STATE OF NEW HAMPSHIRE
SITE EVALUATION COMMITTEE

DOCKET NO. 2015-06

JOINT APPLICATION OF NORTHERN PASS TRANSMISSION, LLC AND PUBLIC SERVICE COMPANY OF NEW HAMPSHIRE D/B/A EVERSOURCE ENERGY FOR A CERTIFICATE OF SITE AND FACILITY

PREFILED DIRECT TESTIMONY OF

DAVID L. TAYLOR, JR., RLA

ON BEHALF OF
COUNSEL FOR THE PUBLIC

December 30, 2016

Qualifications and Purpose of Testimony

Q. Please state your name, position and your employer.

A. My name is David L. Taylor, Jr. I am an Associate Vice President of Dewberry, which is a multi-disciplinary engineering firm with offices in 18 states and headquartered in Fairfax, Virginia.

Q. Please summarize your education background and work experience.

A. I have a Bachelor of Science degree in Landscape Architecture from West Virginia University and a Master of Science degree in Real Estate from Johns Hopkins University. I am a Registered Landscape Architect in Maryland, Pennsylvania, and Ohio.

I have 22 years of experience. I have worked in the energy industry for five years. I have been the project manager for the planning and construction of underground and aboveground utility transmission lines and energy related facilities in the Mid-Atlantic area. In my current position with Dewberry, I am responsible for business and operational development for surveying, engineering, landscape architecture and consulting services in the firm's Baltimore office and throughout the Mid-Atlantic. I work directly with clients in all aspects of program development, feasibility, entitlements, zoning, planning, engineering and permitting. I also coordinate professional resources across many Dewberry offices providing surveying, geospatial, civil engineering, landscape architecture, MEP engineering, structural engineering, planning, zoning and permitting for power/energy, infrastructure, institutional and commercial clients. See my resume attached as Exhibit A.

Q. Have you testified previously before the New Hampshire Site Evaluation Committee or other regulatory bodies?

A. I have not testified before the New Hampshire Site Evaluation Committee. I have testified previously before the Baltimore County, Maryland Hearing Officer and the Baltimore County, Maryland Board of Appeals.

Q. What is the purpose of your testimony?

A. My testimony here discusses the short-term and long-term impacts on New Hampshire’s communities and natural resources from the construction and maintenance of the underground portion of the proposed Northern Pass transmission line project (the "Project").

Impacts from Construction of the Underground Line

Q. Please describe the types of impacts that construction of the underground portion of the Project will have on communities and natural resources?

A. The construction of the underground portion of the Project will have several impacts. Construction of the transmission line will (1) result in increased traffic on public and private roads from many different types of heavy construction vehicles; (2) will cause increased dust/dirt on roads along the route of the Project; (3) will potentially damage roads, particularly local roads that are not designed for high numbers of heavy construction vehicles; (4) will result in lane closures, and in some places road closures, which will cause traffic delays (5) will increase the level of noise, particularly in rural and lightly developed areas; (6) will cause disruption and hardship by road closures and detours in certain areas, lane closures and the loss of parking spaces in business districts; (7) will potentially cause sediment erosion, particularly on unpaved roads; (8) will cause visual impacts from temporary asphalt road patching; (9) will potentially cause impacts to wetlands and water bodies; and (10) along narrow, local roads and along some sections of state highways, the removal of roadside vegetation and trees will alter the look and character of these roads and their surrounding landscapes. See the attached report by Dewberry dated December 30, 2015 (Exhibit B), Dewberry Northern Pass Detour Route Maps (Exhibit C), Dewberry Maps (Exhibit D) and Dewberry Photo Simulations (Exhibit E).

Underground Construction

Q. Please describe the areas of underground construction.

A. There are three areas where the transmission line will be buried: (1) a 0.70-mile segment from Pittsburg to Clarksville; (2) a 7.5-mile segment from Clarksville to Stewartstown; and (3) a 52.3-mile segment from Bethlehem to Bridgewater.

Q. Please describe each of these segments.

A. The 0.70-mile segment is on private property and within the unpaved shoulder along US Route 3 and Beecher Falls Road, and will pass under the Connecticut River. This section will have one (1) Horizontal Directionally Drilled ("HDD") drilling site and one splice vault installed.

The 7.5-mile segment runs along Route 145 for a short distance, then runs underneath or adjacent to three local roads: Old County Road, North Hill Road and Bear Rock Road. This section will have seven (7) HDD and one (1) "jack and bore" ("JB") trenchless drilling sites and twenty (20) splice vaults installed.

The 52.3-mile segment will run adjacent to and underneath state highways: Route 302, Route 18, Route 116, Route 112 and Route 3. This section will have forty-two (42) HDD trenchless drilling sites, one (1) micro tunnel site and 130 splice vaults.

<u>Open Trench and Trenchless Construction</u>

Q. Please describe generally the construction of the underground transmission line by the use of open trench construction.

A. Construction of the underground segments by open trench and trenchless construction will involve the following activities:

1. establish maintenance of traffic controls;
2. stake limits of disturbance;
3. establish erosion and sediment control measures;
4. vegetation clearing and grubbing;
5. stake route alignment, splice vault locations, HDD areas, etc.
6. excavate splice vault locations, perform any blasting of rock or ledge, remove excavation spoils and shore and brace the vault hole;
7. install splice vaults;
8. backfill around splice vaults;
9. excavate open trenches, perform any blasting of rock or ledge, remove excavation spoils and shore and brace the trench;
10. install duct work in open trenches;
11. backfill open trenches;
12. proof the ducts;
13. pull cable through the ducts and into the vaults;
14. splice cable within the underground vaults;

15. temporary road repair;
16. demobilize; and
17. final road repair.

Q. Please describe generally the use of HDD and JB for trenchless construction of the underground transmission line.

A. The Project will primarily use HDD to construct the transmission line under roads and bodies of water. HDD consists of a drilling machine located at one end of the area through which the drill will pass and an exit location at the other end of the drilling area. A drilling machine is used to drill a tunnel underneath the obstacle and then to place the cable and conduit through the tunnel. The Project also will use JB installation for one area where the length of the tunnel is shorter, and it will use a micro-tunnel in Franconia.

Q. How many areas for the Project will require trenchless construction operations?

A. Across all three underground segments there will be fifty (50) drilling operations. There will be forty-eight (48) HDD operations, one (1) JB operations, and one (1) micro-tunnel.

Q. What is the size of the work area of construction for these trenchless operations on the Project?

A. For the Project, the work area for HDD and JB operations vary between 200 feet and 1,650 feet in length. The area for entry pits varies between 21 and 35 feet wide and 300 to 400 feet long, and the area for exit pits ranges between 26 and 44 feet wide and 585 to 1,770 feet long. The depths of the trenchless drilling operations also vary between 27 and 75 feet deep, with many drilling bores passing through bedrock.

Q. What are the work area requirements for open trench construction of the underground sections?

A. For open trench construction, typically two traffic lanes wide are used to excavate and load excavation spoils into a dump truck, and to backfill the trench after the cable is installed. One-lane wide is possible if construction staging is done “end-to-end,” typically for short distances.

Q. What types of equipment is used for open trench construction?

A. The typical open trench construction involves a backhoe or track excavator; dump trucks to haul away excavation spoils and deliver backfill material; concrete trucks to deliver fluidized thermal backfill; flatbed trucks to deliver splice vaults; a crane to install splice vaults; trench boxes to shore up the trench and splice vault holes; soil compactors; steel plates; jackhammers; asphalt rollers; and other equipment.

Q. What additional equipment is used for HDD or JB drilling?

A. A drill rig for HDD or jacking equipment for JB; driller control room; racks of section of drill stem; a crane or excavator; mud cleaning unit; mud mixing tanks; mud pump; frac tanks; dump trucks; flatbed trucks; trench boxes; sheeting and shoring materials; and other equipment.

Q. What is the rate of underground construction for the transmission line?

A. The rate of construction can vary, depending upon the depth of the open trench or the length of the trenchless crossing, the existing soil conditions, the presence of rock or ledge, and the presence of other underground utilities. For open trench construction each crew can install 20 to 100 feet per day. An HDD crossing can take three to eight weeks. A JB can be 10 to 100 feet per day once mobilized.

Specific Constraints and Challenges

Q. Are there any areas along the 0.70-mile segment where the underground construction will be constrained or challenging?

A. Yes. In the 0.70-mile segment, existing vegetation along the road will be removed and the banked-slope area along the road must be regraded. This will require single-lane road closures on Route 3 and Beecher Falls Road. Also, the HDD drilling under the Connecticut River will be a long distance, which will require large work areas for the entry and exit pits. This will require closing the intersection at Route 3 and Beecher Falls Road, as well as single-lane road closures on both sides of the Connecticut River.

Q. What about constraints or challenges along the 7.5-mile segment of underground construction?

A. The local roads in this area are narrow with limited to no shoulder in many places. This section will require seven (7) HDD trenchless drilling operations, one (1) JB operations and the installation of twenty (20) splice vaults. The Applicants plan a rolling work zone up to 1,600 feet in length. There will be lane closures and full road closures along most of this section, with detours around Old County Road, North Hill Road, and Bear Rock Road when those roads are closed.

Q. What about constraints or challenges along the 52.3-mile segment of underground construction?

A. Along the 52.3-mile segment there are several areas where the narrow useable portion of right-of-way, rock and ledge outcrops and numerous HDD drilling locations will cause lane closures, including along Route 18 and Route 116 in Franconia, along Route 116 and Route 112 in Easton, along Route 112 and Route 3 in Woodstock, along Route 3 in Thornton and along Route 3 in Plymouth. In addition, in North Plymouth there are two (2) long HDD drilling operations, one underneath Route 3A (Tenney Mountain Highway) and the other under the Baker River, in an area that has significant vehicle traffic which will likely result in a lengthy construction time, causing impacts.

Also, construction through downtown Plymouth and south of downtown Plymouth will be complicated, slow and cause significant disruption, including the loss of parking and lane closures for an extended period of time, and the detour of traffic around the downtown area of Plymouth.

Impacts on Traffic

Q. Will construction of the underground sections impact traffic?

A. Yes. There will be traffic delays throughout the three underground sections due to road closures and traffic detours, lane closures and the increased traffic from construction related vehicles. For instance, there will be an estimated minimum 19,653 concrete and dump truck deliveries for the open trench construction, with additional concrete truck and dump truck trips for deep trench areas and the 50 trenchless operations. The other construction related vehicles, including flatbed trucks delivering splice vaults, drilling equipment, trench boxes, and other equipment and material; backhoes and excavators; and vehicles for workers will result in increased traffic all along the underground route.

Impact on Roads

Q. In addition to traffic delays, will construction of the underground sections have an impact on the roads?

A. Yes. The construction activity will increase the amount of dirt and dust on roads. It also may cause damage to roads, particularly local roads that are not designed for high volumes of heavy construction related vehicles over many months.

Visual Impacts

Q. Will construction of the underground sections have any visual impacts?

A. Yes. The removal of existing vegetation and trees, particularly along the 7.5-mile section of underground construction, will alter the character of the road and the surrounding landscape. Also, the temporary asphalt road patching will visually impact the appearance of the road. Where existing roads have an older pavement structure, there will be a need for a well-consolidated, permanent patch. Where existing roads have been recently rehabilitated, the roads should be repaved by mill and overlaid methods at a minimum for at least half the road or in some places the entire road or the finished road will not be left in as good a condition as before construction.

Other Impacts

Q. Will construction of the underground sections potentially have other impacts?

A. Yes. The construction activities and construction vehicle traffic will increase the noise level along the route, particularly in rural areas. Also, construction of the underground sections could cause sediment erosion, particularly on unpaved roads, and it could adversely impact wetlands and water bodies if best management practices are not instituted at the beginning of construction and monitored throughout construction for compliance.

Q. Where there aspects of the underground construction that you were not able to assess?

A. Yes. The Applicants' submission did not include sufficient information on the following items for us to assess their impact associated with construction of the underground segments:

1. the location and size of additional laydown areas and staging areas that will be required;
2. the location for the placement of excavation spoils;
3. the location of concrete batch plants;

4. the need for temporary easements;
5. utility designating and test pit data, particularly for the more urban and commercial areas;
6. geotechnical boring along the entire underground route;
7. the protection of cultural resources identified in Easton;
8. detailed traffic control plans with construction sequencing; and
9. detailed erosion and sedimentation control plans with sequencing.

Q. Does this conclude your testimony?

A. Yes.

Exhibits

A. Resume of David L. Taylor, Jr., RLA

B. *Northern Pass Transmission Line: Underground Line Review* report submitted by Dewberry

C. Dewberry Northern Pass Detour Route Map

D. Dewberry Maps -- Aerial maps showing the route, access routes, laydown areas, access points to public roads, fire, police, schools, hospitals, structures in wetland/waterbodies, culturally sensitive areas and HDD start and end locations

E. Dewberry Photo Simulations - Actual and simulations photos for five locations along the underground route

David L. Taylor, Jr. RLA

Associate Vice President

EXPERIENCE HIGHLIGHTS:

Practices Total Project Consulting

Client Manager for all of Dewberry's Exelon/Pepco/BGE commissions

Client Manager and Project Manager for Dewberry's power commissions in Maryland and Washington, DC

EDUCATION:

MS, Real Estate, Johns Hopkins University

BS, Landscape Architecture, West Virginia University

REGISTRATIONS:

Landscape Architect: MD, PA, OH

YEARS OF EXPERIENCE:

Dewberry: 8

Prior: 14

AFFILIATIONS:

Leadership Baltimore County

Maryland Building Industry Association

PUBLICATIONS:

" *Land Development Handbook 3rd ed.;* Chapter 8*"Subdivision Ordinanaces, Site Plan Regulations, and Building Codes"* Published by McGraw-Hill; 2008

Mr. Taylor provides multi-discipline team management/leadership enterprise wide with an emphasis on Total Project Consulting. He is responsible for business and operational development for surveying, engineering, landscape architecture and consulting services in the firm's Baltimore office and throughout the Mid-Atlantic.

As a manager he has a hands-on approach and enjoys working directly with clients in all aspects of program development, feasibility, entitlements, zoning, planning, engineering and permitting. In addition to his core team in Baltimore, David coordinates professional resources across many Dewberry offices providing surveying, geospatial, civil engineering, landscape architecture, MEP engineering, strucutral engineering, planning, zoning and permitting for power/energy, infrastructure, institutional and commerical clients.

RELEVANT EXPERIENCE

Pepco-Buzzard Point/Waterfront Substation Route Study, Washington, D.C.; Project Manager. Project is in SE Washington, DC. Dewberry is exploring potential underground utility corridors for four proposed 138kV transmission line feeders (1,700 LF± each) between an existing substation and proposed substation. This work is being driven, in part, by the potential relocation of a professional soccer stadium. Dewberry is providing base mapping, route surveying, utility data gathering, Level A utility locating, Phase 1 & 2 Environmental Site Assessments, route layouts and analysis, civil engineering, maintenance of traffic plans, conduit plan and profiles, erosion and sediment control, exhibits, DDOT permit processing and general consulting services.

Pepco-Blue Plains Advanced Waste Water Treatment Plant/Naval Research Laboratory/Joint Base Anacostia-Bolling Route Study, Washington, D.C.; Project Manager. Project area includes Blue Plains Advanced Waste Water Treatment Plant, Naval Research Laboratory (NRL) and Joint Base Anacostia-Bolling. To increase reliability and provide redundant power supply to all three facilities Pepco proposes to construct two 69kV underground transmission lines (2,000 LF±) between substation 83 and 168 in SW Washington, DC. Dewberry services inlcude field surveying potential route alignments and assembling existing utility data for water, sewer, storm drain, gas, electric, communications and steam lines, base mapping, analyze potential route alignments, prepare plan and profiles, cross sections, 3D utility visulaization model, traffic control plans, erosion and sediment control, predicitive anylysis for construction equipment vibrations, establishing test pit locations, and permit/approvals coordination with CSX Railroad, Blue Plains, NRL, Joint Base, DC Department of Regulatory and Consumer Affairs (DCRA) and DC Department of the Environment (DDOE).

Pepco-Takoma to Georgetown Route Study, Prince George's County, Maryland and Washington, D.C.; Project Manager. Dewberry is exploring potential underground utility corridors for four proposed 69,000 volt transmission line feeders (41,500 LF± each) routing between four existing substations. Dewberry provided base mapping, route alternatives and recommendations, horizontal alignment plans and client and subconsultant coordination relative to property rights and access, substation and intersection surveys.

Pepco-Capital Crossing Route Realignment, Washington, D.C.; Project Manager. Due to a developer need Dewberry is realigning a 138,000 volt pipe type underground transmission line feeder (450 LF ±) along Massachusetts Ave. Dewberry is responsible for base mapping, route layouts and analysis, civil engineering, pipe-type plans and profiles, exhibits, and client and developer coordination relative to developer design drawings and proposed and existing utilities, and test pitting.

Pepco Champlain Substation MOT, Washington, D.C.; Project Manager. As part of their planned infrastructure upgrades Pepco is replacing older pressurzation plants. In support of this effort at the Champlain substation in NE Washington DC Dewberry prepared maintenance of traffic plans (MOT) for temporary parking restrictions, detours, the closing of a neigborhood road and permitting through DDOT. MOT was necessary for the removal, by crain, and replacement of an existing 8,000 gallon pressurization plant within the substation.

Pepco E. Capitol Street 138kV PTL Repair, Wahsington, DC.; Project Manager. In response to third party contractor damage to an existing pipe-type line, Dewberry provided emergency support services for Pepco in suport of their reparing the line. Services included surveying, collecting geotechnincal samples for testing and exhibit preparation.

Baltimore Gas & Electric LiDAR Specifications & QA/QC, Baltimore, MD.; Client Manager. Dewberry developed specifications and provided independent QA/QC of LiDAR (Light Detection and Ranging) and Imagery collected as part of BGE's ongoing efforts to evaluate and demonstrate compliance of their 800 linear miles of above ground electric transmission lines with the North American Electric Reliability Corporation (NERC). Our services inlcuded review their existing LiDAR acquisition and product deliverables specifications, develop new specifications, review their third party LiDAR vendor qualifications, participate in third party LiDAR vendor interviews and evaluate and rank the potential vendors, check point surveys, general geospatial consulting, quality assessment of LiDAR tiles, completeness check of LiDAR data, quantitative and qualitative assessment of LiDAR data, classified point cloud review, metadata inspection and review of imagery and planimetric maps.

Baltimore Gas & Electric TLCCP, Multiple Counties, MD.; Client/Project Manager. In support of NERC compliance efforts Dewberry is providing above ground transmission line topographic, tower and conductor surveys along with preparing grading, sediment and erosion control plans, and permit expediting for 20 sites in Baltimore, Harford, Frederick and Anne Arundel County.

Potomac River Station C Substation, Arlington County, VA.; Client/Project Manager. In response to Dominion Virginia Power (DVP) connecting a 230kV interconnection to Pepco's system, they will construct a new high side bus to the existing substation at Potomac River Station C, add additional equipment and reconfigure the four existing 230kV underground transmission feeders leading into Station C. The proposed relocation totals approximately 850 linear feet and connects the feeder to the new high side bus. Dewberry is providing routing plans and profiles, laser scanning of substation equipment, boundary and topographic survey, utility designating, test pits, permitting and as-built services.

Pepco- Buzzard to War Substation Survey – Washington D.C. and Arlington County, Virginia; Project Manager. In response to the retirement of two undergound 69,000 volt transmission feeders from Buzzard Point substation within Washington D.C to a termination point in the War substation in Virginia (2 miles LF±) Dewberry located and surveyed 27 manholes so Pepco can remove the cables. Our services included base mapping of manholes, preparing plans showing access points to each manhole, permitting for National Park Service access, subconsultant coordination for utility designation, and client coordination for overall project advancement.

Pepco-Takoma to Burtonsville Permiting, Prince George's County, Maryland; Project Manager. Dewberry provided permitting support for the installation of a 230,000 volt overhead transmission line across 27 road crossings. Our services included base mapping, maintenance of traffic plans, and client coordination relative to permit agencies, contractor and overall project advancement.

Pepco- Substation Decommissioning Surveys, Prince George's County Maryland and Washington, D.C.; Project Manager. Due to the decommissioning of seven (7) substations within Washington, D.C and Maryland Dewberry surveyed each substation to be used as a base for the subquent razing of each facility. Our services included base mapping and survey and client coordination for overall project advancement.

Mattawoman Energy 230kV Generator Lead Line and Switch Yard, Prince George's County MD; Project Director/Manager. In support of Mattawoman's proposed 839-megawatt combined cycle power plant Dewberry is providing surveying, civil engineering, electrical engineering, geotechnical engineering, structural engineering, routing, land acquisition, easements, forest conservation, exhibits, permitting and consulting services for 2.5 miles of 230kV overhead transmission line on mono-poles and associated switch station which will connect to Pepco's existing Burches Hill Substation. Coordiantion with SMECO is also required for the relocation of existing overhead distribution lines along the existing CSX railroad.

Pepco Wye Mills Substation, Queenstown, MD.; Client/Project Manager. Pepco constructed a new 138kV underground transmission line within the Wye Mills substation. Dewberry provided survey and mapping, routing plans, profiles, utility designating, test pits, erosion and sediment control, TL drawings, permitting, as-builts, construction stakeout and general consulting services.

Pepco Indian River Substation, Dagsboro, DE.; Client/Project Manager. Pepco constructed a new 138kV underground transmission line within the Indian River substation. Dewberry provided survey and mapping, routing plans, profiles, utility designating, test pits, erosion and sediment control, TL drawings, permitting, as-builts, construction stakeout and general consulting services.

Pepco Easton Substation, Easton, MD.; Client/Project Manager. Pepco constructed a new 138kV underground transmission line within the Easton substation. Dewberry provided survey and mapping, routing plans, profiles, utility designating, test pits, erosion and sediment control, TL drawings, permitting, as-builts, construction stakeout and general consulting services.

Pepco Takom to Sligo Substation 69kV Underground TL, Prince George's County and Montgomery County, MD and Washington, DC.; Pepco is planning to construct four (4) new 69kV transmission lines in two (2) 8-way duct banks approximately 3.5 miles traveling from the existing Takoma Substation #27 in Prince George's County, MD to Sligo Substation #9 in downtown Silver Spring, MD. Dewberry is providing survey/mapping, route planning, plan and profiles, geotechnical engineering, community outreach, traffic control plans, erosion and sediment control, permitting, construction stakeout, as-builts and construction administration/RFI services.

Dewberry

Northern Pass Transmission Line: Underground Line Review

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December 28, 2016

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PURPOSE OF REVIEW

Dewberry has been retained to provide Consulting and Technical Analysis to Counsel for the Public in the proceedings for the Application of Northern Pass Transmission Line before the Site Evaluation Committee (SEC) (Docket No. 2015-06) for a certificate of site and facility pursuant to RSA c. 162-H (the "Application"). The Application entails 192 miles of 320kV HVDC and 345kV AC overhead and underground transmission line (and related facilities) extending from the international border between Canada and Pittsburg, NH to Deerfield, NH (the "Project"), essentially bisecting the state (see Figure 1). Review and technical analysis of the Application is necessary to determine soundness of design, and determine impacts of construction on New Hampshire communities and natural resources.

The purpose of this report is to review the Underground Transmission Line segments of the Northern Pass Project and identify short-term and long-term impacts on New Hampshire communities and natural resources. In order to understand the Application Dewberry has reviewed the following documents provided by the Applicants.

Figure 1: Project Route

Documents Reviewed

1. Application of Northern Pass Transmission LLC and Public Service Company of New Hampshire d/b/a Eversource Energy, (the "Applicants") for a Certificate of Site and Facility to construct a new high voltage transmission line and related facilities in New Hampshire;
2. The pre-filed testimony of (a) James Muntz; (b) William Quinlan; (c) Samuel Johnson; (d) Jerry Fortier; (e) Derrick Bradstreet; (f) Nathan Scott; (g) John Kayser; (h) Lynn Farrington; (i) Jacob Tinus (j) Lee Carbonneau; and (k) Douglas Bell;
3. Appendixes 1-10, 31, 32, 34, 39 and 47;
4. Project maps, February 2016 revision;
5. The Applicants' Responses to Counsel for the Public's Expert-Assisted Data Requests and Interrogatories-Set1;
6. An evaluation of all UG alternatives for the Northern Pass Transmission Project;
7. White Mountain National Forest (WMNF) Underground Alignment, DOT Sample Permit Package, dated October 21, 2016;
8. Route 3 (RTO3) Underground Alignment, Permit Package-NH DOT District 1, dated November 30, 2016;
9. Northern (NRTH) Underground Alignment, Permit Package-NH DOT District 1, dated November 30, 2016;
10. Rocks Estate Bypass (Rock) Underground Alignment, Permit Package –NH DOT District 1, dated December 7, 2016;
11. SHEBS Estate Bypass (SHEB) Underground Alignment, Permit Package-NH DOT District 1, dated December 8, 2016;
12. White Mountain National Forest (WMNF) Underground Alignment, Permit Package-NH DOT District 1, dated December 13, 2016;
13. Woodstock to Bridgewater-Route 3(WBR3), Permit Package-NH DOT District 3, dated December 7, 2016;
14. Documents produced by the Applicants in response to data requests, requests made at technical sessions, and informal requests.

Site Visits

In addition to documents reviewed, four Dewberry team members –Brenden Alexander, PE, Chris Petrocelli, PE, David Taylor, RLA and Adam Zysk, PE - visited the Project area on August 3, 2016 and August 4, 2016. During the first day Dewberry was accompanied by members of the Applicants' team, and by Rusty Bascom (ECE), and by Thomas J. Pappas, Esq. (Primmer Piper Eggleston & Cramer) and Peter Roth, Esq., Counsel for the Public. Field reviews started at the northern end near the Canadian border in Pittsburg and continued south to the Deerfield substation. For overhead segments of the proposed transmission line route, field review was limited to public road access where overhead line crossings are proposed and at various substation, and transition station locations. The entire length of the underground transmission line route was driven and included numerous field walks. On August 17, 2017, Adam Zysk, PE made a field visit to observe ongoing geotechnical work being performed by the Applicants in multiple locations. On September 13, 2016, David Taylor, RLA revisited numerous areas along the Northern Pass route from Plymouth south to the Deerfield substation, accompanied by Mr. Roth in the Plymouth area. During each field visit existing condition photos were taken for both overhead and underground segments of the Project area.

Technical Information Sessions

Three Dewberry team members – Brenden Alexander, PE, David Taylor, RLA and Adam Zysk, PE – attended a construction technical session with the Applicants' team on September 12, 2016 and two team members – David Taylor, RLA and Adam Zysk, PE – attended a second technical session on September 14, 2016.

Many points of clarification were shared by the Applicants' team regarding the Project including a breakdown of the construction and engineering/design team going forward. This is relevant as new firms will be involved with advancing the Project design and engineering beyond the 30%+/- stage submitted as part of the SEC Application filing, particularly for the underground segments. Burns & McDonnell will remain the lead engineer for all overhead transmission line segments.

John Kayser advised that his role as manager for construction will transition to Quanta Services (Quanta) who will be General Contractor for the Northern Pass Project. PAR Electrical Contractors (PAR), a subsidiary of Quanta will serve as overhead transmission line contractor for the Project and underground items such as open trench and trenchless construction. PAR will also subcontract separate firms for underground open trench design (SGC Engineering), underground trenchless design (Brierley Associates), and overhead transmission line design (Burns & McDonnell). ABB, a specialty contractor, will be retained directly by Northern Pass for construction of the underground transmission line and the Franklin converter station.

It was noted that Quanta is currently doing preliminary analysis for staging areas, laydown areas and access routes necessary to construct the Project, which may include additional areas beyond those shown on the SEC Application documents, especially in the southern half of the Project. The potential for additional staging and storage areas is also noted in the Applicants' responses 1-57 of Applicants' Responses to Council for Public's Expert-Assisted Data Requests and Interrogatories-Set1.

Per Mr. Kayser's pre-filed direct testimony "temporary storage areas/construction laydown yards are typically previously disturbed large paved or gravel surface lots 5 to 50 acres in size. These areas are used for the long-term storage of construction materials such as structural steel, conductor and any other major type of equipment. Staging areas are much smaller in size and are used to stage construction material for the upcoming weeks. Typical staging areas are less than two acres in size." Given the potential need for additional staging and laydown areas beyond those submitted with the Application there is insufficient information to fully assess the impacts that these areas, which can be quite large, may have on New Hampshire communities and natural resources.

Construction sequencing for underground transmission lines was described by the Applicants as six general steps. It was estimated that on average 20 feet to 100 feet of underground transmission line in open trenches can be constructed per day/per crew, with 6-10 trench crews working concurrently. For trenchless construction two weeks was estimated for each horizontal bore (jack and bore, and micro-tunneling) and three to four weeks per horizontal directional drill (HDD), with a lower range of 2.5 weeks and an upper range of five weeks. These time frames would include mobilization and demobilization. Applicants have indicated that work crews are anticipated to work six days per week, from 7:00 a.m. to 7:00 p.m. Evening work hours were also noted as a possibility in more commercial areas, like Plymouth.

The need for blasting rock is expected along the underground route, although exact locations were not discussed and are pending geotechnical boring results. Blasting will occur slightly ahead of trenching operations, with pre and post blast surveys performed by the Applicants' contractor. Blasting will be performed per a blasting plan that will be prepared by the Contractor. At this time blasting plans are not available for review. The Applicants noted that they would alert communities in advance of blasting, although the timing for advance notice and methodology was not described.

Construction sequencing along the Project was not provided and was noted as being heavily dependent on Contractor means and methods, however, the Applicants noted that construction of the Converter Terminal in Franklin is a critical path item and will start first. Due to FAA permit time limits, construction of overhead transmission lines in the Concord area were also described as important for construction scheduling in that area.

The Applicants noted that the construction of temporary concrete batch plants is not currently being considered. Concrete trucks will pick up and deliver concrete from existing concrete batch plants located along the Project route. Subsequent to the September technical sessions Applicants' plans call for fluidized thermal backfill, which is a form of concrete, for filling the trenches. Locations of the existing concrete batch plants were not identified so we could not assess the capacity of the batch plants or potential travel, noise and dust impacts associated with them.

UNDERGROUND TRANSMISSION LINES

Underground transmission line projects entail five major buckets: (1) financing, (2) property rights, (3) entitlements/engineering, (4) construction, and (5) operations/maintenance. Each is comprised of many steps which often advance concurrently as one step can influence the other. Engineering and construction of underground transmission lines include the following steps and generally follow this sequence, although as noted above many steps will occur concurrently or may be combined.

- <u>Engineering</u>
  - Route analysis / matrix
  - Survey/Subsurface Utility Designating Level C-D
    - Level D – review of readily available public data including utility plans and as-built plans to determine presence of existing utilities and easements.
    - Level C – field survey of existing surface features and inverts for wet utilities such as storm drains and sanitary sewer. In some instances aerial mapping and/or LiDAR is used for more rural, open areas with detailed field survey used to supplement areas requiring more detail for design. For example culverts, bridges and road intersections.
  - Horizontal route alignment – 30% design
  - Survey/Subsurface Utility Designating Level A-B
    - Level B – utility designating to identify horizontal location of underground utilities such as water lines, gas lines, telecommunications, electric, fiber optic, steam, etc. At this stage utility locations are "painted" on the ground and the paint marks field surveyed. This level of survey is common in locations where the proposed transmission line alignment is in more commercialized and urban areas or in known underground utility congestion areas (<u>see</u> Figure 2).
    - Level A – often referred to as "test pitting," Level A entails physical excavation to the top, side, bottom or all sides of an existing utility for visual identification and measurement. This level of survey is common in locations where the proposed transmission line alignment will cross existing utilities and in particular in more commercialized and urban areas. Test pits can be done through a ~12 inch hole with a vacuum truck (<u>see</u> Figure 3) or with 3 foot x 3 foot excavations by hand or mechanically (<u>see</u> Figure 4).
  - Geotechnical soil borings
  - Horizontal / Vertical route alignment -60%,90%, IFC
  - Maintenance of Traffic- 60%, 90%, IFC
  - Erosion and Sediment Control- 60%, 90%, IFC

Figure 2: Utility designating Level B (photo by Accumark)

Figure 3: Utility designating Level A- vacuum excavation (photo by Accumark).

Figure 4: Utility designating Level A- hand dug test pit.

- <u>Construction</u>
  - Establish maintenance of traffic controls
  - Stake limits of disturbance
  - Establish erosion and sediment control measures
  - Vegetation clearing and grubbing
  - Stake route alignment, vault locations, HDD areas, etc.
  - Construct underground vaults
  - Install duct work- open trench excavation and trenchless installation
  - Proof the ducts
  - Pull cable through the ducts and into the vaults
  - Splice cable within the underground vaults
  - Temporary road repair
  - Demobilize
  - Final road repair

Northern Pass has three separate underground transmission line segments: (1) 0.70-mile segment between Transition Station No. 1 in Pittsburg and Transition Station No. 2 in Clarksville; (2) 7.5-mile segment between Transition Station No. 3 in Clarksville and Transition Station No. 4 in Stewartstown; and (3) 52.3-mile segment between Transition Station No. 5 in Bethlehem and Transition Station No. 6 in Bridgewater.

Construction Methods – Underground Transmission Lines

Applicants have submitted five underground alignment Permit Packages NH DOT District 1, and one Permit Package NH DOT District 3 covering all of segments from above and a DOT Sample Permit Package for a portion of the third and largest segment (each labeled Preliminary Not for Construction). The DOT Sample Permit Package has been superseded by the more detailed permit packages. The plans show horizontal alignment in plan view, vertical alignment in profile, cable trench details, splice pit details, trench and utility details, erosion control details, traffic control typical details, trenchless crossing plans, profiles and work space requirements. Construction of the underground transmission line segments are broken into two types- open trench and trenchless. Each type of construction will require different equipment set up, construction space, personnel and duration of construction as shown in the chart below.

Item	**Construction Method**		
	Open Trench (see Figure 5A and 5B)	**Trenchless: HDD** (see Figure 6,7,8)	**Trenchless: Jack and Bore** (see Figure 9)
Major Equipment	• Back hoe or track excavator; • Dump truck to haul away excavation spoils; deliver asphalt, stone or other approved backfill material; • Concrete truck to deliver backfill-concrete, fluidized thermal backfill, lean concrete; • Crane for lifting and placing precast concrete splice vaults; • Flatbed truck; • Soil Compactors; • Trench boxes; • Steel plates; • Pickup trucks; • Asphalt roller; • Jack hammer and compressor; • MOT and SEC measures; • Generators.	• Drill rig; • Driller control room; • Racks of section of drill stem; • Crane or excavator to add/remove drill stem on drill rig; • Mud cleaning unit; • Mud mixing tanks; • Mud pump; • Frac tanks; • Drilling mud; • Dump truck or roll-off type dumpster to collect spoils; • Generator or other power supply; • Equipment storage boxes.	• Jacking equipment; • Crane or excavator to excavate pits and lower jacking equipment and casings into pit; • Dump truck to haul away excavation spoils; • Flatbed truck for materials delivery; • Trench boxes, sheeting and shoring materials;
Footprint	• Typically two traffic lanes wide to accommodate side loading of excavation spoils into a dump truck by excavator; • One lane wide is possible if construction staging is done "end-to-end. Typically for short distances.	• Configured to the work space available and can vary greatly, from 20-30 feet wide and 300-600 feet long for linear projects; • 10-30 foot wide laydown area generally equal in length to the length of the HDD crossing for pipe laydown at receiving end of HDD.	• Configured to the workspace available and can vary greatly with 20'L x 10'W or larger pit on either side of the crossing, although; • Can vary considerably based on size of equipment used, depth of pits, existing soil conditions and presence of rock;
Rate of Construction	• ~20 to 100 feet/day, per crew, although; • Can vary considerably depending on depth of trench, existing soil conditions, rock and presence of existing underground utilities.	• 3-8 weeks per HDD crossing, although; • Can vary considerably depending on length of crossing, depth of crossing, existing soil conditions, and presence of rock.	• ~10-100 feet/day, although; • Can vary considerably depending on depth of crossing, length of crossing, existing soil conditions, and presence of rock.

Figure 5A: Example excavator used for trenching.


Figure 5B: Example of steel plates over open trench, traffic control cones and flagger for directing traffic.

Figure 6: Example HDD drill rig and equipment set up in public right-of-way.

Figure 7: Example HDD drill rig and equipment set up in public right-of-way.

Figure 8: Example HDD equipment set up in public right-of-way.

Figure 9: Example Jack and Bore set up with 20'W x 40'L x 20'+D pit. Pit maintained with trench boxes. Steel casing in middle ground and jacking rig in lower foreground.

UNDERGROUND CONSTRUCTION - OPEN TRENCH

Open trench construction is proposed in all three underground segments of the Northern Pass Transmission Line route. In each segment open trench construction will occur inside public road right-of-way or on private property outside of the public right-of-way.

0.70-Mile Underground Segment – Pittsburg to Clarksville

Trench centerline placement in the 0.70-mile segment between Pittsburg and Clarksville is on private property or outside of the roadbed within the unpaved shoulder except for one area of public road crossing on Beecher Falls Road. Along the southern side of Beecher Falls Road and RT3 (the primary road connecting Pittsburg and New Hampshire's Canadian border crossing with points south) where open trench construction will take place, partial road closures will impact local traffic patterns and alter the look and character of the road when construction operations remove existing roadside vegetation (see Figure 10). One splice vault (34'-2"L x 7'-10"W) will be installed outside of the roadbed along the eastern edge of RT3, south of the Connecticut River Bridge.

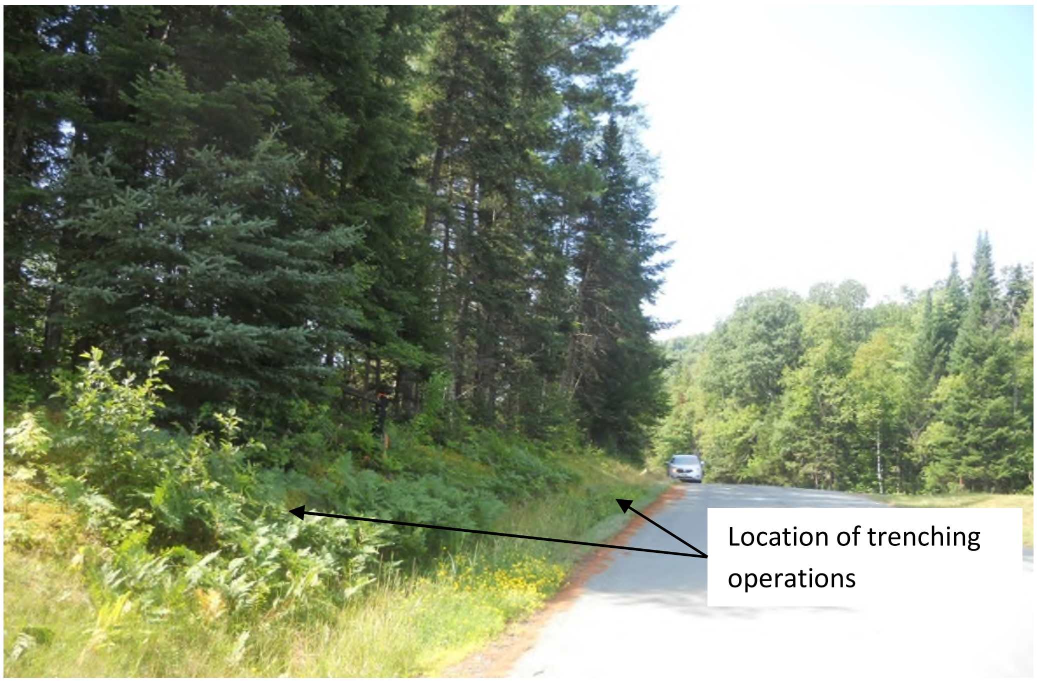


Figure10: Open trench construction along Beecher Falls Road, existing vegetation to be removed and bank slope graded.

7.5-Mile Segment – Clarksville to Stewartstown

In segment two between Clarksville and Stewartstown the trench centerline is proposed within the existing roadbed except for a small stretch along the western edge of RT145 leading up to Old County Road. Some tree clearing and permanent vegetation management will occur along the underground route from Transition Station No. 3 up to RT145 right-of-way (approximately 2,600 linear feet). Old County Road and North Hill Road are narrow gravel roads, as is Bear Rock Road in places, with little or no shoulder (see Figure 11 and 12), adjacent steep slopes, adjacent vegetation, wetlands, structures and cemeteries proximal to the road bed. Open trench construction along these roads will impact local traffic patterns during construction (see Dewberry, Northern Pass Detour Route Map) and alter the look and character of these roads when construction operations remove existing roadside vegetation. Remedial repairs for existing driveway entrances, culverts, mailboxes, and other items within the public right-of-way should be expected. Twenty splice vaults (34'-2"L x 7'-10"W) will be installed along the 7.5-mile segment, nineteen of which will be within the road bed. One will be placed on private property between Transition Station No. 3 and RT145. Vault placements are approximately 1,700 to 2,250 feet apart. Vault spacing is primarily a function of cable pulling tensions and maximum cable length available per reel during shipping.

Figure 11: Old County Road – narrow roadbed with vegetation and steep slopes adjacent to road. Trenches and splice vaults to be installed within the roadbed.

Figure 12: North Hill Road-narrow roadbed with vegetation and steep slopes adjacent to road. Trenches and splice vaults to be installed within the roadbed.

52.3-Mile Segment – Bethlehem to Bridgewater

Trench centerline placement in this segment is generally at the road edge or just outside the road edge within the public right-of-way. In North Woodstock the trench centerline is under existing sidewalk as well as within the roadbed (see Figure 13). Remedial repairs for existing driveway entrances, sidewalks, curbs, mailboxes, and other items within the public right-of-way should be expected throughout this 2.58-mile section.

Figure 13: North Woodstock-trench centerline will be located under sidewalk area outside of roadbed.

Splice Vaults

130 splice vaults (34'-2"L x 7'-10"W) will be installed along the 52.3-mile segment generally outside the roadbed with a few partially in the roadbed. See Figures 14, 15, 16, 17 for examples of vault construction and placement.

Figure 14: Trench box materials and perimeter sediment and erosion control measures.

Figure 15: Excavator digging pit to prepare for trench box placement for concrete vault installation.

Figure 16: Crane hoisting concrete vault (~30'L x 8'W x 8'D). Compactor (yellow and black) is to the right in the photo. Excavator is to the left in the photo.

Figure 17: Precast concrete vault after placement inside trench box. Excavator is in the background.

<u>PVC Duct Banks</u>

Along all underground segments of the transmission line route two, 8 inch PVC schedule 40 ducts (<u>see</u> Figure 18) and two, 2 inch schedule 40 PVC ducts will be installed in trenches ranging from 4 feet 3 inches deep to roughly 32 feet deep in the 7.5-mile segment at North Hill Road in Stewartstown. Multiple width trenches are proposed on the plans. Trenches that are less than 5 feet deep will have a 2 foot 9 inch wide surface trench, 5-8 foot deep trenches may have a 5 foot wide surface trench, and 8 foot plus deep trenches may have a surface width of 6 feet. It should be noted that trench width may vary based on soil conditions encountered during construction, and that trench width in the field is not indicative of the full work zone width needed to accommodate construction equipment and materials staging. Greater trench width would likely require additional work space for construction, sediment and erosion control, and traffic control measures. For example, a planned one lane closure area could increase to a temporary road closure with detour.

Figure 18: Example of 8 inch PVC duct bank.

Trench Spoils and Fluidized Thermal Backfill

Fluidized thermal backfill (FTB) and lean concrete are proposed for backfill along the entire open trench portions of the alignment (see Figure 19). This is a deviation from the earlier cross sections submitted as part of the NPT Project Maps Preliminary Design, February 2016 Revision where approved native soil backfill was an option for the upper layer of the trench, above the concrete cap for mechanical protection. FTB is a low strength concrete (100-250 psi) used as backfill around the duct banks that can be broken up with a backhoe if needed. It also has specific thermal properties which allow it to dissipate heat from the underground transmission line. Lean concrete, which is proposed for a six inch layer between the conduits and upper backfill is stronger than fluidized thermal backfill (but not as strong as concrete used for foundations at ~3,000 psi).

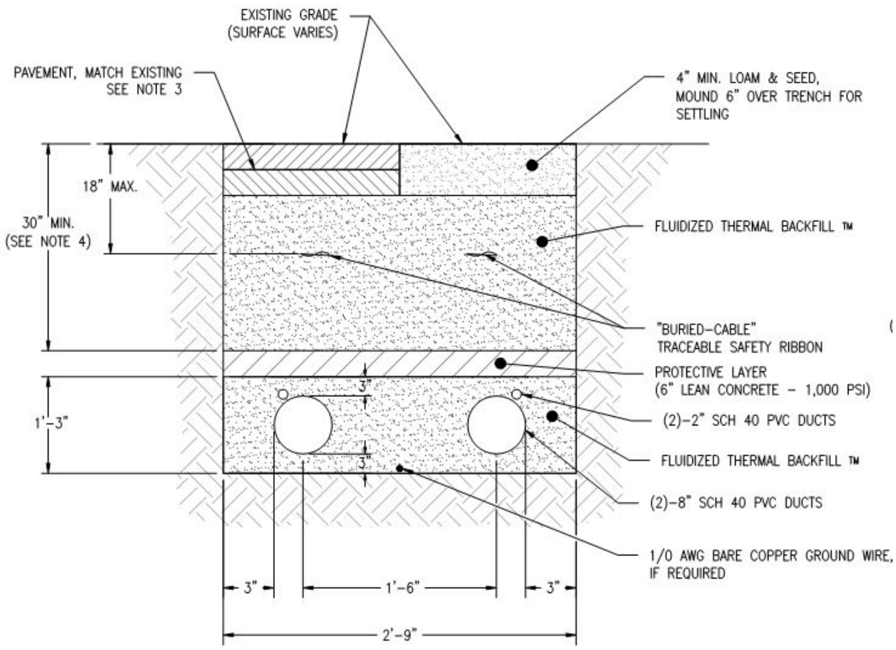


Figure 19: Type 1 - ±320kV Cable Trench Cross Section from Applicants' submission for minimum depth trenches.

There are benefits to using FTB during construction in addition to its thermal properties. For example the need for compaction of native soil backfill in lifts is eliminated, it fills all voids around the ducts, and can be ready for cover the next day, which can allow construction operations to advance more quickly. There are drawbacks as well- more dump truck and concrete truck trips on public roads will be necessary due to the need for removal of all native soil and additional FTB volume. The minimum general order of magnitude for concrete truck deliveries and dump truck trips for native soil removal in open trench areas is in the table below.

Open Trench Construction: Estimated Minimum Concrete Truck deliveries and Dump Truck Trips for Native Soil Removal

Item	0.70-Mile Segment – Pittsburgh to Clarksville	7.5-Mile Segment – Clarksville to Stewartstown	Full 52.3-Mile Segment – Bethlehem to Plymouth	Estimated Minimum Deliveries / Trips
Concrete Truck Deliveries	109	1,438	9,371	10,918
Dump Truck Trips for Native Soil Removal	87	1,151	7,497	8,735
Total	**196**	**2,589**	**16,868**	**19,653**

Assumptions:

1. Concrete trucks average 8 CY per load. Dump trucks average 10 CY per load.
2. A minimum of 8.7 SF of FTB and lean concrete is required for minimum depth open trench construction per Type 1 - ±320kV Cable Trench Cross Section from Applicants' submission.
3. Truck trips noted above exclude any requirements necessary for trenchless construction operations.
4. Additional concrete truck deliveries and dump truck trips for construction rework and trench depth beyond 4 foot 3 inches will be required.

Figure 20: Example concrete truck and dump truck.

Based on the estimated number of dump truck trips from above we estimate that open trench construction will generate a minimum of ~87,000 cubic yards of trench spoils. Finding a final home for this volume of soil removed during trenching is something that will need to be determined. The Applicants' submission does not include information on locations for trench spoils displacement.

Trench Boxes

A number of areas along the underground transmission line route will require trench excavation that is deeper than the ±320kV Type 1 Cable Trench Cross Section shown on the more detailed plans submitted by the Applicants. Deeper open trench sections are typical for areas where the transmission line will go under existing utility infrastructure or dive deeper to align with vault placement or jack and bore crossing depths. For example, the jack and bore crossing below the existing 8 foot CMP in North Hill Road (as shown on sheet NRTHC117 of Northern (NRTH) Underground Alignment, Permit Package-NH DOT District 1, dated November 30, 2016) will require trench excavation of ~32 feet deep for the duct work. For trenches with a depth between 5 feet to 8 feet the upper trench excavation width proposed is a potential maximum of 5 feet. For deeper trench- over 8 feet deep- the upper trench width is proposed to be a potential maximum of 6 feet (see Figure 21).

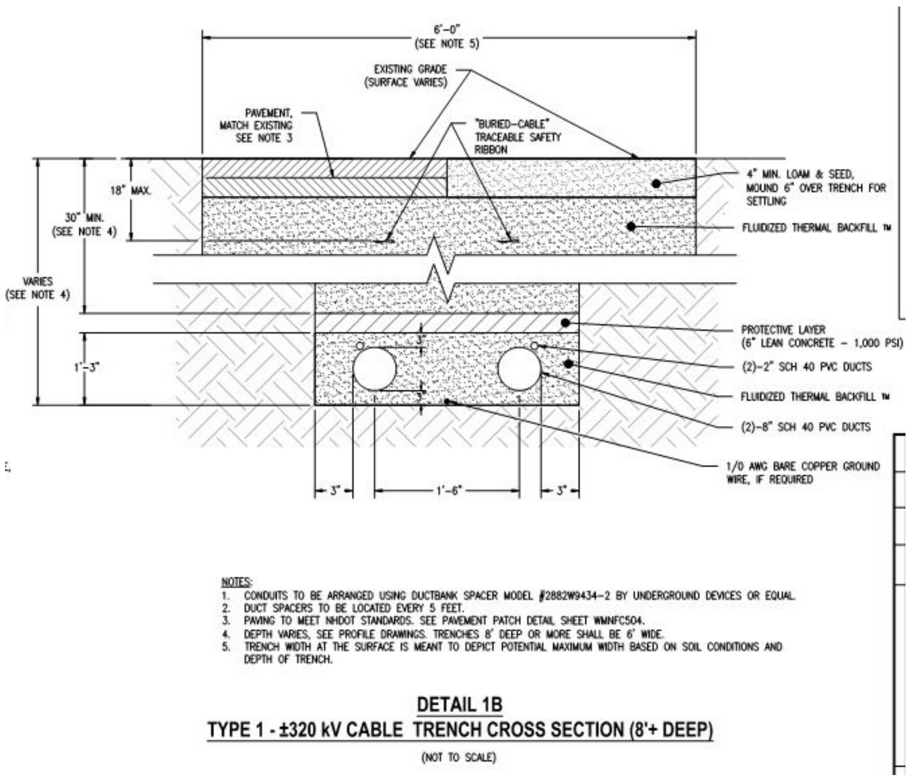


Figure 21: Type 1 - ±320kV Cable Trench Cross Section (8'+ Deep) from Applicants' submission.

In areas of the Project where soil collapse or cave in may occur, or OSHA or other safety regulations require it, trench boxes or shoring may be used to support the sides of the trench excavation while the ducts are installed (see Figure 22 and 23). In more commercial and urban areas trench boxes may also be used to keep trench widths to a minimum. Steel plates are typically used to cover open trenches during off work hours (see Figure 24). In locations where the underground transmission line will be installed in proximity to existing utility infrastructure a 2 foot minimum separation is proposed by the Applicants. In these situations the need for bracing may be needed as well to support existing utility infrastructure that is above the proposed transmission line (see Figure 25 and 26).

Road Repair

After open trench areas have been backfilled temporary asphalt patch will be placed in road bed areas (see Figure 27). During the technical information session on September 12, 2016 the Applicants indicated final asphalt pavement would be put down in road beds approximately one year after the temporary pavement is installed. In more commercialized and urban areas of the underground rout where shops and pedestrian activity is more prevalent the temporary asphalt pavement will be a visual impact that remains after the primary construction is complete and until final pavement is installed (see Figure 28).

Figure 22: Example of open trench construction in urban setting with trench boxes and steel plates set aside for daily work.

Figure 23: Example of open trench construction with one lane traffic closure adjacent to trench outside of road area. Excavator, dump truck, trench box, steel plates, generator and traffic barrel shown.

Figure 24: Example of steel plates covering open trench work at the end of work day.

Figure 25: Example of open trench construction with shoring and bracing around existing storm drain to allow underground transmission line to traverse under the existing utility. Excavator is shown in the background.

Figure 26: Example of shoring and bracing for existing underground utility above proposed underground transmission line alignment.

Figure 27: Example of temporary asphalt being placed at open trench construction.

Figure 28: Example of temporary asphalt patch at vault and duct bank trench within roadbed.

UNDERGROUND CONSTRUCTION - TRENCHLESS

Along the proposed underground route there are a number of locations where open cut trenching is not possible. These locations include bridges over roads or larger water bodies and large culverts at stream crossings. In these areas the Applicants propose to use one of two methods to install the transmission cables without opening a continuous shallow trench. The proposed methods are horizontal directional drilling (HDD) and jack and bore (JB) installation. Jacking and boring is generally used in locations where deep passes must be made and where there are fairly small work areas at each end of the installation. Horizontal directional drilling can be shallow (4 feet below grade) or may extend well below grade. For the Project HDD are used for deep installations of 33 to 70 feet below grade. Due to the depths and lengths being proposed for the Project, large work areas are necessary at either end of the installation.

Jacking and boring is generally used in locations where short (<350 ft.), deep installations are required. This method requires fairly small work areas at each end of the installation. Horizontal directional drilling can be shallow (4 feet below grade) or may extend well below grade. For the Project, HDD is used for longer (>350 ft.), deep installations of 30 to 75 feet below grade. Due to the depths and lengths proposed for the Project, large work areas are necessary at either end of the HDD installation.

Micro-tunneling is also proposed at one location. This process is similar to the jack and bore process except that, for this application, a single large diameter casing is proposed instead of two smaller diameter casing pipes. During the installation, support of the face of excavation at the leading end of the casing may be provided to keep granular soil from collapsing into the pipe and potentially causing settlement above the installation.

HDD

Horizontal directional drilling consists of a drilling machine located at one end of the area where the underground line will run. The drilling machine uses a series of connected sections of drill rod (the drill string) that is inserted at a typically shallow angle into the ground. The cutting head drills a small diameter pilot hole downward at a consistent angle until the desired depth is reached. At this point the drill head is steered to a horizontal direction for the required distance. The head is then steered upward until it meets the ground surface on the other side of the obstruction. It may exit the ground into a pre-excavated pit or just simply emerge from the ground. The drill head may also be steered horizontally to follow a curving alignment. Any curves steered by the drill head, whether horizontal or vertical, need to have a large radius to be practical.

For the Project, once the pilot hole is complete, a larger diameter reamer is attached to the drill string and pulled in reverse back through the pilot hole to open the hole to a large enough diameter to install the casing pipe. The casing pipe is attached behind the reamer and fed into the enlarged hole as the reamer is pulled back through it until it emerges from the beginning point. Both ends of the casing will be connected to the casing in open trenches at either end of the alignment and the cables will be pulled into the casing.

Jack and Bore

Jack and bore installation consists of the excavation of two pits, one at either side of the obstacle. One pit will be the jacking pit where the work will originate from and the other will be the receiving pit. In the jacking pit one or more hydraulic jacks will be set up to exert force in a generally horizontal direction. A section of pipe with a cutting edge on it will be pushed into the sidewall of the pit by the jack(s). As the pipe moves through the soil, displaced soil will be removed out through the pipe that is in place. When the jacks reach the limit of their extension they are withdrawn, another section of pipe is placed behind the first section and both pieces are jacked forward. This process continues until the pipe exits the side wall of the receiving pit.

Should ledge be encountered, either at the start or during the jacking process, a rock coring machine will be used to cut through the ledge to allow the pipe to advance. This process is limited to a straight alignment based on whatever orientation the first pipe is set at. Due to this limitation, the pits are typically quite deep as the jacked pipes need to be at the lowest elevation required to clear the obstacle.

One item that is not indicated in the submitted plans is the method of connecting the shallow length of conduit (installed in the open trench) to the ends of the installed casings in the JB pits. Among the possible options to accomplish this are deep open trenches or short sections of HDD. Excavating deep open trenches would take less overall time to complete but require large excavators to reach the necessary depth and trench boxes. In addition, it is unclear how the fluidized thermal backfill would be contained in a steeply sloped trench. Short sections of HDD would not require the fluidized thermal backfill but would take longer to complete due to the increased complexity of the process.

Both of these processes have potential impacts that need to be addressed. These include:

1. Area requirements at each location;
2. Time of construction at each location;
3. Right of Way limitations at some entry points;
4. Potential environmental impacts.

Across all underground segments the Applicants propose fifty separate trenchless operations, between ~200 feet and ~1,650 feet in length. Two shorter bores are proposed- 200 feet and 340 feet- which will either be jack and bore, or micro tunneling. A dual 18 inch jack and bore is proposed in Stewartstown on North Hill Road. Micro tunneling of a single 36 inch bore is proposed in Franconia under the Gale River. HDD entry pit work areas are 21-35 feet wide and 300-400 feet long. HDD exit pits work areas are 26-44 feet wide and 585-1770 feet long. Maximum depth of trenchless operations vary between 27-75 feet deep, with many bores passing through bedrock (see Trenchless Operations Chart below).

Trenchless Operations Chart

HDD#	Town	HDD Length (Approx. LF)	No. of Bores	Max Depth (Approx. Ft)	Work Areas (Approx. Ft)
RTO3	Pittsburg/ Clarksville	988	2	45	27'x400' (Ent.) 27'x1040' (Ext.)
1	Clarksville	800	2	43	27'x300' (Ent.) 27'x820' (Ext.)
2	Stewartstown	702	2	45	21'x300' (Ent.) 27'x718' (Ext.)
3 (jack and bore)	Stewartstown	200	2	27	28'x300' (Ent.) 20'x150' (Ext.)
4	Stewartstown	650	2	33	29'x300' (Ent.) 27'x670' (Ext.)
5	Stewartstown	650	2	35	22'x300' (Ent.) 27'x670' (Ext.)
6	Stewartstown	607	2	38	20'x300' (Ent.) 27'x624' (Ext.)
7	Stewartstown	600	2	37	30'x300' (Ent.) 27'x620' (Ext.)
10	Bethlehem	710	2	33	27'x330' (Ent.) 27'x750' (Ext.)
11	Sugar Hill	790	2	37	27'x330' (Ent.) 27'x823' (Ext.)
12	Sugar Hill	545	2	37	27'x330' (Ent.) 27'x585' (Ext.)
13 (micro tunnel)	Franconia	340	1	35	30'x106' (Ent.) 30'x315' (Ext.)
14	Franconia	650	2	35	27'x330' (Ent.) 27'x667' (Ext.)
15	Franconia	1,600	2	45	27'x330' (Ent.) 27'x1,635' (Ext.)
16	Franconia/ Easton	790	2	47	27'x330' (Ent.) 27'x815' (Ext.)
17	Easton	800	2	53	27'x330' (Ent.) 27'x818' (Ext.)
18	Easton	655	2	55	27'x330' (Ent.) 27'x818' (Ext.)
19	Easton	1,215	2	40	27'x330' (Ent.) 27'x1,275' (Ext.)
20	Easton	900	2	53	27'x330' (Ent.) 27'x1,070' (Ext.)
21	Easton	695	2	55	27'x330' (Ent.) 27'x731' (Ext.)
22	Easton	1,650	2	65	27'x330' (Ent.) 27'x1,770' (Ext.)
23	Easton	750	2	45	32'x300' (Ent.) 27'x774' (Ext.)
24	Easton	750	2	53	33'x330' (Ent.) 27'x780' (Ext.)
25	Easton/ Woodstock	740	2	55	33'x300' (Ent.) 44'x1,348' (Ext.)
26	Woodstock	685	2	48	33'x300' (Ent.) 27'x673' (Ext.)

27	Woodstock	850	2	57	33'x300' (Ent.) 27'x870' (Ext.)
28	Woodstock	870	2	48	33'x300' (Ent.) 27'x828' (Ext.)
29	Woodstock	710	2	37	33'x300' (Ent.) 27'x828' (Ext.)
30	Woodstock	870	2	75	33'x300' (Ent.) 27'x845' (Ext.)
31	Woodstock	925	2	55	33'x300' (Ent.) 27'x890' (Ext.)
32	Woodstock	1,176	2	72	33'x300' (Ent.) 27'x1,145' (Ext.)
33	Woodstock	902	2	48	33'x300' (Ent.) 27'x866' (Ext.)
34	Woodstock	1,028	2	60	33'x300' (Ent.) 27'x987' (Ext.)
35	Woodstock	1,034	2	52	33'x300' (Ent.) 27'x1,020' (Ext.)
36	Woodstock	883	2	68	33'x300' (Ent.) 27'x847' (Ext.)
37	Woodstock	653	2	38	33'x300' (Ent.) 27'x622' (Ext.)
38	Woodstock	847	2	48	26'x300' (Ent.) 26'x860' (Ext.)
39	Woodstock	1,119	2	45	30'x300' (Ent.) 27'x1,127' (Ext.)
40	Woodstock	791	2	42	29'x300' (Ent.) 27'x824' (Ext.)
41	Thornton	828	2	45	28'x300' (Ent.) 27'x900' (Ext.)
42	Thornton	795	2	35	24'x300' (Ent.) 29'x780' (Ext.)
43	Thornton	671	2	35	32'x300' (Ent.) 27'x680' (Ext.)
44/45	Campton	1,081	2	50	32'x300' (Ent.) 30'x1,090' (Ext.)
46	Campton	850	2	48	32'x300' (Ent.) 30'x920' (Ext.)
47	Campton	695	2	40	32'x300' (Ent.) 27'x730' (Ext.)
48	Campton	1,097	2	70	32'x300' (Ent.) 32'x1,130' (Ext.)
49	Plymouth	1,194	2	63	35'x300' (Ent.) 27'x1,225' (Ext.)
50	Plymouth	1,001	2	45	35'x300' (Ent.) 32'x1,010' (Ext.)
51	Plymouth	652	2	30	34'x300' (Ent.) 32'x1,310' (Ext.)
52	Plymouth	1,079	2	40	30'x300' (Ent.) 27'x1,130' (Ext.)

Area Requirements

For the Project, HDD requires large amounts of area at both ends of the work. The sample plans indicate cleared areas of approximately 300 feet in length at the entry points. This area is needed to locate the drilling machine, storage and mixing of drilling fluid, drill fluid pumps, the drill entry pit, temporary stockpiles of materials needed for the drilling process, and one or more vehicles to remove excavated materials as they come out of the drill hole.

The HDD plans also indicate a length of staging area at the exit end of the drilled section equal in length to the drilled section itself. This length can be greater than 1000 feet. This area is required for storage of additional drilling fluid, mixers, pumps and the exit pit. It is also required for laydown of the casings to be installed. Since the casings (PVC pipe) can't be held on a spool or spools until they are required to be installed, they must be completely laid out and formed into one continuous section of pipe before they are pulled back through the drilled hole. Therefore, an HDD installation that is 800 feet in length will require an 800 foot long staging area at the drill exit point so that an 800 foot long casing may be prepared for installation into the drill hole. The limited, detailed plans produced to date show HDD locations varying in length from 545 feet to 1,600 feet.

The JB process requires a smaller, but not insignificant footprint, to execute. The plans indicate an area of approximately 300 feet in length at each pit. This area includes the pit itself and room for the excavator and material removal vehicles. An item to be considered is the connection between the casings in a normal open trench (30 inches deep) and the ends of the jacked pipe casings (20 feet + deep). It is not clear how this connection will be made although the area delineated for staging may be adequate to complete this work.

Time Requirements

At each location, the HDD process will require numerous days to complete. The drilling machine and all of the related controls, supplies and support equipment must be brought to the site and set up before the drilling may begin. After the pilot hole is complete, the reaming process and the casing installation will require additional time. There will be limited property access during the drilling process which could last for lengthy time periods depending on the duration of the drilling and also the size of the drilling set up to be used as well as the soil conditions through which drilling will occur. The plans indicate rock or ledge will be encountered at the various sites, as well as underground utilities. Alternate access or other accommodation may need to be considered where this process is proposed for populated areas.

The JB process will also require a number of days to complete. Work includes excavation and shoring of the pits, installation of the jacking system, the actual jacking and material removal, connection to the casing line and backfill of the pit. There will be addition time required to make the connection between the jacked pipe and the normal trench. This will occur at both ends of the jacked section. There is not enough information provided to assess this additional effort.

Right of Way Limitations

In some of the locations proposed for HDD, the entry point for one or both casings is close to the street line. In addition, the road alignment is often in a horizontal curve at these same locations. Due to the orientation and size of the drilling machine to be used, there is the potential that the machine will encroach into private property. The need for temporary easements should be reviewed or measures to avoid impacting private property should be developed.

Environmental

The HDD process uses drilling fluid at the drill head to reduce friction and improve the efficiency of the drilling process. This fluid is commonly a mixture of bentonite and water. It is pumped to the drill head under pressure to assist with the excavation, provide lubrication between the drill head and in-situ material and carry the cuttings out of the drill hole. There are several potential concerns regarding drilling fluid. If the drill head passes through a void or fissure as it is drilling through ledge, the pressurized fluid will leave the area being drilled and begin to fill the void or fissure. If the void is limited this is not typically an issue, however, should the fissure be sizeable or long enough to reach open air, fluid could travel the length of the fissure and exit to open air or surface water. This could cause damage to nearby properties or water bodies should they be close to the fluid exit point.

During the drilling process the drill operator would notice if a sudden pressure drop occurred in the fluid pressure and would take steps to minimize the loss of fluid. It is the potential for a slower, continuous loss of fluid, however, that has the most potential for impact.

SPECIFIC ROUTE CONSTRAINTS

Clarkesville - Near Canadian Border / Beecher Falls Road (Open Trench and HDD RTO3)

U.S. RT3 is the primary road connecting Pittsburg and New Hampshire's Canadian border crossing at Pittsburg/Chartierville and points south for local residents and tourists throughout the year.

Open trench construction is proposed from Transition Station No. 1 and will then run along the southern side of Beecher Falls Road between the road edge and approximate base of trees as shown in Figure 29. Existing vegetation within this area will be removed during construction/trenching operations. Likewise the banked slope will be regraded. Single lane road closure is proposed during construction.

Two separate HDD drills of approximately 18 inch diameter are proposed at RT3 to cross under the Connecticut River Bridge (see Figure 30). These operations require large staging and laydown areas at various times of the HDD operations and will require single lane road closures on both sides of the Connecticut River Bridge and temporary intersection closure at RT3 and Beecher Falls Road (see Figure 31).

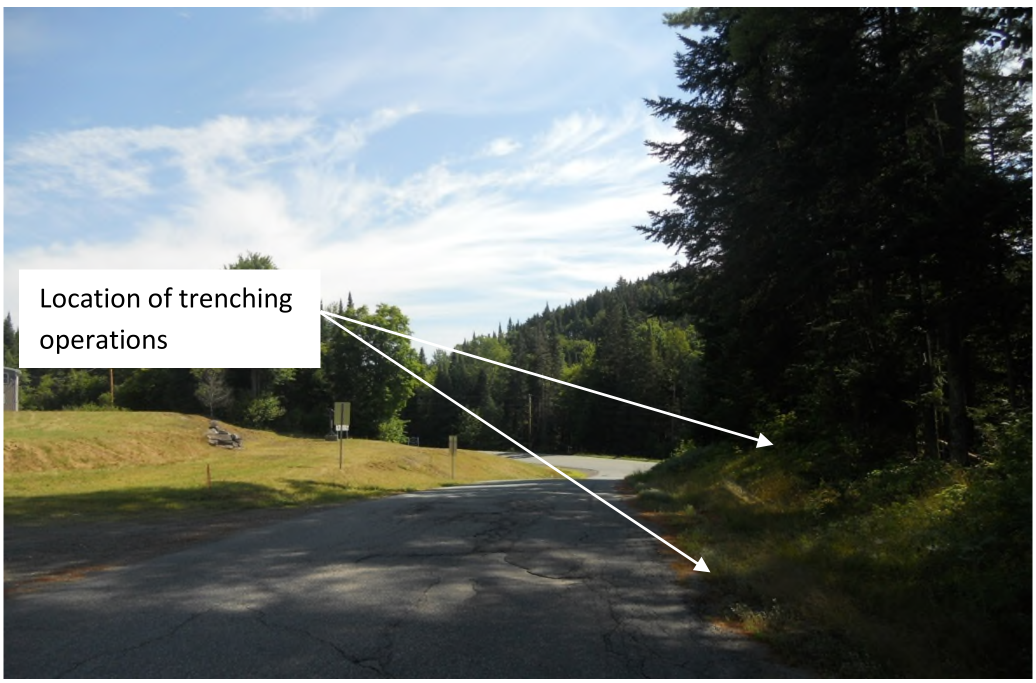


Figure 29: Beecher Falls Road looking toward RT3 in background. Open trench construction will remove existing vegetation and regrading of the bank slope along the roadside.

Figure 30: RT3 Bridge at Connecticut River looking north- trenchless HDD RTO3 crossing proposed. HDD entry pit will be south of the bridge on the right side of Route 3 and the exit pit will be north of the bridge on the left side of Route 3 in the photo background.

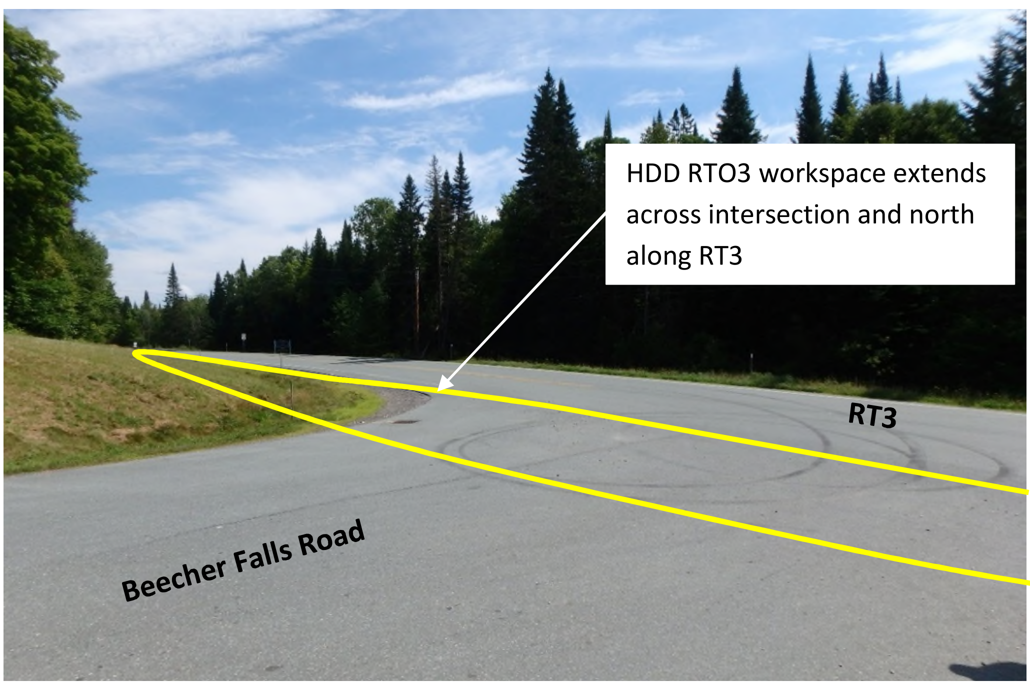


Figure 31: RT3 in background. HDD RTO3 workspace will extend across the intersection and north ~800'.

Stewartstown – Old County Road (Open Trench and HDD 1 and 2)

Old County Road is a narrow gravel road- less than 15 feet wide in areas-and with limited to no shoulder space in places. Removal of existing vegetation in many areas should be expected which would alter the character of the road. The Applicants' plans indicate the trench centerline will be within the gravel road limits in places and off to the side of the roadbed in other places. A rolling work zone up to 1,600 feet in length along with one lane closure or full road closure are proposed along Old County Road. Detours around Old County Road on RT145 and Creampoke Road are proposed.

Two trenchless HDD operations are proposed along Old County Road (HDD 1 and 2) in addition to open trench construction. These trenchless HDD operations will likely require full road closures and disturbance of existing vegetation.

The Applicants' plans show the installation of five splice vaults (34' – 2" L x 7' – 10" W) within the road or partially outside of the roadbed of Old County Road.

Figure 32: Old County Road-narrow road with limited shoulder space and vegetation close to road.

Stewartstown – North Hill Road and Cemetery (Open Trench and HDD 3 (Jack and Bore)

North Hill Road is a narrow gravel road- less than 10 feet wide in areas-with no shoulder in many places, in addition to having vegetation, steep slopes and wetlands adjacent to the road edge. There are 10 existing culverts that cross under North Hill Road. Removal of existing vegetation including mature trees in many areas should be expected which would alter the character of the road. The Applicants' plans indicate the trench centerline will be within the gravel road limits, either in the center of the road or off to the side of the roadbed. A rolling work zone up to 1,600 feet in length along with one lane closure or full road closure are proposed along North Hill Road. Detours around North Hill Road on Creampoke Road, RT145 and Bear Rock Road are proposed (see Dewberry Northern Pass Detour Route Map).

A 200 foot, dual 18 inch diameter jack and bore is proposed just south of North Hill Road and Creampoke Road, with a work area space of 28 feet x 300 feet at start point of work (see Figure 33). A similarly sized work area is required at the exit-end. Construction staging and operation for the jack and bore are shown as being as close as six feet from an existing structure (see Figure 33). Geotechnical borings are not available for review, however, given the depth of pit needed for the jack and bore dewatering is likely necessary.

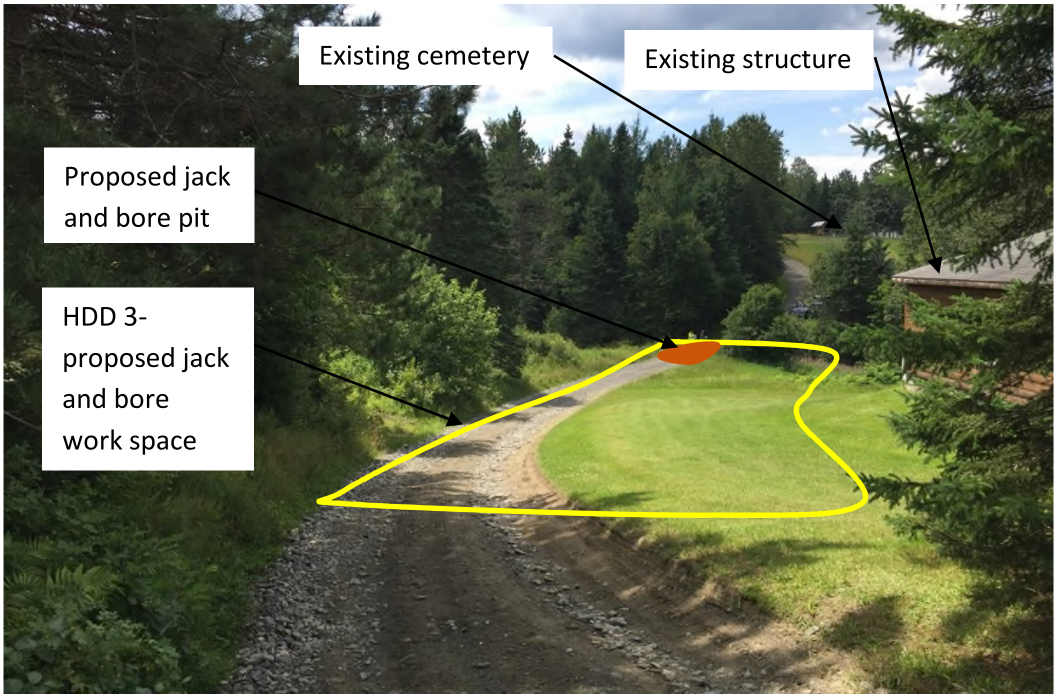


Figure 33: North Hill Road looking south from intersection with Creampoke Road to HDD 3 area-narrow gravel road with no shoulder and vegetation and steep slopes adjacent to the road edge. Work zone for jack and bore staging will be close to an existing structure, remove existing vegetation, disturb maintained lawn area and require road closure.

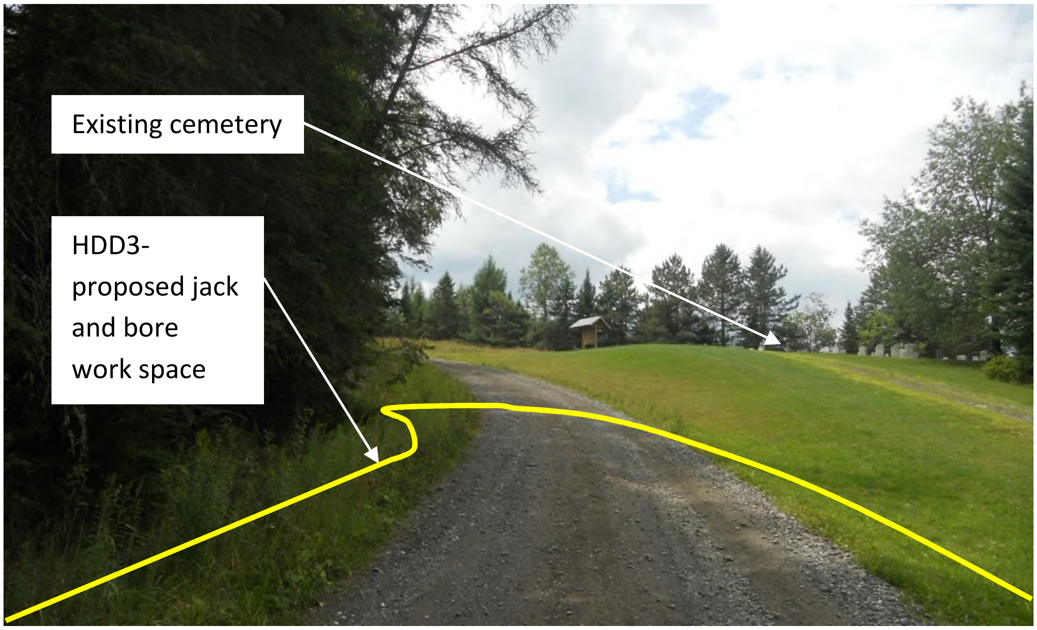


Figure 34: Stewartstown, North Hill Road HDD3 work space area with existing cemetery in background.

The plans show installation of five splice vaults (34' – 2" L x 7' – 10" W) buried under the road or under the side of the roadbed of North Hill Road. The installation of these splice vaults will require the closure of North Hill Road and the detour of traffic. (See Dewberry Northern Pass Detour Route Map.)

Stewartstown – Bear Rock Road (Open Trench and HDD 4-7)

Figure 35: Stewartstown, Bear Rock Road- with limited shoulder and vegetation immediately adjacent to the road.

Bear Rock Road is a narrow gravel road with limited to no shoulder space in places. Removal of existing vegetation in many areas should be expected which would alter the character of the road. The Applicants' plans indicate the trench centerline will be within the gravel road limits in places and off to the side of the roadbed in other locations. A rolling work zone up to 1,600 feet in length along with one lane closure or full road closure are proposed along Bear Rock Road. Detours around Bear Rock Road on RT145, Park Street, Mohawk Road, and E. Colebrook Road are proposed.

Four trenchless HDD operations are proposed along Bear Rock Road in addition to open trench construction.

The plans show installation of nine splice vaults (34' – 2" L x 7' – 10" W) buried under the road or under the side of the roadbed of Bear Rock Road

Heath Road - Transition Station No. 4 (Open Trench)

Surface rock is visible at the area around Transition Station No. 4 on Heath Road. Trenching operations in this area will advance at a slower pace if rock is encountered and blasting may be required. Particular care will need to be taken with blasting in this area due to the proximity of a nearby production capacity water well.

Figure 36: Transition Station No. 4 at Heath Road– rock outcrop visible at surface.

Franconia (Open Trench and HDD 13 (micro tunnel)

Open trench and trenchless construction is proposed in Franconia. This is a busy intersection with tourist and local traffic accessing I-93, Sugar Hill, Franconia, Easton and the Cannon Mountain/Mittersill ski areas to the south. The proposed alignment makes a tight turn off RT116/Main Street on to Easton Road heading south crossing under the Franconia Bridge/Gale River (see Figure 37 and 38). Micro tunneling under the Gale River is proposed with a single 36 inch steel casing to be installed. Two pits or shafts are proposed (see Figure 37) on either side of the river. Tunneling will take place from a south to north direction. A launching pit will be constructed within the public right-of-way partially in the northbound lane of Easton Road just north of Academy Street. A receiving pit will be constructed within the north eastern quadrant of the intersection of Main Street/RT116/RT18 and Wallace Hill Road. Single lane and sidewalk closure is proposed for westbound traffic as you approach the intersection, with alternating traffic going east and westbound.

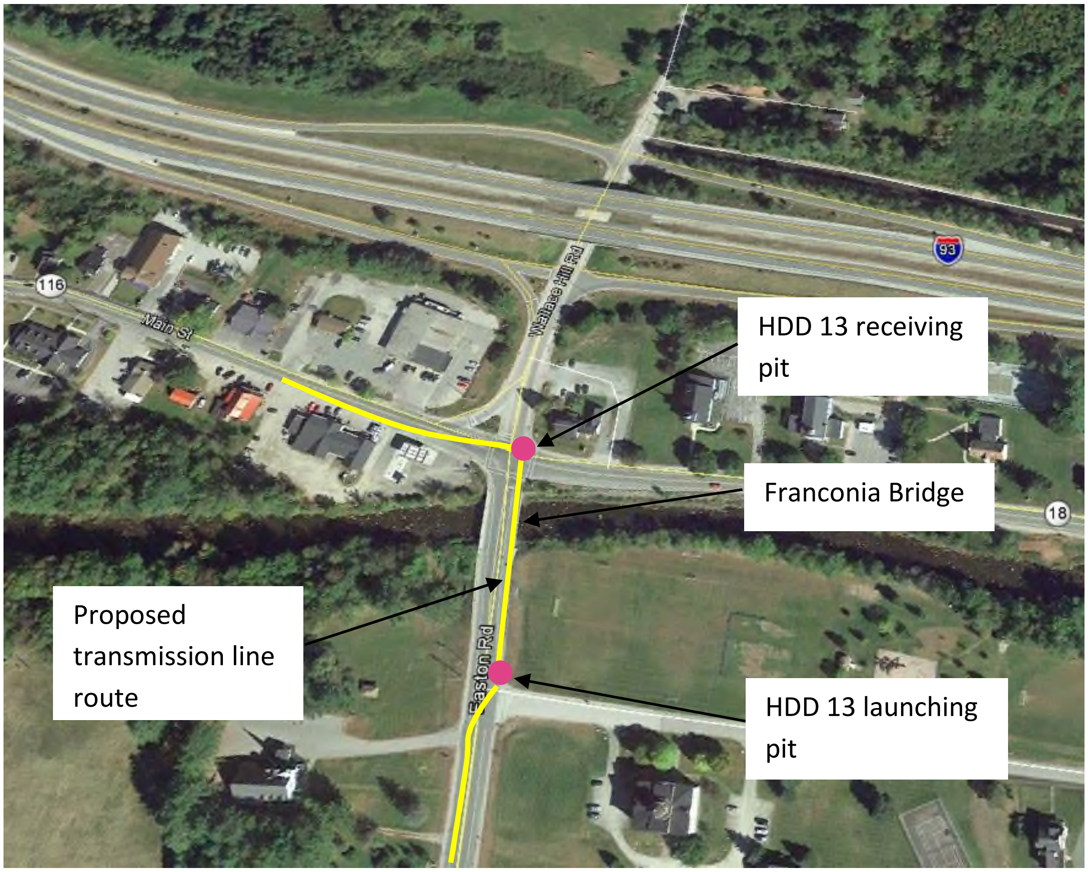


Figure 37: Franconia Bridge HDD 13 area with underground transmission line route shown.

Figure 38: Franconia Bridge.

Easton – RT 116 and Paine Road HDD 18

In the Easton area along RT 116, east of Paine Road the Applicants' plans identify the approximate location of a culturally sensitive resource (see Figure 39 and sheet SHEBC 147/148, SHEBS Estate Bypass (SHEB) underground Alignment, permit Package-NH DOT District 1, dated December 6, 2016). The culturally sensitive area is on the north side of the road and within the HDD 18 entry area work space shown on sheet SHEB18-2. Background information for the culturally sensitive area is not provided on these plans, however it should be noted that approximately 80 percent of the area identified as culturally sensitive is within the HDD entry work space area. Further coordination and review by those responsible for maintaining and protecting the cultural resources along the transmission line route is needed. Impacts to the area during construction will include vegetation removal, HDD pit excavation, and construction equipment staging.

Along RT 116 between Delage Farm Road in Franconia and south to the Reel Brook Road area (~5 miles) the route is congested with nine (9) separate HDD operations including HDD 18. A prolonged impact on local traffic due to HDD operations should be expected for this stretch of road leading into Franconia.

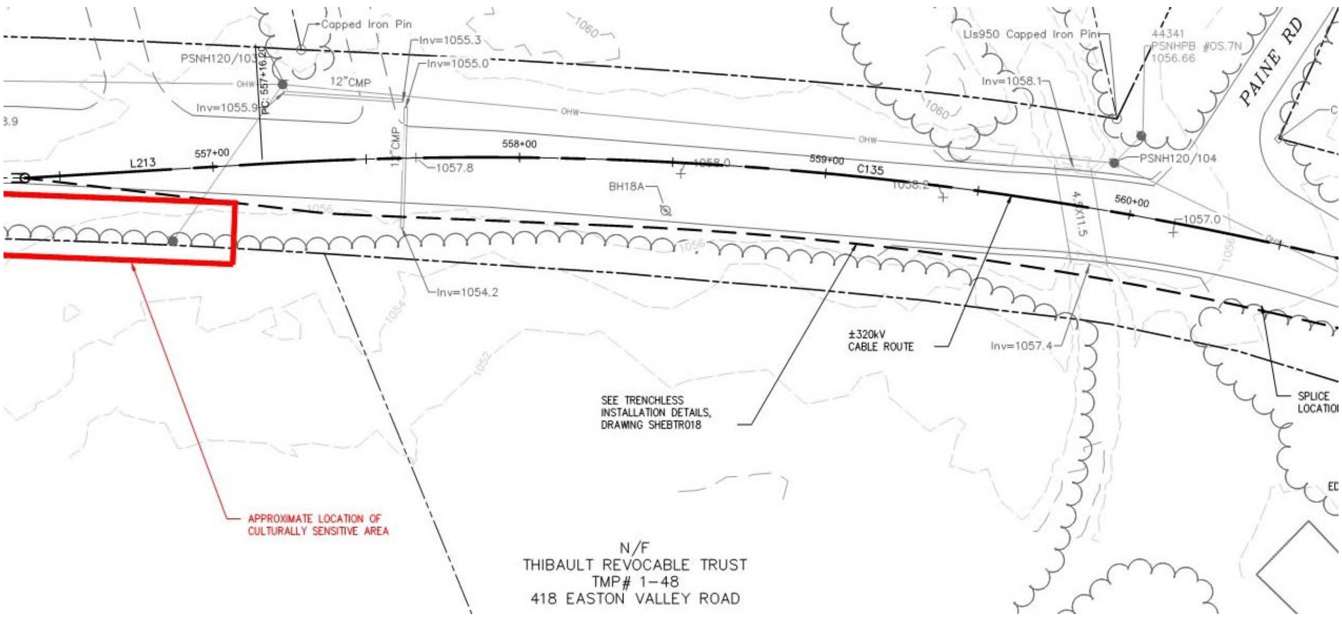


Figure 39: Culturally sensitive area along RT116 within HDD 18 work space proposed by Applicants.

Woodstock - White Mountain Nation Forest (Open Trench and HDD 24-37)

This is a scenic area of New Hampshire through the White Mountains National Forest with extensive undeveloped areas, pristine forest, ponds, rock outcrops and views in addition to being proximal to the Appalachian Trail. RT112 is a two lane road with steep grades and narrow shoulders. This road also connects eastern areas of Grafton County to the county center located further west along the Connecticut River. Guardrail and rock outcrops are typically in close proximity to the road shoulder making the work area available during construction limited. Open trench construction is proposed in this area and will impede traffic while in progress. Close proximity to the clear waters of Beaver Pond will make installing and maintaining adequate sediment and erosion control measures during construction critical.

As the Applicants noted during the technical sessions final road repair will occur roughly a year after the underground transmission line construction has occurred. Temporary road patch in this area may be viewed as a visual impact. Similarly, if permanent road patch is used versus a mill and overlay for half the road this visual impact would be longer term.

Along RT 112 within the White Mountain National Forest between Hummingbird Lane and RT 118 (see Dewberry Maps 39-41) (~8 miles) the route is congested with 14 separate HDD operations including HDD 32 near Beaver Pond. A prolonged impact on local traffic due to HDD operations should be expected for this stretch of road.

Figure 39: RT112/Lost River Road, White Mountain National Forest HDD 32– road with limited shoulders, confined by rock outcrops and guardrail. Construction will be in close proximity to Beaver Pond, shown in the right side background.

Woodstock- RT3, Gordon Pond Brook Crossing near Woodstock Firehouse (HDD 39)

Along RT3 near Gordon Pond Brook Bridge in Woodstock a 1,119 foot long 45 foot deep HDD crossing is proposed. The work zones for the entry and exit areas are 30 feet x 300 feet and 37 feet x 1,127 feet and include sidewalk, on street parallel parking and single lane closure during HDD operations. Traffic impacts due to lane closures will slow traffic entering and exiting this part of Woodstock which includes shops and restaurants. Of importance during construction operations will be maintaining communication and coordination with the Fire Department which is located adjacent to the Gordon Pond Bridge, so their ingress and egress is not impeded.

Figure 40: Woodstock Main Street looking north. Woodstock Fire Station is south of this photo. Northbound travel lane closure, parking closure and sidewalk closure are proposed along the 300 foot HDD 39 work space area.

Figure 41: Woodstock at Fire Station. Gordon Pond Brook Bridge is in the background. HDD 39 exit area work space beyond the bridge on the right side of the road.

Figure 42: Bridge at Gordon Pond Crossing in Woodstock (HDD 39).

North Plymouth – RT3, RT3A, and Baker River Bridge (HDD 49 and 50)

North of Plymouth along RT3, HDD 49-50 are proposed. HDD 49 is under RT3A (Tenney Mountain Highway) (see Figure 43 and 44). HDD 50 is nearly immediately after HDD49 and is for crossing under the Baker River (see Figure 45 and 46) and adjacent to the Baker River Bridge (see Dewberry Map 47). During our field visit vehicular traffic along RT3 and the RT3A on and off ramps was steady. We also observed pedestrians walking and bicyclists along RT3. The Common Man Inn Restaurant and Spa as well as other businesses are located in this area. Both HDD crossings are greater than 1,000 feet and between 45-63 feet deep.

Traffic congestion due to HDD work space areas coupled with multiple vehicle turning movements in the area will be a significant traffic impact. As noted earlier in the report for HDD construction time frames (3-8 weeks each) the upper time limit to complete HDD 49 and 50 crossing is anticipated due to the location, length, depth, and dual drills per HDD.

Figure 43: RT3 overpass with RT3A passing under. HDD 49 crossing from RT3 above then under RT3A will be required.

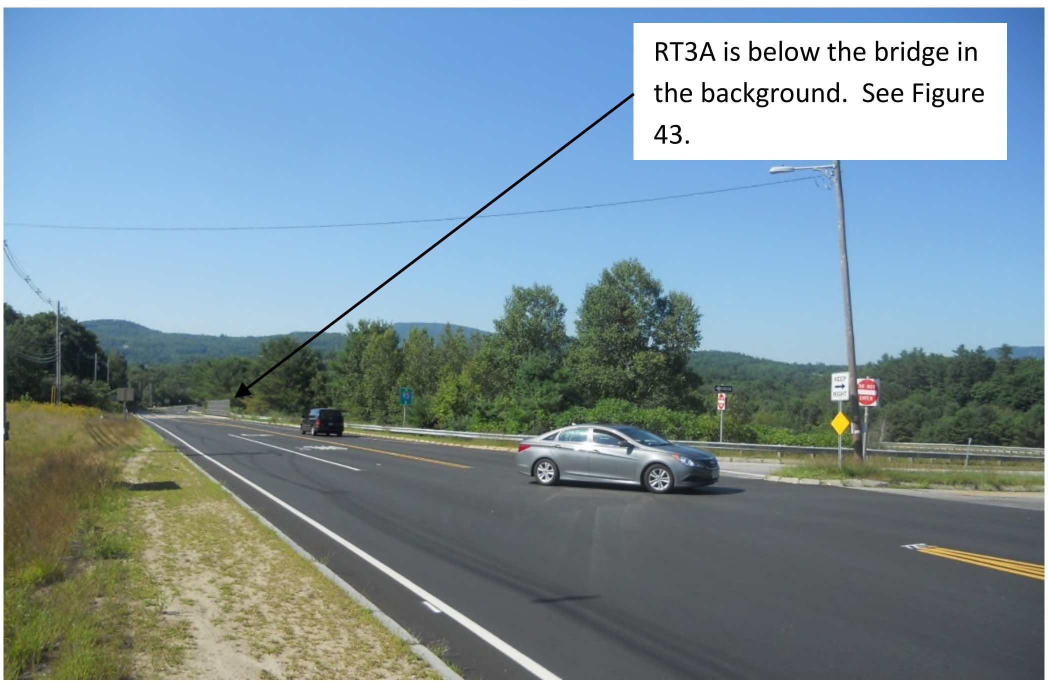


Figure 44: RT3 looking south with at bridge over RT3A. HDD 49 crossing under RT3A will be required.

Figure 45: Baker River Bridge. HDD 50 crossing under the river will be required.

Figure 46: View from on Baker River Bridge at Baker River, which is a sizeable river to cross with HDD 50.

<u>Plymouth – Downtown (Open Trench)</u>

The underground transmission line route is proposed to traverse downtown Plymouth along the west side of RT3 within or immediately adjacent to on street parking. Traffic impediments, visual clutter, loss of parking, vibration, noise and dust are the impacts anticipated during construction. Construction in the downtown area will be more complicated- compared to less urban areas- due to traffic, driveway cuts and existing utilities to navigate such as water, sewer, gas, electric, possibly shallow rock and the presence of concrete roadbed. During the September 12, 2016 technical session the Applicants indicated the possibility of working night time hours.

Defining downtown Plymouth as being between Merrill Street to the north and Warren Street to the south, the downtown is ~3,400 LF (0.64 miles) in length. This is a significant commercial district, with numerous shops, restaurants, government buildings and the presence of Plymouth State University. It is a heavily travelled area for vehicles, bicyclists and pedestrians during the day and in the evening. Main Street is the dominant north – south route in Plymouth for residents, shoppers, tourists, and first responders. Construction in this area will require lane closures and the loss of parking during construction. Referring to the construction duration chart from above it is likely the contractor can get 70-100 feet of underground transmission line construction done per day on average. Using this rate downtown Plymouth construction will take 34-49 work days. The Applicants have indicated they will work six days a week which translates into ~6-8 work weeks. This duration could be longer if unknown utilities or shallow rock are encountered.

Our assumptions are as follow:

1. Some existing utility infrastructure interference with the route;
2. Average trench depth of 5-6 feet;
3. Encounter minimal shallow rock while trenching;
4. Reconstruct concrete base section of road only within the trench width;
5. Includes vault placement.

Figure 47: Traffic circle immediately north of downtown Plymouth with proposed transmission line route shown.

Figure 48: View looking south towards downtown Plymouth, taken just south of the traffic circle. Parallel parking in foreground, sidewalk, and adjacent travel lane will likely be closed during construction. (<u>See</u> Dewberry simulation 2 on Maps 48A-C)

Figure 49: View from downtown Plymouth looking north toward traffic circle. Proposed transmission line will be constructed within the angle parking spaces adjacent to the park on the left side of the photo. All on-street parking will be closed during construction in this area. (<u>See</u> Dewberry simulation 3 on Maps 48D-F)

Plymouth will experience significant traffic impacts during construction of the underground transmission line. The transmission line will be constructed largely in the southbound travel lane along the full length of Main Street. The Applicants propose to close RT3/Main Street north of town between Merrill Street and Tobey Road. All traffic will be detoured to Weeks Street during construction in this block. Concurrently the western two-thirds of the roundabout at Main Street/High Street/RT 175A will be closed along with partial road closure extending south to the park/green across from the Post Office. One-way northbound traffic is proposed, with all southbound traffic and on-street parking eliminated from Main Street south. RT 3 southbound traffic will be detoured around the downtown area using Merrill Street, Langdon Street and Highland Street (<u>see</u> Figure 50). As construction advances parallel to the park/green a single northbound travel lane will be maintained, but all on street parking will be eliminated in this area on both sides of the road. South of the park/green area underground transmission line construction is largely in the southbound travel lane in a rolling work zone of 700-1,600 feet. Alternating traffic is proposed for north and southbound traffic with all on-street parking removed from within the rolling work zone.

Figure 50: Applicants' plan showing detour route around Main Street during construction between Merrill Street and the park/green in the center of town.

<u>Utility Impacts in Plymouth</u>

As part of our analysis of the underground portions of the proposed transmission lines we have discussed several details of the Project with a representative of the Plymouth Village Water and Sewer District (PVWSD). He related several requirements for underground utility location within the district area that the Project will need to abide by along with some related concerns.

PVWSD requires ten feet (10') of horizontal separation between water and sewer lines. The separation increases to fifteen feet (15') between electric lines running parallel to water or sewer lines. The Applicants' plans do not currently meet this horizontal separation requirement. PVWSD will require ten feet (10') of vertical separation for perpendicular water and sewer line crossing if native backfill is used to fill the trench. A detailed crossing-by-crossing review of the plans will be required by PVWSD to determine acceptable vertical clearance if fluidized thermal backfill is used, as is shown on the Applicants' plans. PVWSD also noted that they prefer the underground transmission line to be installed below any existing water and sewer lines at perpendicular crossings. The Applicants' plans do not currently meet this preference.

PVWSD's concerns regarding the transmission line installation include any proposed location of the transmission lines above their facilities and electrical interference. They have recently experienced incidents where they had to access their pipelines in an emergency and are concerned that, should the transmission lines be installed above their facilities, they would lose valuable time by having to work around them in case of a future emergency. They are also concerned about undermining of any utility lines located over a water main in case of a break. Their preference is that the transmission lines be installed below their pipes.

They also indicated that they have electronic metering of their water lines and are concerned that they will be unable to retrieve correct meter readings due to electrical interference from the proposed transmission lines.

Roads with Concrete Bases

We understand that the pavement of portions of Route 3, specifically the section through Plymouth, is constructed using a concrete base layer with a bituminous concrete surface. This type of construction is indicative of a number of older, typically heavily travelled roads throughout New England. Another example of this type of construction that is well known is U.S. Route 1 through much of the northeast.

Underground work on roads having this type of construction adds another layer of complexity into the construction process. To excavate a trench, both the bituminous pavement surface course(s) and the concrete layer must be cut through. Cutting the concrete requires powerful saws equipped with special blades made especially to cut concrete. This layer may not be cut with a jackhammer as that will cause the concrete to shatter which will reduce its effectiveness in supporting the surface pavement.

For open trench construction, once the underground work is complete, the trench is backfilled and the pavement is restored. This is a process which, depending on how it is done, may have long term impacts on the road pavement. Four scenarios are described which will afford differing degrees of adequacy in addressing the impact over the long term.

1 - Trench Backfill with Native Materials

For a typical trench, once the utility line is installed, the trench is backfilled with the material that was excavated. That material is placed and compacted in layers and, when the appropriate depth is reached, the surface pavement is placed. In this area, the existence of the concrete base creates a hard surface on either side of the trench. Over the long term, if the concrete base in the trench area is not replaced, differential settling will occur between the trench section and the remaining pavement. This will lead to low spots and/or rutting along the area of the trench and associated uncomfortable driving conditions unless the trench surface is repaired. The long term settlement described is partially offset by the proposed use of fluidized thermal backfill in the trench as this material will help limit the overall amount of potential settlement that might otherwise occur.

2 – Partial Concrete Base Removal

Since the proposed alignment of the transmission line is generally not along the extreme edge of the road, removal of a portion of the concrete slab will leave a relatively narrow strip of the concrete base remaining between the trench and the edge of road. By itself, this narrow strip may not have the strength to withstand traffic loading that a larger slab would and it is likely that this strip, if left in place, would experience long term damage and would break apart, thereby resulting in an uneven driving surface due to the multiple small hard spots below the pavement. Freeze/thaw action on these smaller pieces might expedite the process. If approximately half of the concrete slab were to be removed from the road over the transmission line (centerline to edge of road) there would be some differential settlement along the edge of the slab as described above. However, unlike scenario 1 the settlement would occur along the centerline where vehicles don't typically drive. In addition, the vehicle loads on the pavement would be spread out over a much larger area and any resulting settlement would be much less pronounced.

3 – Reconstruct Concrete Base Section

Once the depth of fill in the trench is brought back to the elevation of the existing concrete slab, the portion of slab that was cut and removed can be replaced. This is a laborious process requiring drilling into the existing concrete slab sections and installing reinforcing material. Following that, new concrete is placed to recreate a continuous concrete base. This is a time consuming process requiring a lot of hand labor to complete. It is our understanding that this is typically what New Hampshire DOT requires in instances such as this.

4 – Complete Removal of Concrete Base

One option that may be considered is, instead of repairing the concrete base, to remove the existing concrete slab in its entirety. This would eliminate the potential for long term differential settlement and provide a better overall driving surface. Doing this, however, would add time and cost to the construction process and would require more involved traffic management to place the surface pavement.

South of Downtown Plymouth

Main Street in Plymouth narrows immediately south of downtown. The travel lane is less than 11 feet wide. There are businesses on both sides of the road, including retail, service and restaurants. Construction in this area will require lane closures and the loss of parking spaces during construction.

Figure 51: Immediately south of downtown Plymouth looking south. The road is narrow in this area with a travel lane less than 11 feet wide.

South Plymouth – near RT3/Parker Street (Open Trench)

Several areas along RT3 south of Plymouth have limited shoulder width along with rock outcrops, steep slopes and vegetation immediately adjacent to the road. This limits the available work space during construction and will necessitate single lane traffic or closures and detours during construction.

Figure 52: RT3 just south of downtown Plymouth at Parker Street. Limited shoulder road with rock outcrops, steep slopes and vegetation adjacent to road limiting construction work area.

South Plymouth – RT3/Railroad in Close Proximity (Open Trench)

Along RT3 south of Plymouth a section of road with limited shoulder width is paralleled by rock outcrops, steep slopes and vegetation on one side and a stone retaining wall with guardrail on the other. This limits the available work space during construction and will require single lane traffic during construction. Attention will need to be paid to trench routing and construction techniques such as blasting in this area due to the position of the road near ledge and supported by a retaining wall.

Figure 53: RT3 south of downtown Plymouth. Limited shoulder road with rock outcrops, retaining walls, steep slopes, and vegetation adjacent to road limiting construction work area.

LAYDOWN AREAS AND STAGING AREAS

For ease of viewing and tracking by the SEC, Dewberry has assembled a set of maps which compile the location of off right-of-way access routes and proposed laydown areas identified on the NHDES Wetlands & US Army Corps of Engineers Section 404/10 Permit Application Plans along with an accompanying spreadsheet which cross references the Applicants' plans.

Three construction laydown areas are proposed by the Applicants and are shown on the NHDES Wetlands & US Army Corps of Engineers Section 404/10 Permit Application Plans. One is located in Clarksville (215,615 SF / 4.95 acres), and two are located in Millsfield (42,180 SF / 0.96 acres and 68,515 SF / 1.57 acres). The laydown area in Clarksville is adjacent to Transition Station 2 and will have access to NH Route 3. Both laydown areas in Millsfield are located adjacent to the proposed overhead transmission line right-of-way. Laydown area two is also accessible from NH Route 26.

Staging and laydown areas necessary for underground transmission line construction beyond the immediate work area within public right-of-way are not identified by the Applicants. The Applicants will require additional laydown and staging areas for the Project. Until these additional laydown areas are identified we cannot assess their impacts on New Hampshire communities and natural resources.

TRAFFIC IMPACTS

Construction of any project requires a substantial number of vehicles of many types to complete the work. Larger and more complicated projects require a higher number of vehicles. Construction vehicles are all well above average size in terms of overall length, width and weight. They are difficult to maneuver and are slow to start and stop. A partial listing of the types of vehicles required for the open trench work and their function includes:

- Jack hammers or pavement saws to cut through the existing pavement to access the soil below.
- Excavators of various sizes to excavate the trench and transfer the excavated material into dump body trucks. These vehicles may also be used to move trench boxes required to temporarily support trench walls and place steel plates used to temporarily cover a trench until it can be backfilled.
- Dump body trucks: Hauling and disposal of any surplus, unusable or unneeded pavement and soil materials. These vehicles will also be used to return native material that may be used to backfill the trench and also the thermal sand used to fill the splice pits after the splice work is complete.
- Concrete mixers: Hauling and placement of the fluidized thermal backfill material that will be used to fill the bulk of the excavated trench.
- Flatbed trucks: Hauling and delivery of the conduits, splice vaults and other components to the site for installation.
- Spool trucks to pull the cables through the installed conduits.
- Small and medium foot print cranes: For lifting the splice boxes and other materials into position that may be too large for the excavators to move.
- Paving machines and rollers to place and compact the pavement over the trench. Smaller machines may be used for temporary trench patches and larger pavers and rollers will be used for overlays or new pavement.
- A number of other vehicles may be required based on the types of shoring that is planned for the various trenches and pits that are required along the route.

Specialized equipment needed for the trenchless areas include:

- Drill rigs and supporting equipment for the horizontal directional drilling.
- Spool trucks for pulling the cables through the drilled sections.
- Large excavators and/or cranes for the pits needed for jack and bore operations.
- Hydraulic jacks and power supply for the jacking operations.
- Coring equipment to cut through ledge if it is encountered during the jacking process

Supplementing these primary vehicles will be fuel trucks, maintenance and repair vehicles, street sweepers, workers personal vehicles and others.

All of these vehicles will have a number of impacts on the existing public road system. Impacts that are pertinent to the public roadway system include increased traffic, potential for damage to the road surface, odor from vehicle exhaust, and noise from use during the construction process. Other considerations include impacts to school bus routes, timing of work during tourist seasons, winter work and the impact on emergency response vehicles such as police, fire and ambulance services. It is likely that flagging crews or uniformed officers will be required for traffic control in numerous locations.

Due to the nature of the work, some of the vehicles listed will remain in a local area for the time required to excavate a section of trench, place the conduits and backfill the trenches. They will then continue farther along the route. However, the hauling and delivery vehicles will be making multiple trips per day along some or all of the roads that comprise the route as they remove and deliver materials to and from the work areas. Also, as noted above, this does not include the multiple support vehicles that will travel to and from each work site on a regular basis.

The primary concern for traffic impact is in those areas where the proposed transmission line is to run below a road comprised of only two lanes with fairly narrow or no shoulders. In these areas the Applicants propose to shut down one lane of the road to construct the proposed transmission line while the other lane is used to move traffic in alternating directions typically controlled by one or more flaggers depending on the length of the alternating lane. The details used indicate that the alternating lane detail will be used for roads having less than 850 total vehicles per day. The following should be considered:

1. Room for construction vehicles – In areas of narrow work zones, construction vehicles will need to be arranged in a single file as there will be insufficient room to operate side by side. Vehicles used to haul material to or away from the trench will need to be queued outside the work zone while a single active vehicle is loaded or unloaded. Once the active vehicle is finished, it will have to leave the work zone. The next queued vehicle must wait until the active vehicle exits the work zone before it can take its place. It is estimated that this process will increase the construction time in those areas by a substantial amount compared to a work zone where vehicles can queue next to one another.
2. Reopening the work zone: In several places within the application documents, open trench sections of up to 750 feet in length are proposed. Since a length of trench this long cannot be excavated, have the casing installed and be backfilled in a single day, the trench will need to be temporarily covered with steel plates while work is not in progress. Steel plates form a very uneven driving surface for vehicles and 750 feet is well beyond the typical length of steel plate usage. In addition, they may become slippery when wet which increases the chance for vehicle incidents.
3. Higher seasonal traffic volumes – Work in some of the locations along the proposed route is subject to substantially higher traffic volumes during certain seasons. Traffic volumes during these times will exceed the traffic volume used to develop the traffic work zone details included in the plans. Alternate details for work during periods of higher traffic may be required or the work needs to be scheduled to avoid construction in those areas during periods of higher traffic volumes.
4. There are several unpaved roads that are included in the proposed route. Most of these are very narrow and are generally single lane roads although they generally are wide enough to allow opposing vehicles to pass. The Applicants have stated that all of these areas are sufficiently wide to allow alternating traffic to be maintained during construction. It is likely, however, that in one or more locations some supplemental material will be required to safely allow an alternating lane of traffic to be maintained. Any areas where this is a possibility should be clearly identified and some indication of the limits of material needed should be given. Limits of any clearing required to accommodate this work should be indicated as well.
5. Road Damage – see below.

ROAD DAMAGE

Construction vehicles are similar to other large trucks in that they inflict a higher level of stress on the pavement structure than smaller personal vehicles do. Most of the paved roads that comprise the route of the underground portion of the proposed transmission line are designed to handle reasonably high volumes of larger vehicles. In addition, as vehicle speeds in work zones are very slow, pavement stress is reduced.

A common problem with underground construction is the long-term settling that occurs after the installation work is complete and the road surface has been repaired. A combination of traffic loads on the patched area combined with natural forces often cause irregular settlement along the trench line. This is typically offset by the requirement for a contractor to place a temporary patch over the trench and then return after a specified period of time (typically between 3 and 12 months) to remove the temporary patch, place additional trench backfill as needed, re-compact everything and then place a final, permanent patch. This alleviates most of the settlement that may occur after the work is complete. It is unclear from the documents if this approach is proposed for areas of underground construction.

NOISE

As noted previously one of the areas of concern are the noise levels generated by the proposed construction activities. In an urban environment noise is caused by a number of factors such as motor vehicle traffic, passing airplanes, and machinery. Each of these contribute to what is known as background or ambient noise. In the urban environment, the intensity of the background noise may be referred to as a baseline noise level. Over time residents who dwell in urban environments often grow accustomed to the background noise levels and learn to live with them or ignore them. As one leaves the busier, high volume roadways for smaller, local roads, the ambient noise levels tend to decrease.

Along much of the proposed route the Project is routed to pass through rural or lightly developed areas where the ambient noise level is quite low. In these areas the noise impact of the proposed construction will be significant. The relative increase in noise due to the numerous construction vehicles will be quite noticeable in these areas regardless of the projected duration of work in any given area.

WORK DURING TOURIST SEASONS

Different areas of New Hampshire experience high volumes of tourist traffic at different times of the year. The impact of the Project on the tourist industry is discussed in greater detail by others. This section is included to reinforce the fact that the various tourist seasons bring large volumes of people and vehicles to virtually all areas where Project construction will occur. Due to these higher traffic volumes, it is more likely that a slow moving construction vehicle or an alternating lane of traffic will cause delays should it conflict with the higher volumes of tourist traffic. Consideration should be given to scheduling the work of the different Project areas to minimize impacts to tourists.

WORK IN WINTER

Discussions during the technical sessions indicated that work will continue in some areas of the Project throughout the winter months. Typically, work on roads under the jurisdiction of NHDOT is suspended in mid to late November and not allowed to resume until the following March. There may be some flexibility allowed depending on the actual weather conditions near the shutdown date. Should extension of the work period be authorized by NHDOT, the Contractor may be required to remove and dispose accumulated snow within the work zones and treat paved surfaces to minimize slippery conditions. Any construction that continues beyond the typical shutdown date will need to use extreme caution due to the potential for limited visibility due to piled snow and the aforementioned slippery conditions. It is likely that extra personnel to control traffic will be required during these periods.

EROSION AND SEDIMENTATION CONTROL

Included with Appendix 4, NHDES Section 401 Water Quality Certification Application is a draft Stormwater Pollution Prevention Plan (SWPPP). This is a required document for any project that proposes to disturb one or more acres of land. This plan lists the Project proponent, describes the proposed construction activities and details a number of potential Best Management Practices (BMPs) that may be utilized to reduce or control the disturbance to the Project site due to the removal of material via erosion. This erosion is typically due to rainfall on exposed ground that suspends fine grained material in the water and transports it away from the Project site with the runoff.

Section 3.0 describes twenty-one (21) different types of BMPs. Some of these are only generally described as they tend to be applied on a location specific basis. Other types are described in more detail as they remain the same regardless of where they are used. This section also describes procedures used to restore the work sites following the completion of construction.

There are a number of State of New Hampshire documents that pertain to Erosion Control and BMPs along with Eversource's own BMP manual. All of these documents are relevant to this work. These are referenced in several locations in the documents and will be applied to the work of the Project.

BMPs only work if they are (1) correctly installed, (2) installed in the necessary locations, and (3) properly maintained during their use. If not correctly installed and/or not installed in the appropriate locations they will not work properly from the beginning and will not protect the resources that they were placed to protect. Once installed, proper maintenance is critical to the ongoing effectiveness of the BMP.

At the end of Section 3 of the SWPPP, there is a section that describes the proposed schedule of inspections and corrective actions to be taken with regard to the BMPs. It is critical that regular inspections of all installed BMPs be performed to verify their proper function and to identify any issues with the BMPs so they may be promptly addressed.

We have identified several statements within the SWPPP that we believe need additional clarification. These clarifications should be made in advance of the SEC's consideration of the Application so that their efficacy may be measured to fully understand the Project's impacts.

1. The proposed BMPs to be used for specific locations or situations need to be identified by the Applicants and evaluated by the SEC before the work is approved. As of this time there is no indication of which BMPs are planned to be used in any specific location.
2. Any temporary BMPs that are proposed to be used as permanent BMPs must be evaluated by the SEC and approved. The person or persons responsible for this review and approval need to be identified.
3. For some of the proposed BMPs such as silt fencing, the effects of lack of maintenance or failure of the BMP are more severe than others. Specific steps should be identified to address failures of these BMPs.
4. Section 4.6 discusses allowable non-stormwater discharges. One or more examples of this item should be provided.

SUMMARY OF FINDINGS

Short-term Impacts

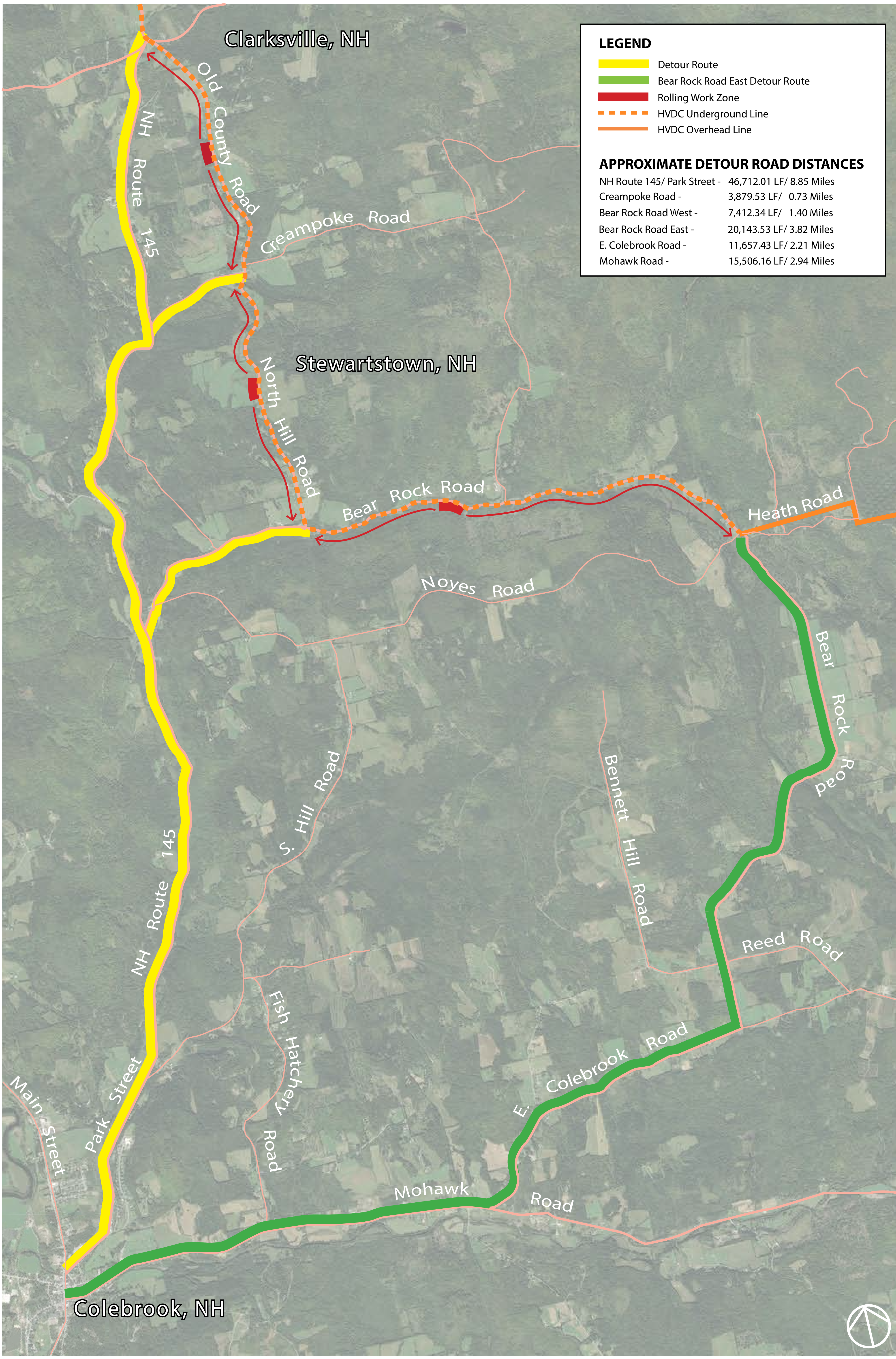
Staging and Laydown Areas - Given the potential need for additional staging and laydown areas beyond those submitted with the SEC Application there is insufficient information to fully assess the impacts these areas, which can be quite large, will have on New Hampshire communities and natural resources.

1. Increased traffic and traffic delays on public roads should be expected and will be a short-term impact on New Hampshire communities, businesses, and public road systems throughout construction. Increased traffic will be caused by construction vehicles, loss of available parking and close access to businesses, increased traffic accessing the right-of-way at numerous locations along the route and accessing laydown and staging areas along the route.
2. Inconvenience and hardship caused by road closures and detours in Woodstock, Easton, Franconia, Plymouth, Old County Road, North Hill Road and Bear Rock Road in Stewartstown.
3. Potential road damage to local roads from heavy construction vehicles.
4. Soil tracking onto public roads as vehicles exit the construction work areas.
5. The increase of noise above the ambient noise level through rural or lightly developed areas along much of the proposed route.
6. Potential sediment erosion, particularly on unpaved roads.
7. Visual impact from temporary asphalt road patch.
8. Potential impact on wetlands and water bodies.

Long-term Impacts

1. One of the most important aspects of the Project is the long-term impression that the Project will leave with the residents of, and visitors to, the State of New Hampshire. Many of these persons will form that impression based on what is easily discernable as they move over and around the project areas. This includes the driving surface of the roads. Where existing roads have an older pavement structure, the need for a well consolidated, permanent trench patch is critical.

   In our team's travels along the proposed route, there were a number of areas where the pavement was observed to have been recently rehabilitated (within the past three (3) years). In these areas permanent trench patch will likely be deemed insufficient regarding the impression it will have on residents and visitors to the State of New Hampshire, as the finished road will not be visually left in as good or better condition than before construction begins. To address this visual impact these areas should be repaved by mill and overlaid methods at a minimum for at least the half of the road where the trench was excavated.
2. Along the narrow, local roads and along some sections of state highways, the removal of roadside vegetation and trees will alter the look and character of these roads and their surrounding landscapes, long-term or permanently.



LEGEND

- Detour Route
- Bear Rock Road East Detour Route
- Rolling Work Zone
- HVDC Underground Line
- HVDC Overhead Line

APPROXIMATE DETOUR ROAD DISTANCES

NH Route 145/ Park Street -	46,712.01 LF/ 8.85 Miles
Creampoke Road -	3,879.53 LF/ 0.73 Miles
Bear Rock Road West -	7,412.34 LF/ 1.40 Miles
Bear Rock Road East -	20,143.53 LF/ 3.82 Miles
E. Colebrook Road -	11,657.43 LF/ 2.21 Miles
Mohawk Road -	15,506.16 LF/ 2.94 Miles

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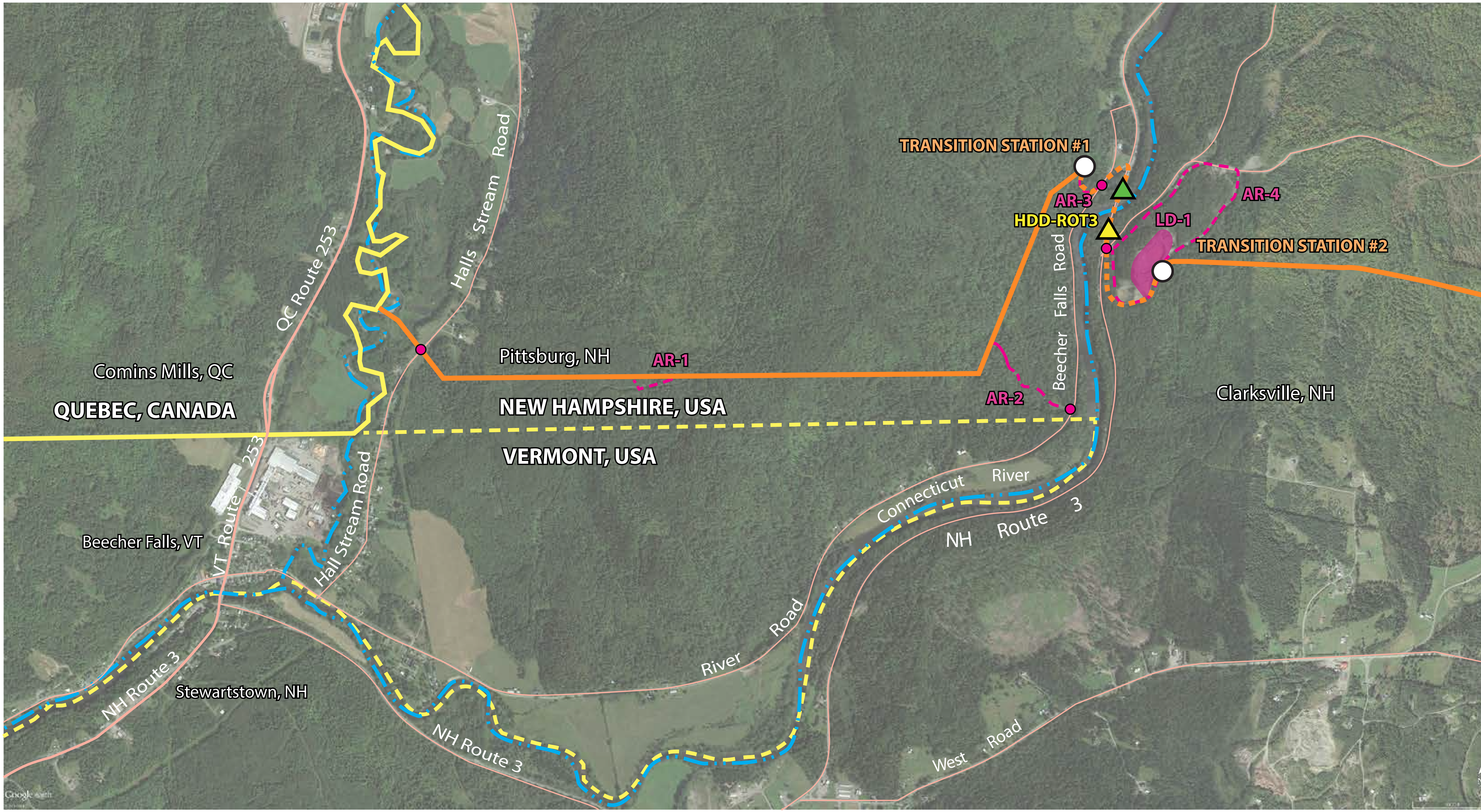
Northern Pass - Detour Route Map

Clarksville, Stewartstown, Colebrook

Scale: 1″ = 3000′

3000′ 1500′ 0′ 3000′ 6000′

Map 5A



SEE MAP 2

LEGEND

Transition Station	Converter Station	Fire Station	Public Road Access Point	Photo Simulation	HDD-#	HDD Label	HDD Start Location	HDD End Location	Culturally Sensitive Area		
Substation	Police Station	Hospital	School	Lay Down Area	AR-#	Access Route Label	State Divide	HVDC Underground Line	345kV Line		
			Structure in Wetland/ Waterway		LD-#	Lay Down Area Label	Country Divide	HVDC Overhead Line	Rivers/ Streams		
							Existing Access Route	Proposed Access Route			

PS-1

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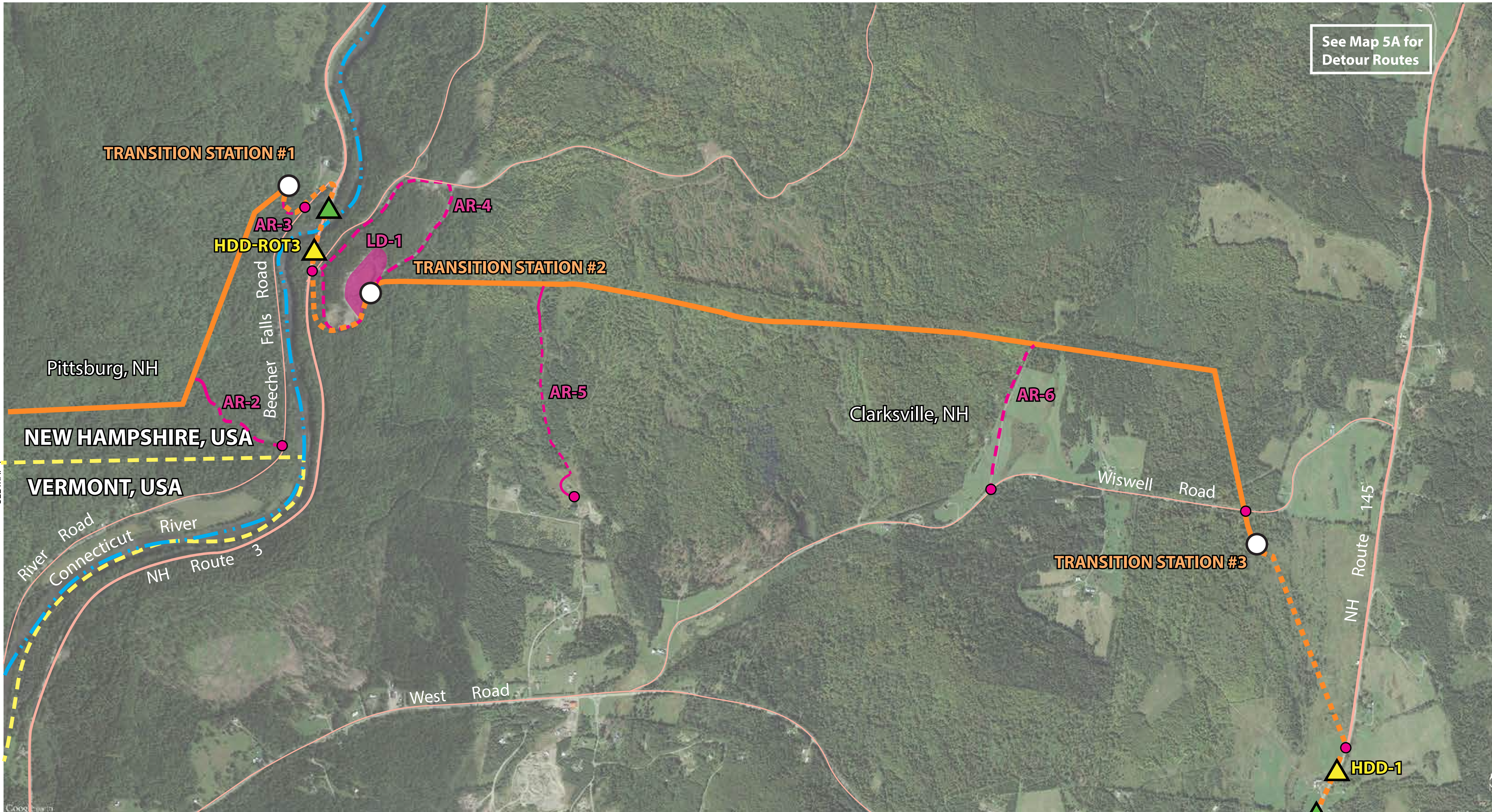
Canada to Transition Station #2

Canada, Pittsburg, Clarksville

Scale: 1″ = 1200′

1200′ 600′ 0′ 1200′ 2400′

Map 1



LEGEND

Transition Station
Substation
Converter Station
Police Station
Fire Station
Hospital
Public Road Access Point
School
Structure in Wetland/ Waterway
PS-1 Photo Simulation
Lay Down Area
HDD-# HDD Label
AR-# Access Route Label
LD-# Lay Down Area Label
HDD Start Location
State Divide
Country Divide
Existing Access Route
HDD End Location
HVDC Underground Line
HVDC Overhead Line
Proposed Access Route
Culturally Sensitive Area
345kV Line
Rivers/ Streams

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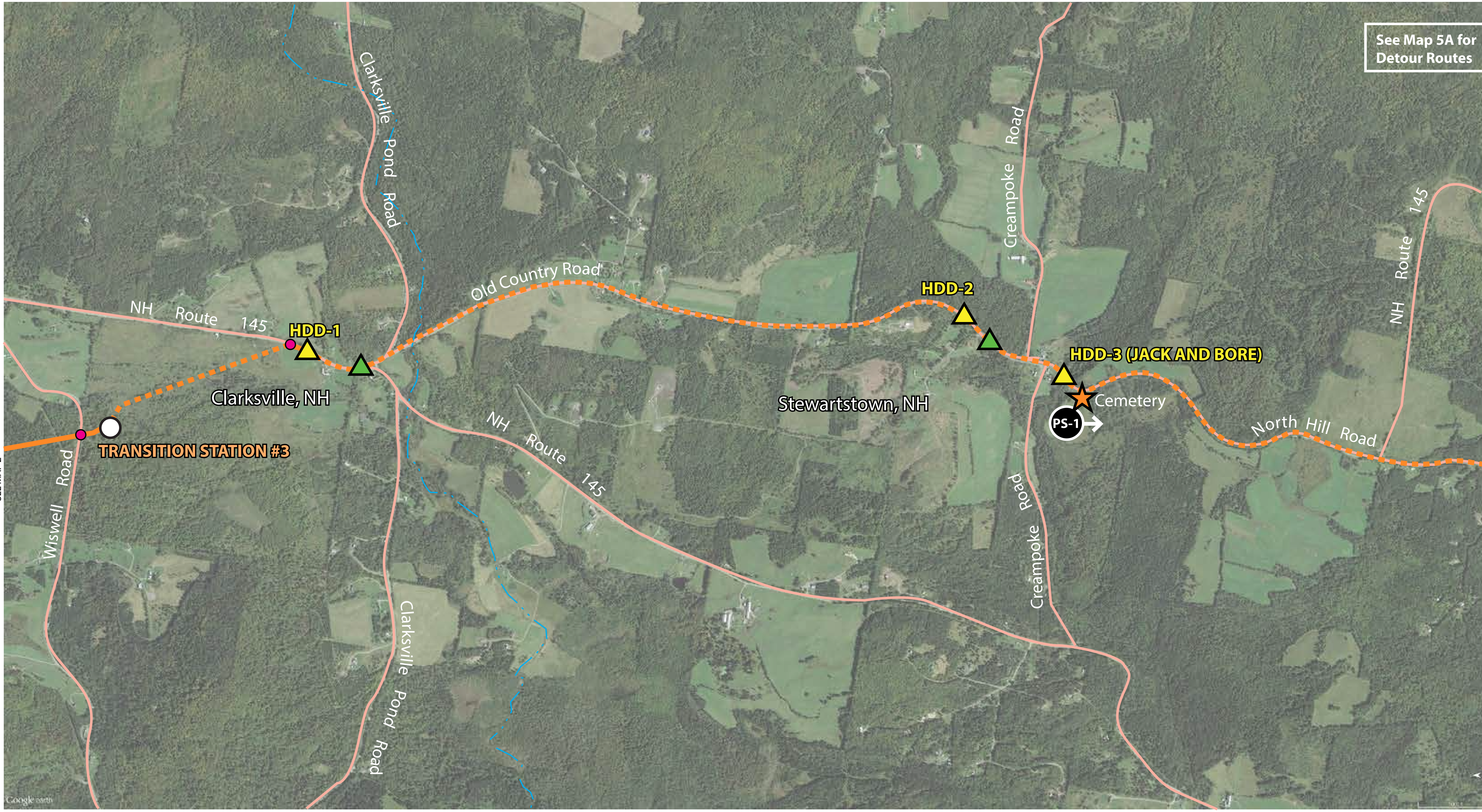
Transition Station #2 to Transition Station #3

Pittsburg, Clarksville

Map 2

Scale: 1″ = 1200′

1200′ 600′ 0′ 1200′ 2400′



LEGEND

Transition Station	Substation	Converter Station	Police Station
Fire Station	Hospital	Public Road Access Point	School
Structure in Wetland/ Waterway	Photo Simulation	Lay Down Area	HDD-# HDD Label
AR-# Access Route Label	LD-# Lay Down Area Label	HDD Start Location	State Divide
Country Divide	Existing Access Route	HDD End Location	HVDC Underground Line
HVDC Overhead Line	Proposed Access Route	Culturally Sensitive Area	345kV Line
Rivers/ Streams			

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Transition Station #3 to Transition Station #4

Clarksville, Stewartstown

Scale: 1″ = 1200′

1200′ 600′ 0′ 1200′ 2400′

Map 3

SEE MAP 5

SEE MAP 3

LEGEND

Transition Station
Substation
Converter Station
Police Station
Fire Station
Hospital
Public Road Access Point
School
Structure in Wetland/ Waterway
PS-1 Photo Simulation
Lay Down Area
HDD-# HDD Label
AR-# Access Route Label
LD-# Lay Down Area Label
HDD Start Location
State Divide
Country Divide
Existing Access Route
HDD End Location
HVDC Underground Line
HVDC Overhead Line
Proposed Access Route
Culturally Sensitive Area
345kV Line
Rivers/ Streams

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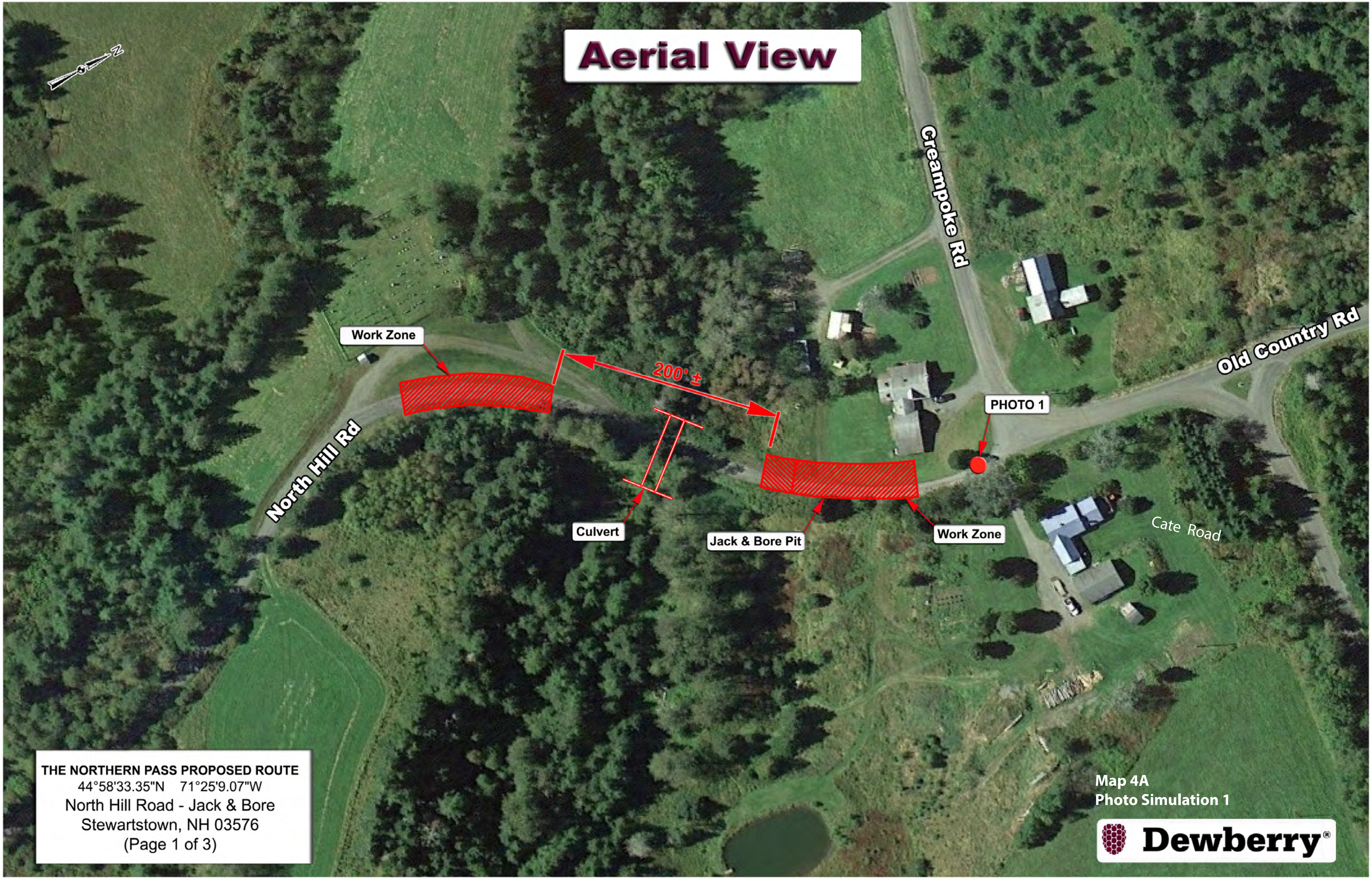
Transition Station #3 to Transition Station #4

Stewartstown

Map 4

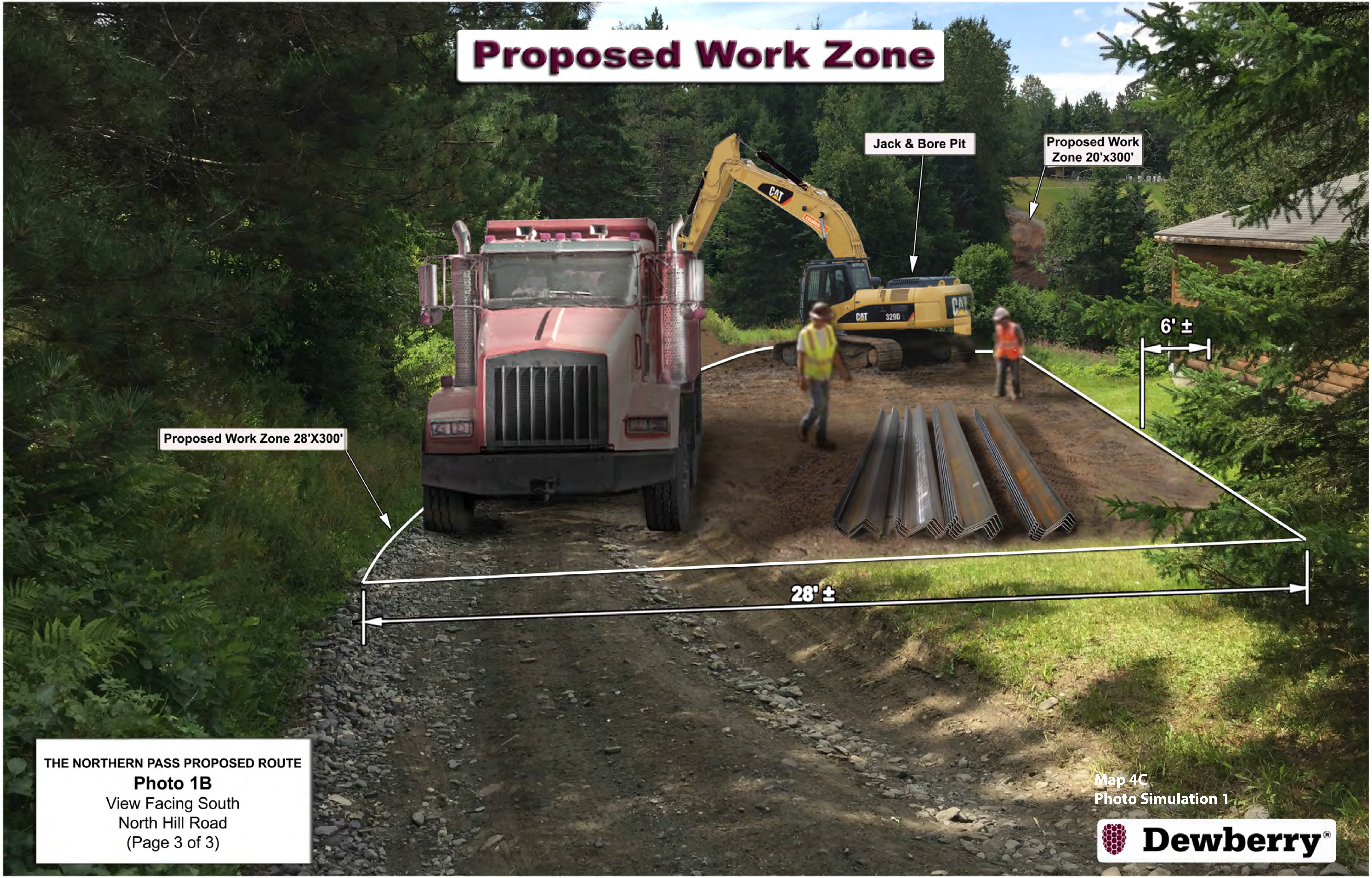
Scale: 1″ = 1200′

1200′ 600′ 0′ 1200′ 2400′



Aerial View
Creampoke Rd
Old Country Rd
Work Zone
200' ±
PHOTO 1
North Hill Rd
Culvert
Jack & Bore Pit
Work Zone
Cate Road
THE NORTHERN PASS PROPOSED ROUTE
44°58'33.35"N 71°25'9.07"W
North Hill Road - Jack & Bore
Stewartstown, NH 03576
(Page 1 of 3)
Map 4A
Photo Simulation 1
Dewberry

THE NORTHERN PASS PROPOSED ROUTE
Photo 1A
View Facing South
North Hill Road
(Page 2 of 3)


Proposed Work Zone
Jack & Bore Pit
Proposed Work Zone 20'x300'
6' ±
Proposed Work Zone 28'X300'
28' ±
THE NORTHERN PASS PROPOSED ROUTE
Photo 1B
View Facing South
North Hill Road
(Page 3 of 3)
Map 4C
Photo Simulation 1
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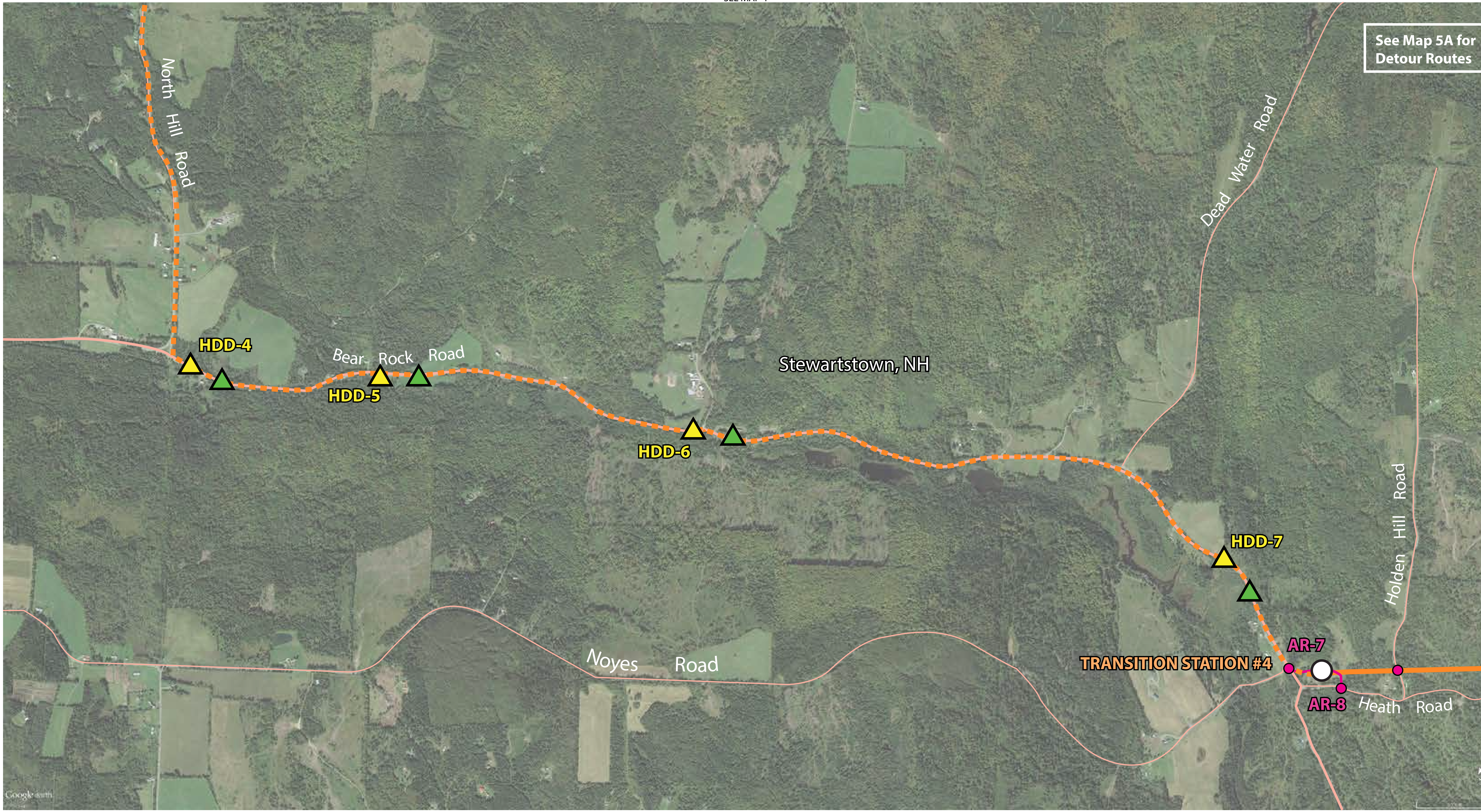
SEE MAP 4



SEE MAP 6

LEGEND

Transition Station	Converter Station	Fire Station	Public Road Access Point	Photo Simulation	HDD-# HDD Label	HDD Start Location
Substation	Police Station	Hospital	School	Lay Down Area	AR-# Access Route Label	State Divide
			Structure in Wetland/ Waterway		LD-# Lay Down Area Label	Country Divide
						Existing Access Route
HDD End Location	Culturally Sensitive Area					
HVDC Underground Line	345kV Line					
HVDC Overhead Line	Rivers/ Streams					
Proposed Access Route						

December 24, 2016

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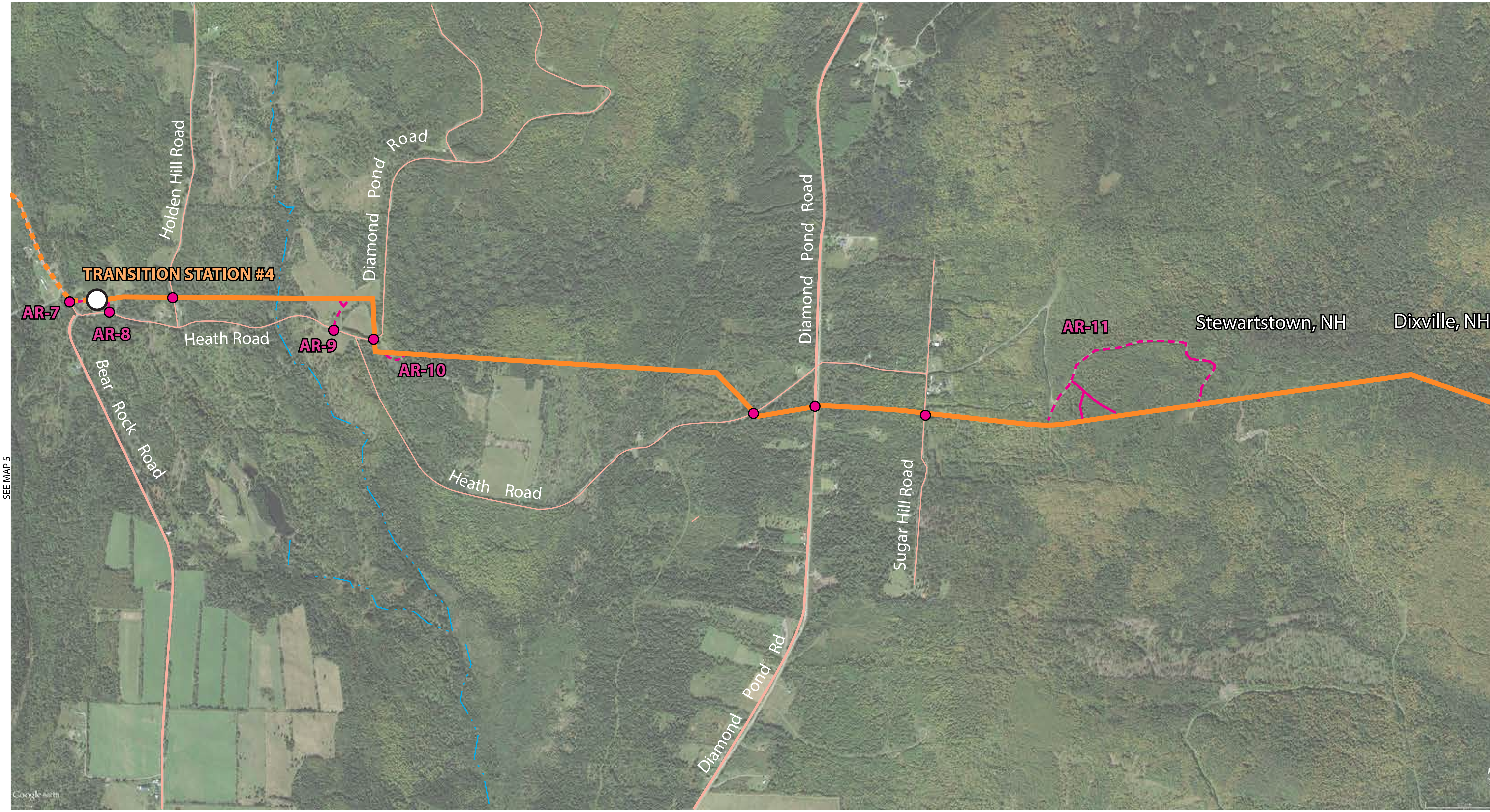
Transition Station #3 to Transition Station #4

Stewartstown

Scale: 1″= 1200′

1200′ 600′ 0′ 1200′ 2400′

Map 5



SEE MAP 5

SEE MAP 7

LEGEND

- Transition Station
- Substation
- Converter Station
- Police Station
- Fire Station
- Hospital
- Public Road Access Point
- School
- Structure in Wetland/ Waterway
- PS-1 Photo Simulation
- Lay Down Area
- HDD-# HDD Label
- AR-# Access Route Label
- LD-# Lay Down Area Label
- HDD Start Location
- State Divide
- Country Divide
- Existing Access Route
- HDD End Location
- HVDC Underground Line
- HVDC Overhead Line
- Proposed Access Route
- Culturally Sensitive Area
- 345kV Line
- Rivers/ Streams

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Transition Station #4 to Transition Station #5

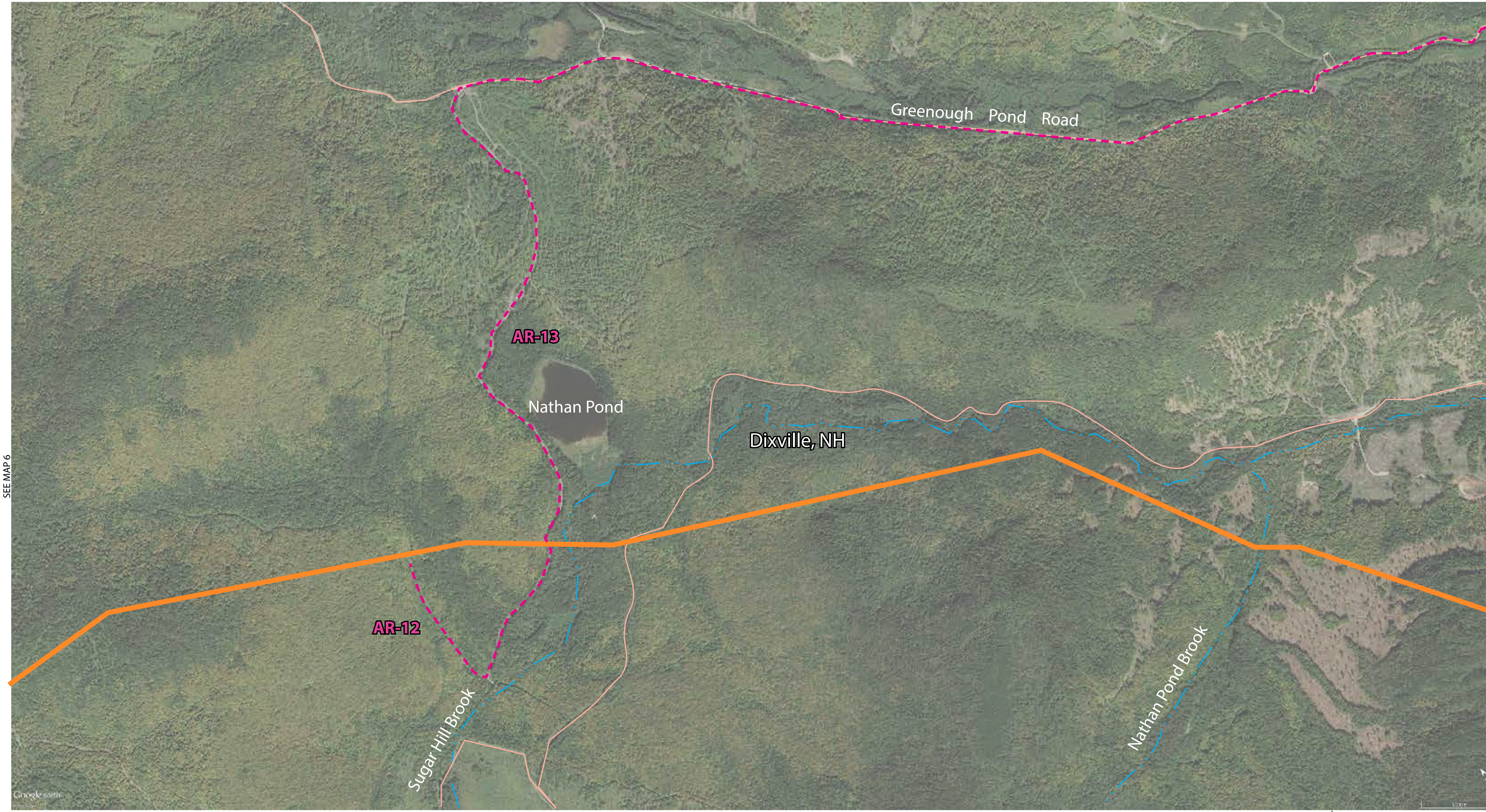
Stewartstown, Dixville

Map 6

Scale: 1″= 1200′

1200′ 600′ 0′ 1200′ 2400′

SEE MAP 6



SEE MAP 8

LEGEND

Transition Station	Substation	Converter Station	Police Station
Fire Station	Hospital	Public Road Access Point	School
Structure in Wetland/ Waterway	PS-1 Photo Simulation	Lay Down Area	HDD-# HDD Label
AR-# Access Route Label	LD-# Lay Down Area Label	HDD Start Location	State Divide
Country Divide	Existing Access Route	HDD End Location	HVDC Underground Line
HVDC Overhead Line	Proposed Access Route	Culturally Sensitive Area	345kV Line
Rivers/ Streams			

December 24, 2016

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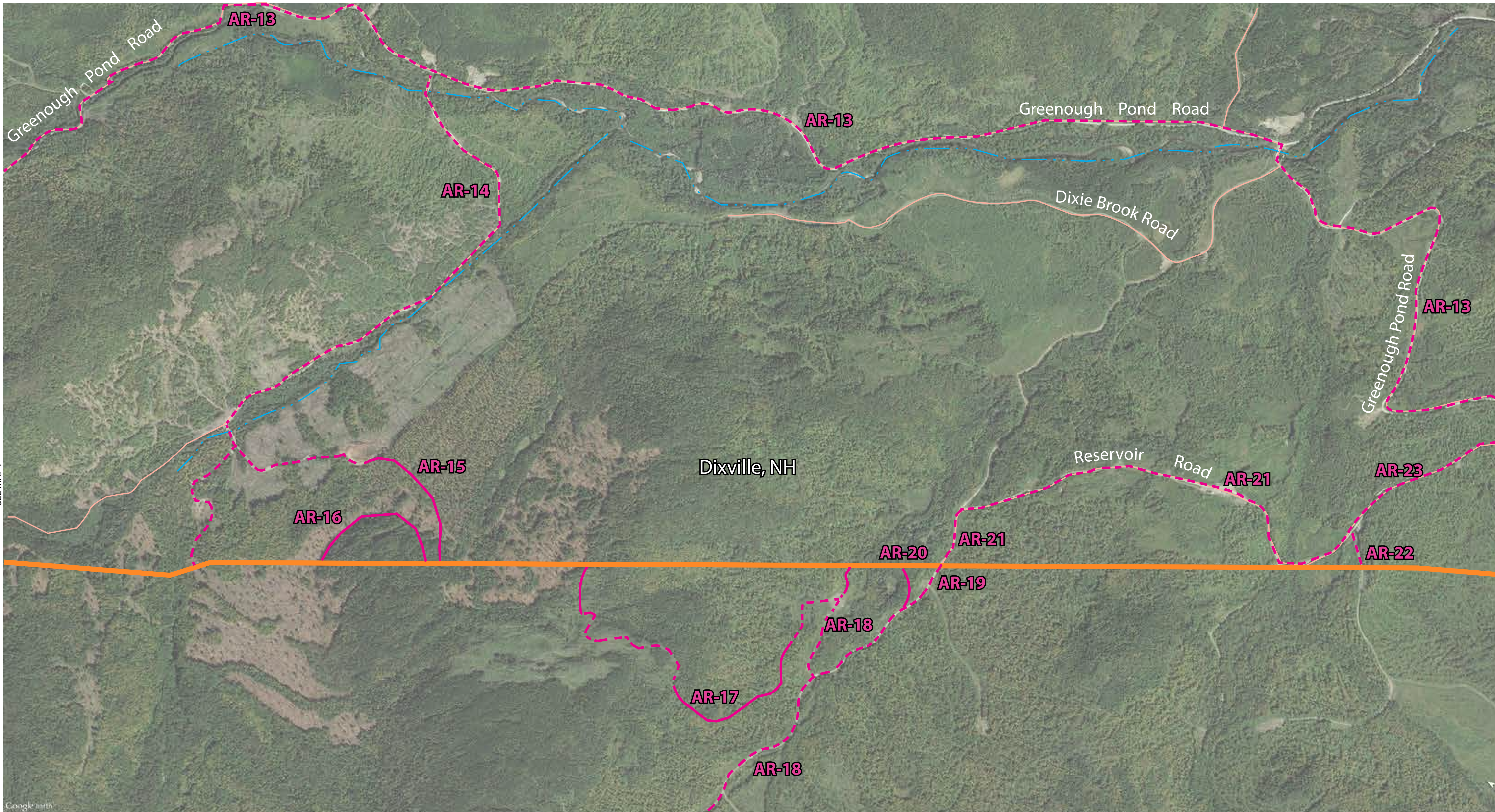
Transition Station #4 to Transition Station #5

Dixville

Map 7

Scale: 1″ = 1200′

1200′ 600′ 0′ 1200′ 2400′



LEGEND

Transition Station	Converter Station	Fire Station	Public Road Access Point	Photo Simulation	HDD-# HDD Label	HDD Start Location	HDD End Location	Culturally Sensitive Area
Substation	Police Station	Hospital	School	Lay Down Area	AR-# Access Route Label	State Divide	HVDC Underground Line	345kV Line
			Structure in Wetland/ Waterway		LD-# Lay Down Area Label	Country Divide	HVDC Overhead Line	Rivers/ Streams
					PS-1	Existing Access Route	Proposed Access Route	

December 24, 2016

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Transition Station #4 to Transition Station #5

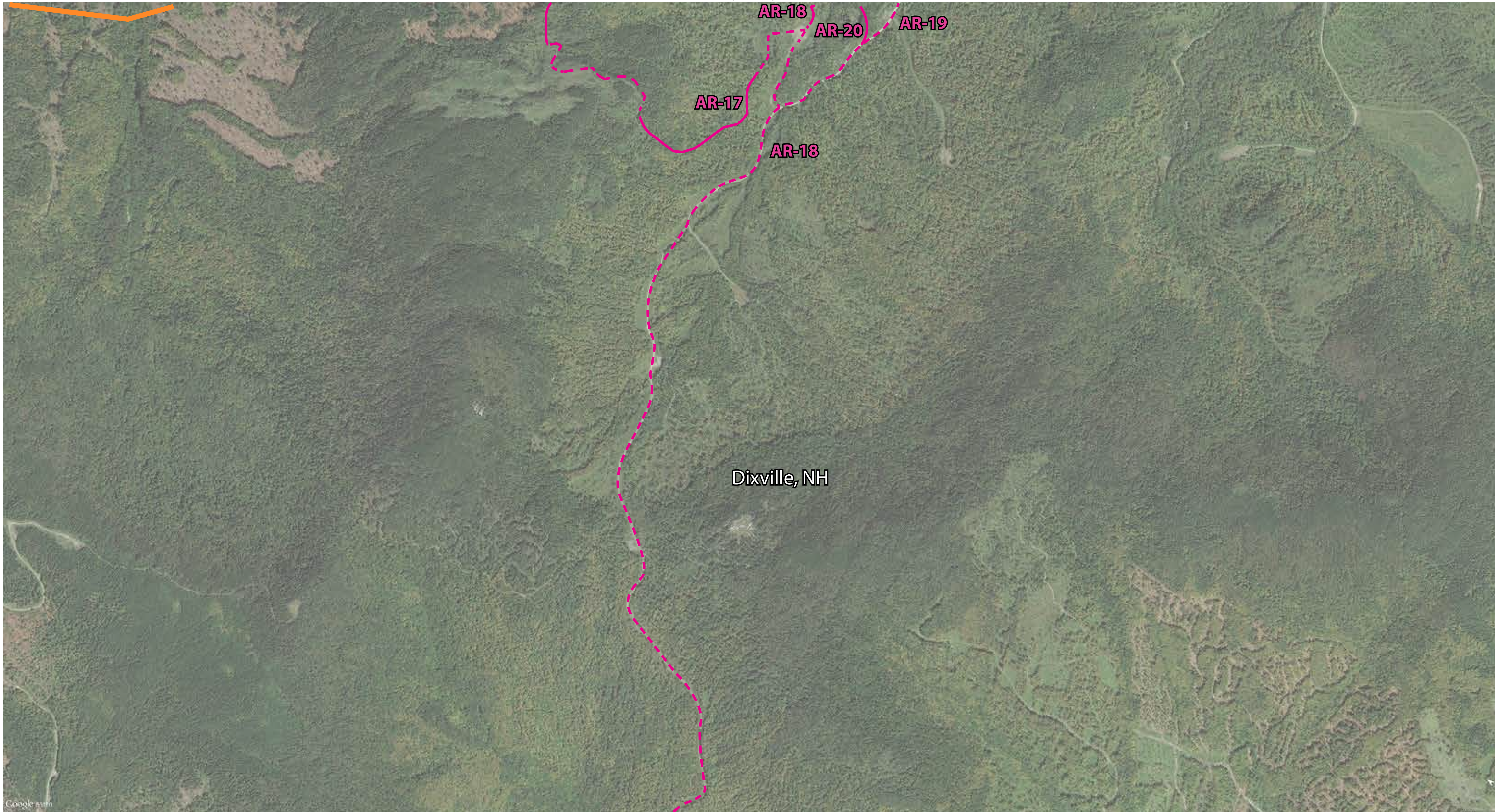
Dixville

Scale: 1″ = 1200′

1200′ 600′ 0′ 1200′ 2400′

Map 8

SEE MAP 8



SEE MAP 10

LEGEND

Transition Station
Substation
Converter Station
Police Station
Fire Station
Hospital
Public Road Access Point
School
Structure in Wetland/ Waterway
PS-1 Photo Simulation
Lay Down Area
HDD-# HDD Label
AR-# Access Route Label
LD-# Lay Down Area Label
HDD Start Location
State Divide
Country Divide
Existing Access Route
HDD End Location
HVDC Underground Line
HVDC Overhead Line
Proposed Access Route
Culturally Sensitive Area
345kV Line
Rivers/ Streams

December 24, 2016

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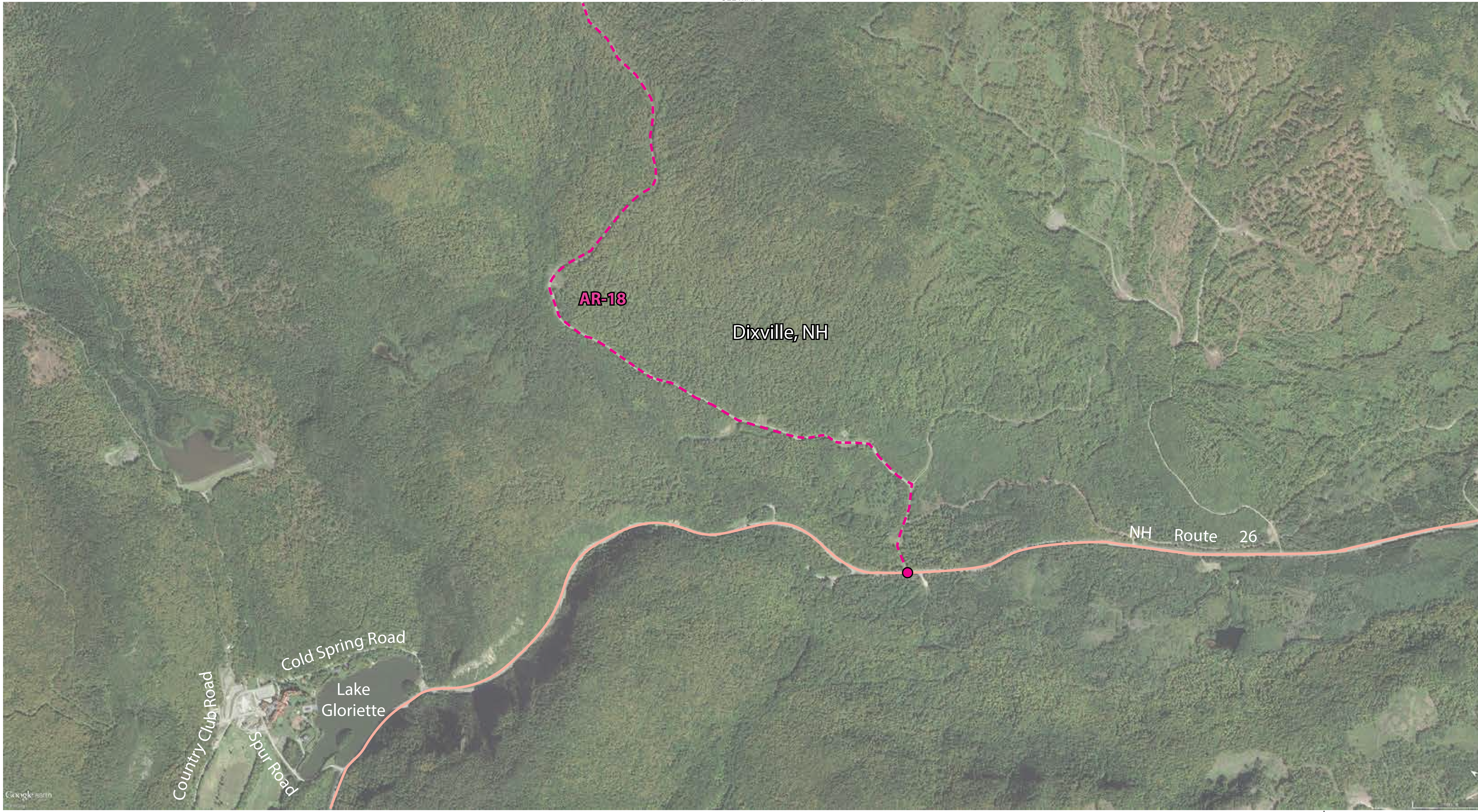
Transition Station #4 to Transition Station #5

Dixville

Scale: 1″ = 1200′

1200′ 600′ 0′ 1200′ 2400′

SEE MAP 9



LEGEND

Transition Station	Converter Station	Fire Station	Public Road Access Point	Photo Simulation	HDD-# HDD Label	HDD Start Location
Substation	Police Station	Hospital	School	Lay Down Area	AR-# Access Route Label	State Divide
			Structure in Wetland/ Waterway		LD-# Lay Down Area Label	Country Divide
						Existing Access Route
HDD End Location	Culturally Sensitive Area					
HVDC Underground Line	345kV Line					
HVDC Overhead Line	Rivers/ Streams					
Proposed Access Route						

December 24, 2016

Dewberry®

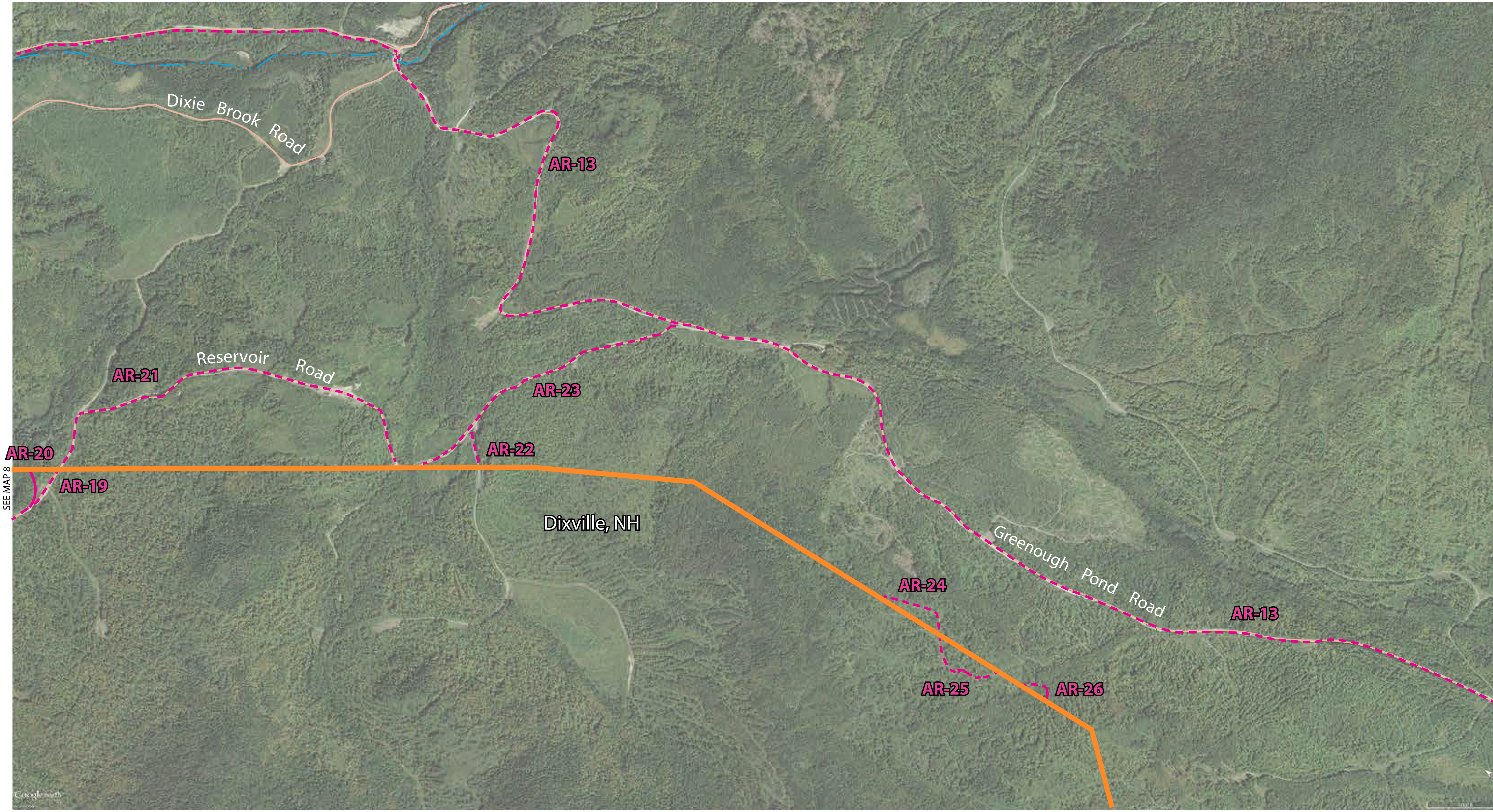
Transition Station #4 to Transition Station #5

Dixville

Scale: 1″ = 1200′

1200′ 600′ 0′ 1200′ 2400′

Map 10



LEGEND

- Transition Station
- Substation
- Converter Station
- Police Station
- Fire Station
- Hospital
- Public Road Access Point
- School
- Structure in Wetland/ Waterway
- PS-1 Photo Simulation
- Lay Down Area
- HDD-# HDD Label
- AR-# Access Route Label
- LD-# Lay Down Area Label
- HDD Start Location
- State Divide
- Country Divide
- Existing Access Route
- HDD End Location
- HVDC Underground Line
- HVDC Overhead Line
- Proposed Access Route
- Culturally Sensitive Area
- 345kV Line
- Rivers/ Streams

December 24, 2016

Dewberry

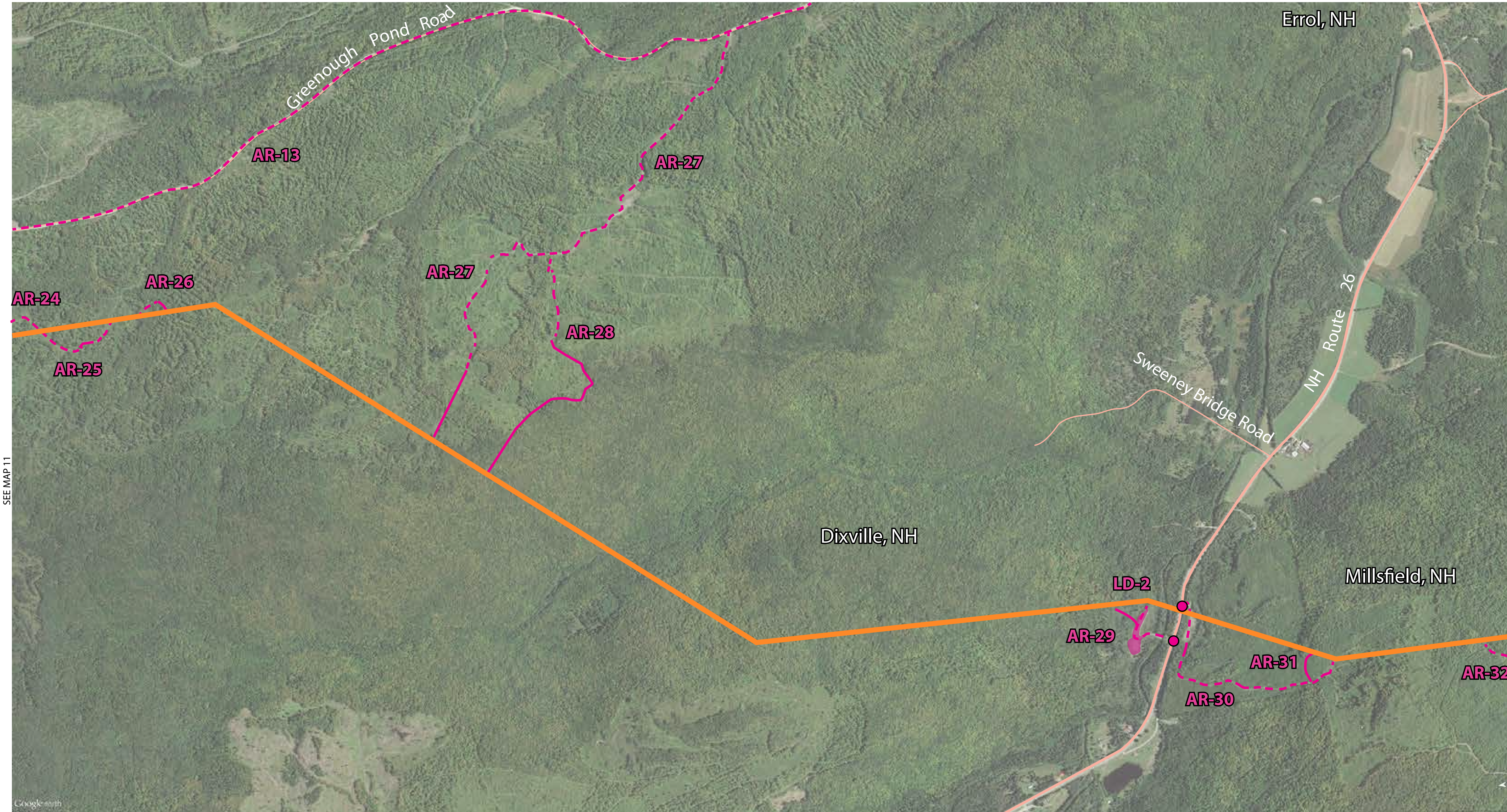
Transition Station #4 to Transition Station #5

Dixville

Scale: 1″= 1200′

1200′ 600′ 0′ 1200′ 2400′

Map 11



LEGEND

Transition Station
Substation
Converter Station
Police Station
Fire Station
Hospital
Public Road Access Point
School
Structure in Wetland/ Waterway
PS-1 Photo Simulation
Lay Down Area
HDD-# HDD Label
AR-# Access Route Label
LD-# Lay Down Area Label
HDD Start Location
State Divide
Country Divide
Existing Access Route
HDD End Location
HVDC Underground Line
HVDC Overhead Line
Proposed Access Route
Culturally Sensitive Area
345kV Line
Rivers/ Streams

December 24, 2016

Dewberry®

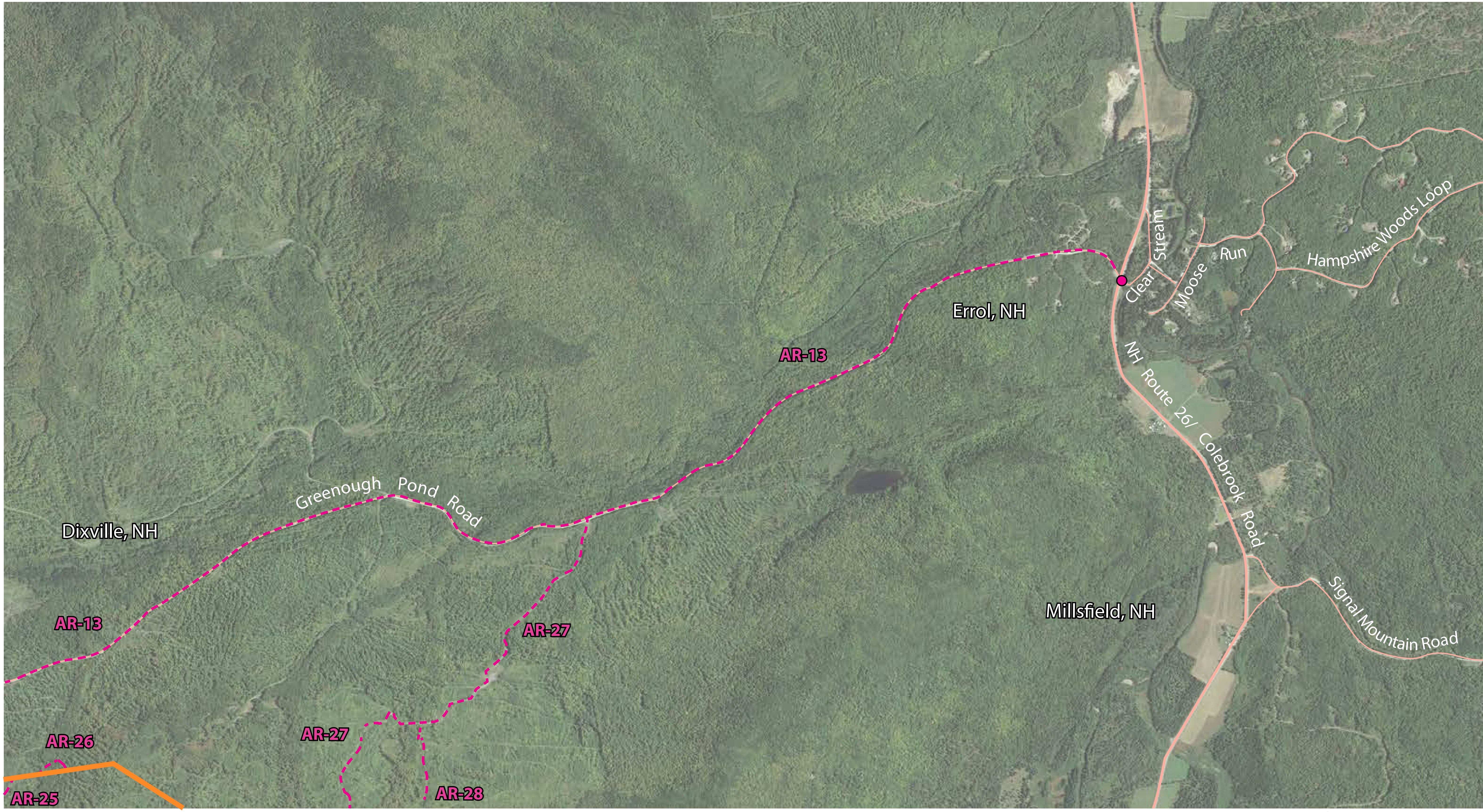
Transition Station #4 to Transition Station #5

Dixville, Millsfield

Scale: 1″ = 1200′

1200′ 600′ 0′ 1200′ 2400′

Map 12



SEE MAP 12

LEGEND

Transition Station	Converter Station	Fire Station	Public Road Access Point	Photo Simulation	HDD-# HDD Label	HDD Start Location	HDD End Location	Culturally Sensitive Area
Substation	Police Station	Hospital	School	Lay Down Area	AR-# Access Route Label	State Divide	HVDC Underground Line	345kV Line
			Structure in Wetland/ Waterway		LD-# Lay Down Area Label	Country Divide	HVDC Overhead Line	Rivers/ Streams
						Existing Access Route	Proposed Access Route	

December 24, 2016

Dewberry®

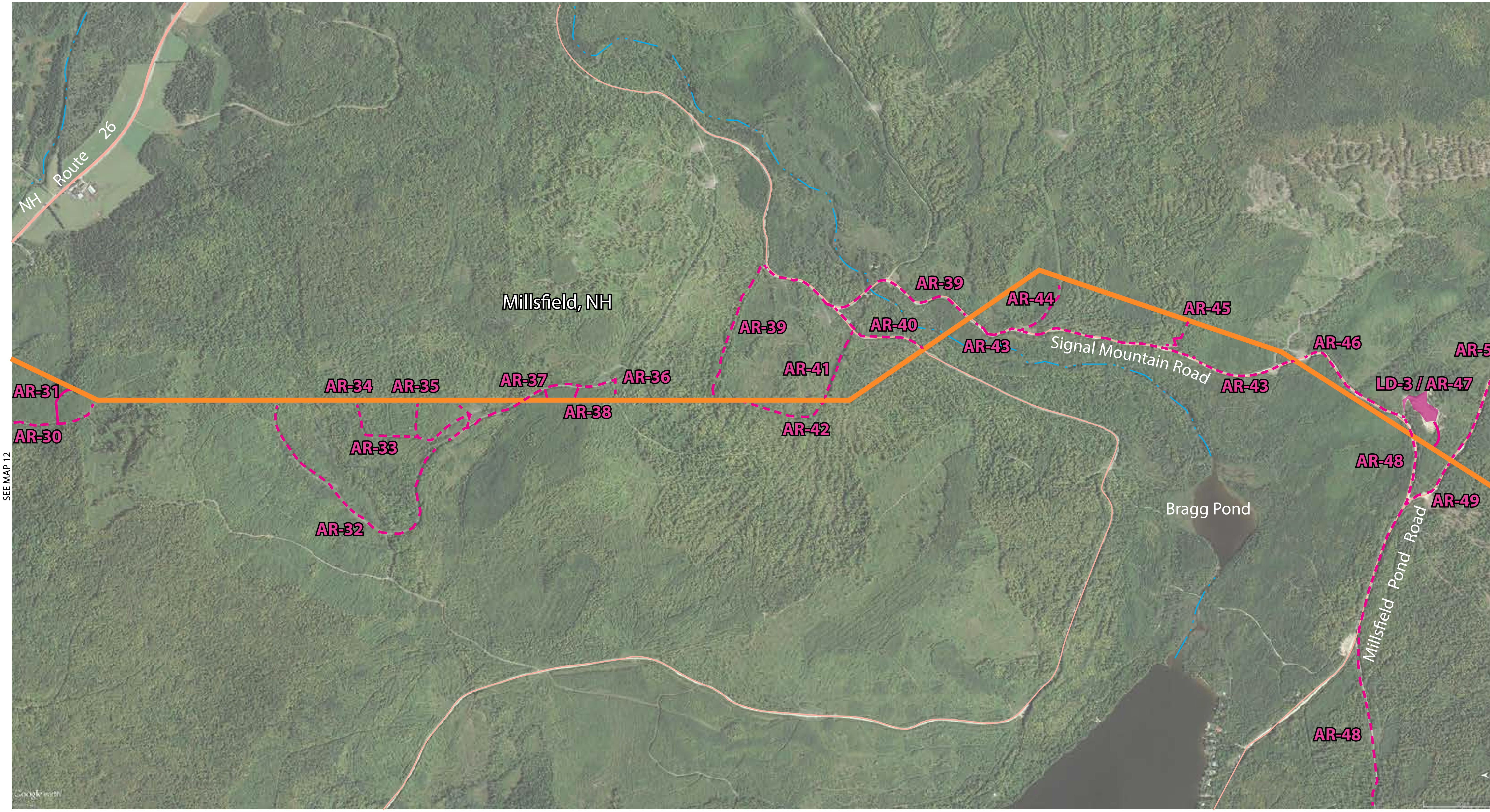
Transition Station #4 to Transition Station #5

Dixville, Millsfield, Errol

Scale: 1″ = 1200′

1200′ 600′ 0′ 1200′ 2400′

Map 13



LEGEND

Transition Station
Substation
Converter Station
Police Station
Fire Station
Hospital
Public Road Access Point
School
Structure in Wetland/ Waterway
PS-1 Photo Simulation
Lay Down Area
HDD-# HDD Label
AR-# Access Route Label
LD-# Lay Down Area Label
HDD Start Location
State Divide
Country Divide
Existing Access Route
HDD End Location
HVDC Underground Line
HVDC Overhead Line
Proposed Access Route
Culturally Sensitive Area
345kV Line
Rivers/ Streams

December 24, 2016

Dewberry®

Transition Station #4 to Transition Station #5

Millsfield

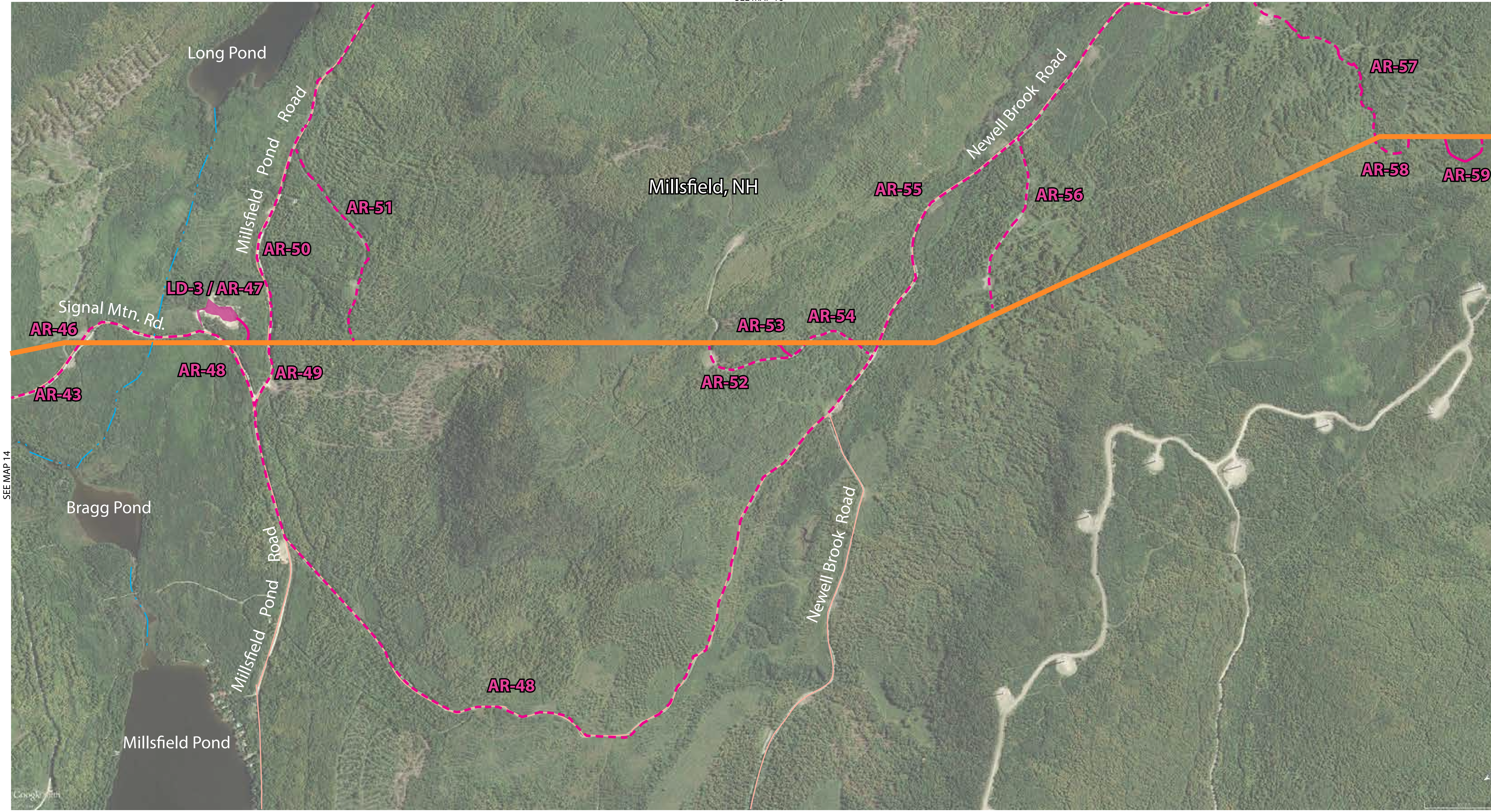
Scale: 1″ = 1200′

1200′ 600′ 0′ 1200′ 2400′

Map 14

SEE MAP 16

SEE MAP 14



SEE MAP 20

LEGEND

Transition Station	Substation	
Converter Station	Police Station	
Fire Station	Hospital	
Public Road Access Point	School	
Structure in Wetland/ Waterway		
PS-1	Photo Simulation	
	Lay Down Area	
HDD-#	HDD Label	
AR-#	Access Route Label	
LD-#	Lay Down Area Label	
HDD Start Location	State Divide	
Country Divide	Existing Access Route	
HDD End Location	HVDC Underground Line	
HVDC Overhead Line	Proposed Access Route	
Culturally Sensitive Area	345kV Line	
Rivers/ Streams		

December 24, 2016

Dewberry®

Transition Station #4 to Transition Station #5

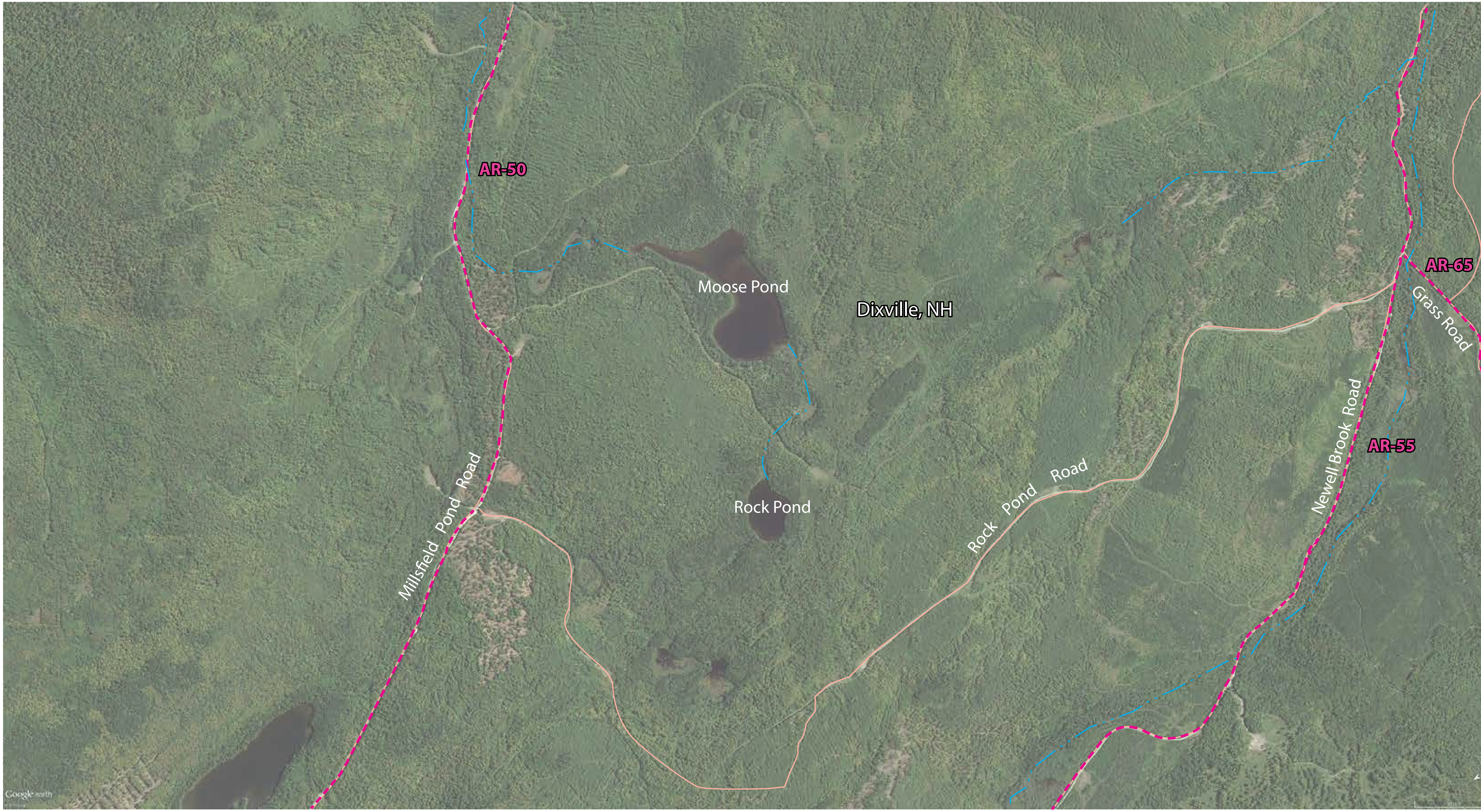
Millsfield

Scale: 1″ = 1200′

1200′ 600′ 0′ 1200′ 2400′

Map 15

SEE MAP 17



LEGEND

Transition Station
Substation
Converter Station
Police Station
Fire Station
Hospital
Public Road Access Point
School
Structure in Wetland/ Waterway
PS-1 Photo Simulation
Lay Down Area
HDD-# HDD Label
AR-# Access Route Label
LD-# Lay Down Area Label
HDD Start Location
State Divide
Country Divide
Existing Access Route
HDD End Location
HVDC Underground Line
HVDC Overhead Line
Proposed Access Route
Culturally Sensitive Area
345kV Line
Rivers/ Streams

December 24, 2016

Dewberry®

Transition Station #4 to Transition Station #5

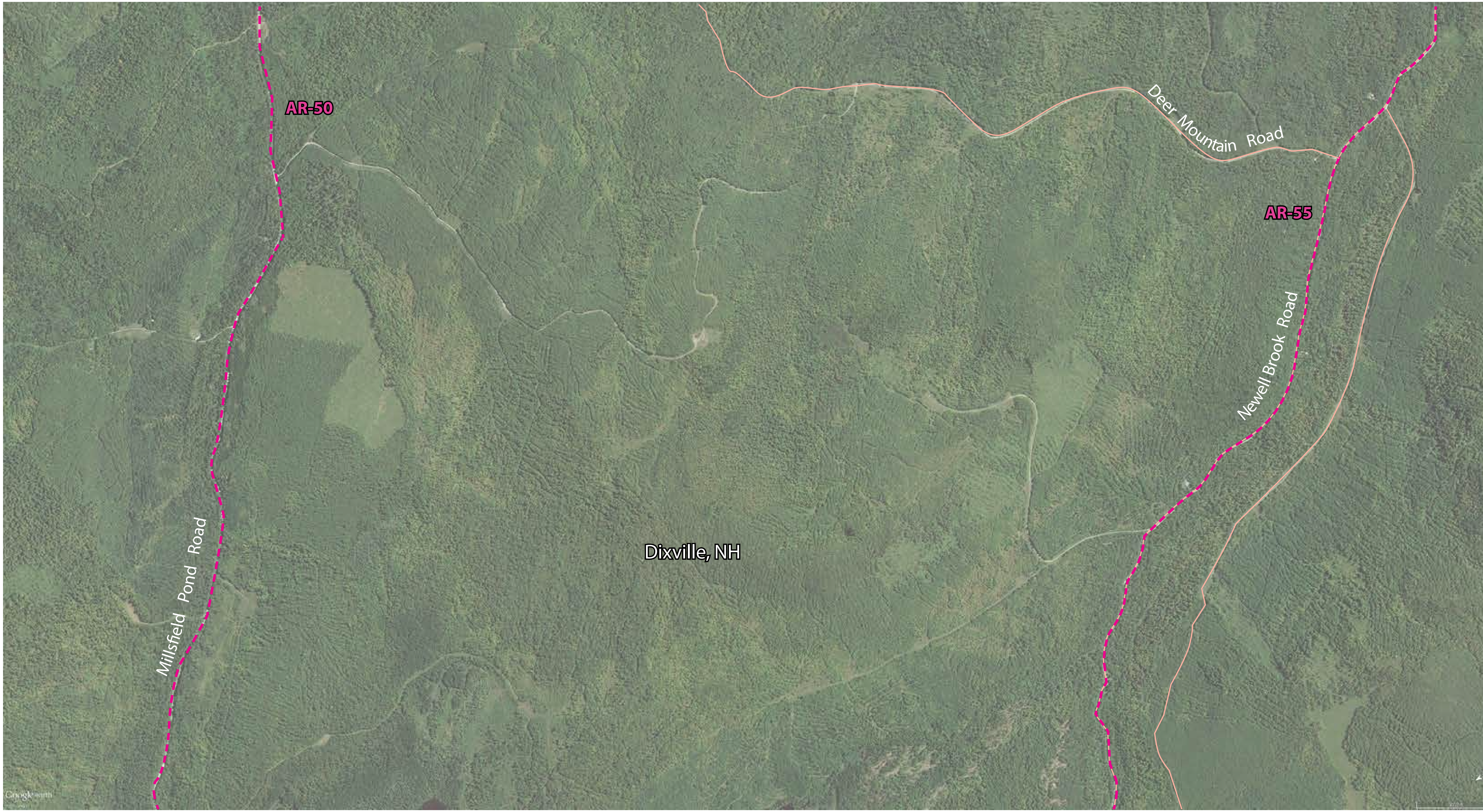
Dixville

Scale: 1″= 1200′

1200′ 600′ 0′ 1200′ 2400′

Map 16

SEE MAP 18



SEE MAP 16

LEGEND

- Transition Station
- Substation
- Converter Station
- Police Station
- Fire Station
- Hospital
- Public Road Access Point
- School
- Structure in Wetland/ Waterway
- PS-1 Photo Simulation
- Lay Down Area
- HDD-# HDD Label
- AR-# Access Route Label
- LD-# Lay Down Area Label
- HDD Start Location
- State Divide
- Country Divide
- Existing Access Route
- HDD End Location
- HVDC Underground Line
- HVDC Overhead Line
- Proposed Access Route
- Culturally Sensitive Area
- 345kV Line
- Rivers/ Streams

December 24, 2016

Dewberry

Transition Station #4 to Transition Station #5

Dixville

Scale: 1″ = 1200′

1200′ 600′ 0′ 1200′ 2400′

Map 17

SEE MAP 17

LEGEND

Transition Station
Substation
Converter Station
Police Station
Fire Station
Hospital
Public Road Access Point
School
Structure in Wetland/ Waterway
PS-1 Photo Simulation
Lay Down Area
HDD-# HDD Label
AR-# Access Route Label
LD-# Lay Down Area Label
HDD Start Location
State Divide
Country Divide
Existing Access Route
HDD End Location
HVDC Underground Line
HVDC Overhead Line
Proposed Access Route
Culturally Sensitive Area
345kV Line
Rivers/ Streams

December 24, 2016

Dewberry®

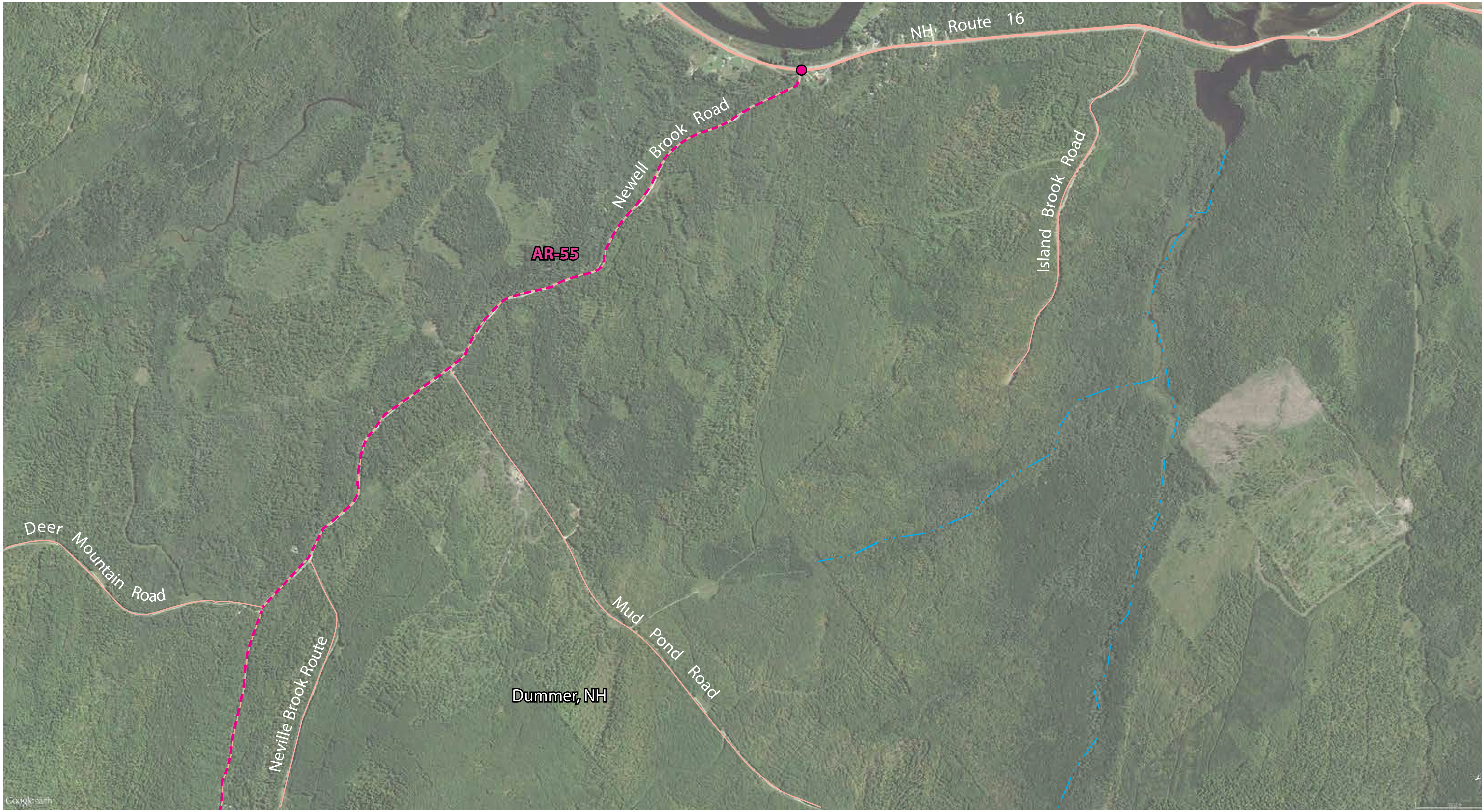
Transition Station #4 to Transition Station #5

Dummer

Map 18

Scale: 1″ = 1200′

1200′ 600′ 0′ 1200′ 2400′



SEE MAP 18

LEGEND

Transition Station
Substation
Converter Station
Police Station
Fire Station
Hospital
Public Road Access Point
School
Structure in Wetland/ Waterway
PS-1 Photo Simulation
Lay Down Area
HDD-# HDD Label
AR-# Access Route Label
LD-# Lay Down Area Label
HDD Start Location
State Divide
Country Divide
Existing Access Route
HDD End Location
HVDC Underground Line
HVDC Overhead Line
Proposed Access Route
Culturally Sensitive Area
345kV Line
Rivers/ Streams

December 24, 2016

Dewberry®

Transition Station #4 to Transition Station #5

Dummer

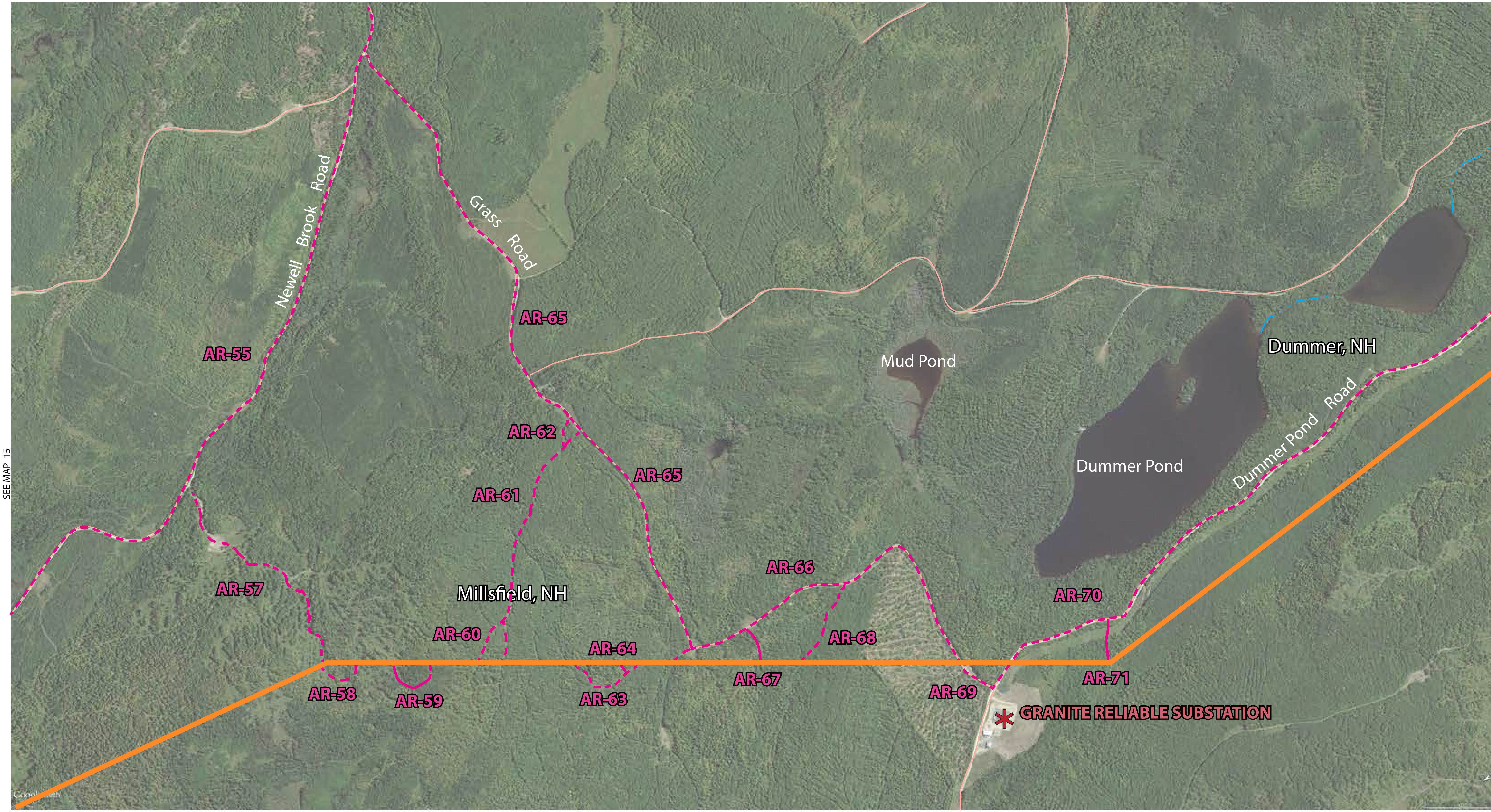
Scale: 1″ = 1200′

1200′ 600′ 0′ 1200′ 2400′

Map 19

SEE MAP 16

SEE MAP 15



SEE MAP 21

LEGEND

- Transition Station
- Substation
- Converter Station
- Police Station
- Fire Station
- Hospital
- Public Road Access Point
- School
- Structure in Wetland/ Waterway
- PS-1 Photo Simulation
- Lay Down Area
- HDD-# HDD Label
- AR-# Access Route Label
- LD-# Lay Down Area Label
- HDD Start Location
- State Divide
- Country Divide
- Existing Access Route
- HDD End Location
- HVDC Underground Line
- HVDC Overhead Line
- Proposed Access Route
- Culturally Sensitive Area
- 345kV Line
- Rivers/ Streams

December 24, 2016

Dewberry®

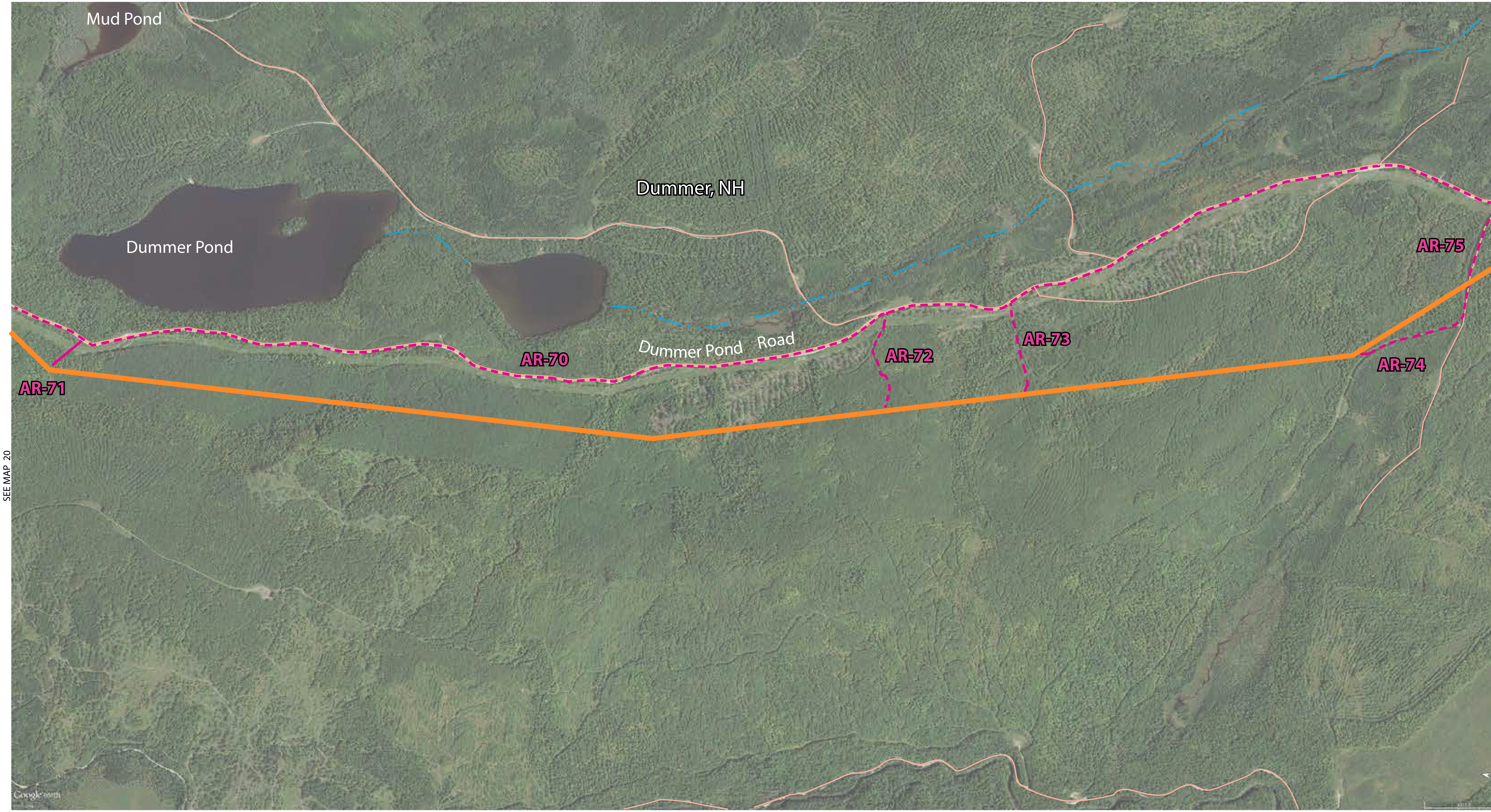
Transition Station #4 to Transition Station #5

Millsfield, Dummer

Scale: 1″ = 1200′

1200′ 600′ 0′ 1200′ 2400′

Map 20



LEGEND

Transition Station
Substation
Converter Station
Police Station
Fire Station
Hospital
Public Road Access Point
School
Structure in Wetland/ Waterway
PS-1 Photo Simulation
Lay Down Area
HDD-# HDD Label
AR-# Access Route Label
LD-# Lay Down Area Label
HDD Start Location
State Divide
Country Divide
Existing Access Route
HDD End Location
HVDC Underground Line
HVDC Overhead Line
Proposed Access Route
Culturally Sensitive Area
345kV Line
Rivers/ Streams

December 24, 2016

Dewberry®

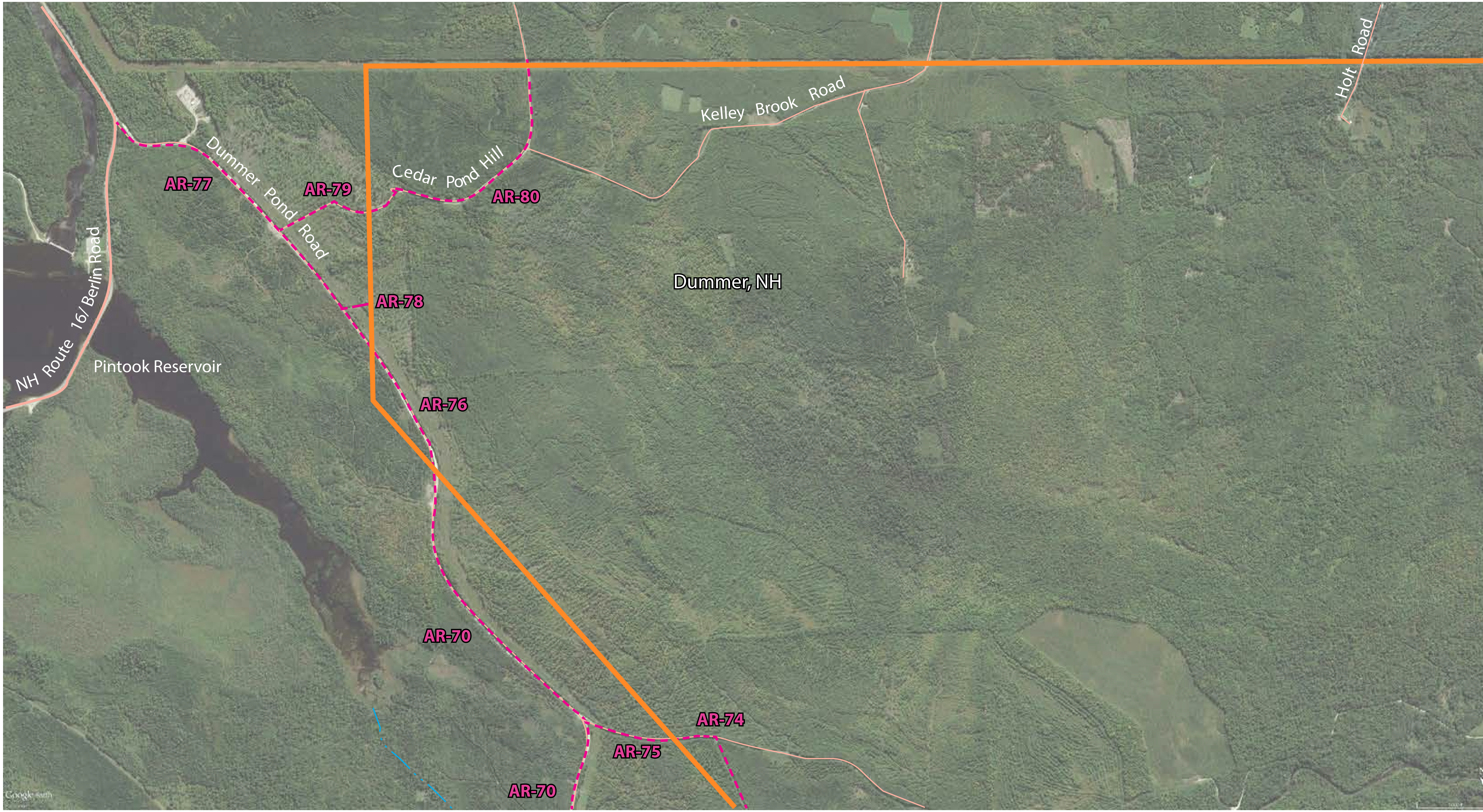
Transition Station #4 to Transition Station #5

Dummer

Map 21

Scale: 1" = 1200'

1200' 600' 0' 1200' 2400'



LEGEND

Transition Station
Substation
Converter Station
Police Station
Fire Station
Hospital
Public Road Access Point
School
Structure in Wetland/ Waterway
Photo Simulation
Lay Down Area
HDD-# HDD Label
AR-# Access Route Label
LD-# Lay Down Area Label
HDD Start Location
State Divide
Country Divide
Existing Access Route
HDD End Location
HVDC Underground Line
HVDC Overhead Line
Proposed Access Route
Culturally Sensitive Area
345kV Line
Rivers/ Streams

December 24, 2016

Dewberry

Transition Station #4 to Transition Station #5

Dummer

Map 22

Scale: 1″ = 1200′

1200′ 600′ 0′ 1200′ 2400′

LEGEND

- Transition Station
- Substation
- Converter Station
- Police Station
- Fire Station
- Hospital
- Public Road Access Point
- School
- Structure in Wetland/ Waterway
- PS-1 Photo Simulation
- Lay Down Area
- HDD-# HDD Label
- AR-# Access Route Label
- LD-# Lay Down Area Label
- HDD Start Location
- State Divide
- Country Divide
- Existing Access Route
- HDD End Location
- HVDC Underground Line
- HVDC Overhead Line
- Proposed Access Route
- Culturally Sensitive Area
- 345kV Line
- Rivers/ Streams

December 24, 2016

Dewberry

Transition Station #4 to Transition Station #5

Dummer, Stark

Map 23

Scale: 1″ = 1200′

1200′ 600′ 0′ 1200′ 2400′

LEGEND

Transition Station
Substation
Converter Station
Police Station
Fire Station
Hospital
Public Road Access Point
School
Structure in Wetland/ Waterway
PS-1 Photo Simulation
Lay Down Area
HDD-# HDD Label
AR-# Access Route Label
LD-# Lay Down Area Label
HDD Start Location
State Divide
Country Divide
Existing Access Route
HDD End Location
HVDC Underground Line
HVDC Overhead Line
Proposed Access Route
Culturally Sensitive Area
345kV Line
Rivers/ Streams

December 24, 2016

Dewberry®

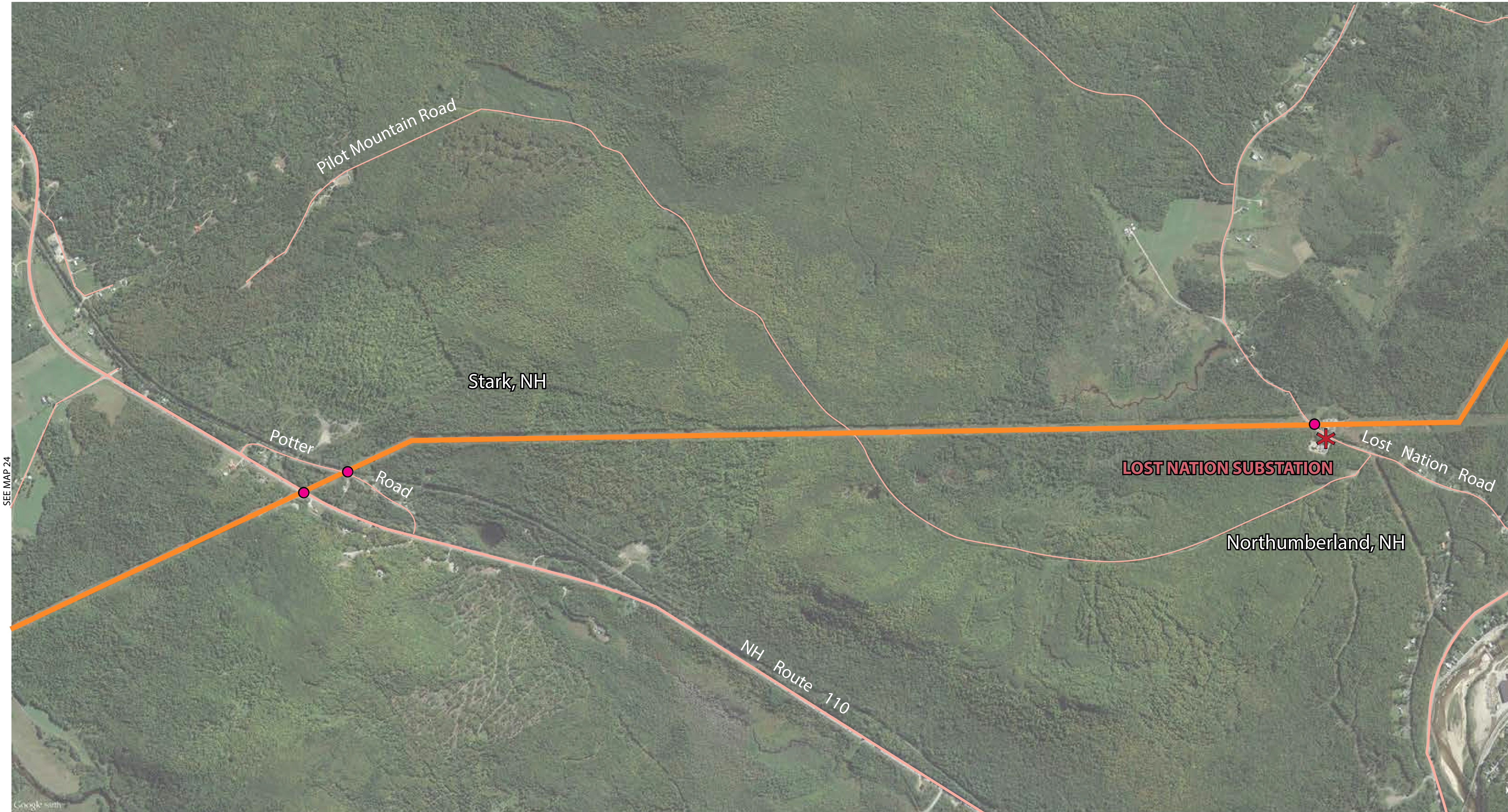
Transition Station #4 to Transition Station #5

Stark

Scale: 1" = 1200'

1200' 600' 0' 1200' 2400'

Map 24



LEGEND

- Transition Station
- Substation
- Converter Station
- Police Station
- Fire Station
- Hospital
- Public Road Access Point
- School
- Structure in Wetland/ Waterway
- PS-1 Photo Simulation
- Lay Down Area
- HDD-# HDD Label
- AR-# Access Route Label
- LD-# Lay Down Area Label
- HDD Start Location
- State Divide
- Country Divide
- Existing Access Route
- HDD End Location
- HVDC Underground Line
- HVDC Overhead Line
- Proposed Access Route
- Culturally Sensitive Area
- 345kV Line
- Rivers/ Streams

December 24, 2016

Dewberry

Transition Station #4 to Transition Station #5

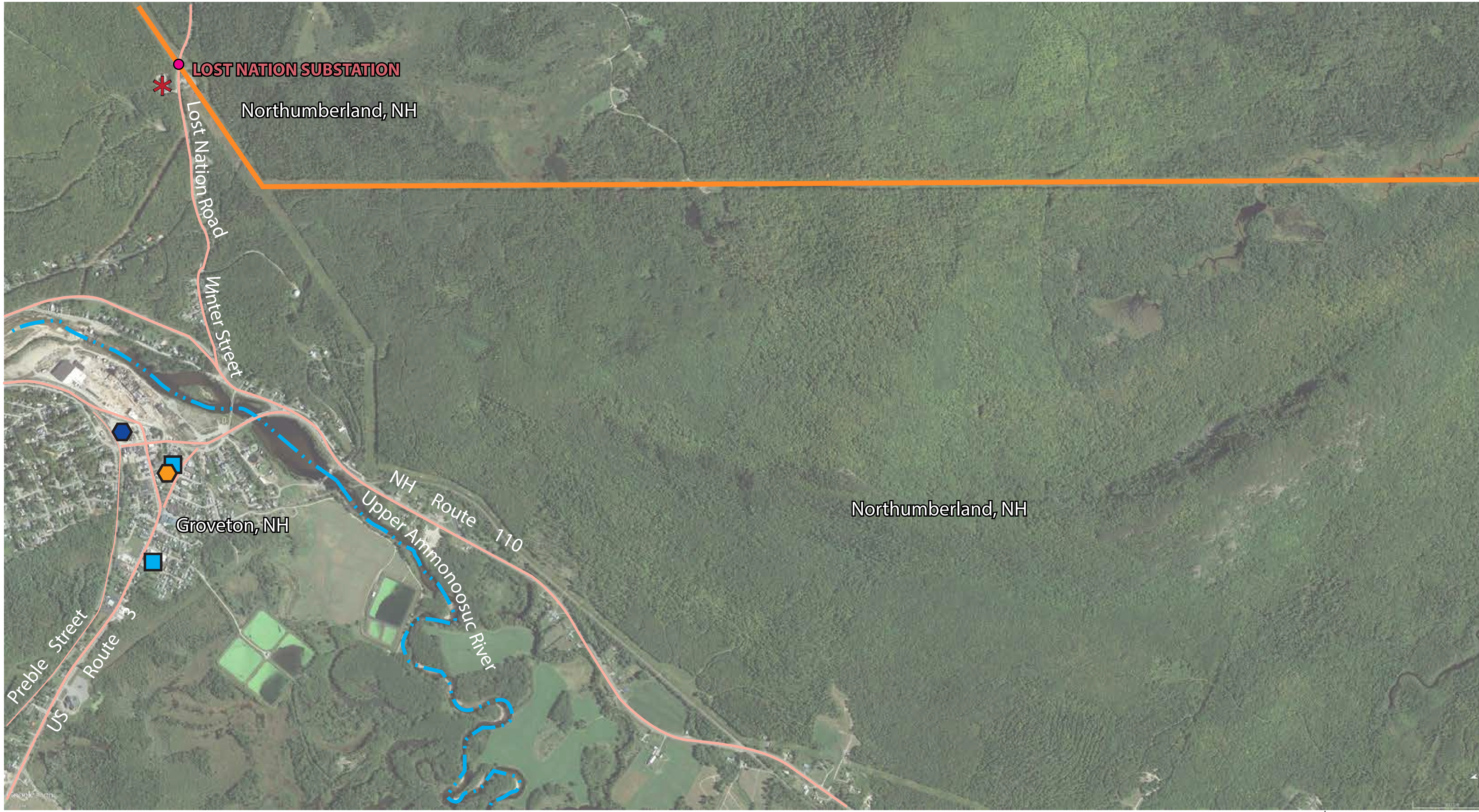
Stark, Northumberland

Scale: 1″ = 1200′

1200′ 600′ 0′ 1200′ 2400′

Map 25

SEE MAP 25



SEE MAP 27

LEGEND

- Transition Station
- Substation
- Converter Station
- Police Station
- Fire Station
- Hospital
- Public Road Access Point
- School
- Structure in Wetland/ Waterway
- PS-1 Photo Simulation
- Lay Down Area
- HDD-# HDD Label
- AR-# Access Route Label
- LD-# Lay Down Area Label
- HDD Start Location
- State Divide
- Country Divide
- Existing Access Route
- HDD End Location
- HVDC Underground Line
- HVDC Overhead Line
- Proposed Access Route
- Culturally Sensitive Area
- 345kV Line
- Rivers/ Streams

December 24, 2016

Dewberry®

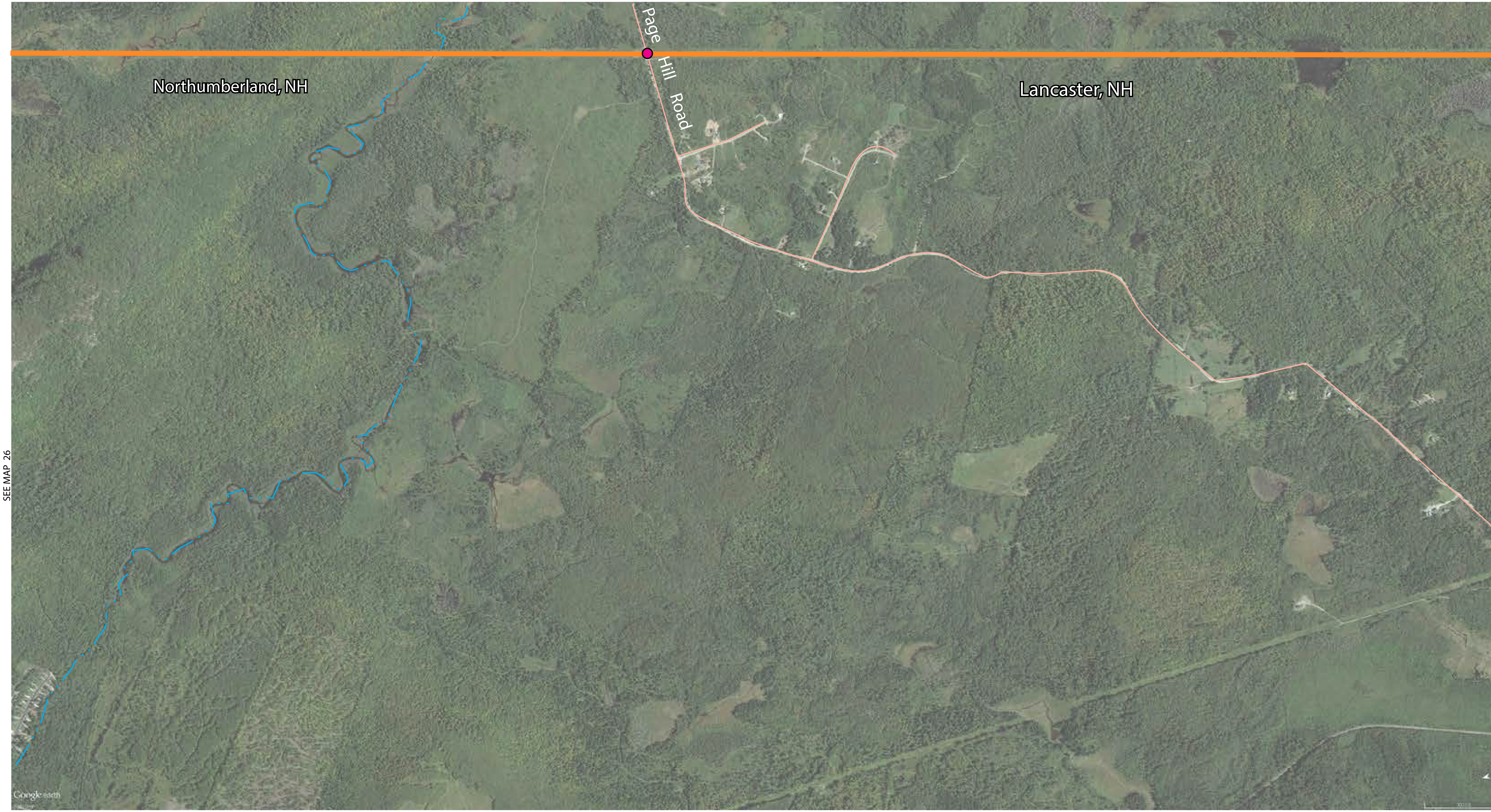
Transition Station #4 to Transition Station #5

Groveton, Northumberland

Map 26

Scale: 1″ = 1200′

1200′ 600′ 0′ 1200′ 2400′



SEE MAP 26

SEE MAP 28

LEGEND

- Transition Station
- Substation
- Converter Station
- Police Station
- Fire Station
- Hospital
- Public Road Access Point
- School
- Structure in Wetland/ Waterway
- PS-1 Photo Simulation
- Lay Down Area
- HDD-# HDD Label
- AR-# Access Route Label
- LD-# Lay Down Area Label
- HDD Start Location
- State Divide
- Country Divide
- Existing Access Route
- HDD End Location
- HVDC Underground Line
- HVDC Overhead Line
- Proposed Access Route
- Culturally Sensitive Area
- 345kV Line
- Rivers/ Streams

December 24, 2016

Dewberry®

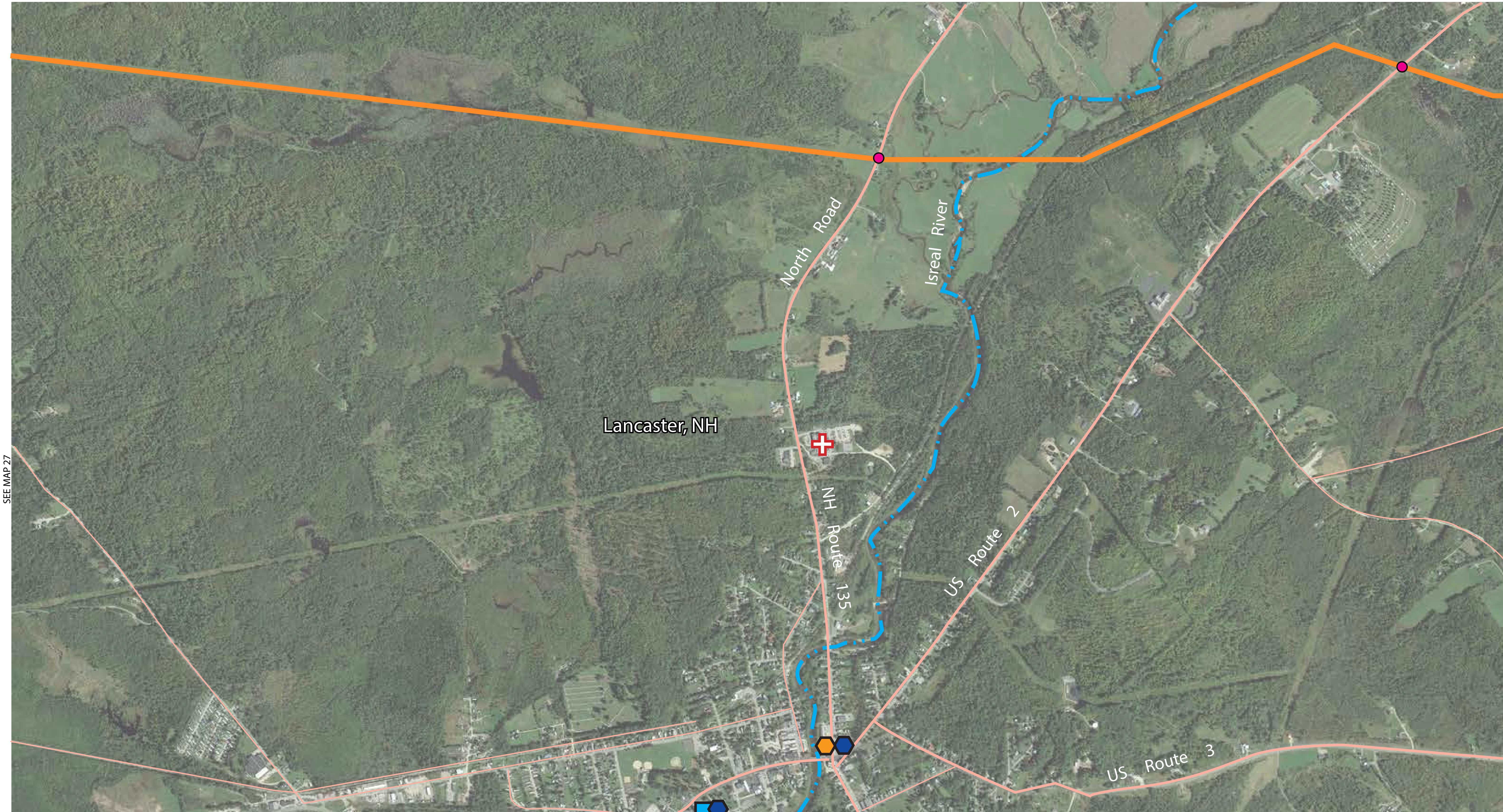
Transition Station #4 to Transition Station #5

Northumberland, Lancaster

Scale: 1″ = 1200′

1200′ 600′ 0′ 1200′ 2400′

Map 27



LEGEND

Transition Station
Substation
Converter Station
Police Station
Fire Station
Hospital
Public Road Access Point
School
Structure in Wetland/ Waterway
Photo Simulation
Lay Down Area
HDD-# HDD Label
AR-# Access Route Label
LD-# Lay Down Area Label
HDD Start Location
State Divide
Country Divide
Existing Access Route
HDD End Location
HVDC Underground Line
HVDC Overhead Line
Proposed Access Route
Culturally Sensitive Area
345kV Line
Rivers/ Streams

December 24, 2016

Dewberry®

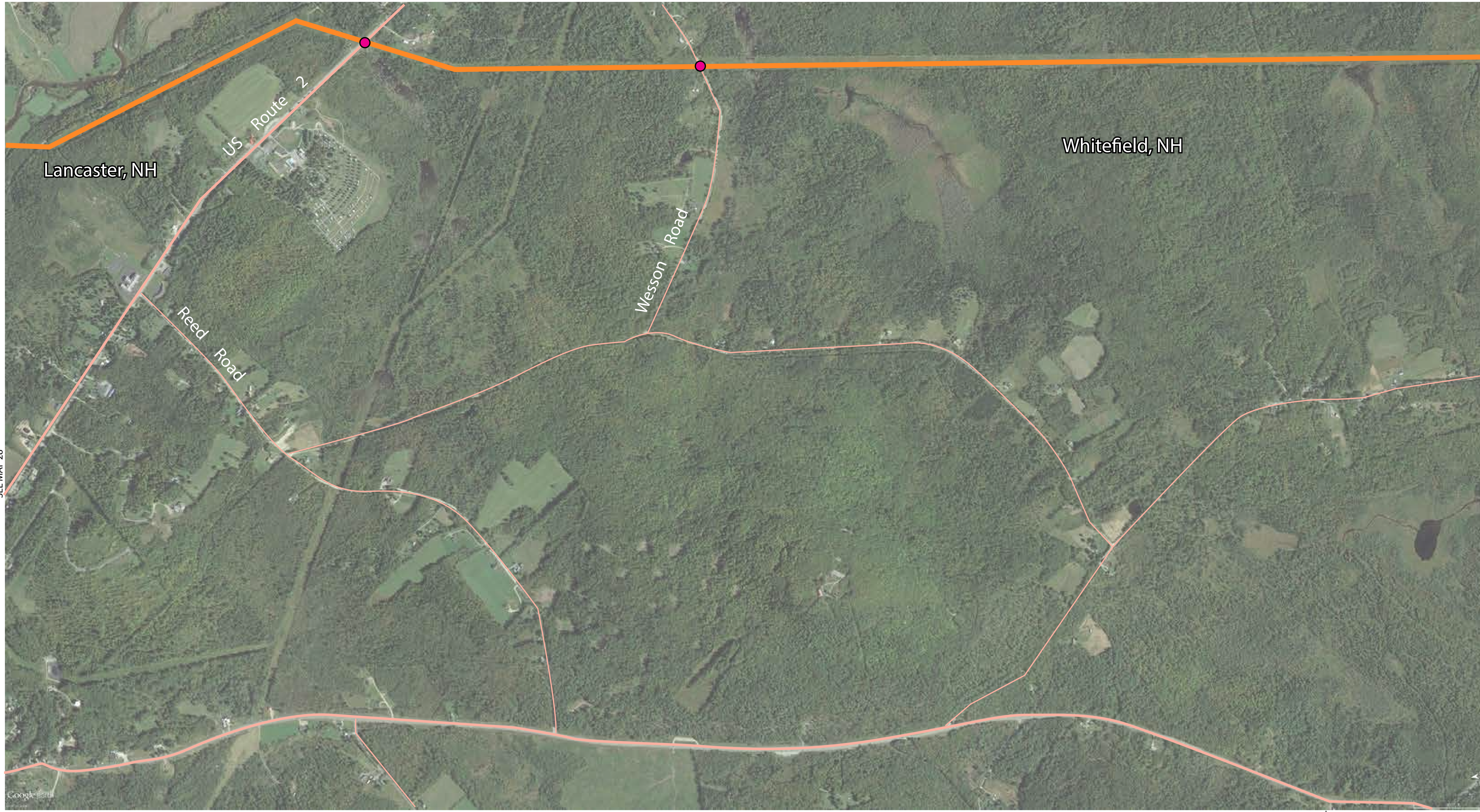
Transition Station #4 to Transition Station #5

Lancaster

Scale: 1″ = 1200′

1200′ 600′ 0′ 1200′ 2400′

Map 28



LEGEND

Transition Station
Substation
Converter Station
Police Station
Fire Station
Hospital
Public Road Access Point
School
Structure in Wetland/ Waterway
PS-1 Photo Simulation
Lay Down Area
HDD-# HDD Label
AR-# Access Route Label
LD-# Lay Down Area Label
HDD Start Location
State Divide
Country Divide
Existing Access Route
HDD End Location
HVDC Underground Line
HVDC Overhead Line
Proposed Access Route
Culturally Sensitive Area
345kV Line
Rivers/ Streams

December 24, 2016

Dewberry®

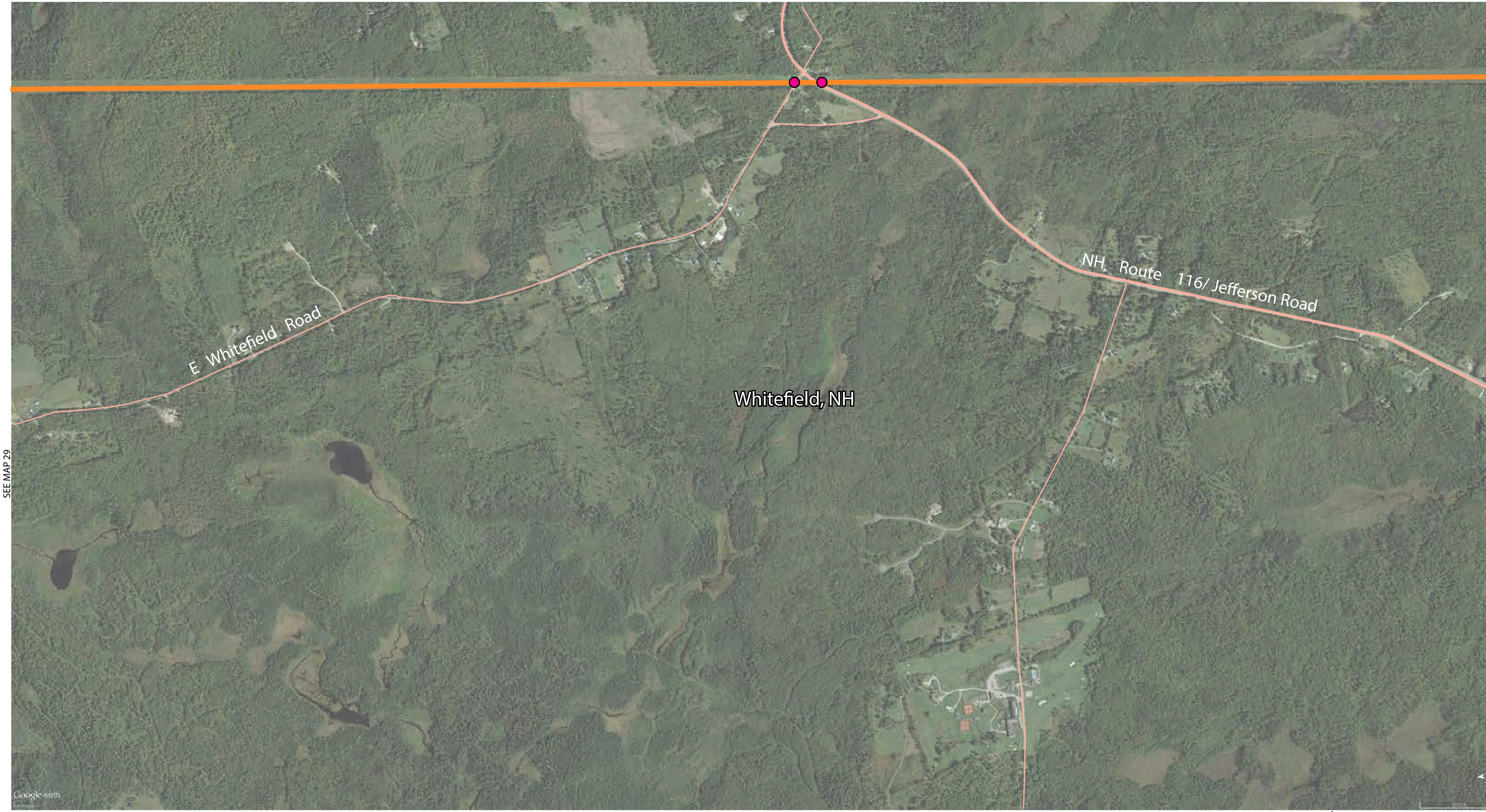
Transition Station #4 to Transition Station #5

Lancaster, Whitefield

Scale: 1″ = 1200′

1200′ 600′ 0′ 1200′ 2400′

Map 29



LEGEND

Transition Station
Substation
Converter Station
Police Station
Fire Station
Hospital
Public Road Access Point
School
Structure in Wetland/ Waterway
Photo Simulation
Lay Down Area
HDD-# HDD Label
AR-# Access Route Label
LD-# Lay Down Area Label
HDD Start Location
State Divide
Country Divide
Existing Access Route
HDD End Location
HVDC Underground Line
HVDC Overhead Line
Proposed Access Route
Culturally Sensitive Area
345kV Line
Rivers/ Streams

December 24, 2016

Dewberry

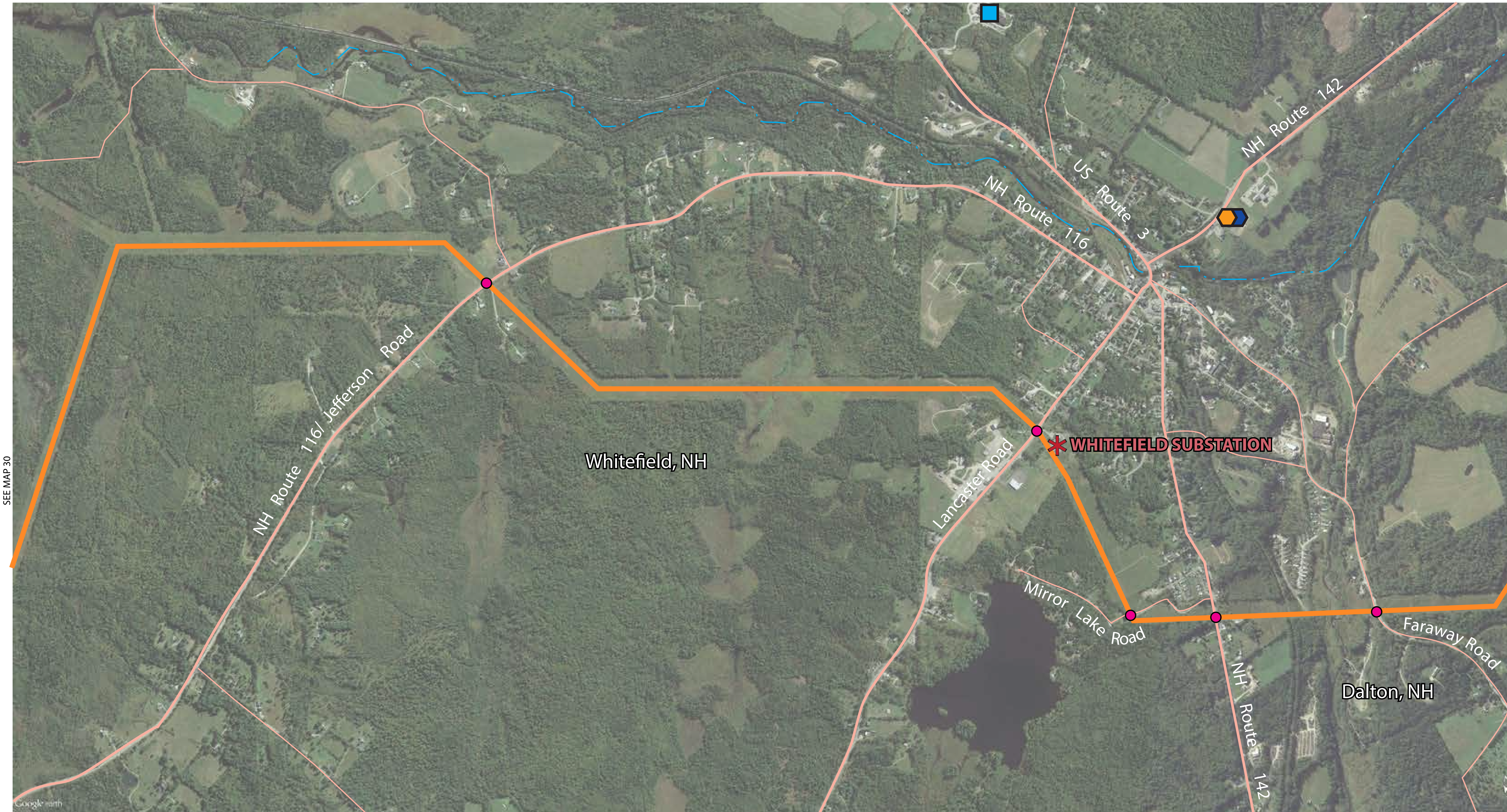
Transition Station #4 to Transition Station #5

Whitefield

Scale: 1″ = 1200′

1200′ 600′ 0′ 1200′ 2400′

Map 30



LEGEND

Transition Station	Substation	Converter Station	Police Station	Fire Station	Hospital	Public Road Access Point	School	Structure in Wetland/ Waterway	Photo Simulation	Lay Down Area	HDD-# HDD Label	AR-# Access Route Label	LD-# Lay Down Area Label	HDD Start Location	HDD End Location
State Divide	Country Divide	Existing Access Route	HVDC Underground Line	HVDC Overhead Line	Proposed Access Route	Culturally Sensitive Area	345kV Line	Rivers/ Streams							

December 24, 2016

Dewberry®

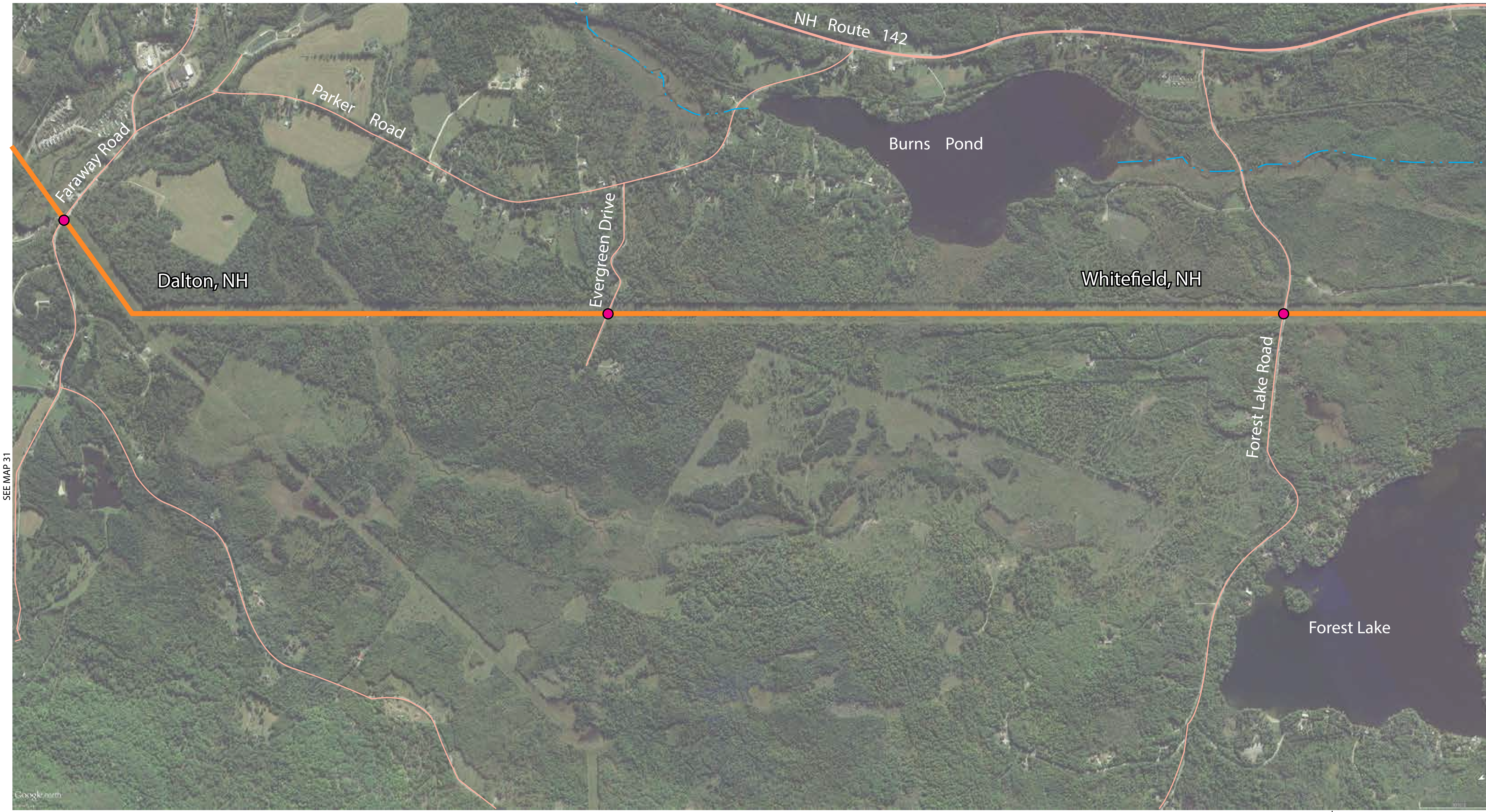
Transition Station #4 to Transition Station #5

Whitefield, Dalton

Scale: 1″= 1200′

1200′ 600′ 0′ 1200′ 2400′

Map 31



LEGEND

Transition Station
Substation
Converter Station
Police Station
Fire Station
Hospital
Public Road Access Point
School
Structure in Wetland/ Waterway
PS-1 Photo Simulation
Lay Down Area
HDD-# HDD Label
AR-# Access Route Label
LD-# Lay Down Area Label
HDD Start Location
State Divide
Country Divide
Existing Access Route
HDD End Location
HVDC Underground Line
HVDC Overhead Line
Proposed Access Route
Culturally Sensitive Area
345kV Line
Rivers/ Streams

December 24, 2016

Dewberry

Transition Station #4 to Transition Station #5

Dalton, Whitefield

Scale: 1″ = 1200′

1200′ 600′ 0′ 1200′ 2400′

Map 32

LEGEND

Transition Station
Substation
Converter Station
Police Station
Fire Station
Hospital
Public Road Access Point
School
Structure in Wetland/ Waterway
PS-1 Photo Simulation
Lay Down Area
HDD-# HDD Label
AR-# Access Route Label
LD-# Lay Down Area Label
HDD Start Location
State Divide
Country Divide
Existing Access Route
HDD End Location
HVDC Underground Line
HVDC Overhead Line
Proposed Access Route
Culturally Sensitive Area
345kV Line
Rivers/ Streams

December 24, 2016

Dewberry

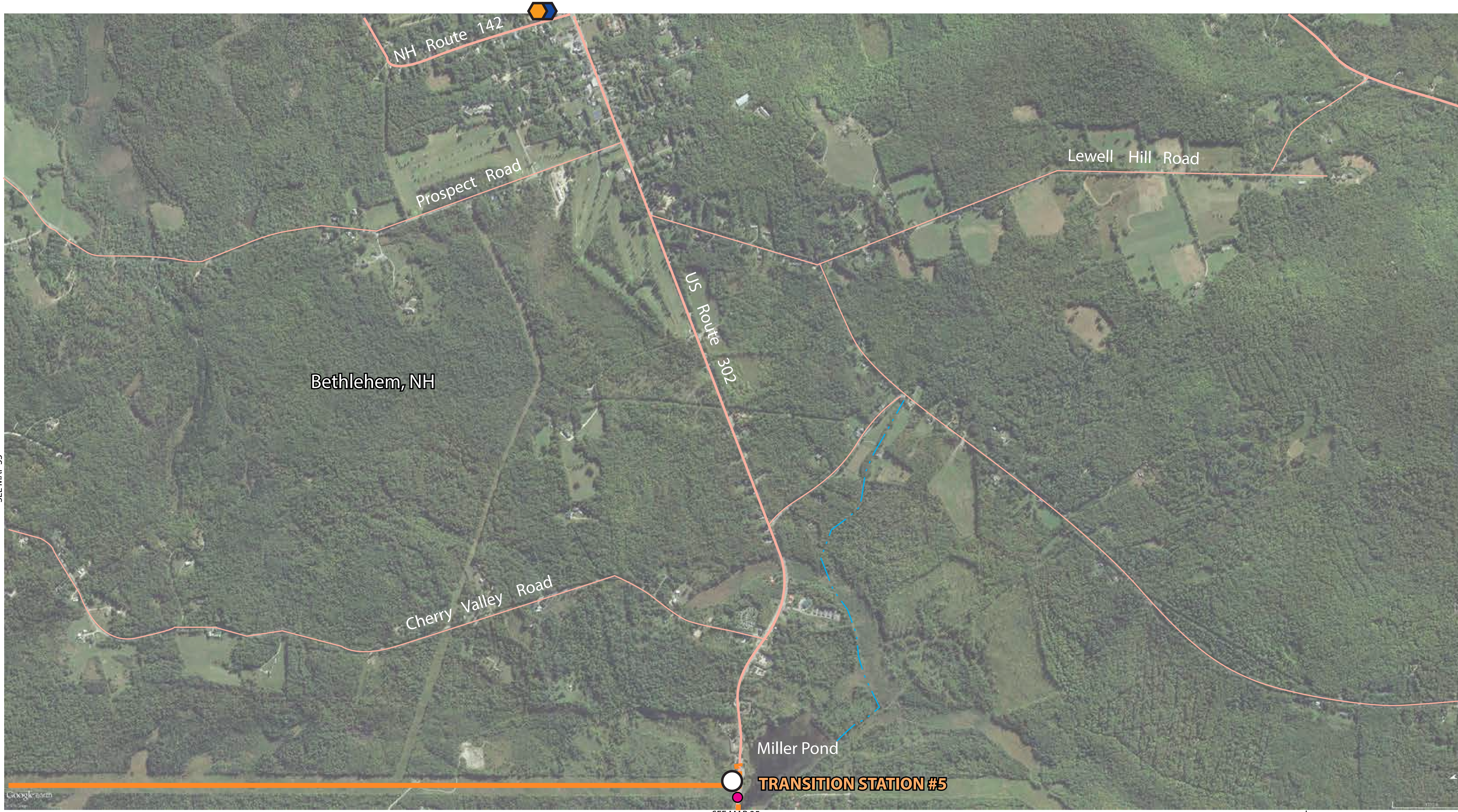
Transition Station #4 to Transition Station #5

Whitefield, Bethlehem

Scale: 1" = 1200'

1200' 600' 0' 1200' 2400'

Map 33



LEGEND

Transition Station
Substation
Converter Station
Police Station
Fire Station
Hospital
Public Road Access Point
School
Structure in Wetland/ Waterway
PS-1 Photo Simulation
Lay Down Area
HDD-# HDD Label
AR-# Access Route Label
LD-# Lay Down Area Label
HDD Start Location
State Divide
Country Divide
Existing Access Route
HDD End Location
HVDC Underground Line
HVDC Overhead Line
Proposed Access Route
Culturally Sensitive Area
345kV Line
Rivers/ Streams

December 24, 2016

Dewberry®

Transition Station #5 to Transition Station #6

Bethlehem

Scale: 1″= 1200′

1200′ 600′ 0′ 1200′ 2400′

Map 34

December 24, 2016

Dewberry

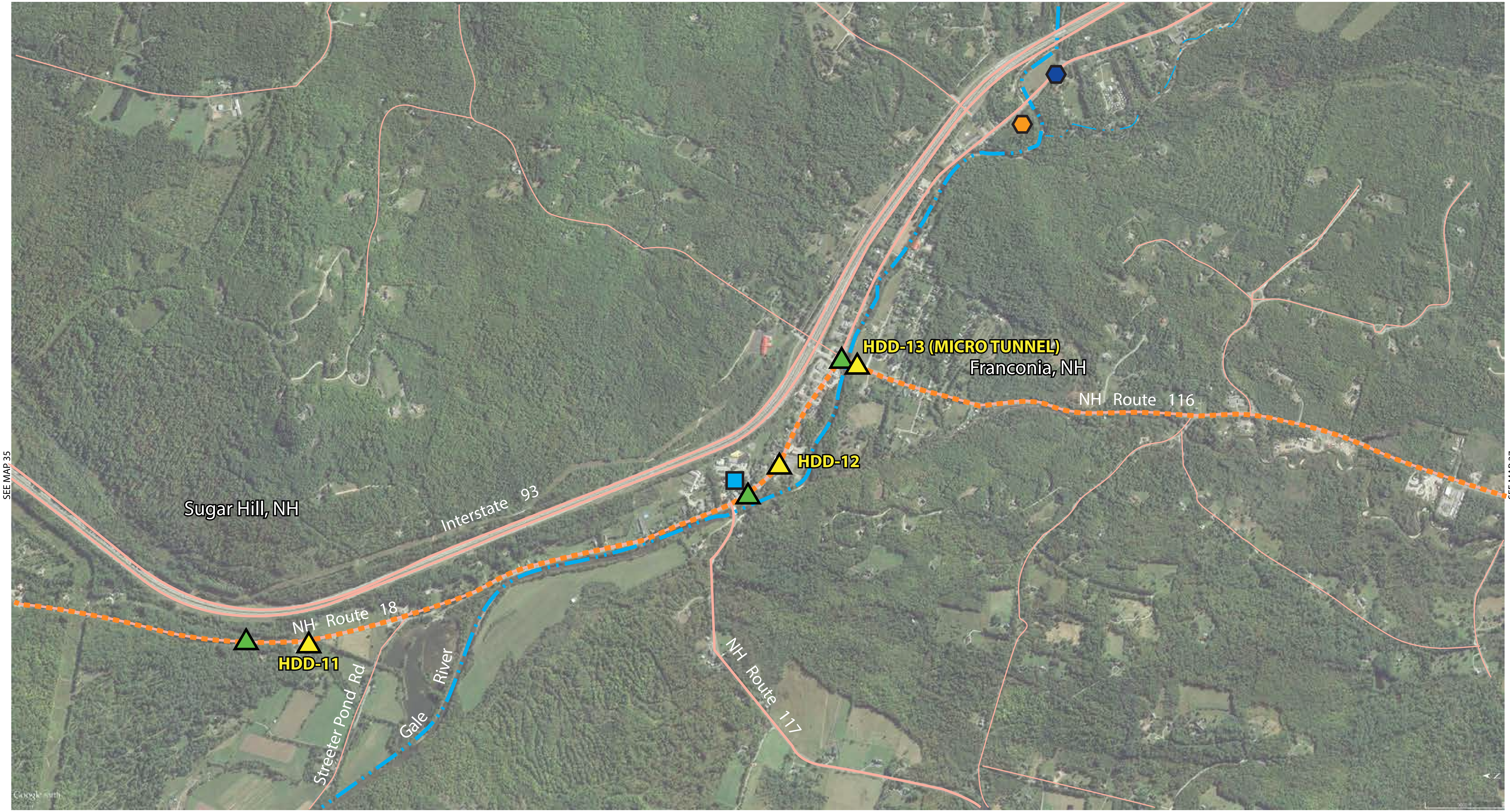
Transition Station #5 to Transition Station #6

Bethlehem, Sugar Hill

Scale: 1" = 1200'

1200' 600' 0' 1200' 2400'

Map 35



LEGEND

Transition Station	Converter Station	Fire Station	Public Road Access Point	Photo Simulation (PS-1)	HDD Label (HDD-#)	HDD Start Location	HDD End Location
Substation	Police Station	Hospital	School	Lay Down Area	Access Route Label (AR-#)	State Divide	HVDC Underground Line
			Structure in Wetland/ Waterway		Lay Down Area Label (LD-#)	Country Divide	HVDC Overhead Line
						Existing Access Route	Proposed Access Route
Culturally Sensitive Area	345kV Line	Rivers/ Streams					

December 24, 2016

Dewberry®

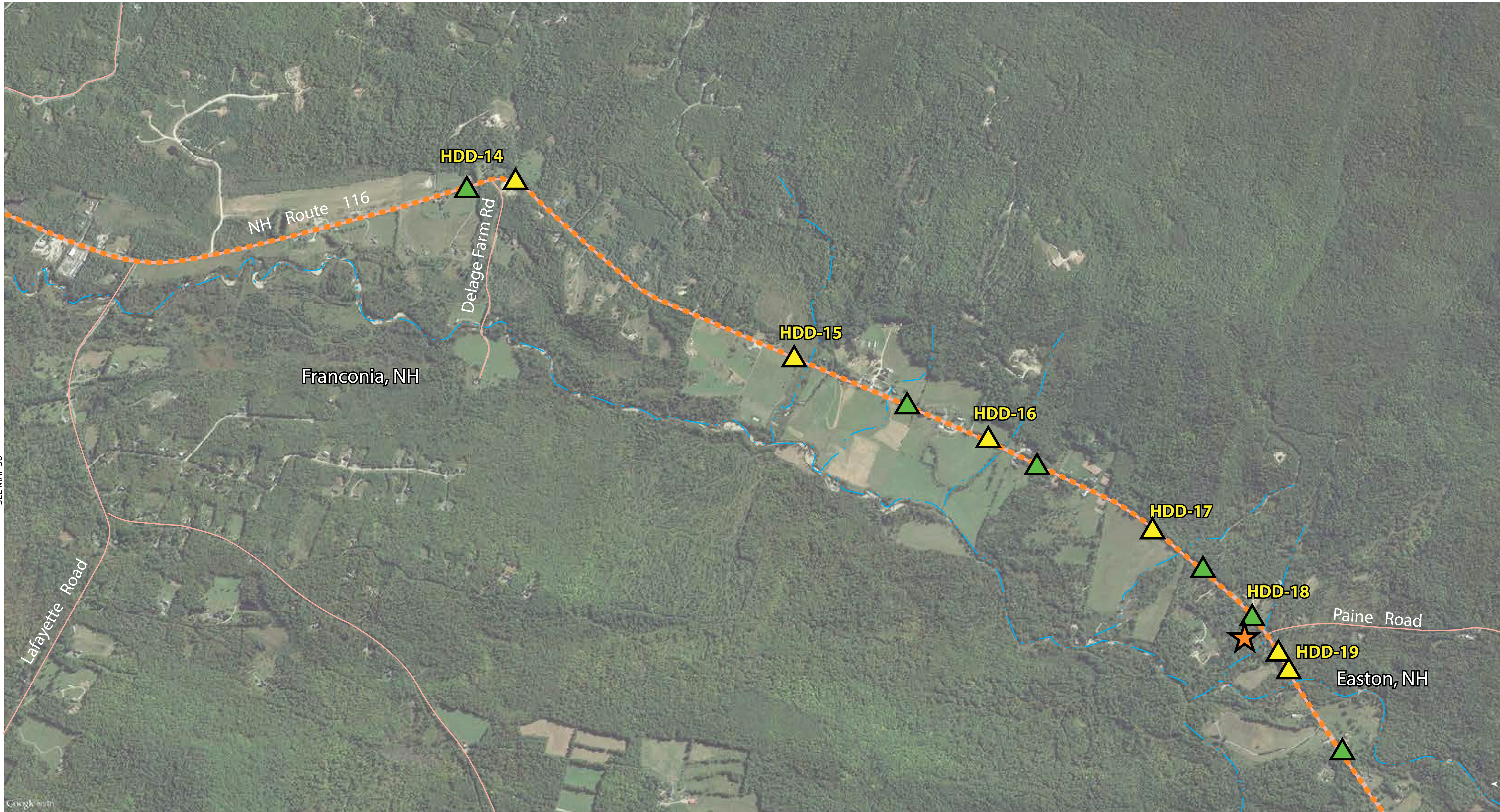
Transition Station #5 to Transition Station #6

Sugar Hill, Franconia

Scale: 1" = 1200'

1200' 600' 0' 1200' 2400'

Map 36



LEGEND

Transition Station
Substation
Converter Station
Police Station
Fire Station
Hospital
Public Road Access Point
School
Structure in Wetland/ Waterway
Photo Simulation
Lay Down Area
HDD Label
Access Route Label
Lay Down Area Label
HDD Start Location
State Divide
Country Divide
Existing Access Route
HDD End Location
HVDC Underground Line
HVDC Overhead Line
Proposed Access Route
Culturally Sensitive Area
345kV Line
Rivers/ Streams

December 24, 2016

Dewberry

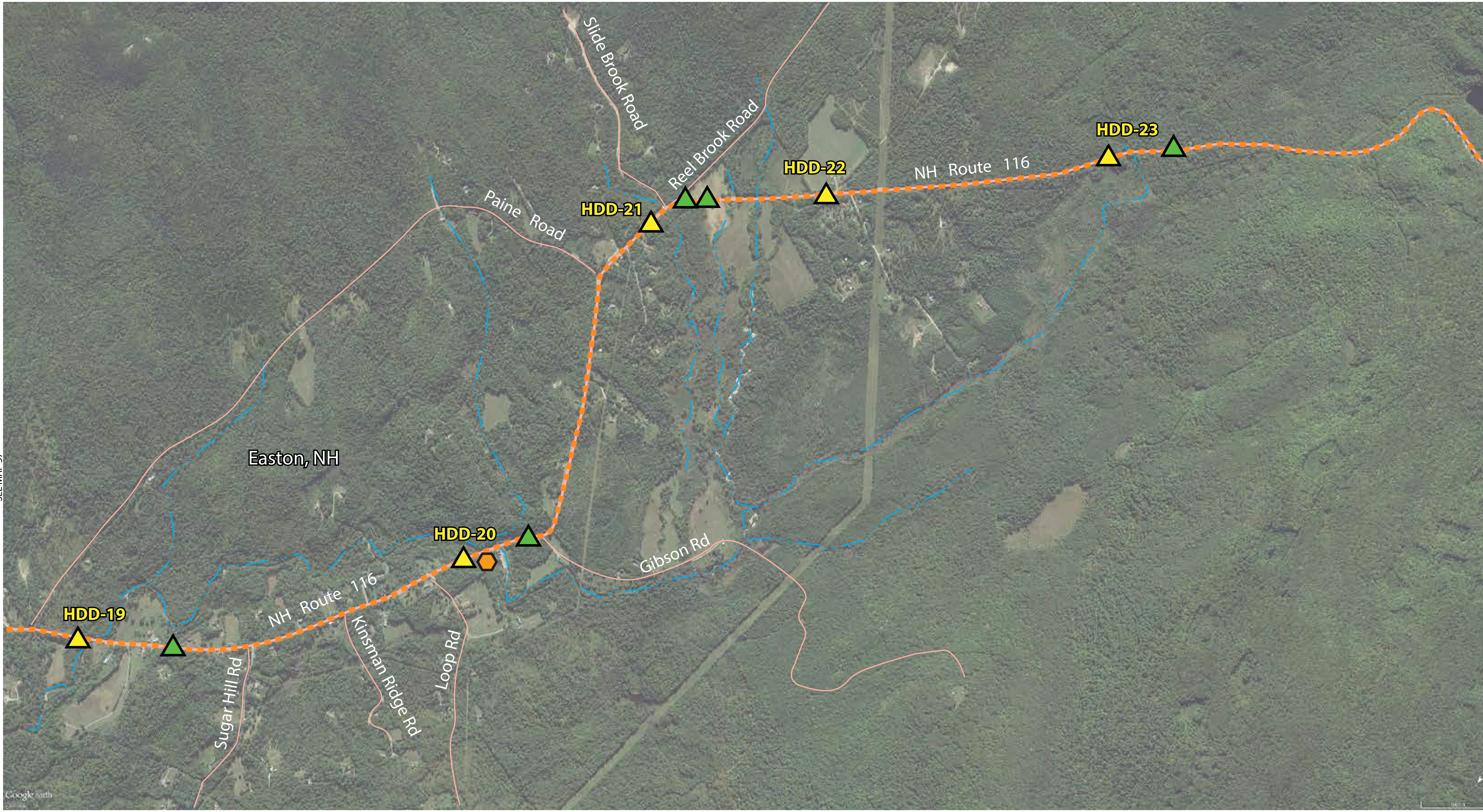
Transition Station #5 to Transition Station #6

Franconia, Easton

Scale: 1" = 1200'

1200' 600' 0' 1200' 2400'

Map 37



LEGEND

Transition Station	Converter Station	Fire Station	Public Road Access Point	Photo Simulation	HDD-#	HDD Label		HDD Start Location		HDD End Location		Culturally Sensitive Area
Substation	Police Station	Hospital	School	Lay Down Area	AR-#	Access Route Label		State Divide		HVDC Underground Line		345kV Line
			Structure in Wetland/ Waterway		LD-#	Lay Down Area Label		Country Divide		HVDC Overhead Line		Rivers/ Streams
								Existing Access Route		Proposed Access Route		

December 24, 2016

Dewberry

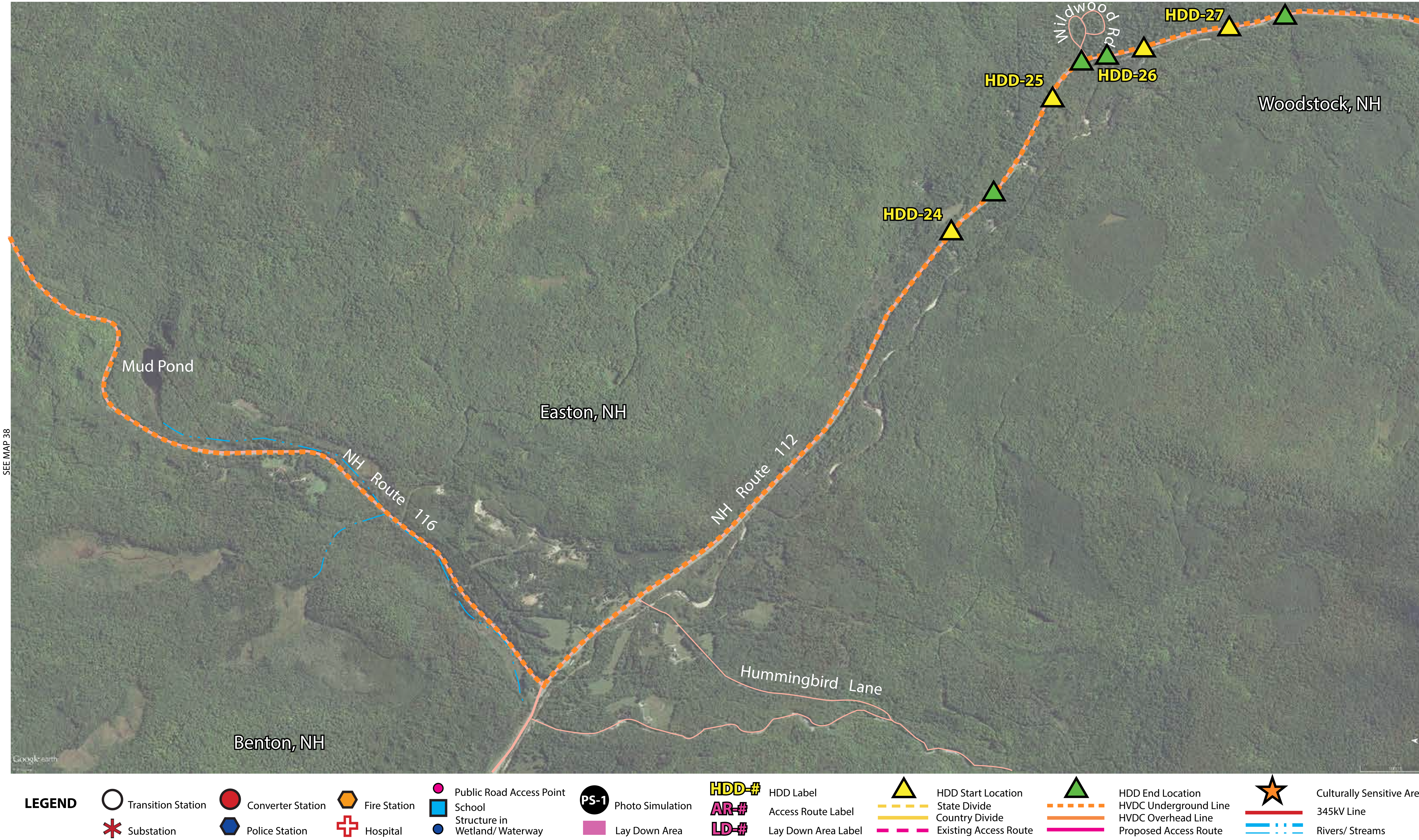
Transition Station #5 to Transition Station #6

Easton

Map 38

Scale: 1″ = 1200′

1200′ 600′ 0′ 1200′ 2400′



December 24, 2016

Dewberry®

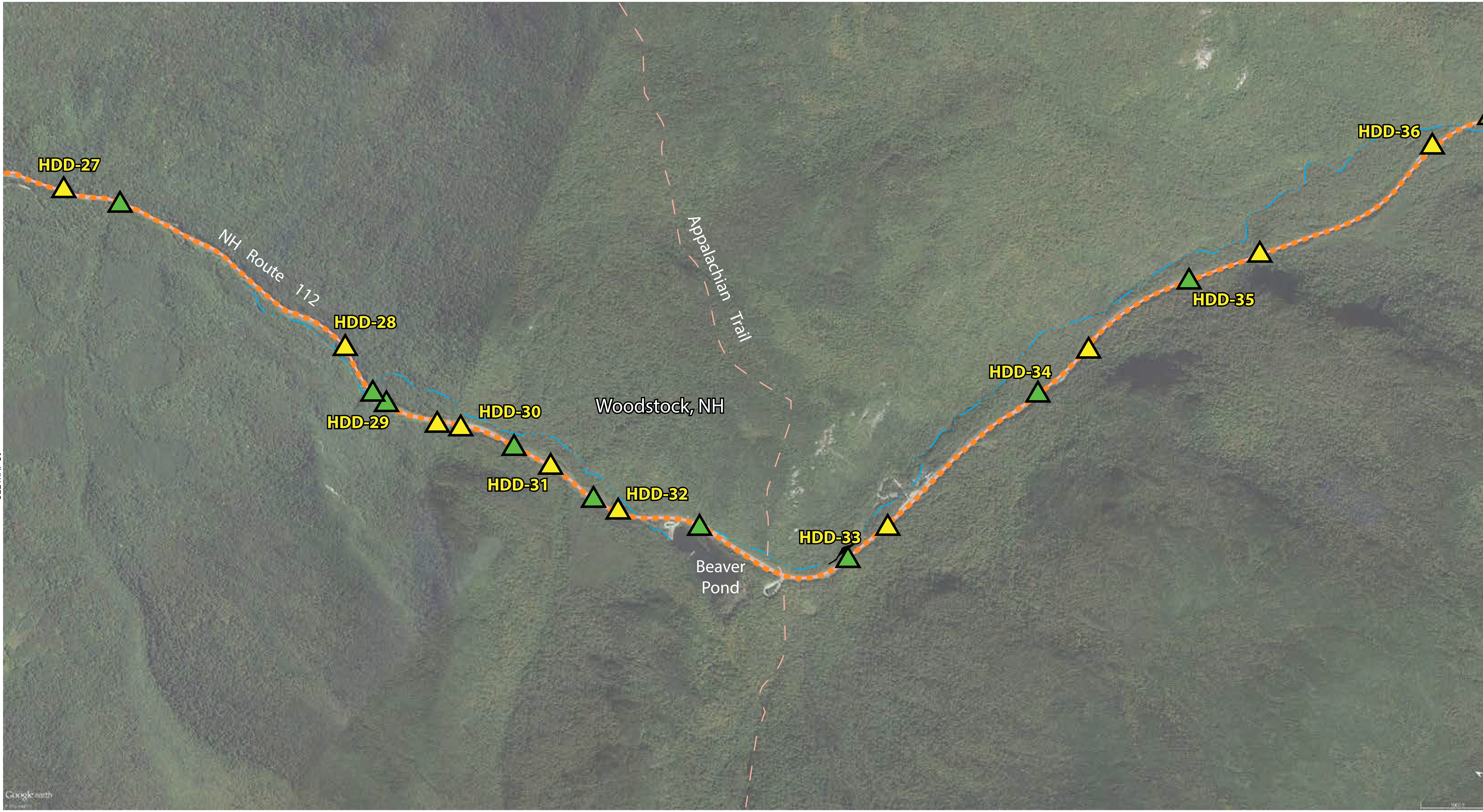
Transition Station #5 to Transition Station #6

Benton, Easton

Scale: 1″ = 1200′

1200′ 600′ 0′ 1200′ 2400′

Map 39



LEGEND

Transition Station	Converter Station	Fire Station	Public Road Access Point	Photo Simulation	HDD-#	HDD Label	HDD Start Location	HDD End Location		Culturally Sensitive Area
Substation	Police Station	Hospital	School	Lay Down Area	AR-#	Access Route Label	State Divide	HVDC Underground Line		345kV Line
			Structure in Wetland/ Waterway		LD-#	Lay Down Area Label	Country Divide	HVDC Overhead Line		Rivers/ Streams
							Existing Access Route	Proposed Access Route		

December 24, 2016

Dewberry

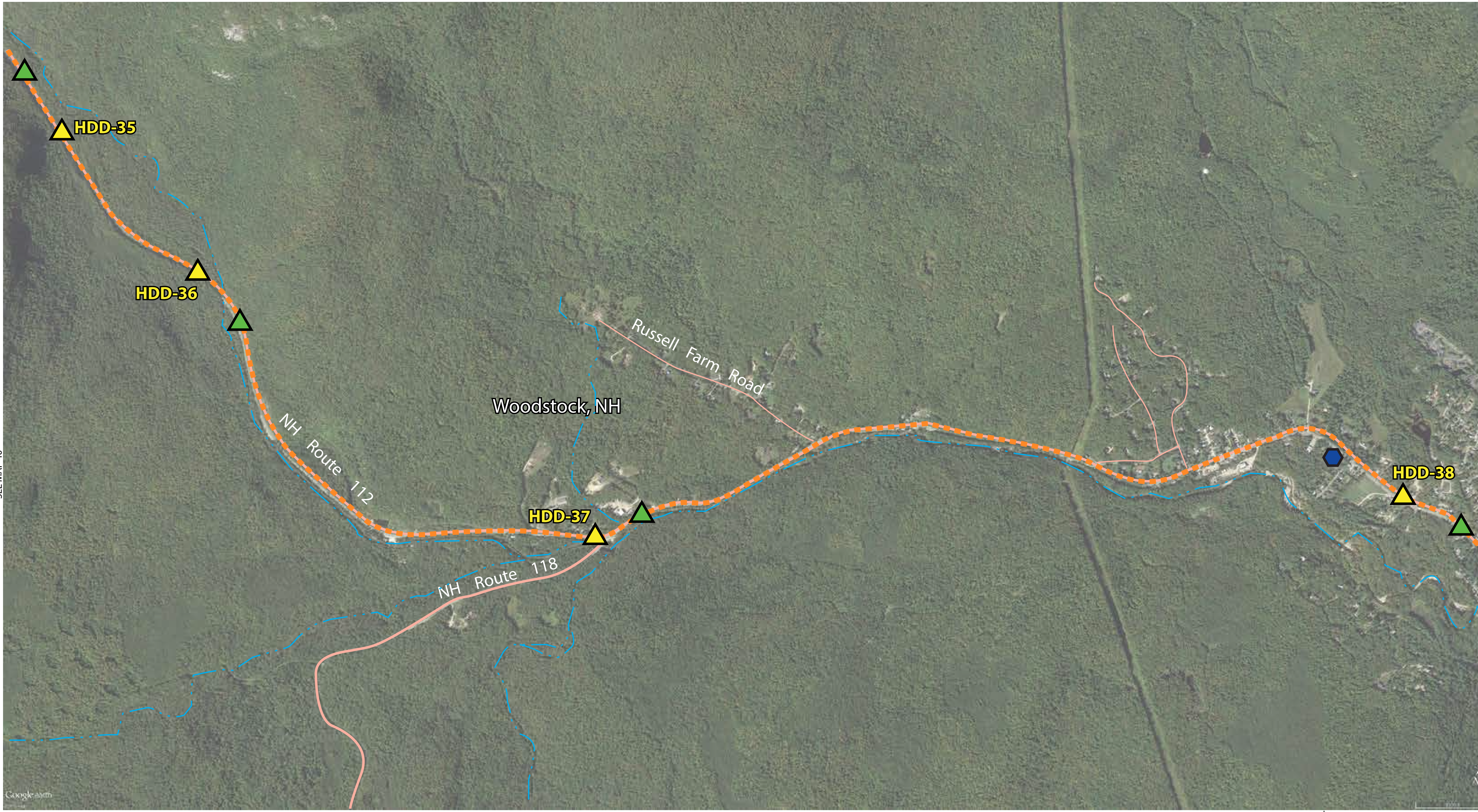
Transition Station #5 to Transition Station #6

Woodstock

Scale: 1" = 1200'

1200' 600' 0' 1200' 2400'

Map 40



LEGEND

Transition Station
Substation
Converter Station
Police Station
Fire Station
Hospital
Public Road Access Point
School
Structure in Wetland/ Waterway
PS-1 Photo Simulation
Lay Down Area
HDD-# HDD Label
AR-# Access Route Label
LD-# Lay Down Area Label
HDD Start Location
State Divide
Country Divide
Existing Access Route
HDD End Location
HVDC Underground Line
HVDC Overhead Line
Proposed Access Route
Culturally Sensitive Area
345kV Line
Rivers/ Streams

December 24, 2016

Dewberry®

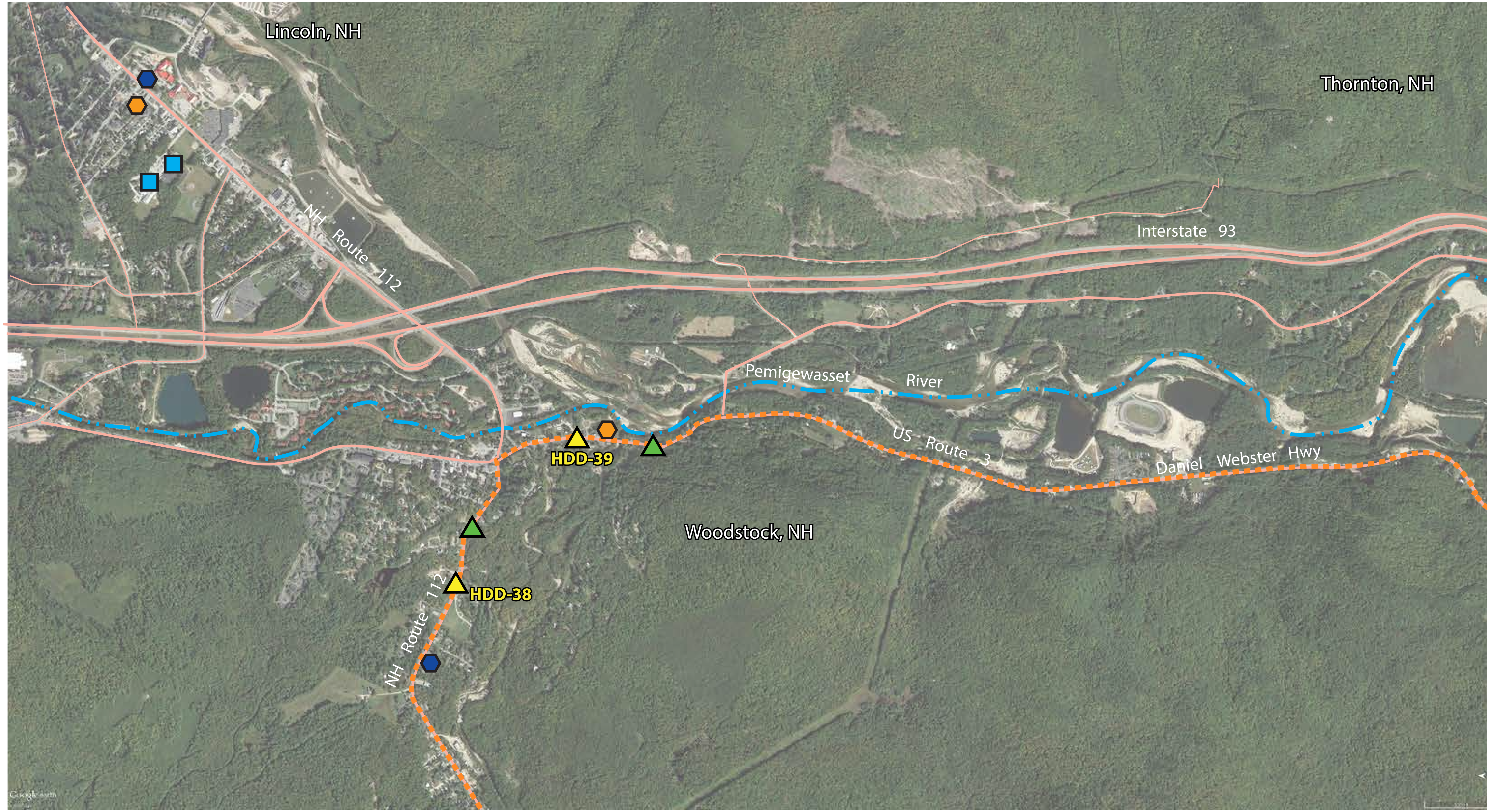
Transition Station #5 to Transition Station #6

Woodstock

Scale: 1″ = 1200′

1200′ 600′ 0′ 1200′ 2400′

Map 41



SEE MAP 41

LEGEND

- Transition Station
- Substation
- Converter Station
- Police Station
- Fire Station
- Hospital
- Public Road Access Point
- School
- Structure in Wetland/ Waterway
- PS-1 Photo Simulation
- Lay Down Area
- HDD-# HDD Label
- AR-# Access Route Label
- LD-# Lay Down Area Label
- HDD Start Location
- State Divide
- Country Divide
- Existing Access Route
- HDD End Location
- HVDC Underground Line
- HVDC Overhead Line
- Proposed Access Route
- Culturally Sensitive Area
- 345kV Line
- Rivers/ Streams

December 24, 2016

Dewberry®

Transition Station #5 to Transition Station #6

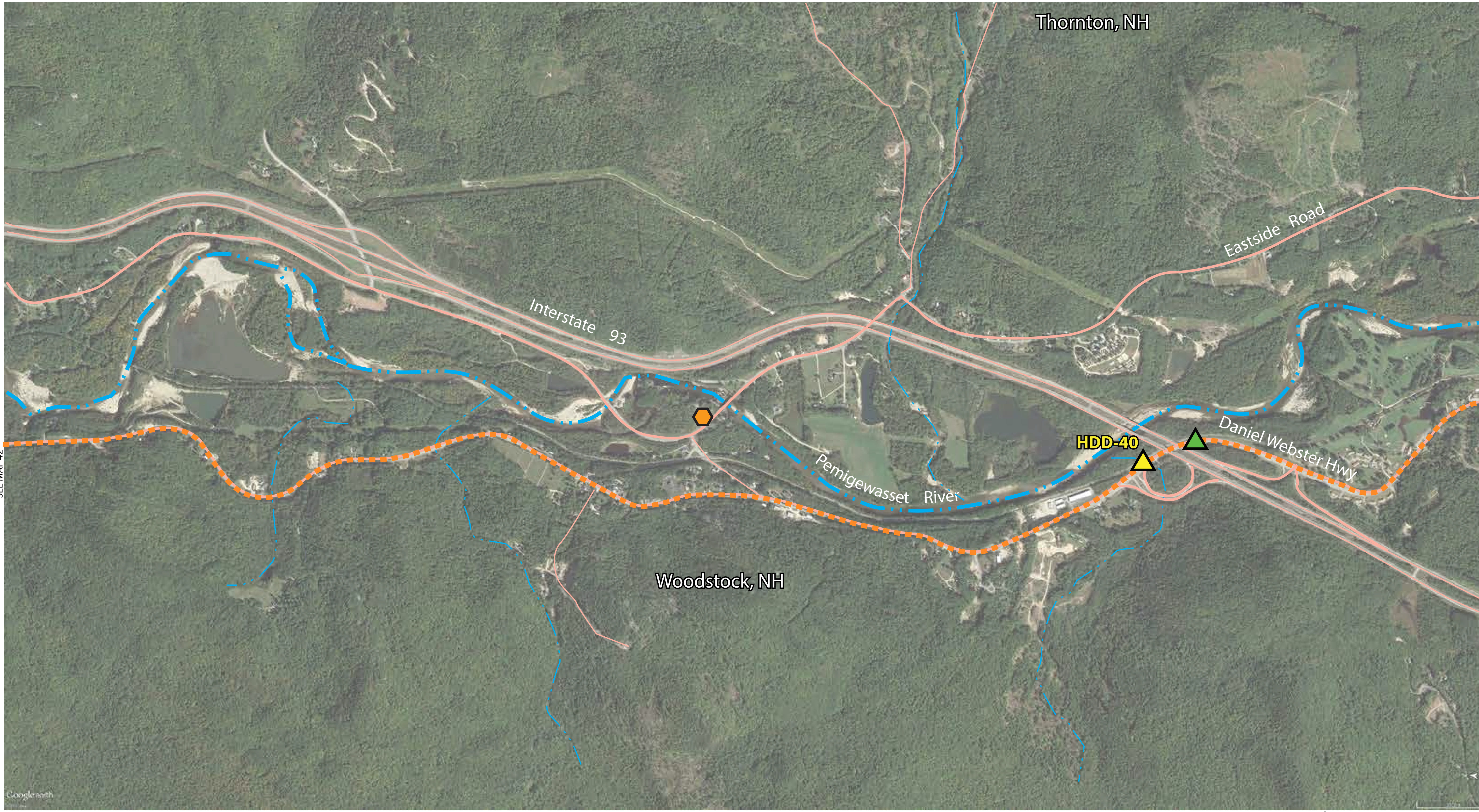
Lincoln, Woodstock, Thornton

Scale: 1″ = 1200′

1200′ 600′ 0′ 1200′ 2400′

Map 42

SEE MAP 42



SEE MAP 44

LEGEND

- Transition Station
- Substation
- Converter Station
- Police Station
- Fire Station
- Hospital
- Public Road Access Point
- School
- Structure in Wetland/ Waterway
- PS-1 Photo Simulation
- Lay Down Area
- HDD-# HDD Label
- AR-# Access Route Label
- LD-# Lay Down Area Label
- HDD Start Location
- State Divide
- Country Divide
- Existing Access Route
- HDD End Location
- HVDC Underground Line
- HVDC Overhead Line
- Proposed Access Route
- Culturally Sensitive Area
- 345kV Line
- Rivers/ Streams

December 24, 2016

Dewberry®

Transition Station #5 to Transition Station #6

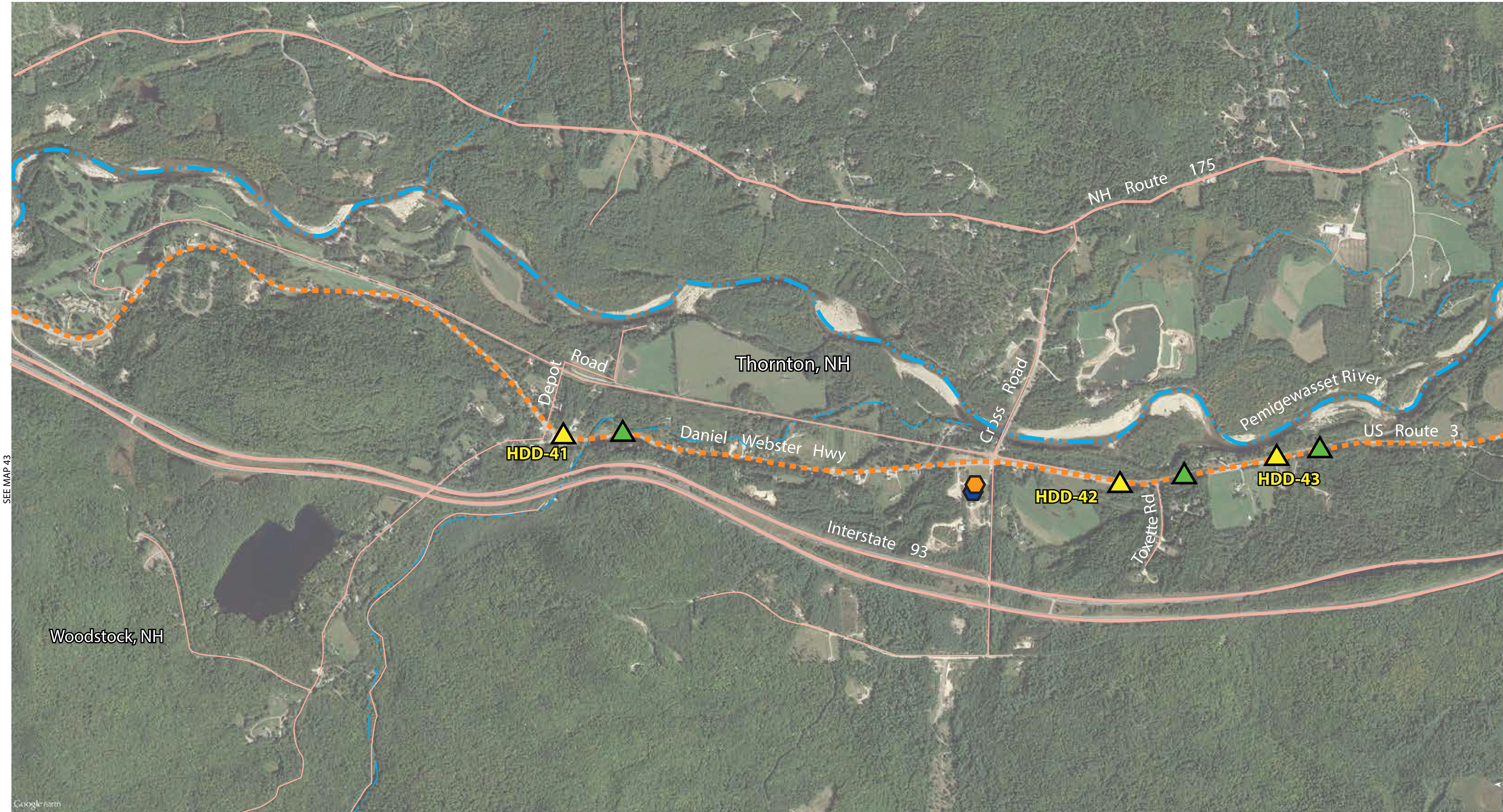
Woodstock, Thornton

Scale: 1″ = 1200′

1200′ 600′ 0′ 1200′ 2400′

Map 43

SEE MAP 43



SEE MAP 45

LEGEND

Transition Station	Converter Station	Fire Station	Public Road Access Point	Photo Simulation	HDD-#	HDD Label	HDD Start Location	HDD End Location	Culturally Sensitive Area
Substation	Police Station	Hospital	School	Lay Down Area	AR-#	Access Route Label	State Divide	HVDC Underground Line	345kV Line
			Structure in Wetland/ Waterway		LD-#	Lay Down Area Label	Country Divide	HVDC Overhead Line	Rivers/ Streams
							Existing Access Route	Proposed Access Route	

PS-1

December 24, 2016

Dewberry®

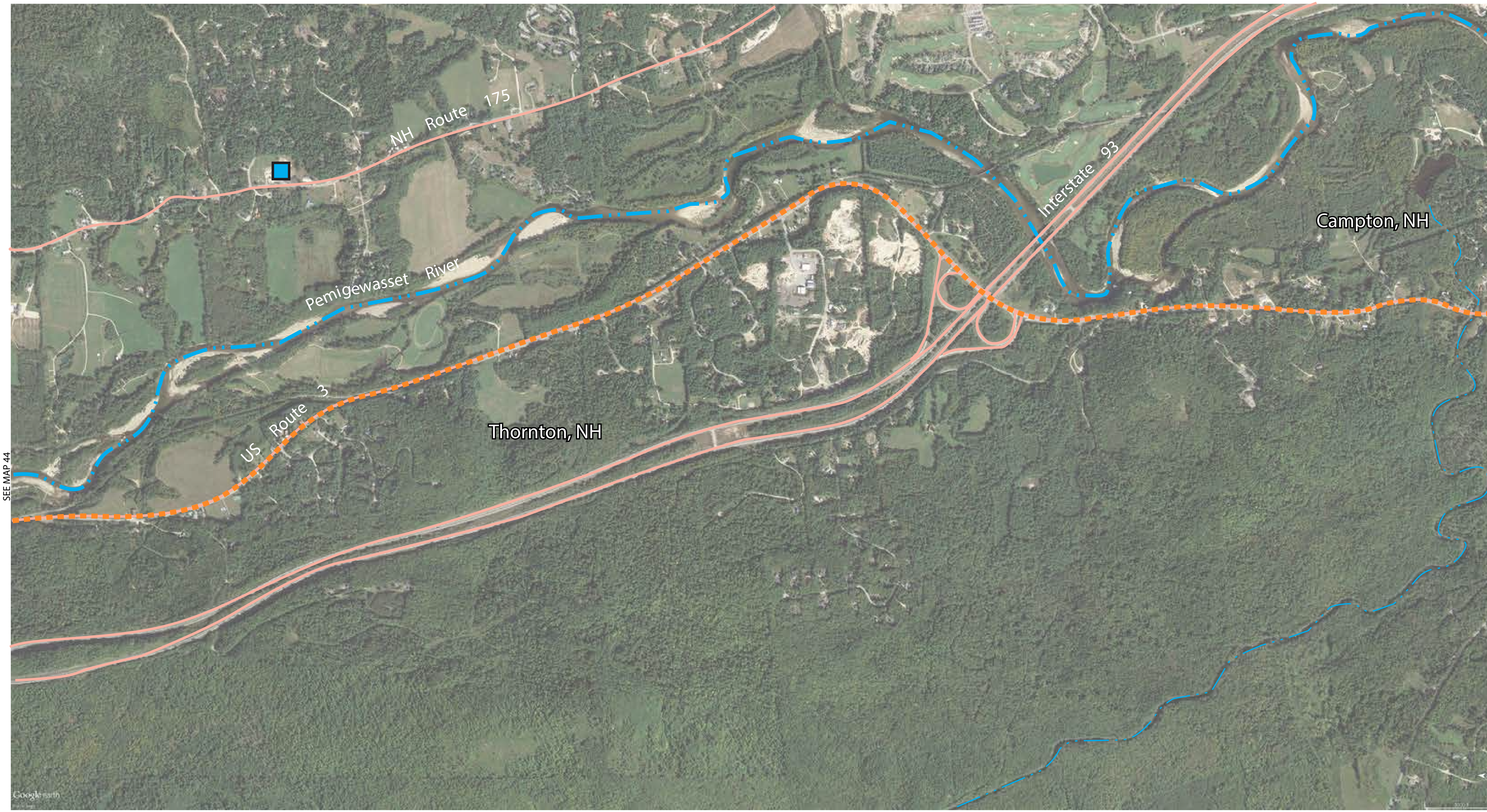
Transition Station #5 to Transition Station #6

Thornton

Scale: 1″ = 1200′

1200′ 600′ 0′ 1200′ 2400′

Map 44



LEGEND

- Transition Station
- Substation
- Converter Station
- Police Station
- Fire Station
- Hospital
- Public Road Access Point
- School
- Structure in Wetland/ Waterway
- PS-1 Photo Simulation
- Lay Down Area
- HDD-# HDD Label
- AR-# Access Route Label
- LD-# Lay Down Area Label
- HDD Start Location
- State Divide
- Country Divide
- Existing Access Route
- HDD End Location
- HVDC Underground Line
- HVDC Overhead Line
- Proposed Access Route
- Culturally Sensitive Area
- 345kV Line
- Rivers/ Streams

December 24, 2016

Dewberry®

Transition Station #5 to Transition Station #6

Thornton, Campton

Scale: 1″ = 1200′

1200′ 600′ 0′ 1200′ 2400′

Map 45

LEGEND

- Transition Station
- Substation
- Converter Station
- Police Station
- Fire Station
- Hospital
- Public Road Access Point
- School
- Structure in Wetland/ Waterway
- PS-1 Photo Simulation
- Lay Down Area
- HDD-# HDD Label
- AR-# Access Route Label
- LD-# Lay Down Area Label
- HDD Start Location
- State Divide
- Country Divide
- Existing Access Route
- HDD End Location
- HVDC Underground Line
- HVDC Overhead Line
- Proposed Access Route
- Culturally Sensitive Area
- 345kV Line
- Rivers/ Streams

December 24, 2016

Dewberry®

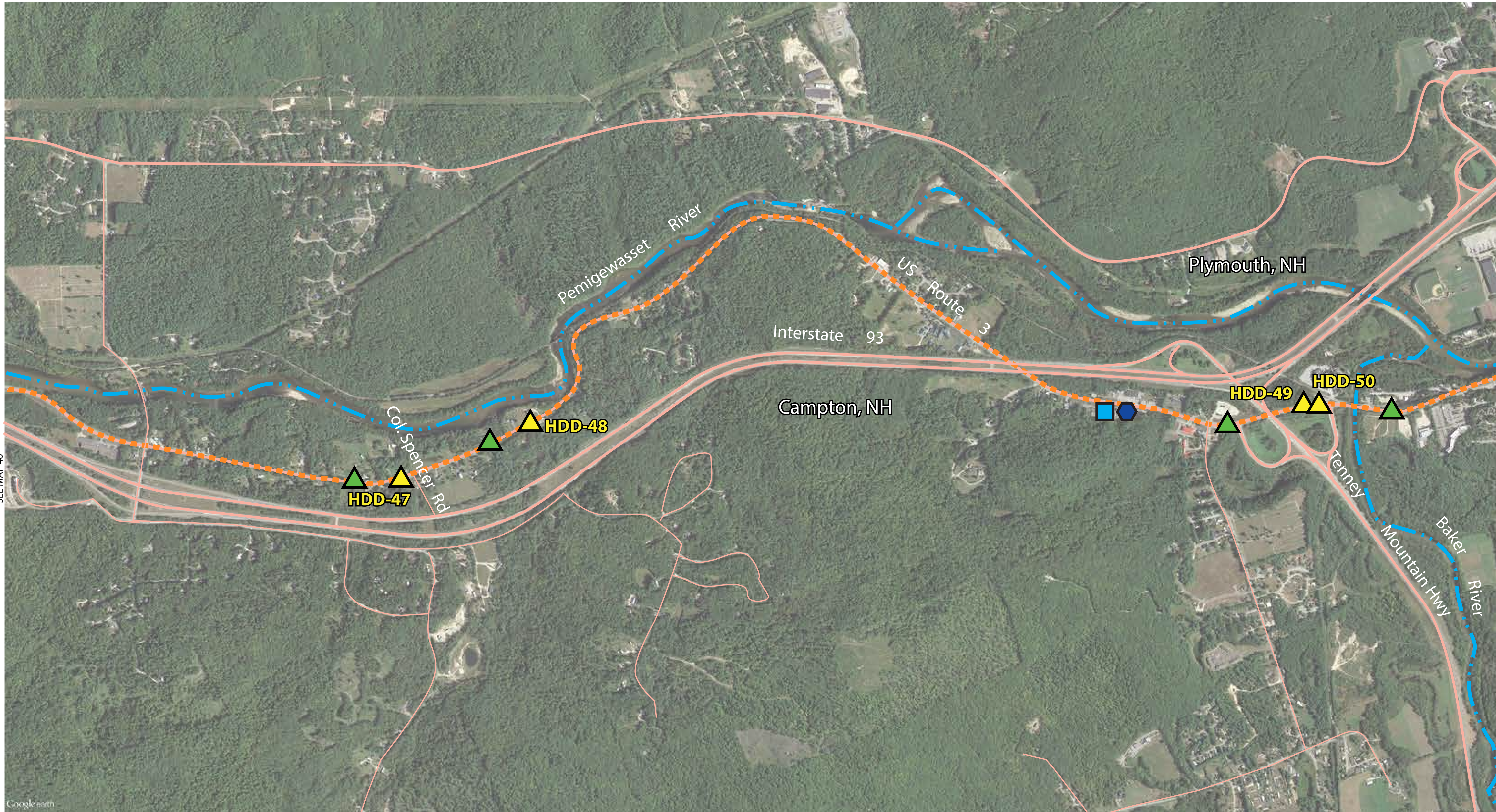
Transition Station #5 to Transition Station #6

Campton

Scale: 1″ = 1200′

1200′ 600′ 0′ 1200′ 2400′

Map 46



LEGEND

- Transition Station
- Substation
- Converter Station
- Police Station
- Fire Station
- Hospital
- Public Road Access Point
- School
- Structure in Wetland/ Waterway
- PS-1 Photo Simulation
- Lay Down Area
- HDD-# HDD Label
- AR-# Access Route Label
- LD-# Lay Down Area Label
- HDD Start Location
- State Divide
- Country Divide
- Existing Access Route
- HDD End Location
- HVDC Underground Line
- HVDC Overhead Line
- Proposed Access Route
- Culturally Sensitive Area
- 345kV Line
- Rivers/ Streams

December 24, 2016

Dewberry®

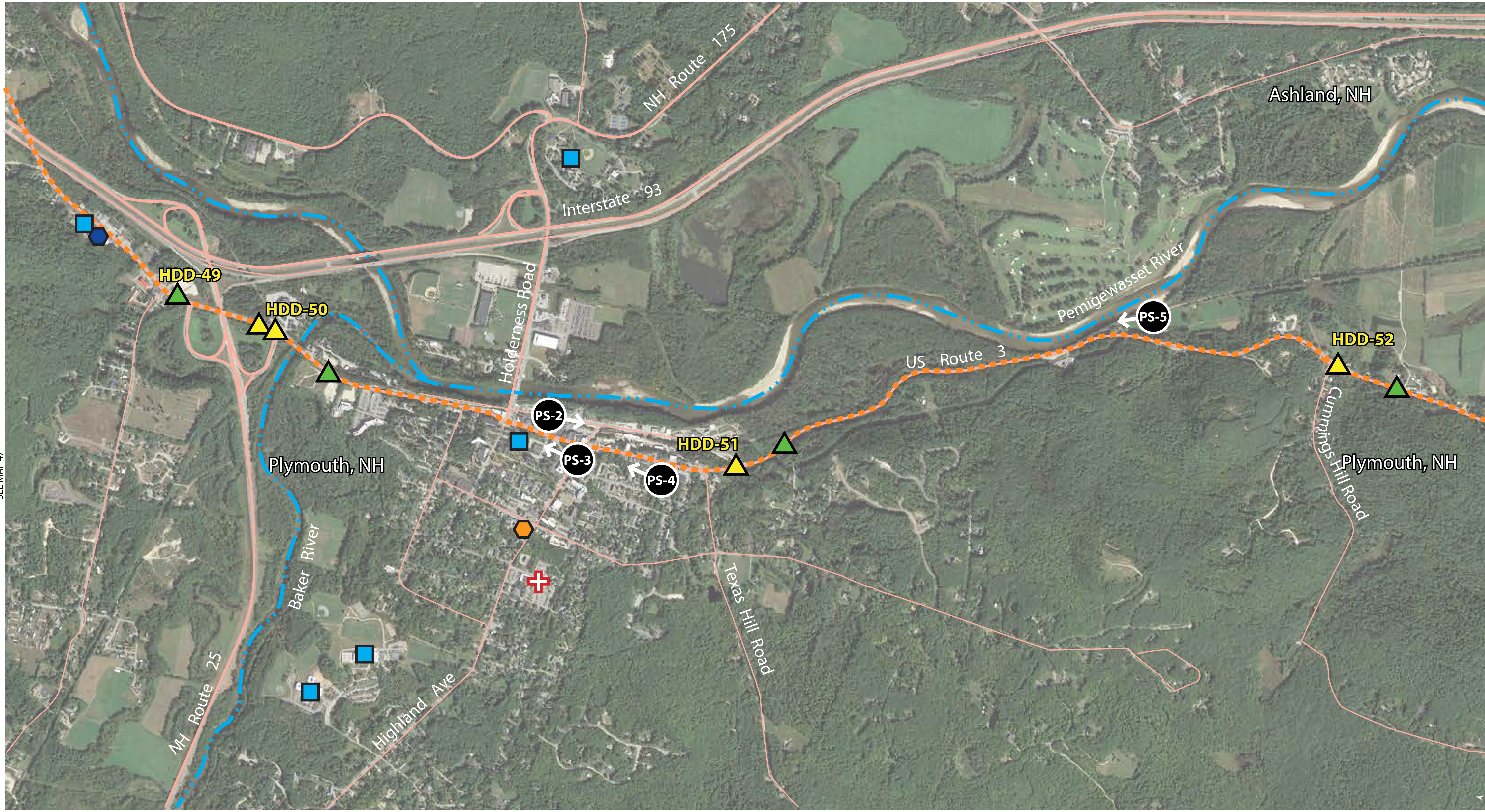
Transition Station #5 to Transition Station #6

Campton, Plymouth

Scale: 1″ = 1200′

1200′ 600′ 0′ 1200′ 2400′

Map 47



LEGEND

- Transition Station
- Substation
- Converter Station
- Police Station
- Fire Station
- Hospital
- Public Road Access Point
- School
- Structure in Wetland/ Waterway
- PS-1 Photo Simulation
- Lay Down Area
- HDD-# HDD Label
- AR-# Access Route Label
- LD-# Lay Down Area Label
- HDD Start Location
- State Divide
- Country Divide
- Existing Access Route
- HDD End Location
- HVDC Underground Line
- HVDC Overhead Line
- Proposed Access Route
- Culturally Sensitive Area
- 345kV Line
- Rivers/ Streams

December 24, 2016

Dewberry®

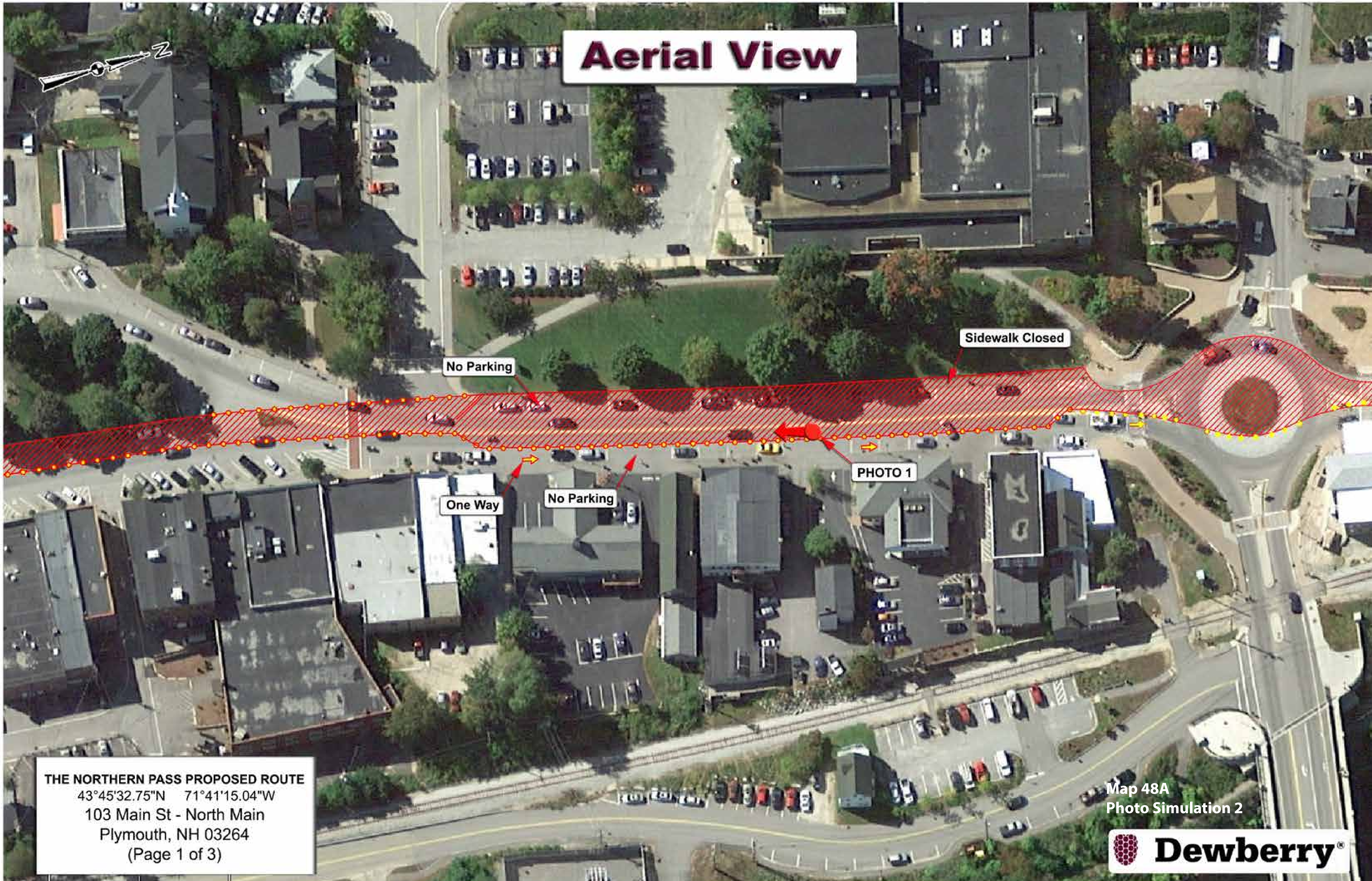
Transition Station #5 to Transition Station #6

Plymouth

Scale: 1" = 1200'

1200' 600' 0' 1200' 2400'

Map 48



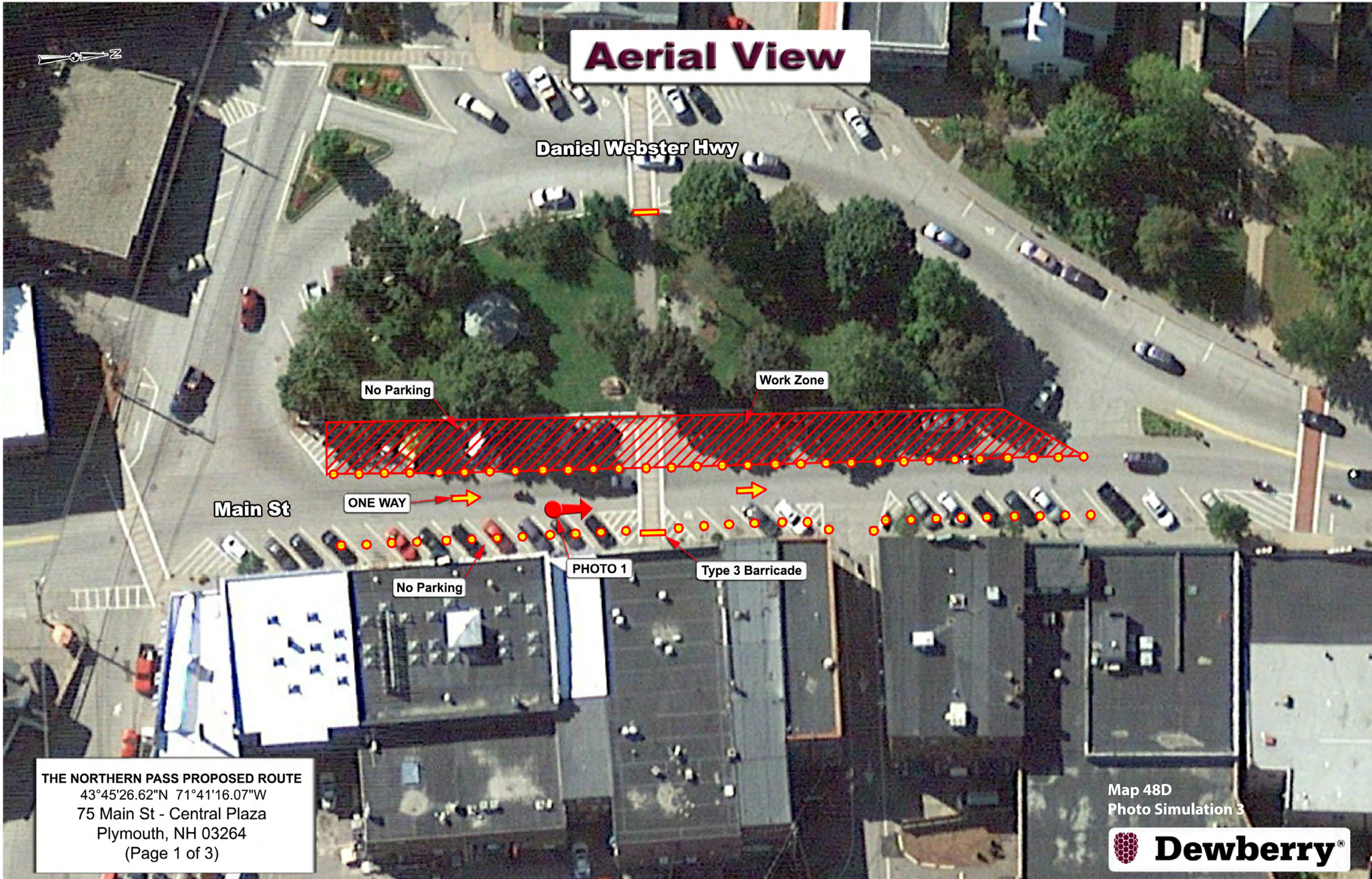
Aerial View
N
No Parking
Sidewalk Closed
PHOTO 1
One Way
No Parking
THE NORTHERN PASS PROPOSED ROUTE
43°45'32.75"N 71°41'15.04"W
103 Main St - North Main
Plymouth, NH 03264
(Page 1 of 3)
Map 48A
Photo Simulation 2
Dewberry®

THE NORTHERN PASS PROPOSED ROUTE
Photo 1A
View Facing South
From Main Street
(Page 2 of 3)

Map 48B
Photo Simulation 2

Dewberry®

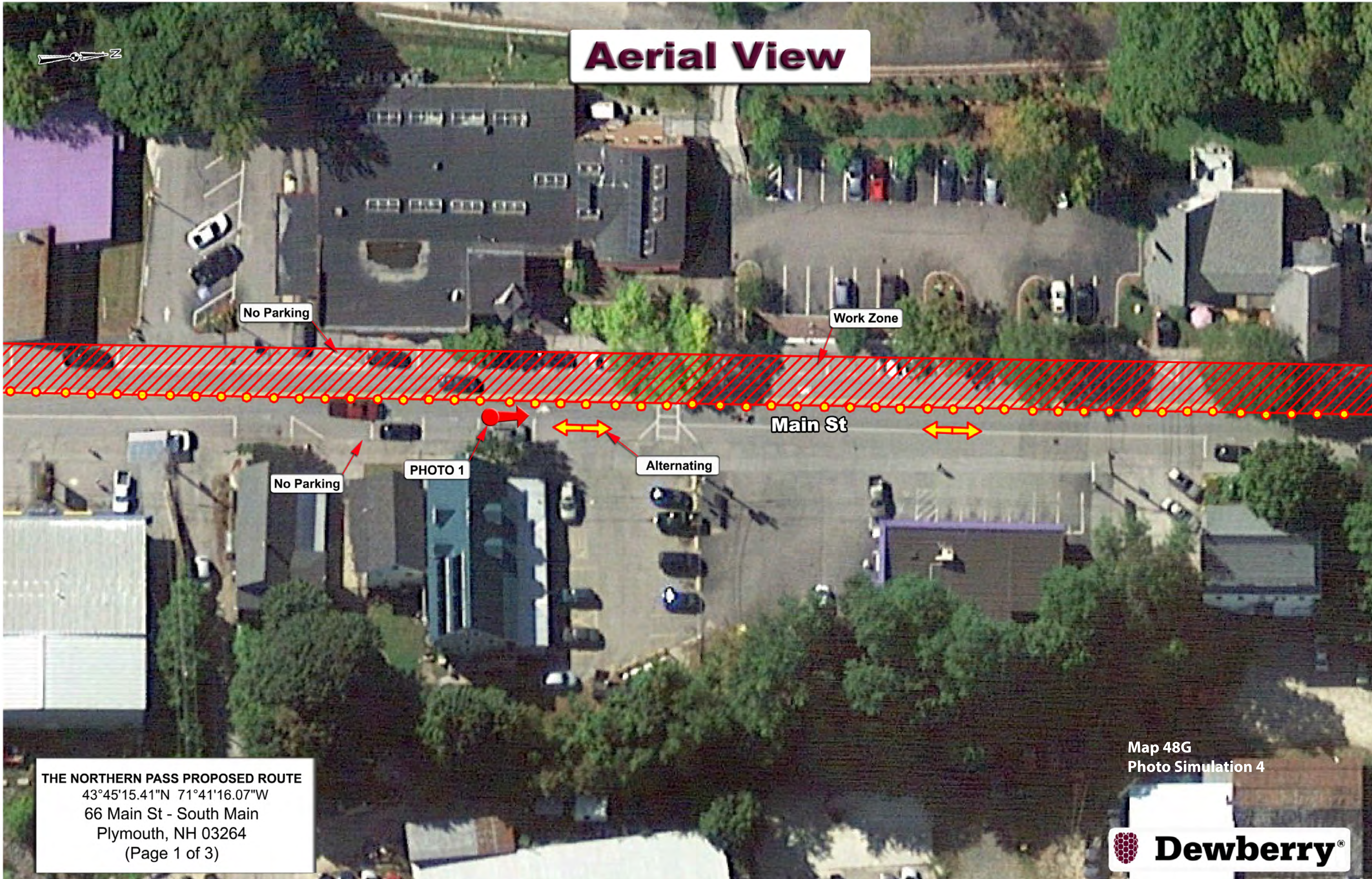
Proposed Work Zone
No Parking
One Way
11' ±
No Parking
Sidewalk Closed
THE NORTHERN PASS PROPOSED ROUTE
Photo 1B
View Facing South
From Main Street
(Page 3 of 3)
Map 48C
Photo Simulation 2
Dewberry®



Aerial View
Daniel Webster Hwy
Main St
No Parking
Work Zone
ONE WAY
PHOTO 1
Type 3 Barricade
No Parking
THE NORTHERN PASS PROPOSED ROUTE
43°45'26.62"N 71°41'16.07"W
75 Main St - Central Plaza
Plymouth, NH 03264
(Page 1 of 3)
Map 48D
Photo Simulation 3
Dewberry®

THE NORTHERN PASS PROPOSED ROUTE
Photo 1A
View Facing South
From Main Street
(Page 2 of 3)

Proposed Work Zone
No Parking
No Parking
11' ±
One way
YOGA
THE NORTHERN PASS PROPOSED ROUTE
Photo 1B
View Facing North
From Main Street
(Page 3 of 3)
Map 48F
Photo Simulation 3
Dewberry®



Aerial View
No Parking
Work Zone
Main St
Alternating
PHOTO 1
No Parking
Map 48G
Photo Simulation 4
THE NORTHERN PASS PROPOSED ROUTE
43°45'15.41"N 71°41'16.07"W
66 Main St - South Main
Plymouth, NH 03264
(Page 1 of 3)
Dewberry®

Actual View

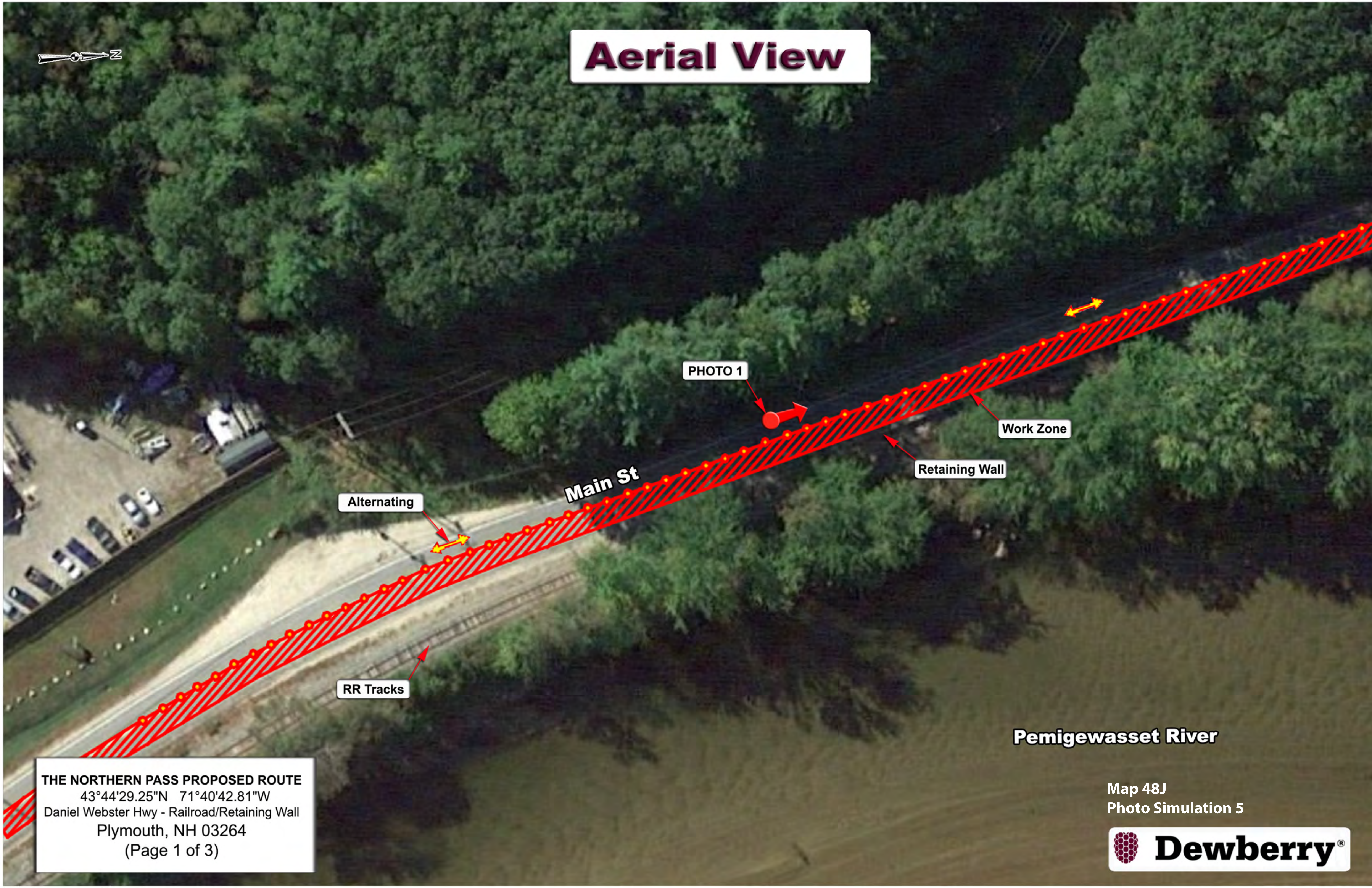
THE NORTHERN PASS PROPOSED ROUTE
Photo 1A
View Facing North
From Main Street
(Page 2 of 3)

Map 48H
Photo Simulation 4

Dewberry®

THE NORTHERN PASS PROPOSED ROUTE
Photo 1B
View Facing North
From Main Street
(Page 3 of 3)

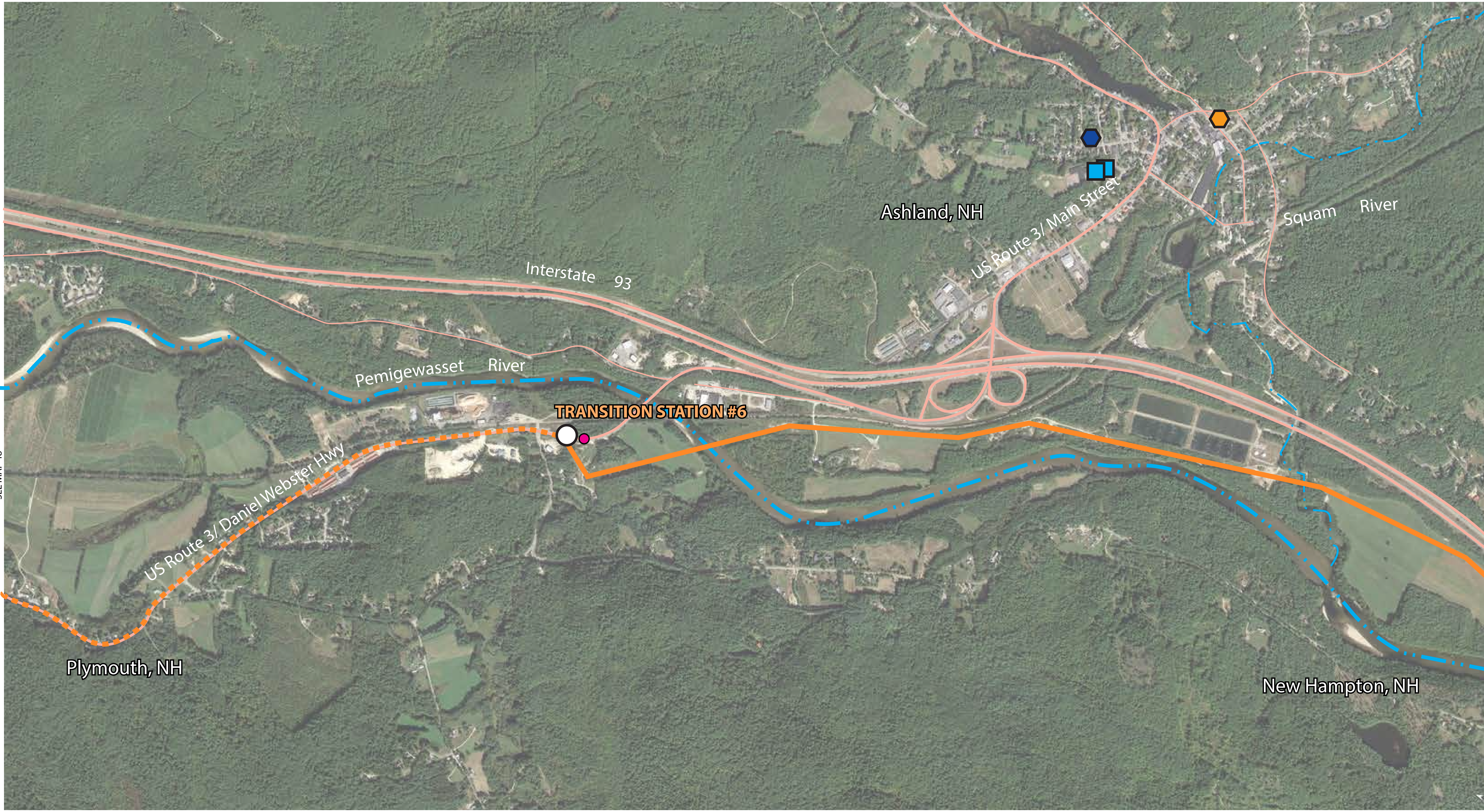
Map 48I
Photo Simulation 4



Aerial View
N
PHOTO 1
Work Zone
Retaining Wall
Main St
Alternating
RR Tracks
Pemigewasset River
THE NORTHERN PASS PROPOSED ROUTE
43°44'29.25"N 71°40'42.81"W
Daniel Webster Hwy - Railroad/Retaining Wall
Plymouth, NH 03264
(Page 1 of 3)
Map 48J
Photo Simulation 5
Dewberry®


Actual View
THE NORTHERN PASS PROPOSED ROUTE
Photo 1A
View Facing North
From Daniel Webster Hwy
(Page 2 of 3)
Map 48K
Photo Simulation 5
Dewberry


Proposed Work Zone
Existing Wall
Alternating
14' ±
THE NORTHERN PASS PROPOSED ROUTE
Photo 1B
View Facing North
From Daniel Webster Hwy
(Page 3 of 3)
Map 48L
Photo Simulation 5
Dewberry®



LEGEND

Transition Station
Substation
Converter Station
Police Station
Fire Station
Hospital
Public Road Access Point
School
Structure in Wetland/ Waterway
PS-1 Photo Simulation
Lay Down Area
HDD-# HDD Label
AR-# Access Route Label
LD-# Lay Down Area Label
HDD Start Location
State Divide
Country Divide
Existing Access Route
HDD End Location
HVDC Underground Line
HVDC Overhead Line
Proposed Access Route
Culturally Sensitive Area
345kV Line
Rivers/ Streams

December 24, 2016

Dewberry®

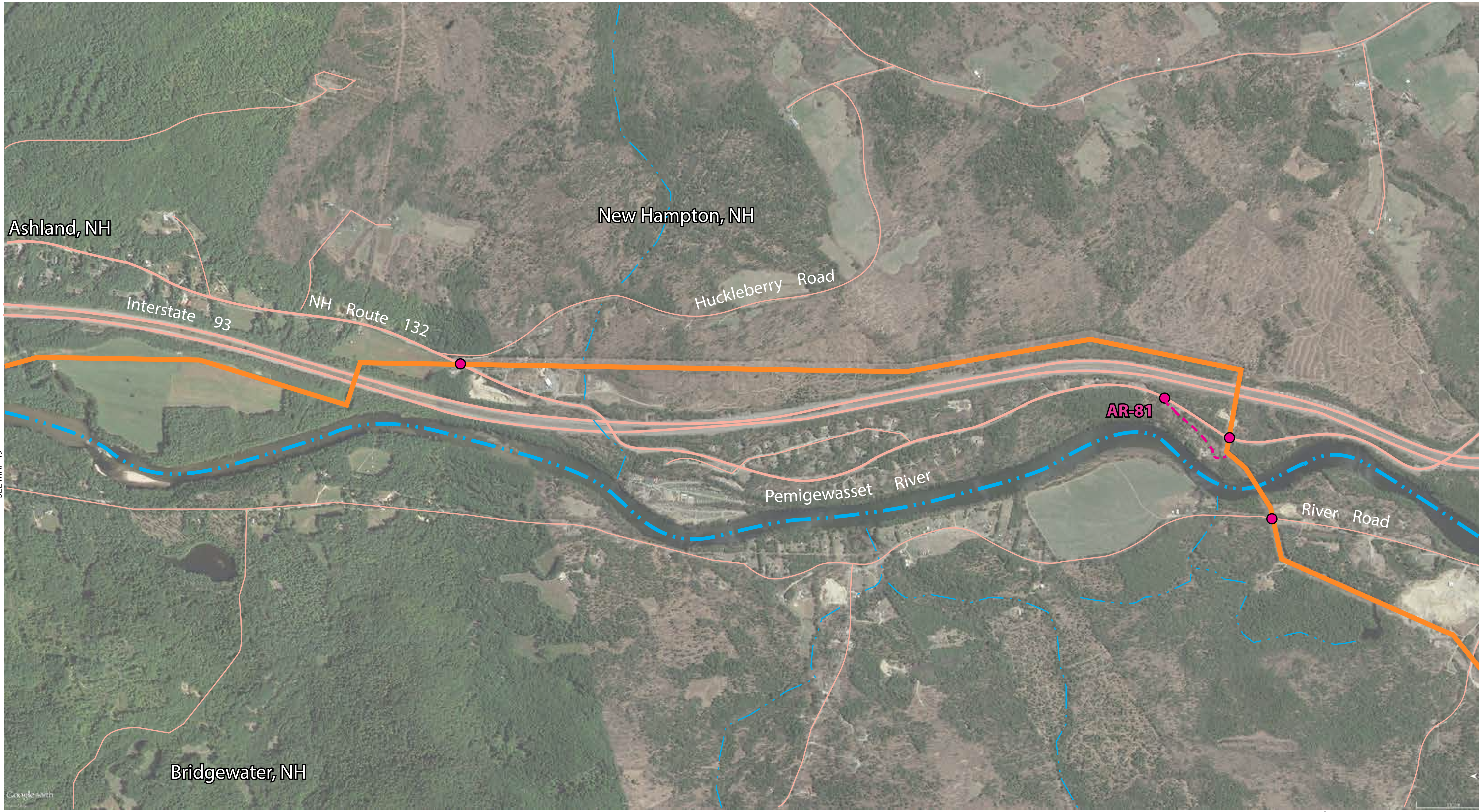
Transition Station #6 to Deerfield Substation

Plymouth, Ashland, New Hampton

Scale: 1″ = 1200′

1200′ 600′ 0′ 1200′ 2400′

Map 49



LEGEND

Transition Station
Substation
Converter Station
Police Station
Fire Station
Hospital
Public Road Access Point
School
Structure in Wetland/ Waterway
PS-1 Photo Simulation
Lay Down Area
HDD-# HDD Label
AR-# Access Route Label
LD-# Lay Down Area Label
HDD Start Location
State Divide
Country Divide
Existing Access Route
HDD End Location
HVDC Underground Line
HVDC Overhead Line
Proposed Access Route
Culturally Sensitive Area
345kV Line
Rivers/ Streams

December 24, 2016

Dewberry®

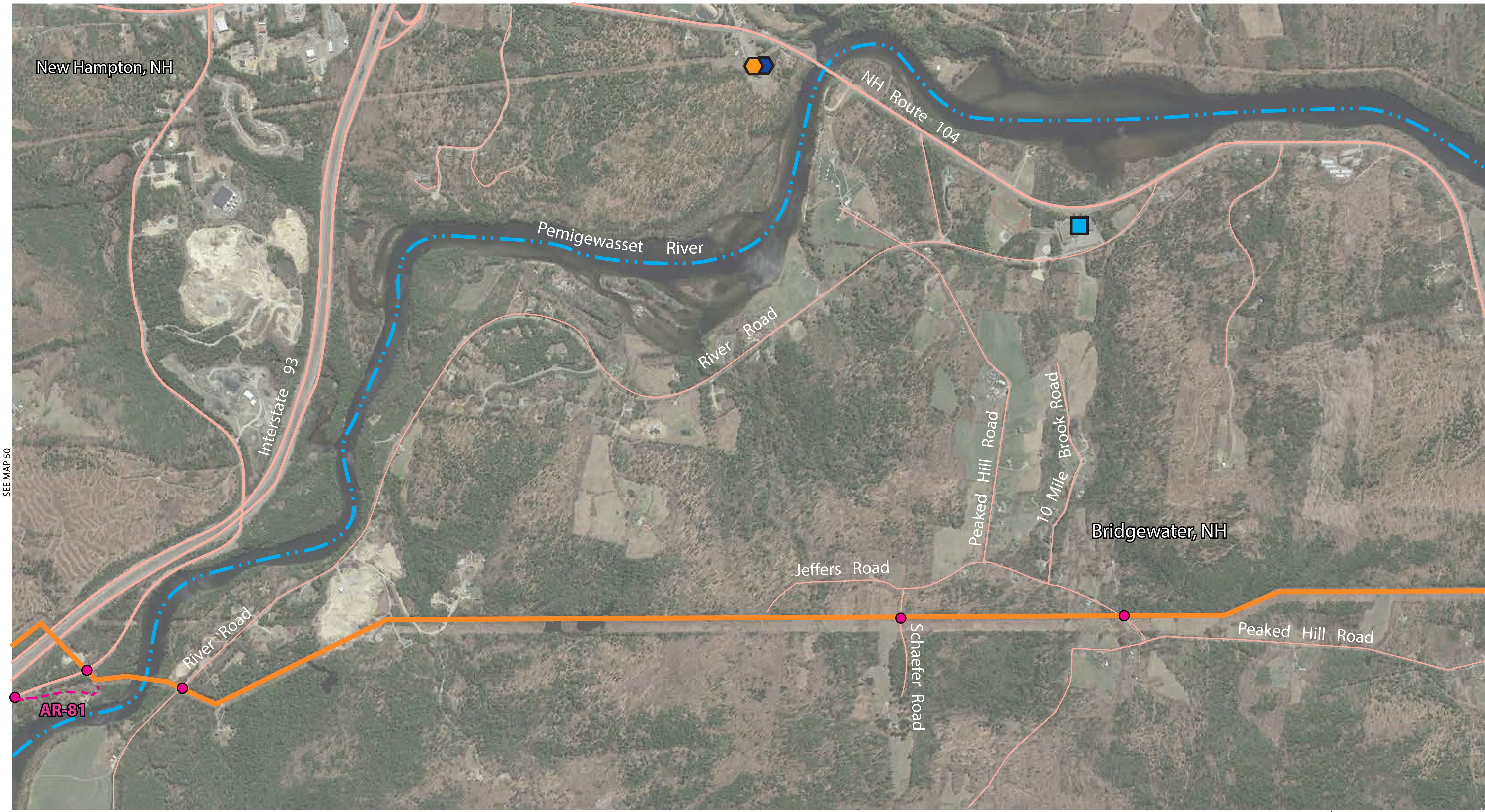
Transition Station #6 to Deerfield Substation

Ashland, Bridgewater, New Hampton

Scale: 1″ = 1200′

1200′ 600′ 0′ 1200′ 2400′

Map 50



LEGEND

Transition Station
Substation
Converter Station
Police Station
Fire Station
Hospital
Public Road Access Point
School
Structure in Wetland/ Waterway
PS-1 Photo Simulation
Lay Down Area
HDD-# HDD Label
AR-# Access Route Label
LD-# Lay Down Area Label
HDD Start Location
State Divide
Country Divide
Existing Access Route
HDD End Location
HVDC Underground Line
HVDC Overhead Line
Proposed Access Route
Culturally Sensitive Area
345kV Line
Rivers/ Streams

December 24, 2016

Dewberry®

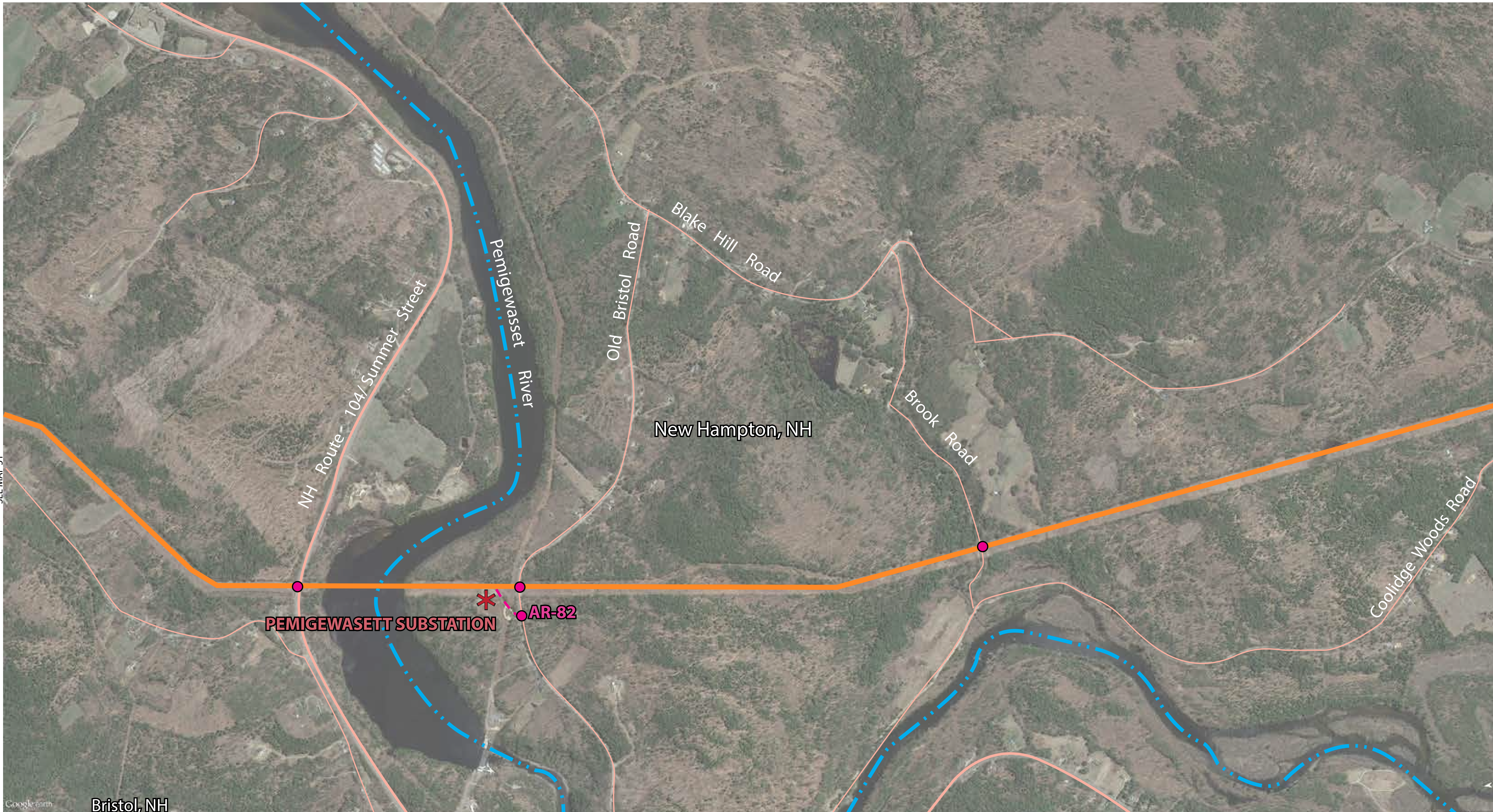
Transition Station #6 to Deerfield Substation

New Hampton, Bridgewater

Scale: 1″ = 1200′

1200′ 600′ 0′ 1200′ 2400′

Map 51



LEGEND

Transition Station	Converter Station	Fire Station	Public Road Access Point
Substation	Police Station	Hospital	School
			Structure in Wetland/ Waterway
PS-1 Photo Simulation	HDD-# HDD Label	HDD Start Location	HDD End Location
Lay Down Area	AR-# Access Route Label	State Divide	HVDC Underground Line
	LD-# Lay Down Area Label	Country Divide	HVDC Overhead Line
		Existing Access Route	Proposed Access Route
Culturally Sensitive Area	345kV Line	Rivers/ Streams	

December 24, 2016

Dewberry

Transition Station #6 to Deerfield Substation

Bristol, New Hampton

Map 52

Scale: 1″ = 1200′

1200′ 600′ 0′ 1200′ 2400′

SEE MAP 52

SEE MAP 54

LEGEND

Transition Station	Converter Station	Fire Station	Public Road Access Point	Photo Simulation	HDD-# HDD Label	HDD Start Location	HDD End Location
Substation	Police Station	Hospital	School	Lay Down Area	AR-# Access Route Label	State Divide	HVDC Underground Line
			Structure in Wetland/ Waterway	PS-1	LD-# Lay Down Area Label	Country Divide	HVDC Overhead Line
						Existing Access Route	Proposed Access Route

Culturally Sensitive Area
345kV Line
Rivers/ Streams

December 24, 2016

Dewberry®

Transition Station #6 to Deerfield Substation

New Hampton, Sandbornton, Hill, Franklin

Scale: 1″ = 1200′

1200′ 600′ 0′ 1200′ 2400′

Map 53

SEE MAP 53

SEE MAP 55

LEGEND

- Transition Station
- Substation
- Converter Station
- Police Station
- Fire Station
- Hospital
- Public Road Access Point
- School
- Structure in Wetland/ Waterway
- PS-1 Photo Simulation
- Lay Down Area
- HDD-# HDD Label
- AR-# Access Route Label
- LD-# Lay Down Area Label
- HDD Start Location
- State Divide
- Country Divide
- Existing Access Route
- HDD End Location
- HVDC Underground Line
- HVDC Overhead Line
- Proposed Access Route
- Culturally Sensitive Area
- 345kV Line
- Rivers/ Streams

December 24, 2016

Dewberry®

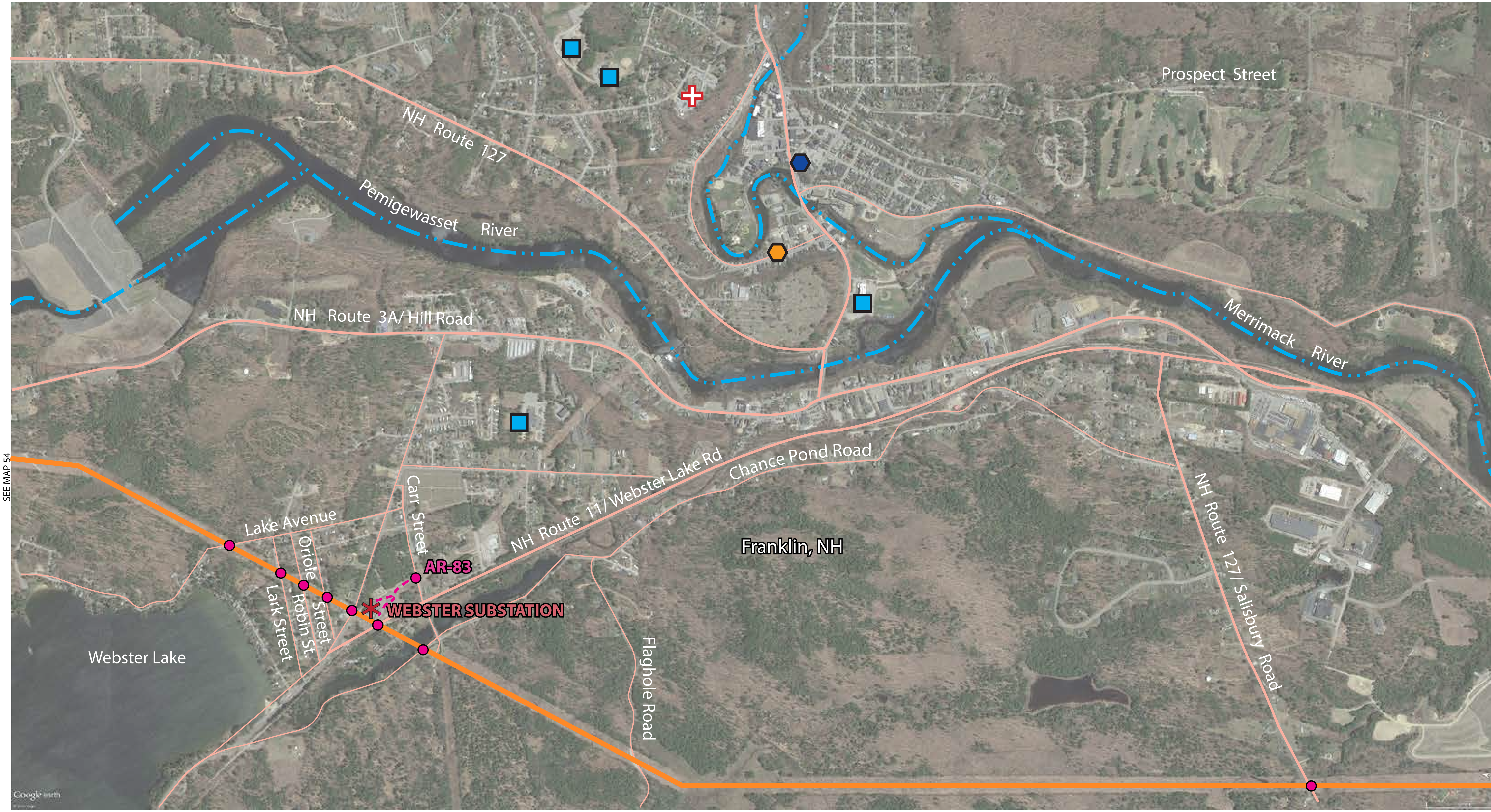
Transition Station #6 to Deerfield Substation

Franklin

Scale: 1″= 1200′

1200′ 600′ 0′ 1200′ 2400′

Map 54



LEGEND

- Transition Station
- Substation
- Converter Station
- Police Station
- Fire Station
- Hospital
- Public Road Access Point
- School
- Structure in Wetland/ Waterway
- PS-1 Photo Simulation
- Lay Down Area
- HDD-# HDD Label
- AR-# Access Route Label
- LD-# Lay Down Area Label
- HDD Start Location
- State Divide
- Country Divide
- Existing Access Route
- HDD End Location
- HVDC Underground Line
- HVDC Overhead Line
- Proposed Access Route
- Culturally Sensitive Area
- 345kV Line
- Rivers/ Streams

December 24, 2016

Dewberry®

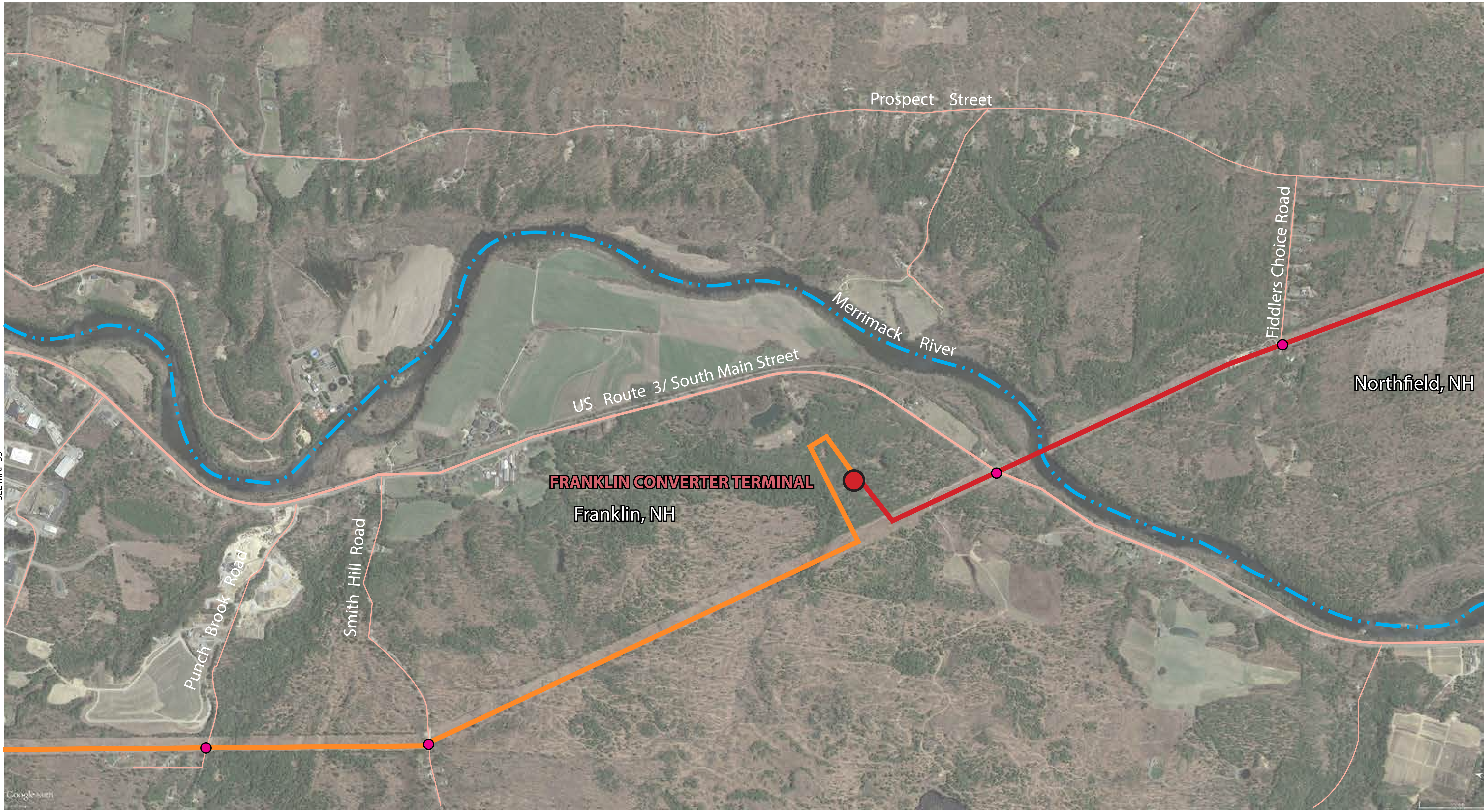
Transition Station #6 to Deerfield Substation

Franklin

Scale: 1″ = 1200′

1200′ 600′ 0′ 1200′ 2400′

Map 55



LEGEND

Transition Station
Substation
Converter Station
Police Station
Fire Station
Hospital
Public Road Access Point
School
Structure in Wetland/ Waterway
Photo Simulation
Lay Down Area
HDD-# HDD Label
AR-# Access Route Label
LD-# Lay Down Area Label
HDD Start Location
State Divide
Country Divide
Existing Access Route
HDD End Location
HVDC Underground Line
HVDC Overhead Line
Proposed Access Route
Culturally Sensitive Area
345kV Line
Rivers/ Streams

December 24, 2016

Dewberry

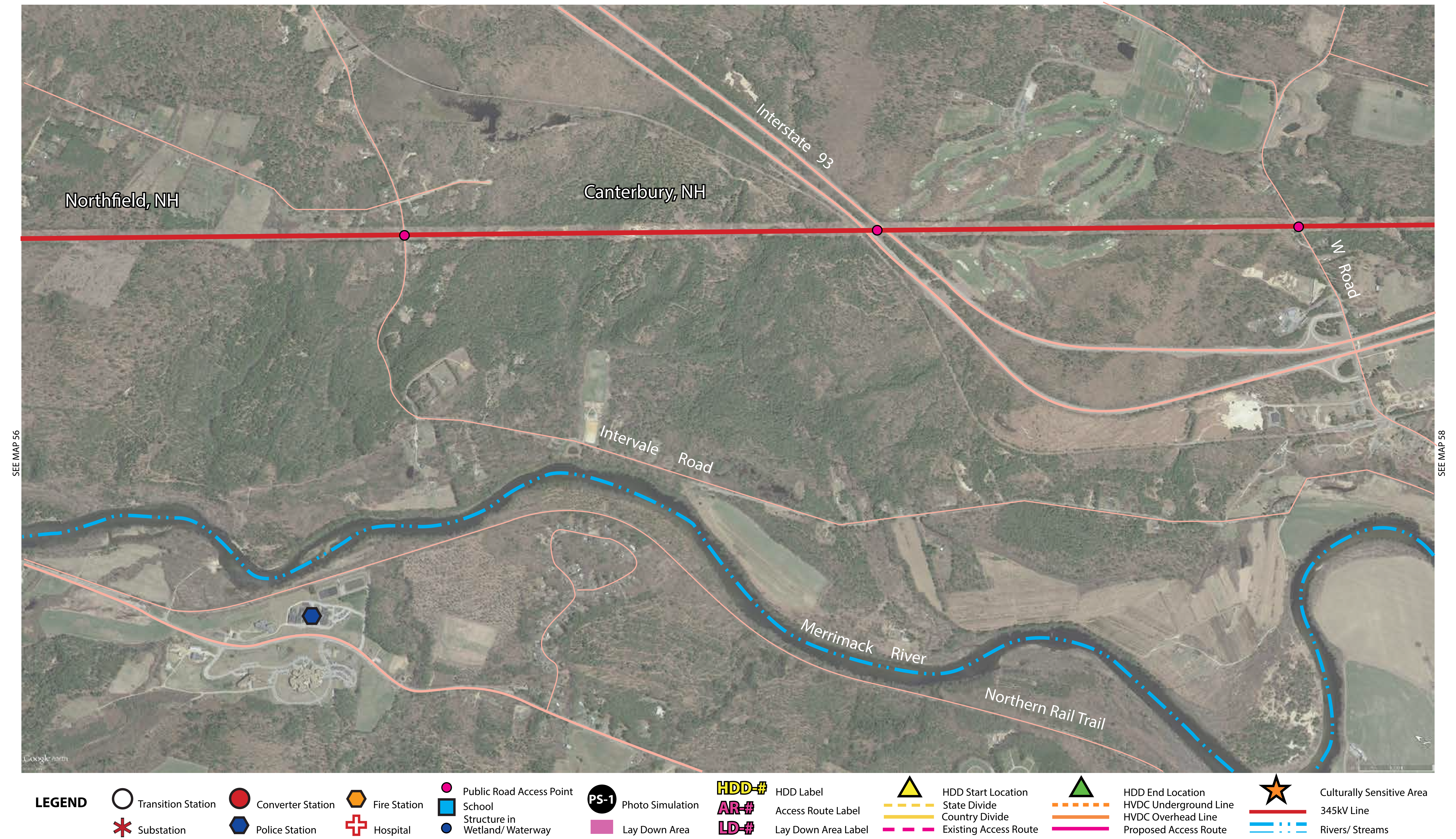
Transition Station #6 to Deerfield Substation

Franklin, Northfield

Scale: 1" = 1200'

1200' 600' 0' 1200' 2400'

Map 56



December 24, 2016

Dewberry

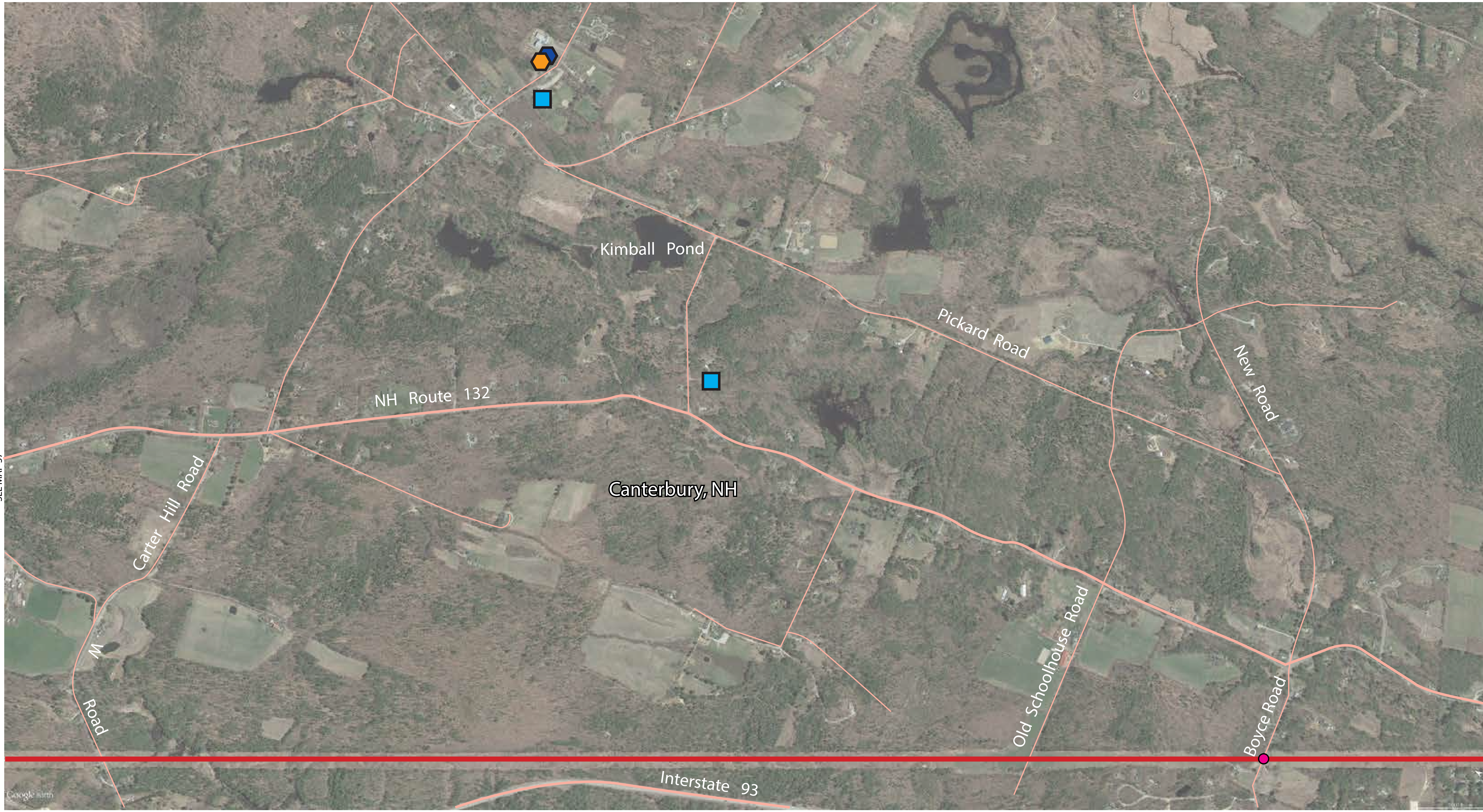
Transition Station #6 to Deerfield Substation

Northfield, Canterbury

Scale: 1″ = 1200′

1200′ 600′ 0′ 1200′ 2400′

Map 57



December 24, 2016

Dewberry

Transition Station #6 to Deerfield Substation

Canterbury

Map 58

Scale: 1″ = 1200′

1200′ 600′ 0′ 1200′ 2400′

LEGEND

- Transition Station
- Substation
- Converter Station
- Police Station
- Fire Station
- Hospital
- Public Road Access Point
- School
- Structure in Wetland/ Waterway
- PS-1 Photo Simulation
- Lay Down Area
- HDD-# HDD Label
- AR-# Access Route Label
- LD-# Lay Down Area Label
- HDD Start Location
- State Divide
- Country Divide
- Existing Access Route
- HDD End Location
- HVDC Underground Line
- HVDC Overhead Line
- Proposed Access Route
- Culturally Sensitive Area
- 345kV Line
- Rivers/ Streams

December 24, 2016

Dewberry®

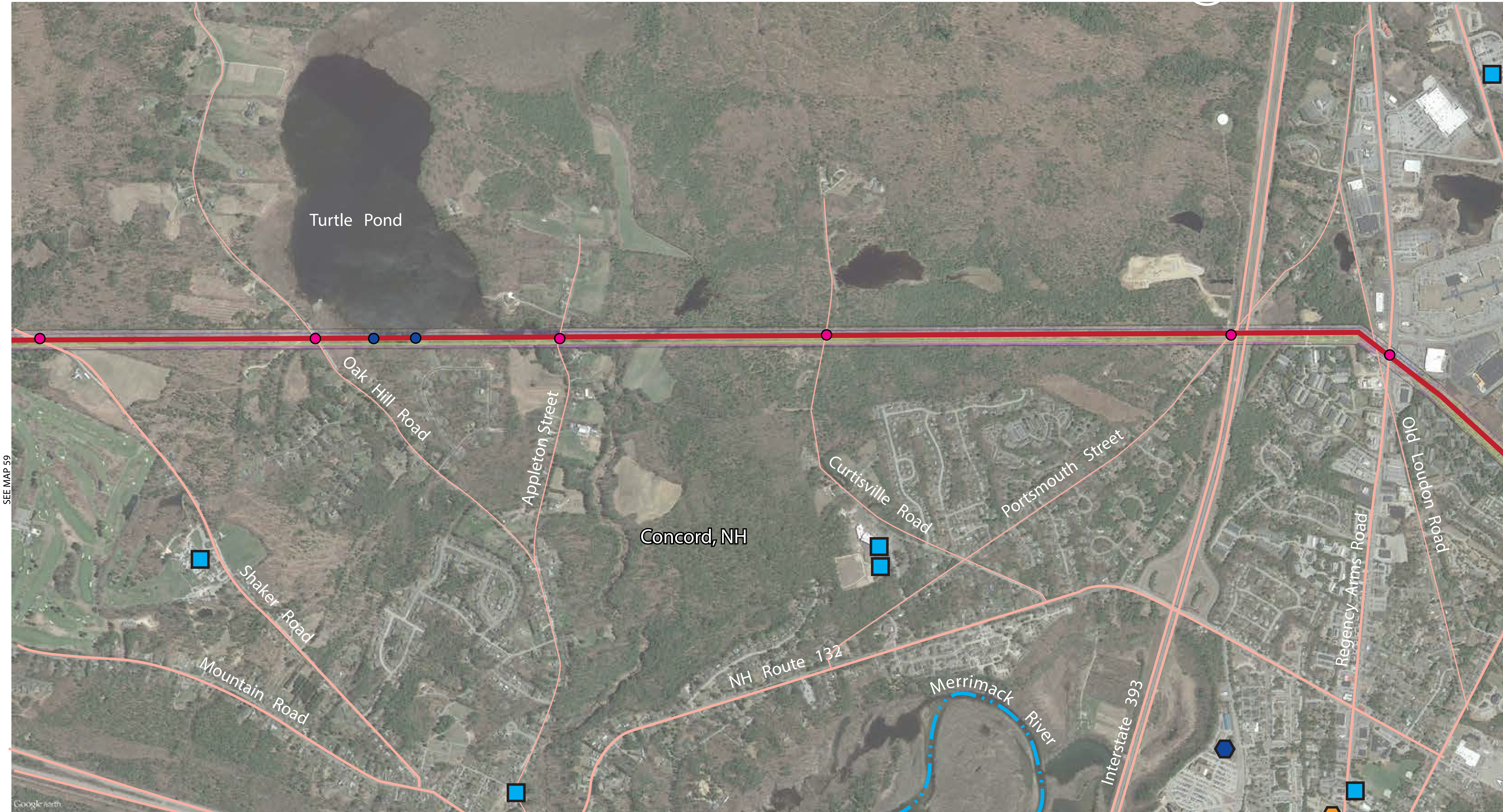
Transition Station #6 to Deerfield Substation

Canterbury, Concord

Scale: 1″ = 1200′

1200′ 600′ 0′ 1200′ 2400′

Map 59



LEGEND

Transition Station
Substation
Converter Station
Police Station
Fire Station
Hospital
Public Road Access Point
School
Structure in Wetland/ Waterway
PS-1 Photo Simulation
Lay Down Area
HDD-# HDD Label
AR-# Access Route Label
LD-# Lay Down Area Label
HDD Start Location
State Divide
Country Divide
Existing Access Route
HDD End Location
HVDC Underground Line
HVDC Overhead Line
Proposed Access Route
Culturally Sensitive Area
345kV Line
Rivers/ Streams

December 24, 2016

Dewberry

Transition Station #6 to Deerfield Substation

Concord

Scale: 1″= 1200′

1200′ 600′ 0′ 1200′ 2400′

Map 60

LEGEND

Transition Station	Converter Station	Fire Station	Public Road Access Point	Photo Simulation	HDD-#	HDD Label	HDD Start Location	HDD End Location	Culturally Sensitive Area
Substation	Police Station	Hospital	School	Lay Down Area	AR-#	Access Route Label	State Divide	HVDC Underground Line	345kV Line
			Structure in Wetland/ Waterway		LD-#	Lay Down Area Label	Country Divide	HVDC Overhead Line	Rivers/ Streams
				PS-1			Existing Access Route	Proposed Access Route	

December 24, 2016

Dewberry®

Transition Station #6 to Deerfield Substation

Concord, Pembroke

Scale: 1″ = 1200′

1200′ 600′ 0′ 1200′ 2400′

Map 61

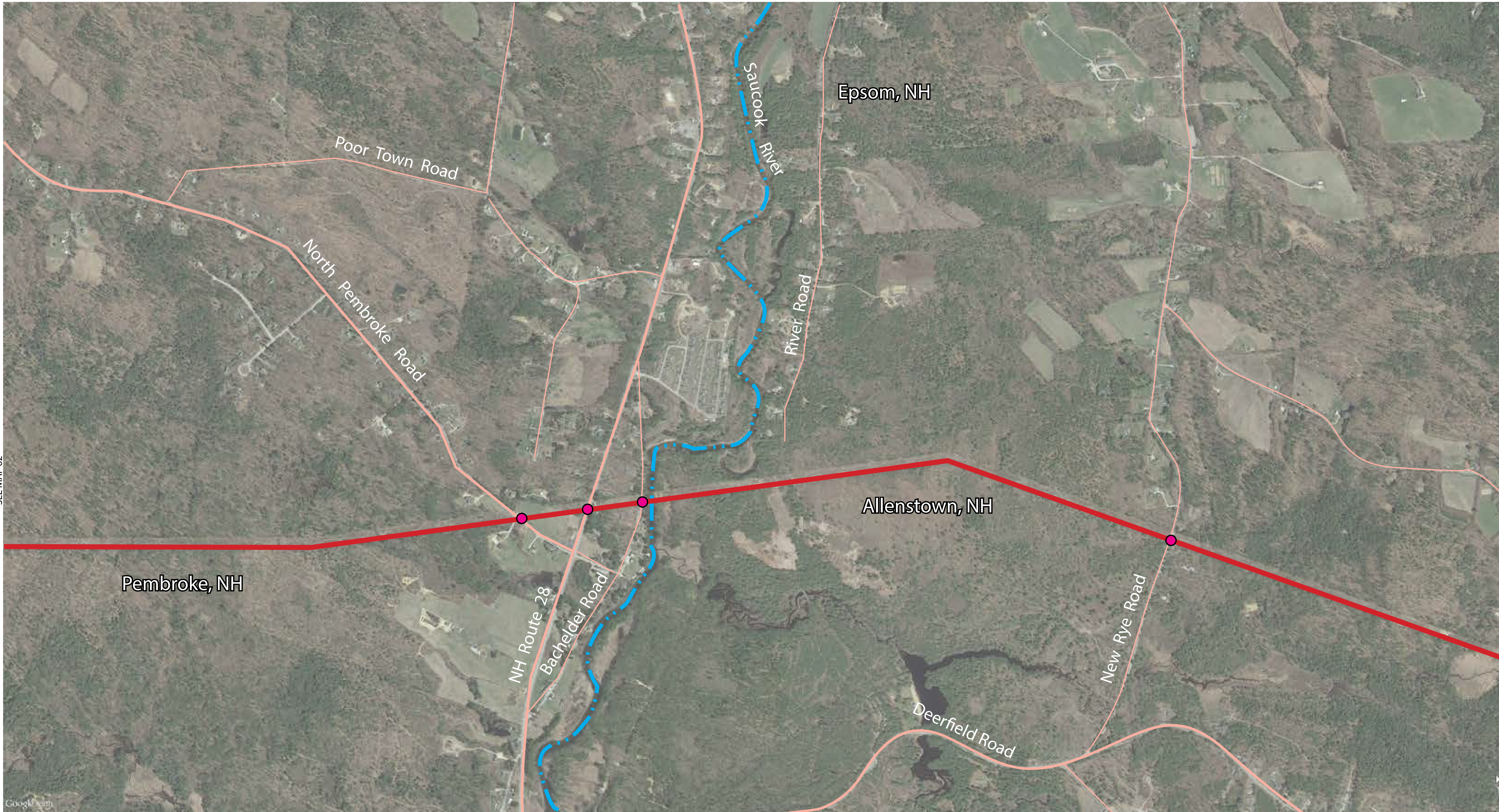
December 24, 2016

Dewberry

Transition Station #6 to Deerfield Substation

Pembroke

Map 62



LEGEND

Transition Station
Substation
Converter Station
Police Station
Fire Station
Hospital
Public Road Access Point
School
Structure in Wetland/ Waterway
Photo Simulation
Lay Down Area
HDD-# HDD Label
AR-# Access Route Label
LD-# Lay Down Area Label
HDD Start Location
State Divide
Country Divide
Existing Access Route
HDD End Location
HVDC Underground Line
HVDC Overhead Line
Proposed Access Route
Culturally Sensitive Area
345kV Line
Rivers/ Streams

December 24, 2016

Dewberry®

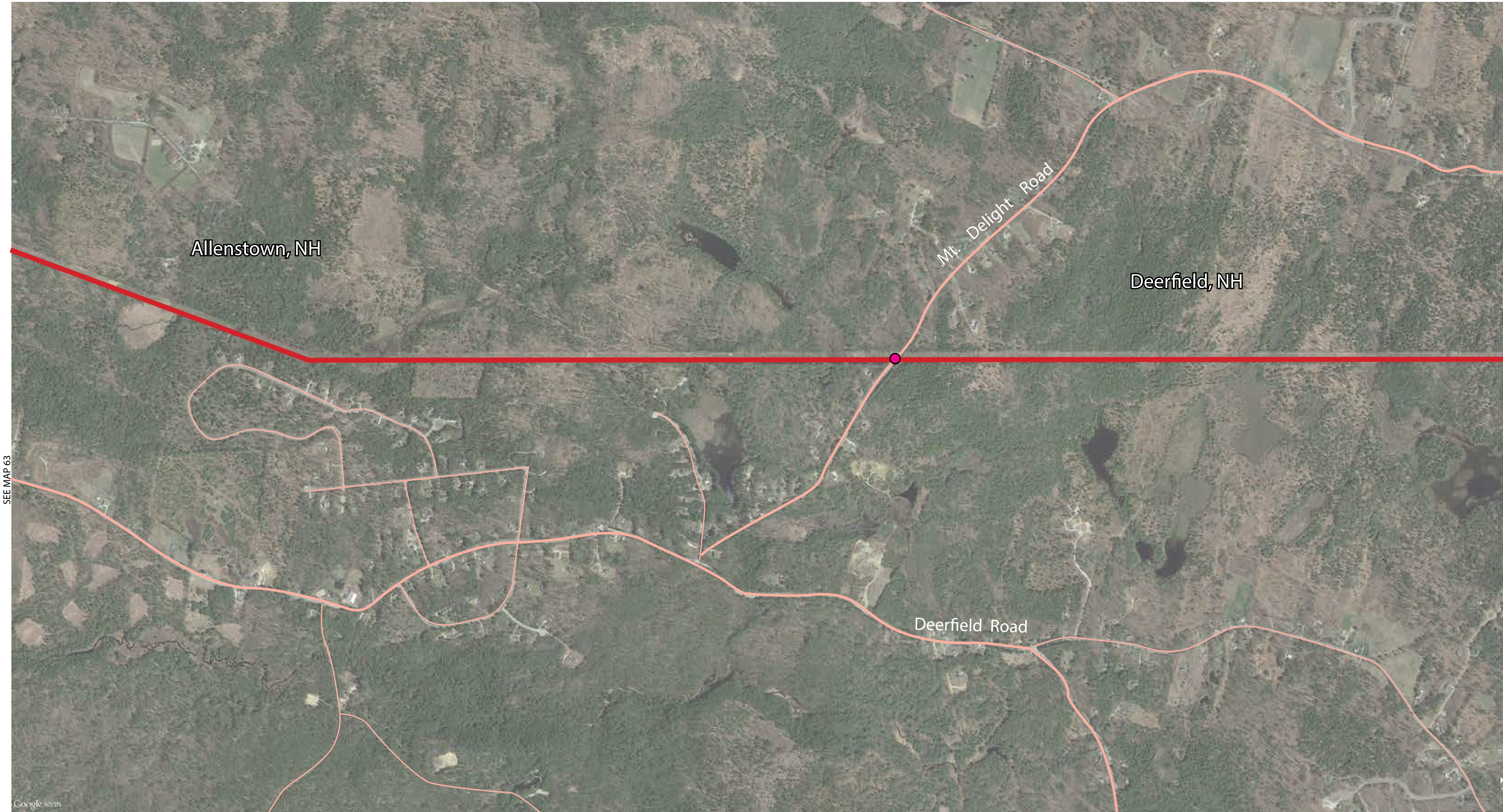
Transition Station #6 to Deerfield Substation

Pembroke, Allenstown, Epsom

Scale: 1″ = 1200′

1200′ 600′ 0′ 1200′ 2400′

Map 63



LEGEND

Transition Station
Substation
Converter Station
Police Station
Fire Station
Hospital
Public Road Access Point
School
Structure in Wetland/ Waterway
PS-1 Photo Simulation
Lay Down Area
HDD-# HDD Label
AR-# Access Route Label
LD-# Lay Down Area Label
HDD Start Location
State Divide
Country Divide
Existing Access Route
HDD End Location
HVDC Underground Line
HVDC Overhead Line
Proposed Access Route
Culturally Sensitive Area
345kV Line
Rivers/ Streams

December 24, 2016

Dewberry

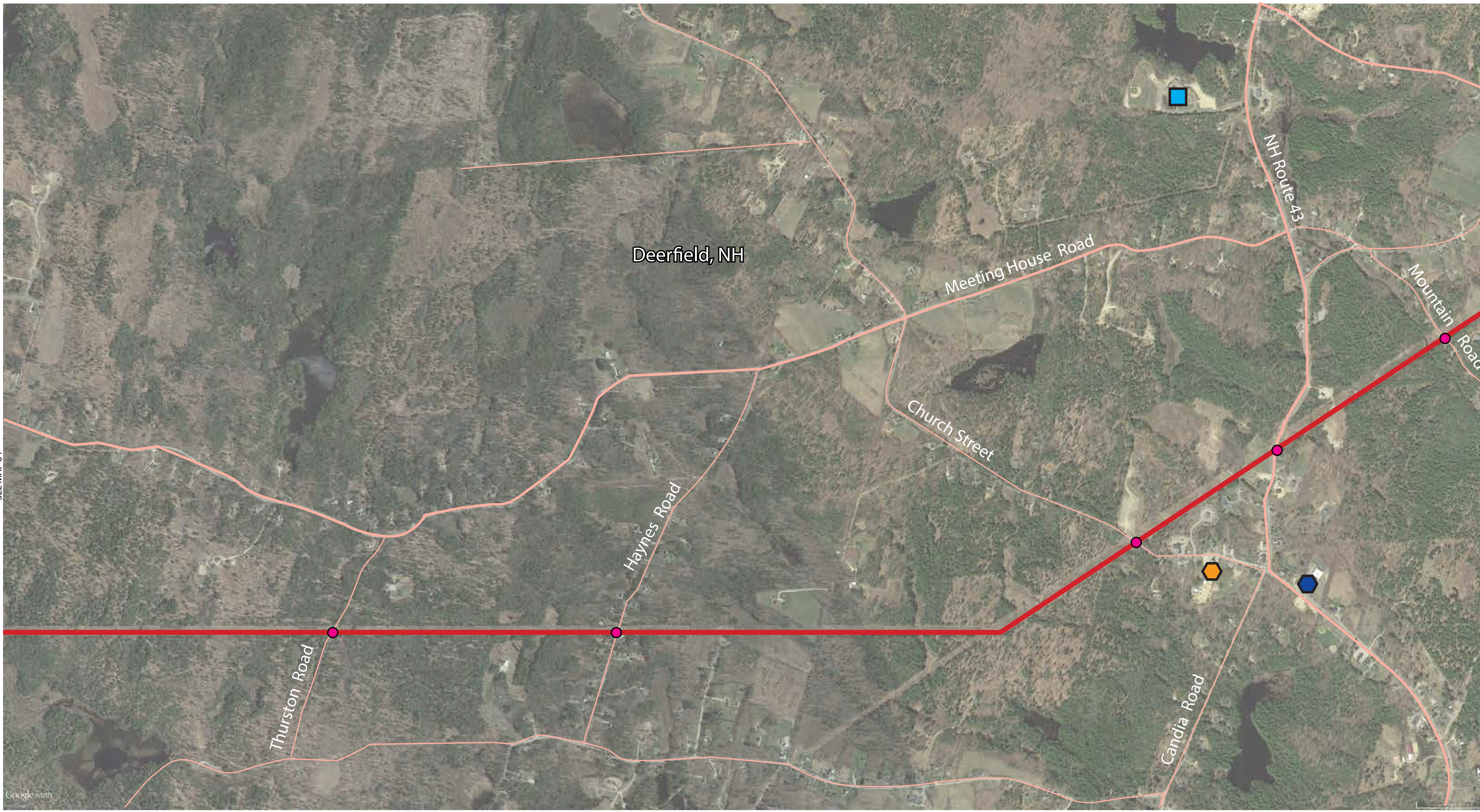
Transition Station #6 to Deerfield Substation

Allenstown, Deerfield

Scale: 1″= 1200′

1200′ 600′ 0′ 1200′ 2400′

Map 64



LEGEND

Transition Station
Substation
Converter Station
Police Station
Fire Station
Hospital
Public Road Access Point
School
Structure in Wetland/ Waterway
PS-1 Photo Simulation
Lay Down Area
HDD-# HDD Label
AR-# Access Route Label
LD-# Lay Down Area Label
HDD Start Location
State Divide
Country Divide
Existing Access Route
HDD End Location
HVDC Underground Line
HVDC Overhead Line
Proposed Access Route
Culturally Sensitive Area
345kV Line
Rivers/ Streams

December 24, 2016

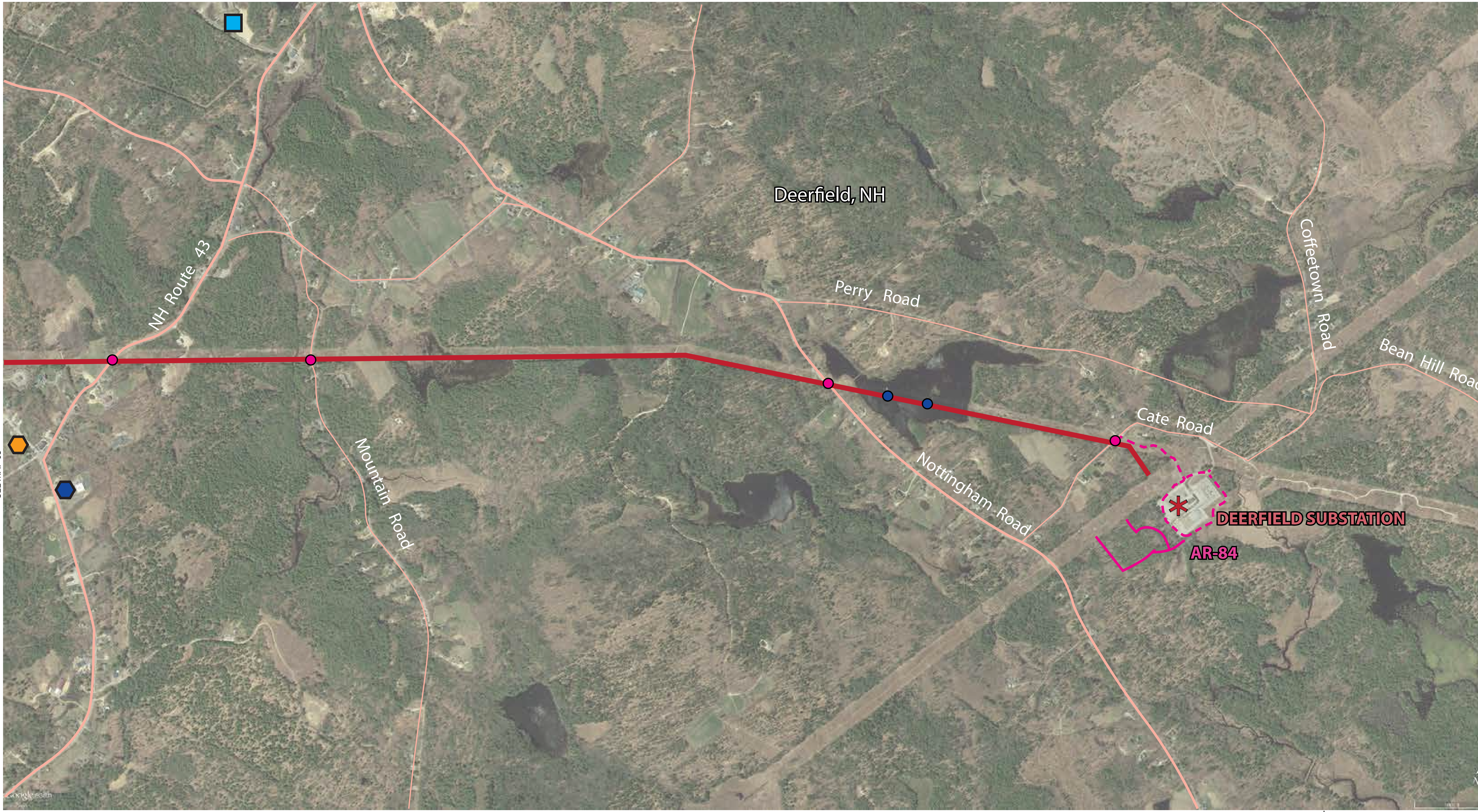
Dewberry®

Transition Station #6 to Deerfield Substation

Deerfield

Scale: 1″ = 1200′

1200′ 600′ 0′ 1200′ 2400′



LEGEND

Transition Station	Converter Station	Fire Station	Public Road Access Point	Photo Simulation	HDD-#	HDD Label	HDD Start Location	HDD End Location	Culturally Sensitive Area
Substation	Police Station	Hospital	School	Lay Down Area	AR-#	Access Route Label	State Divide	HVDC Underground Line	345kV Line
			Structure in Wetland/ Waterway		LD-#	Lay Down Area Label	Country Divide	HVDC Overhead Line	Rivers/ Streams
							Existing Access Route	Proposed Access Route	

PS-1

December 24, 2016

Dewberry

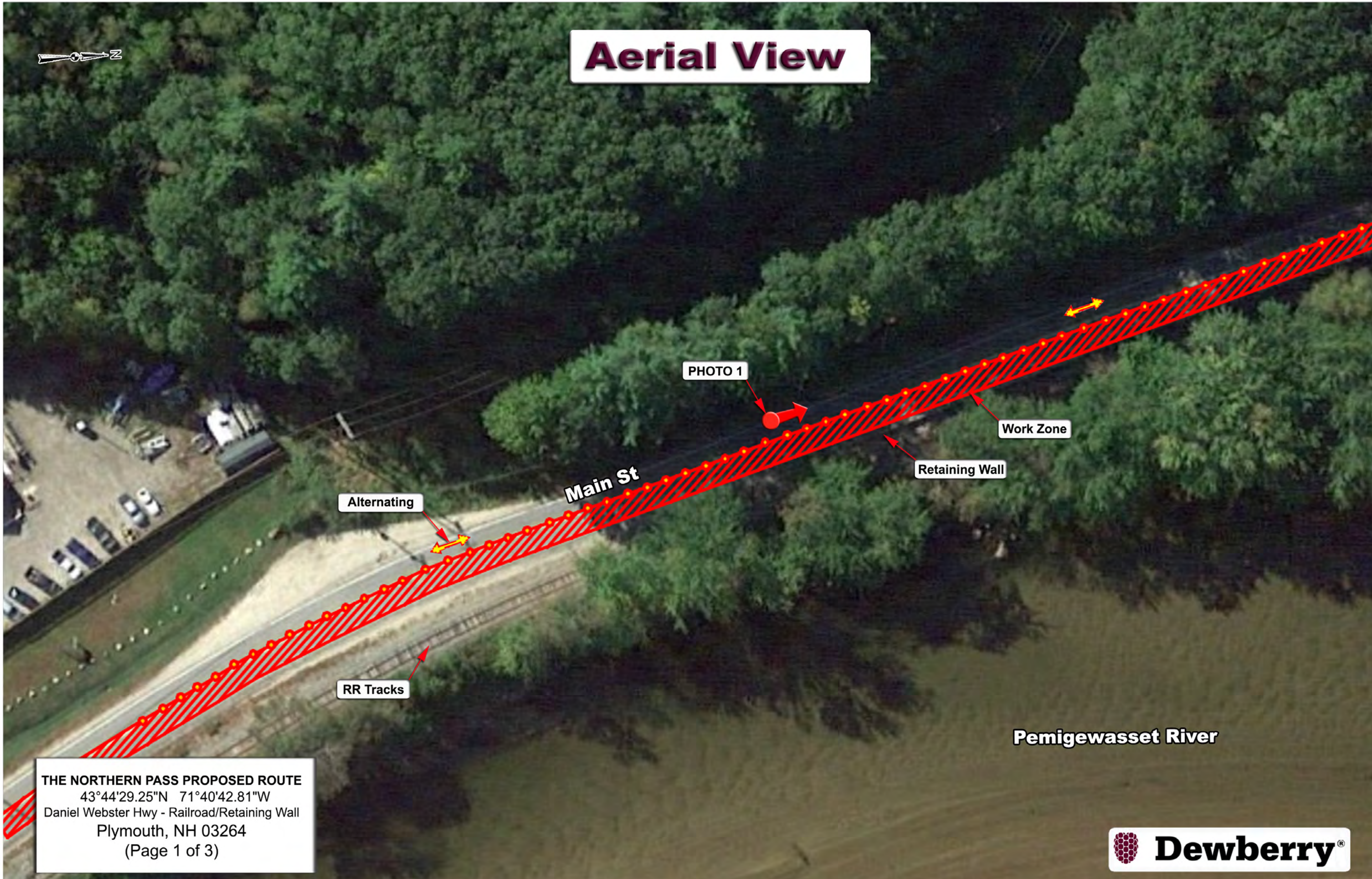
Transition Station #6 to Deerfield Substation

Deerfield

Map 66

Scale: 1″ = 1200′

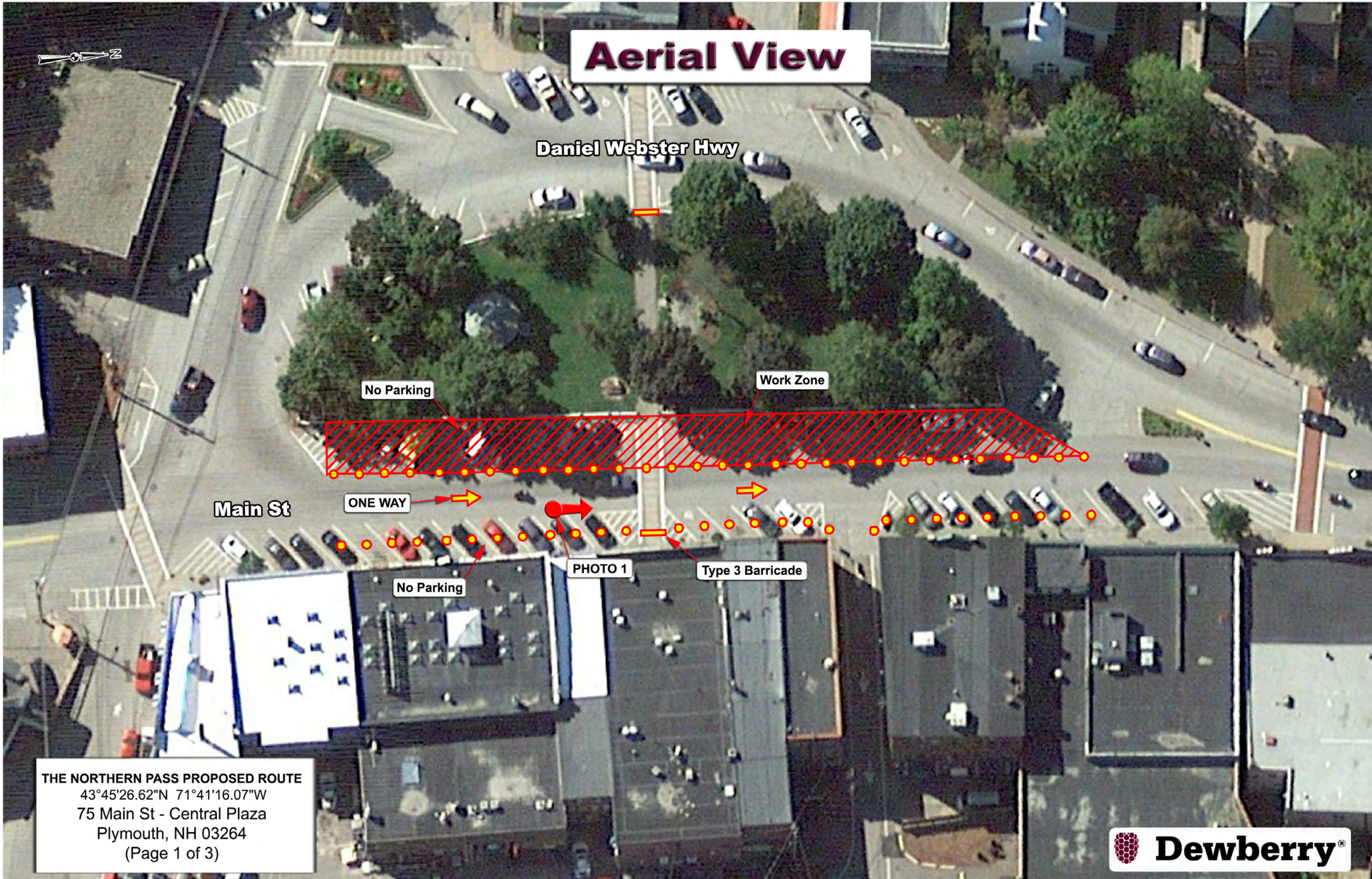
1200′ 600′ 0′ 1200′ 2400′



Aerial View
PHOTO 1
Work Zone
Retaining Wall
Main St
Alternating
RR Tracks
Pemigewasset River
THE NORTHERN PASS PROPOSED ROUTE
43°44'29.25"N 71°40'42.81"W
Daniel Webster Hwy - Railroad/Retaining Wall
Plymouth, NH 03264
(Page 1 of 3)
Dewberry®


Actual View
THE NORTHERN PASS PROPOSED ROUTE
Photo 1A
View Facing North
From Daniel Webster Hwy
(Page 2 of 3)
Dewberry®

THE NORTHERN PASS PROPOSED ROUTE
Photo 1B
View Facing North
From Daniel Webster Hwy
(Page 3 of 3)

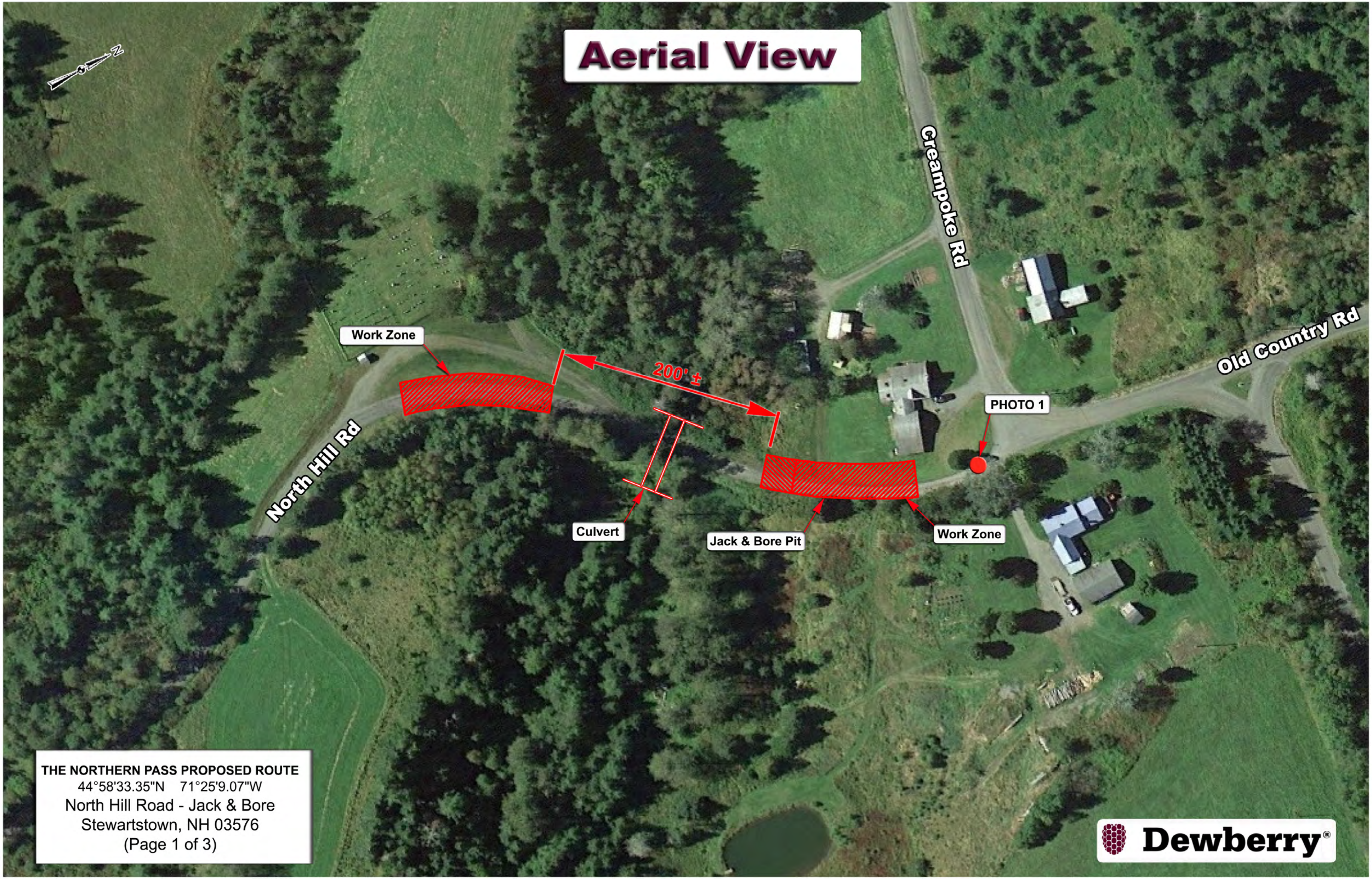

Aerial View
Daniel Webster Hwy
No Parking
Work Zone
Main St
ONE WAY
PHOTO 1
Type 3 Barricade
No Parking
N
THE NORTHERN PASS PROPOSED ROUTE
43°45'26.62"N 71°41'16.07"W
75 Main St - Central Plaza
Plymouth, NH 03264
(Page 1 of 3)
Dewberry®

Actual View

THE NORTHERN PASS PROPOSED ROUTE
Photo 1A
View Facing South
From Main Street
(Page 2 of 3)

Dewberry®


Proposed Work Zone
No Parking
No Parking
11' ±
One way
THE NORTHERN PASS PROPOSED ROUTE
Photo 1B
View Facing North
From Main Street
(Page 3 of 3)
Dewberry



Aerial View
Creampoke Rd
Old Country Rd
North Hill Rd
Work Zone
200' ±
PHOTO 1
Culvert
Jack & Bore Pit
Work Zone
THE NORTHERN PASS PROPOSED ROUTE
44°58'33.35"N 71°25'9.07"W
North Hill Road - Jack & Bore
Stewartstown, NH 03576
(Page 1 of 3)
Dewberry®

THE NORTHERN PASS PROPOSED ROUTE
Photo 1A
View Facing South
North Hill Road
(Page 2 of 3)

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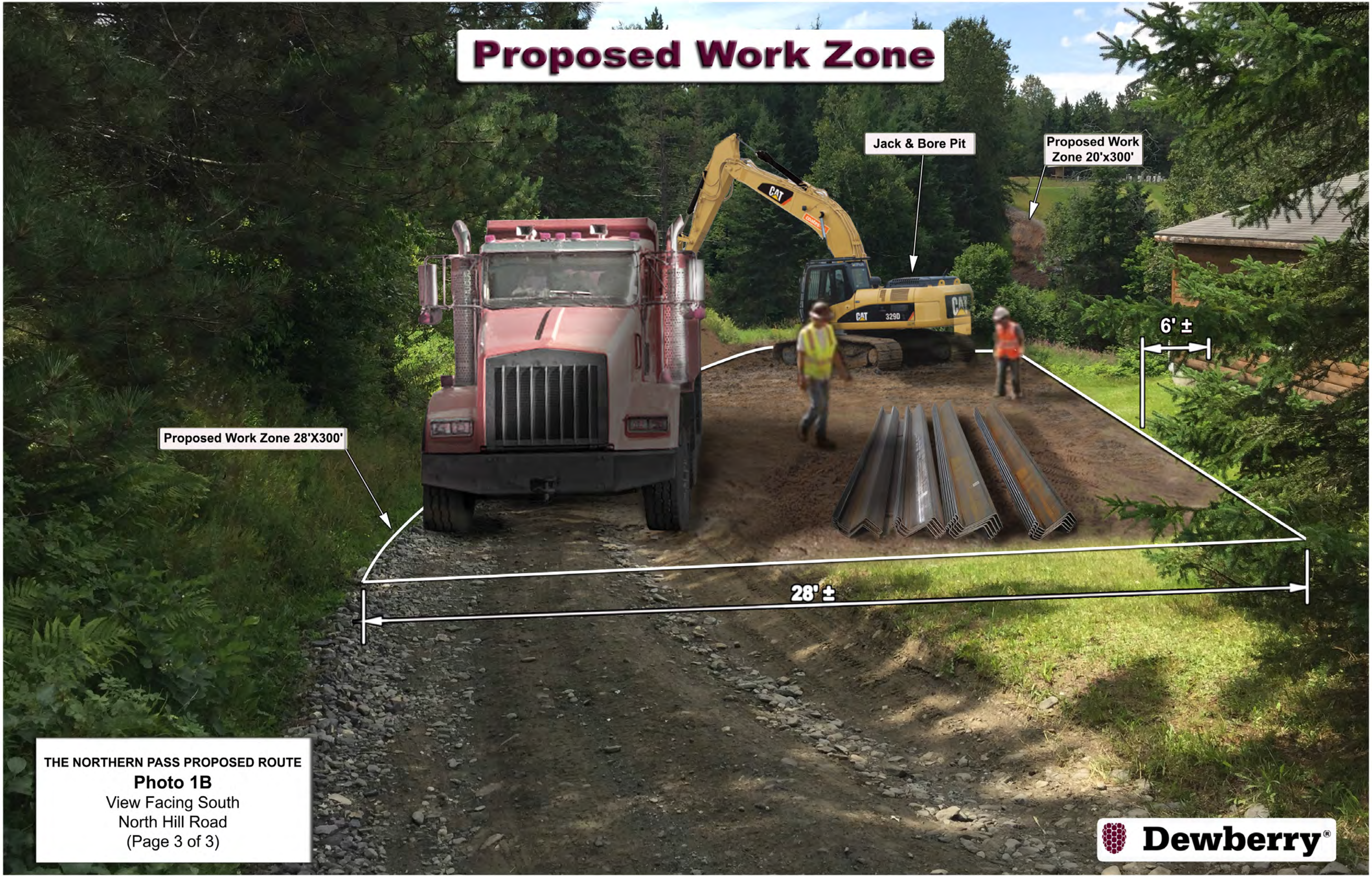
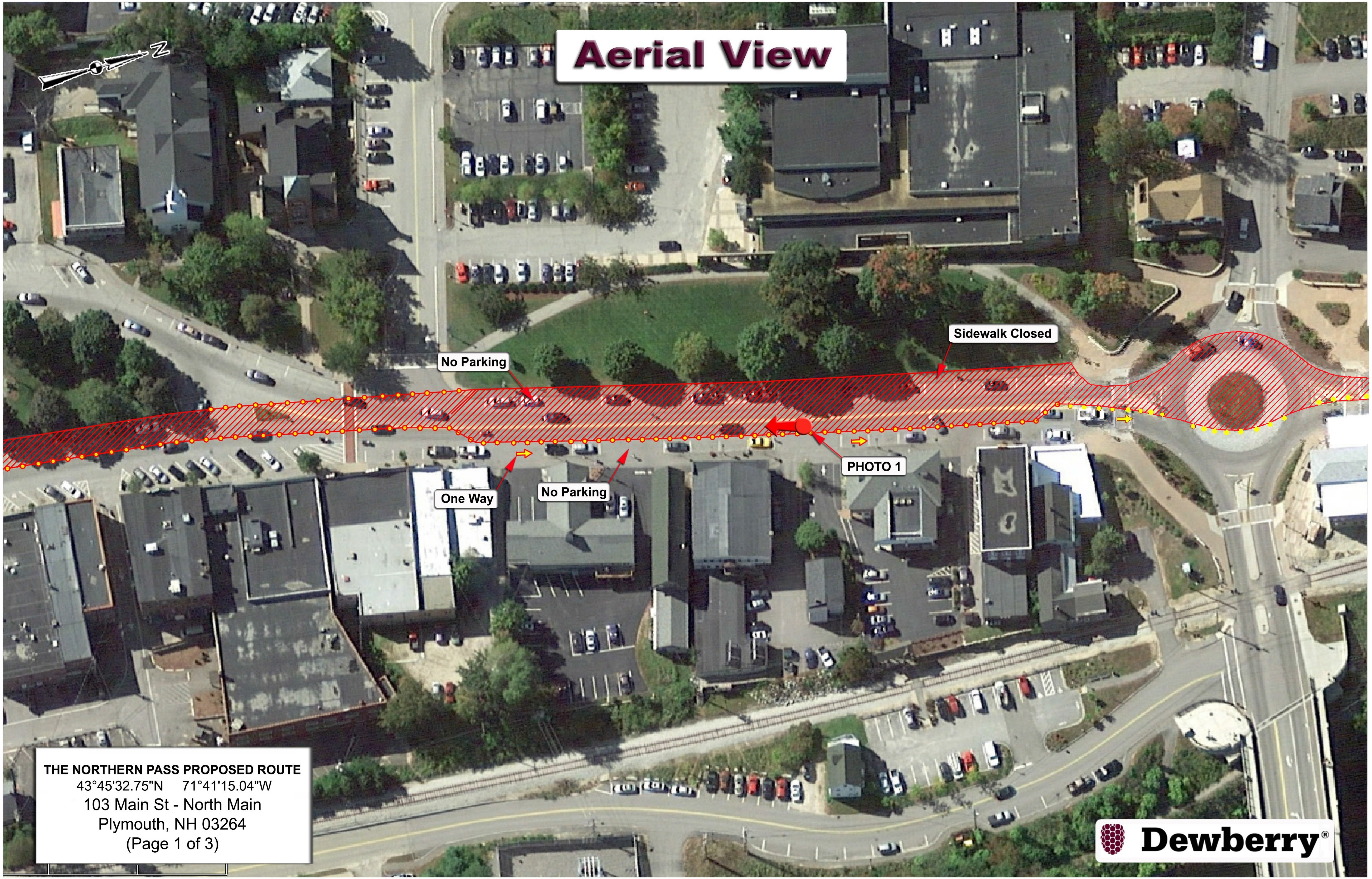


Proposed Work Zone
Jack & Bore Pit
Proposed Work Zone 20'x300'
6' ±
Proposed Work Zone 28'X300'
28' ±
THE NORTHERN PASS PROPOSED ROUTE
Photo 1B
View Facing South
North Hill Road
(Page 3 of 3)
Dewberry®


Aerial View
N
Sidewalk Closed
No Parking
PHOTO 1
One Way
No Parking
THE NORTHERN PASS PROPOSED ROUTE
43°45'32.75"N 71°41'15.04"W
103 Main St - North Main
Plymouth, NH 03264
(Page 1 of 3)
Dewberry®

THE NORTHERN PASS PROPOSED ROUTE
Photo 1A
View Facing South
From Main Street
(Page 2 of 3)


Proposed Work Zone
No Parking
One Way
11' ±
No Parking
Sidewalk Closed
THE NORTHERN PASS PROPOSED ROUTE
Photo 1B
View Facing South
From Main Street
(Page 3 of 3)
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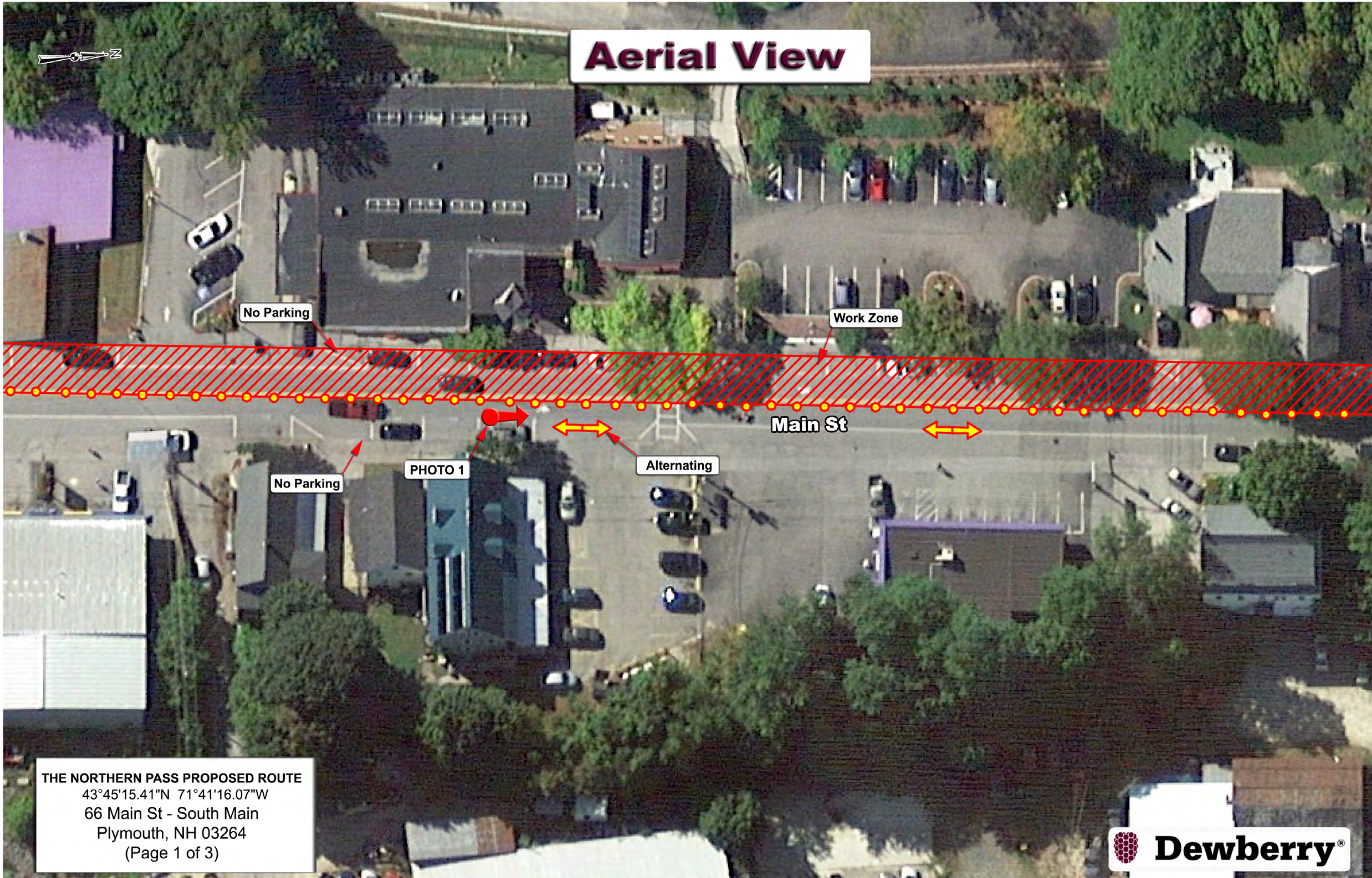
Aerial View



THE NORTHERN PASS PROPOSED ROUTE
43°45'15.41"N 71°41'16.07"W
66 Main St - South Main
Plymouth, NH 03264
(Page 1 of 3)

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Actual View

THE NORTHERN PASS PROPOSED ROUTE
Photo 1A
View Facing North
From Main Street
(Page 2 of 3)

Proposed Work Zone

THE NORTHERN PASS PROPOSED ROUTE
Photo 1B
View Facing North
From Main Street
(Page 3 of 3)