

**New Hampshire Department of Environmental Services
Wetlands Permit
Application & Wetland Impact Narrative**



Project:
Brookside Drive Culvert Replacement
Brookside Drive
New London, NH
CLD Reference No. 15-0184

Owner/Applicant:
Town of New London New Hampshire
184 South Pleasant Street
New London, NH 03257

Dated: October 25, 2016



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White River Junction, VT 05001
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1. APPLICATION & FEE



WETLANDS PERMIT APPLICATION

Water Division/ Wetlands Bureau
Land Resources Management

Check the status of your application: <http://des.nh.gov/onestop>



RSA/Rule: Env-Wq 100-900

<i>Administrative Use Only</i>	<i>Administrative Use Only</i>	<i>Administrative Use Only</i>	File No.:
			Check No.:
			Amount:
			Initials:

1. REVIEW TIME:
Indicate your Review Time below. Refer to Guidance Document A for instructions.

Standard Review (Minimum, Minor or Major Impact) Expedited Review (Minimum Impact only)

2. PROJECT LOCATION:
Separate applications must be filed with each municipality that jurisdictional impacts will occur in.

ADDRESS: **Brookside Drive** TOWN/CITY: **New London**

TAX MAP: BLOCK: LOT: UNIT:

USGS TOPO MAP WATERBODY NAME: **Lyon Brook** NA STREAM WATERSHED SIZE: **1103 Acres** NA

LOCATION COORDINATES (If known): **43d23'48.21"N71d58'25.43"W** Latitude/Longitude
 UTM State Plane

3. PROJECT DESCRIPTION:
Provide a brief description of the project outlining the scope of work. Attach additional sheets as needed to provide a detailed explanation of your project. DO NOT reply "See Attached" in the space provided below.

The project consists of replacing existing structurally deficient culverts with aluminum box culverts over Lyon Brook (a Tier 3 stream) along Brookside Drive in New London, NH. The culverts are in two locations: each location consisting of three (3) six foot diameter culverts. The intent is that the new culverts meet current Tier 3 standards. NHDES general design criteria is to provide a crossing that is 1.2 times the bank-full channel width, plus two feet.

4. SHORELINE FRONTAGE

NA This lot has no shoreline frontage. SHORELINE FRONTAGE:

Shoreline frontage is calculated by determining the average of the distances of the actual natural navigable shoreline frontage and a straight line drawn between the property lines, both of which are measured at the normal high water line.

5. RELATED PERMITS, ENFORCEMENT, EMERGENCY AUTHORIZATION, SHORELAND, ALTERATION OF TERRAIN, ETC...

6. NATURAL HERITAGE BUREAU & DESIGNATED RIVERS:
See the Instructions & Required Attachments document for instructions to complete a & b below.

a. Natural Heritage Bureau File ID: NHB 15 - 3583.

b. Designated River the project is in ¼ miles of: _____; and
date a copy of the application was sent to Local River Advisory Committee: Month: ___ Day: ___ Year: ___

NA

7. APPLICANT INFORMATION (Desired permit holder)

LAST NAME, FIRST NAME, M.I.: **Town of New London**

TRUST / COMPANY NAME: **Town of New London** MAILING ADDRESS: **184 South Pleasant Street**

TOWN/CITY: **New London** STATE: **NH** ZIP CODE: **03257**

EMAIL or FAX: **nlhd@tds.net** PHONE: **603-526-6337**

ELECTRONIC COMMUNICATION: By initialing here: _____, I hereby authorize DES to communicate all matters relative to this application electronically

8. PROPERTY OWNER INFORMATION (If different than applicant)

LAST NAME, FIRST NAME, M.I.:

TRUST / COMPANY NAME: MAILING ADDRESS:

TOWN/CITY: STATE: ZIP CODE:

EMAIL or FAX: PHONE:

ELECTRONIC COMMUNICATION: By initialing here _____, I hereby authorize DES to communicate all matters relative to this application electronically

9. AUTHORIZED AGENT INFORMATION

LAST NAME, FIRST NAME, M.I.: **Vincent, Brian A.** COMPANY NAME: **CLD Consulting Engineers, Inc.**

MAILING ADDRESS: **28 Gates Street, Suite 100**

TOWN/CITY: **White River Junction** STATE: **VT** ZIP CODE: **05001**

EMAIL or FAX: **clduv@cldengineers.com** PHONE: **802-698-0370**

ELECTRONIC COMMUNICATION: By initialing here **BAV**, I hereby authorize DES to communicate all matters relative to this application electronically

10. PROPERTY OWNER SIGNATURE:

See the Instructions & Required Attachments document for clarification of the below statements

By signing the application, I am certifying that:

1. I authorize the applicant and/or agent indicated on this form to act in my behalf in the processing of this application, and to furnish upon request, supplemental information in support of this permit application.
2. I have reviewed and submitted information & attachments outlined in the Instructions and Required Attachment document.
3. All abutters have been identified in accordance with RSA 482-A:3, I and Env-Wt 100-900.
4. I have read and provided the required information outlined in Env-Wt 302.04 for the applicable project type.
5. I have read and understand Env-Wt 302.03 and have chosen the least impacting alternative.
6. Any structure that I am proposing to repair/replace was either previously permitted by the Wetlands Bureau or would be considered grandfathered per Env-Wt 101.47.
7. I have submitted a Request for Project Review (RPR) Form (www.nh.gov/nhdhr/review) to the NH State Historic Preservation Officer (SHPO) at the NH Division of Historical Resources to be reviewed for the presence of historical/ archeological resources.
8. I authorize DES and the municipal conservation commission to inspect the site of the proposed project.
9. I have reviewed the information being submitted and that to the best of my knowledge the information is true and accurate.
10. I understand that the willful submission of falsified or misrepresented information to the New Hampshire Department of Environmental Services is a criminal act, which may result in legal action.
11. I am aware that the work I am proposing may require additional state, local or federal permits which I am responsible for obtaining.
12. The mailing addresses I have provided are up to date and appropriate for receipt of DES correspondence. DES will not forward returned mail.

 Property Owner Signature	Print name legibly	/ / Date
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MUNICIPAL SIGNATURES

11. CONSERVATION COMMISSION SIGNATURE

The signature below certifies that the municipal conservation commission has reviewed this application, and:

1. Waives its right to intervene per RSA 482-A:11;
2. Believes that the application and submitted plans accurately represent the proposed project; and
3. Has no objection to permitting the proposed work.

	Print name legibly	Date
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DIRECTIONS FOR CONSERVATION COMMISSION

1. Expedited review ONLY requires that the conservation commission's signature is obtained in the space above.
2. Expedited review requires the Conservation Commission signature be obtained **prior** to the submittal of the original application to the Town/City Clerk for signature.
3. The Conservation Commission may refuse to sign. If the Conservation Commission does not sign this statement for any reason, the application is not eligible for expedited review and the application will reviewed in the standard review time frame.

12. TOWN / CITY CLERK SIGNATURE

As required by Chapter 482-A:3 (amended 2014), I hereby certify that the applicant has filed four application forms, four detailed plans, and four USGS location maps with the town/city indicated below.

	Print name legibly	Town/City	Date
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DIRECTIONS FOR TOWN/CITY CLERK:

Per RSA 482-A:3,I

1. For applications where "Expedited Review" is checked on page 1, if the Conservation Commission signature is not present, NHDES will accept the permit application, but it will NOT receive the expedited review time.
2. IMMEDIATELY sign the original application form and four copies in the signature space provided above;
3. Return the signed original application form and attachments to the applicant so that the applicant may submit the application form and attachments to NHDES by mail or hand delivery.
4. IMMEDIATELY distribute a copy of the application with one complete set of attachments to each of the following bodies: the municipal Conservation Commission, the local governing body (Board of Selectmen or Town/City Council), and the Planning Board; and
5. Retain one copy of the application form and one complete set of attachments and make them reasonably accessible for public review.

DIRECTIONS FOR APPLICANT:

1. Submit the single, original permit application form bearing the signature of the Town/ City Clerk, additional materials, and the application fee to NHDES by mail or hand delivery.

13. IMPACT AREA:

For each jurisdictional area that will be/has been impacted, provide square feet and, if applicable, linear feet of impact

Permanent: impacts that will remain after the project is complete.

Temporary: impacts not intended to remain (and will be restored to pre-construction conditions) after the project is complete.

JURISDICTIONAL AREA	PERMANENT Sq. Ft. / Lin. Ft.	TEMPORARY Sq. Ft. / Lin. Ft.
Forested wetland	<input type="checkbox"/> ATF	<input type="checkbox"/> ATF
Scrub-shrub wetland	<input type="checkbox"/> ATF	<input type="checkbox"/> ATF
Emergent wetland	<input type="checkbox"/> ATF	<input type="checkbox"/> ATF
Wet meadow	<input type="checkbox"/> ATF	<input type="checkbox"/> ATF
Intermittent stream	<input type="checkbox"/> ATF	<input type="checkbox"/> ATF
Perennial Stream / River	144 / 17 <input type="checkbox"/> ATF	1407 / 130 <input type="checkbox"/> ATF
Lake / Pond	/ <input type="checkbox"/> ATF	/ <input type="checkbox"/> ATF
Bank - Intermittent stream	/ <input type="checkbox"/> ATF	/ <input type="checkbox"/> ATF
Bank - Perennial stream / River	766 / 34 <input type="checkbox"/> ATF	907 / 260 <input type="checkbox"/> ATF
Bank - Lake / Pond	/ <input type="checkbox"/> ATF	/ <input type="checkbox"/> ATF
Tidal water	/ <input type="checkbox"/> ATF	/ <input type="checkbox"/> ATF
Salt marsh	<input type="checkbox"/> ATF	<input type="checkbox"/> ATF
Sand dune	<input type="checkbox"/> ATF	<input type="checkbox"/> ATF
Prime wetland	<input type="checkbox"/> ATF	<input type="checkbox"/> ATF
Prime wetland buffer	<input type="checkbox"/> ATF	<input type="checkbox"/> ATF
Undeveloped Tidal Buffer Zone (TBZ)	<input type="checkbox"/> ATF	<input type="checkbox"/> ATF
Previously-developed upland in TBZ	<input type="checkbox"/> ATF	<input type="checkbox"/> ATF
Docking - Lake / Pond	<input type="checkbox"/> ATF	<input type="checkbox"/> ATF
Docking - River	<input type="checkbox"/> ATF	<input type="checkbox"/> ATF
Docking - Tidal Water	<input type="checkbox"/> ATF	<input type="checkbox"/> ATF
TOTAL	910 / 51	2314 / 390

14. APPLICATION FEE: See the Instructions & Required Attachments document for further instruction

Minimum Impact Fee: Flat fee of \$ 200

Minor or Major Impact Fee: Calculate using the below table below

Permanent and Temporary (non-docking) 3224 sq. ft. X \$0.20 = \$ 644.80

Temporary (seasonal) docking structure: _____ sq. ft. X \$1.00 = \$

Permanent docking structure: _____ sq. ft. X \$2.00 = \$

Projects proposing shoreline structures (including docks) add \$200 = \$

Total = \$ 644.80

The Application Fee is the above calculated Total or \$200, whichever is greater = \$ 644.80

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2. PRE-APPLICATION NOTES



Pre-App Meeting Summary

Brookside Drive Culvert Replacement Project

Subject: Brookside Road Culvert Replacement Project-New London, NH
Date: July 28, 2015
Location: New Hampshire Department of Environmental Services (NHDES) Headquarters, Concord, NH
Participants: William Thomas, NHDES
Carl Benedict, NHDES
Brian Vincent, P.E., CLD Consulting Engineers, Inc.
Charlie Hirshberg, P.E., CLD Consulting Engineers, Inc.

The purpose of this meeting was to present the proposed project and associated design issues to NHDES participants. The project requires a NHDES Dredge and Fill Permit. Aerial photographs, site photographs and a USGS map were presented and referred to during the meeting. Discussion items included the following:

-) The existing channel is wider at each culvert crossing.
-) Existing utilities cross the existing culverts, generally parallel with the road at each location. A water main is located below the culvert crossings, and telephone, power and cable is located above the culvert crossings. These existing utilities potentially present constructability issues. NHDES asked if the water line could be lowered. At this point, it is unknown if the water lines can be lowered. Potential obstacles to this option include shallow bedrock, potential water shut off to the area, and construction costs. It is not clear if the water line is currently encased in concrete.
-) Design options were discussed. One approach would be to design one or two submerged concrete box culvert(s) to pass the 50-year storm, and also have overflow culverts to pass the 100-year storm. NHDES general design criteria is to provide a crossing that is 1.2 times the bank-full channel width, plus two feet. We also need to be cognizant of not flooding downgradient properties with the new design. NHDES indicated that they are generally open to alternative designs as long as the project provides some improvement over the existing condition. Improvements include flow capacity (if necessary), providing for wildlife corridors/passage, and/or streambed simulation. NHDES noted that weirs could be designed into the pipe systems to control velocities and help maintain stream simulation measures.
-) For any wetland impacts located within 20 feet of an abutting property, the abutter needs to provide permission in writing.
-) A construction cost analysis may be provided if there are construction budget issues with culvert crossings that meet the strict criteria of the NHDES Rules, and to justify an alternative analysis. NHDES advised to show any constraints that preclude a standard design approach, and that justify an alternative design approach.



-) Bill Thomas suggested contacting John McGee of NH Fish and Game to obtain input on configuration approach to velocity reduction and fish passage.
-) For hydraulic calculations, the Cornell Data should be used.
-) The project should obtain upstream & downstream channel characteristics for typ. Pebble (rock size) and channel width.

Dan L. Monette

From: Magee, John <john.magee@wildlife.nh.gov>
Sent: Monday, December 07, 2015 8:52 AM
To: Brian A. Vincent
Subject: RE: Magee contact info - re: New London, NH culverts

Hi Brian. It was good to meet you on Friday. Below is what I think I said while there. Please check it to make sure it seems correct.

- 1) I think it is OK to reconfigure the outlet and/or inlet channels to provide a more natural (and closer to the original) alignment of the stream as part of restoring natural channel dimensions.
- 2) For aquatic organism passage, I think a bench for wildlife is a good idea, but because this is on a small residential road that is a circle (and thus is not a connector road for drive through traffic), a bench is probably not vital at this location.
- 3) Several options for aquatic organism passage: No slope, and stream simulation. Both may require grade control on the downstream end.
- 4) I recommend that you include our email communication in your application so that DES can see that you corresponded with me on these topics. Please cc me on final emails you send to DES. If you can send the application to me via email, that would be helpful.

Thank you,

John

John Magee
Fish Habitat Biologist
New Hampshire Fish and Game Department
11 Hazen Drive
Concord, NH 03301
P 603-271-2744
F 603-271-1438

-----Original Message-----

From: Brian A. Vincent [mailto:BrianV@cldengineers.com]
Sent: Thursday, December 03, 2015 8:30 AM
To: Magee, John
Subject: RE: Magee contact info - re: New London, NH culverts

Hi John,

Here are some worksheets for your use to better understand the project. Some of the notes are from another project and need to be updated. The proposed culverts are aluminum (flat bottom with arched tops). Vertical height is 4'-1". Widths are 19'-1".

See you tomorrow-9AM at the site. My cell is 603-748-1159.

**3. PERMIT APPLICATION –
ATTACHMENT A: MINOR & MAJOR
20 QUESTIONS**

WETLANDS PERMIT APPLICATION – ATTACHMENT A MINOR AND MAJOR - 20 QUESTIONS

Water Division/ Wetlands Bureau/ Land Resources Management
Check the Status of your application: <http://des.nh.gov/onestop>



RSA/ Rule: RSA 482-A, Env-Wt 100-900

<p>Env-Wt 302.04 Requirements for Application Evaluation - For any major or minor project, the applicant shall demonstrate by plan and example that the following factors have been considered in the project's design in assessing the impact of the proposed project to areas and environments under the department's jurisdiction. Respond with statements demonstrating:</p>
<p>1. The need for the proposed impact.</p>
<p>The project consists of removing structurally deficient culverts along Lyon Brook located on Brookside Drive in New London New Hampshire. The existing culverts which in poor condition and are on the State DOT Bridge Red List, will be replaced with aluminum box culverts. The culverts cannot be replaced without wetland impacts associated with abutment removal, temporary stream routing and construction of the new culverts and appurtenances.</p>
<p>2. That the alternative proposed by the applicant is the one with the least impact to wetlands or surface waters on site.</p>
<p>Lyon Brook, at both crossings was determined to be a Type B stream, which has a minimum entrenchment ratio of 1.4 according to the NHDES Stream Crossing Rules. Bank Full Width is estimated to be 13 feet. To obtain 1.4 times channel width at the bridge crossing, the minimum waterway opening would be 18.2 feet as measured perpendicular to the channel. The proposed box culverts accommodates this channel width.</p> <p>With the proposed culverts configuration, there will be an increase in the hydraulic capacity of the crossing, and it will also pass the Lyon Brook peak 100-year storm flow, which is 540 cubic feet per second (cfs) based on the designed Hydrology models/report. There is also little or no proposed change in the existing road surface elevation.</p> <p>Temporary impacts to wetlands are expected during construction. Permanent impacts are needed in order to provide scour protection and to accommodate the new culverts and provide positive stream drainage upgradient and downgradient at each crossing. The design intent is to maintain a slope of 1 percent through each culvert reach. The excavations for culvert wingwalls will impact the edges of the stream. Our intent is to backfill the excavations with suitable compacted structural fill. The abutment wingwalls will be protected with available natural boulders and/or NHDOT Class B stone fill placed along the base of each abutment, but outside of the estimated bank-full width of Lyon Brook. We believe that this approach provides the least impacting feasible alternative. This design approach is an "Alternative Design" consistent with NHDES Stream Crossing Rules.</p>

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3. The type and classification of the wetlands involved.

A wetland delineation was completed by Jonathan Sisson of Beaver Tracks, LLC. on July 13, 2015. There were two wetlands delineated. The wetlands were labeled A and B and were flagged with numbered strips of fluorescent pink and black striped flagging. Wetland A: Flag numbers were A1-A16,A101-A112,A151-163,A201-205. Wetland B: B1-16,B101-117). Both wetlands are classified as R3UB1(upper-perennial stream with cobble-gravel unconsolidated bottoms). See attached Delineation Report.

Wetlands are determined according to the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region, Version 2.0, ERDC/EL TR-12-1, January 2012 to the 1987 Corps of Engineers Wetland Delineation Manual, Technical Report Y-87-1. Wetlands are classified in accordance with the procedures outlined in the USFWS "Methodology for the Classification of Wetlands and Deepwater Habitats", 1987. Wetlands were evaluated using the Method for Inventorying and Evaluating Freshwater Wetlands in New Hampshire, June 2011. The plants are classified using the 2014 US Army Corps of Engineers Northcentral and

4. The relationship of the proposed wetlands to be impacted relative to nearby wetlands and surface waters.

The proposed wetland impacts are associated with Lyon Brook channel and its embankments, immediately adjacent to the proposed culvert installation. Impacts to wetlands would be associated with removal of existing culverts, construction of new wingwalls, minimal channel improvements immediately adjacent to the culvert crossings including grade control features, and installation of permanent erosion control and scour countermeasures.

5. The rarity of the wetland, surface water, sand dunes, or tidal buffer zone area.

The wetlands discovered on-site consist of upper perennial stream with cobble-gravel unconsolidated bottom (R3UB 1). These wetlands are not considered rare in New Hampshire.

6. The surface area of the wetlands that will be impacted.

A total of 3,200 square feet of wetlands will be impacted. Temporary impacts to a perennial stream (Lyon Brook) will total 1,800 square feet and temporary impacts to the stream bank will total 1,000 square feet. A total of 400 square feet of permanent impact is proposed around each of the new wingwall. This will also include riprap scour protection.

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7. The impact on plants, fish and wildlife including, but not limited to:
- a. Rare, special concern species;
 - b. State and federally listed threatened and endangered species;
 - c. Species at the extremities of their ranges;
 - d. Migratory fish and wildlife;
 - e. Exemplary natural communities identified by the DRED-NHB; and
 - f. Vernal pools.

No negative impacts to rare or special concern species, state or federally listed threatened or endangered species, species at the extremities of their ranges, migratory fish or wildlife, expemplary natural commuties are anticipated with this project.

8. The impact of the proposed project on public commerce, navigation and recreation.

No negative impacts are anticipated on public commerse, navigaton or recreation. In fact, the project is likely a betterment to these items given that the project proposal includes guardrails for public safety, embarkment stabilazation and wingwalls.

9. The extent to which a project interferes with the aesthetic interests of the general public. For example, where an applicant proposes the construction of a retaining wall on the bank of a lake, the applicant shall be required to indicate the type of material to be used and the effect of the construction of the wall on the view of other users of the lake.

The existing culverts are rusted and the embarkments are not stable. The proposed replacement will add new aluminum culverts, guardrails, limited road replacement and, stream channel and embarkment stabilization. This will be aesthetically better.

10. The extent to which a project interferes with or obstructs public rights of passage or access. For example, where the applicant proposes to construct a dock in a narrow channel, the applicant shall be required to document the extent to which the dock would block or interfere with the passage through this area.

The proposed culvert replacement plans to use the Contech® Aluminum box culvert structure #47, which if assembled and installed as per manufacturer's specifications, meets the AASHTO Live Load Rating of HL-93. There are no foreseeable interferences to public rights of passage or access post-construction.

11. The impact upon abutting owners pursuant to RSA 482-A:11, II. For example, if an applicant is proposing to rip-rap a stream, the applicant shall be required to document the effect of such work on upstream and downstream abutting properties.

No negative impacts to abutters are anticipated with the new crossings. The proposed culverts waterway area will be larger than the existing, allowing for complete passage of the Lyon Brook 100-year flood. No increase in flood plain elevation is anticipated as shown in the Hydrology report conducted by CLD Engineers.

12. The benefit of a project to the health, safety, and well being of the general public.

The existing culvert crossings are structurally unsound and listed on the State DOT Bridge Red List. The proposed project consists of replacing the failing culverts with structurally competent aluminum box culverts and adding guardrails which are not currently in place. The new bridge will result in a much improved safety and well being for the general public.

13. The impact of a proposed project on quantity or quality of surface and ground water. For example, where an applicant proposes to fill wetlands the applicant shall be required to document the impact of the proposed fill on the amount of drainage entering the site versus the amount of drainage exiting the site and the difference in the quality of water entering and exiting the site.

No negative impacts to the quantity or quality of surface or groundwater are anticipated with this project. The proposed project will be constructed using effective erosion and sediment control measures to minimize any sedimentation impact to Lyon Brook. In addition, the work would be done in primarily dry conditions by temporarily rerouting the stream channel or bypass pumping flow around work areas, during a dry season or period of time.

14. The potential of a proposed project to cause or increase flooding, erosion, or sedimentation.

No flooding erosion or sedimentation impacts are anticipated with this project. The proposed project will be constructed using effective erosion and sediment control measures to minimize any sedimentation impact to Lyon Brook. In addition, the work would be done in primarily dry conditions by temporarily rerouting the stream channel away from the work areas, during a dry season or period of time. The proposed bridge crossing is designed to pass the Lyon Brook 100-year flood, and will actually increase the bridge opening to allow for even less probable storms to pass. Lyon brook's watershed was modeled in HydroCAD and HEC-RAS using the 100 year 24 hour storm parameters.

15. The extent to which a project that is located in surface waters reflects or redirects current or wave energy which might cause damage or hazards.

No negative impacts to current or wave action are anticipated with this project. The proposed bridge crossing is designed to pass the Lyon Brook 100-year flood, and will actually increase the culvert opening to allow for a lessening of flow velocities in both normal and flood conditions.

16. The cumulative impact that would result if all parties owning or abutting a portion of the affected wetland or wetland complex were also permitted alterations to the wetland proportional to the extent of their property rights. For example, an applicant who owns only a portion of a wetland shall document the applicant's percentage of ownership of that wetland and the percentage of that ownership that would be impacted.

The cumulative impact that would result if all parties owning or abutting a portion of the affected wetland complex were also permitted temporary alterations would not result in any negative impacts. In fact, this project should be considered a betterment given the proposed increase in waterway area and associated improvements with respect to the NHDES Wetland Crossing Rules.

17. The impact of the proposed project on the values and functions of the total wetland or wetland complex.

The proposed project will have no negative impacts on the values and functions of the total wetland complex, and in fact should be considered a betterment for the reasons noted within this permit application.

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18. The impact upon the value of the sites included in the latest published edition of the National Register of Natural Landmarks, or sites eligible for such publication.

The project will have no impacts on National Landmarks or sites published in the latest edition of the National Register of Natural Landmarks.

19. The impact upon the value of areas named in acts of congress or presidential proclamations as national rivers, national wilderness areas, national lakeshores, and such areas as may be established under federal, state, or municipal laws for similar and related purposes such as estuarine and marine sanctuaries.

No impacts to the above interests are anticipated.

20. The degree to which a project redirects water from one watershed to another.

No redirection of watershed area is proposed with this project.

Additional comments

shoreland@des.nh.gov or (603) 271-2147
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www.des.nh.gov

4. ALTERNATIVE DESIGN NARRATIVE



Alternative Design

Brookside Drive Culvert Replacement Project

The proposed project consists of removing structurally deficient culverts in two locations along Brookside Drive and replacing them with aluminum box culverts. The existing culverts convey Lyon Brook, a Tier 3 Stream, across Brookside Drive in two locations. The existing culverts are in poor condition and are on the State DOT Bridge Red List. Given the current condition of the culverts, the Town needs to replace the culverts even without the financial assistance from the State DOT – Bridge Aid Funds.

Site #1 (N43°23'45.33" W71°58'24.50") has three (3) six foot diameter culverts that are approximately 50 feet long and cross the road. Site #1 culverts will be replaced by one aluminum box culvert with the following dimensions: length of 55 feet, a width of 19 feet 1 inch and a height of 4 feet 2 inches. The proposed box culvert has a closed bottom and wing walls to accommodate the bank-full channel width.

Similarly, Site #2 (N43°23'50.66" W71°58'26.03") has three (3) six foot diameter culverts that are approximately 60 feet long and cross the road at an angle of about 51°. Site #2 culverts will be replaced by one aluminum box culvert with the following dimensions; 72 feet length, a width of 19 feet 1 inch and a height of 4 feet 2 inches. The proposed box culvert has a closed bottom and wing walls. The additional culvert length is due to the fact that the new culvert is designed to have wing walls that are perpendicular to the culvert, rather than skewed. The Town considered the skewed culvert option, but it was much more costly than the perpendicular option.

The Town of New London (Town) considered open bottom bridges at both locations. However, it became clear that the cost of bridges would be far beyond the Town's budget. Replacing the existing culverts with bridges was ruled out, and box culverts were determined to be a cost effective solution. Given that Lion Brook is a Tier 3 Stream, which requires open bottom structures for stream crossings, or an "Alternative Design", to meet NHDES Stream Crossing Rules, the applicant is proposing Alternative Designs in accordance with NHDES Stream Crossing Rules Env-Wt 904.09. The culverts cannot be replaced without wetland impacts associated with culvert removal, temporary stream routing and construction of the new box culvert and appurtenances.

Underground utilities cross the existing culverts, generally in a parallel direction with the road at both crossings. The identified utilities at the culvert crossings are water, telephone, electric power and cable. The existing cover between the top of the culverts and the road surface ranges from 2 to 3 feet, making it very difficult to find replacement structure options that fit this height restriction and that can meet the required minimum 2 foot cover without raising the road profile. Due to all of the above noted constraints, the Town has selected to proceed with the afore-noted Alternative Design. The applicant believes that the Alternative Design proposal is a reasonable approach given the above-noted budget constraints and the fact that the crossing currently consists of multiple culverts. The Alternative Designs proposed should be consider improvements in terms of flow capacity, fish passage, and reduced risk of debris build up/blockages.

In order to meet NHDES Stream Crossing Rules, the proposed replacement culverts would widen the crossing span as follows:



The existing three-culvert openings have a combined waterway area of 54.3 square feet. The average bank-full channel width was estimated to be approximately 13 feet. The proposed culvert has a waterway area of 63.3 square feet.

Lyon Brook, at both crossings was determined to be a Type B stream, which has a minimum entrenchment ratio of 1.4 according to the NHDES Stream Crossing Rules. To obtain 1.4 times channel width at the bridge crossing, the minimum waterway opening would be 18.2 feet as measured perpendicular to the channel. The proposed box culverts accommodate this channel width. With the proposed culverts configuration, there will be an increase in the hydraulic capacity of the crossing, and it will also pass the Lyon Brook peak 100-year storm flow, which is 540 cubic feet per second (cfs) based on the designed Hydrology report. There is also no proposed change in the existing road surface elevation.

Temporary impacts to wetlands are expected during construction. Permanent impacts are needed in order to provide scour protection and to accommodate the new culverts. The design intent is to maintain the existing stream channel slope through each culvert reach. The excavations for culvert wing walls will impact the edges of the stream. Our intent is to backfill the excavations with suitable compacted structural fill. The abutment wing walls will be backfilled with common fill, protected with NHDOT Class B stone fill placed along the base of each abutment, but outside of the estimated bank-full width of Lyon Brook. We believe that this approach provides the least impacting feasible alternative. In addition, select stream banks are proposed to be protected with rip rap to help prevent potential future streambank erosion and scour.

Based on site observations and discussions with New Hampshire Fish and Game, CLD is proposing boulders be placed just downstream of each culvert. The purpose of these boulders is to provide a minimum of 2 inches of water level through the culvert reaches. This will provide flowing water that fish and other aquatic species can use to pass through the crossing. In conjunction with this water level control measure, CLD is also proposing that each culvert be installed at 1.5 percent slope. This will also ensure some water in the culverts during low flow conditions, and should allow for natural stream bed material transport, but still allow for some stream bed aggregation within the culverts, creating some natural stream simulation. Given the relatively low profile of the proposed culverts (approximately 4 feet), and the very low traffic (trips per day) for this road, CLD does not recommend stream simulation or vegetative banks for wildlife to cross. It is estimated that the materials to be placed in the stream would need to be relative large (greater than 2-foot diameter boulders) in order for the materials to remain in place following heavy rains. These larger boulders will occupy a notable amount of area with the culverts, and potentially create stream blockage (debris or ice), flow capacity and/or flooding problems. Likewise, it is estimated that the vegetative banks could cause capacity and blockage issues. The benefit of the vegetated banks is considered limited at these sites as Brookside Drive has very low “trips per day”.

Construction Sequencing

The proposed construction sequencing is summarized below, as follows: Note that only one culvert crossing will be constructed at a time such that residential property access is maintained during construction.

1. Close Brookside Drive to through traffic at one of the culvert crossings.
2. Install erosion control measures in staging areas and up gradient work zones.



3. Set up construction staging area on either side of Brookside Drive, immediately adjacent to the crossing.
4. Mobilize utility companies to locate existing utilities including water, power, cable and telephone. Supply temporary poles and services as needed.
5. Mobilize equipment and culvert to the site. Begin culvert assembly.
6. Install sandbag coffer dam approximately 30 feet upstream of the crossing, blocking stream flow and installing temporary pump bypass. Work would occur during low-flow periods. Pump bypass would include large pumps with pump backup on-site. Emergency overflow provisions would be included in the sandbag coffer dam. No equipment or supplies will be left in the stream channel downstream of the coffer dam during non-work hours or construction downtimes.
7. Remove the existing asphalt and cover. Salvage for reuse as directed by Engineer.
8. Hand excavate to locate shallow utilities
9. Excavate carefully to locate existing water line and deep electric/telephone and cable conduit(s).
10. Support utilities as required.
11. Clearing, grubbing and tree removal for disturbed areas.
12. Remove existing culverts and haul off site for legal disposal.
13. Excavate and prepare subgrade for new culverts. Excavate deposited materials with brook as noted on plans.
14. Install new culverts and wing walls.
15. Backfill culverts and wing walls with clean structural fill. Backfill shall be placed and compacted in lifts. The structure shall be backfilled using clean well graded granular material that meets the requirements of AASHTO M 145 for soil classifications A-1, A-3, A-2-4, A-2-5. Backfill must be placed symmetrically on each side of the structure in 6 to 8 inch lifts. Each lift shall be compacted to a minimum of 90 percent density per AASHTO T 180.
16. Restore and stabilize impacted areas of streambed. Maintain existing channel slope.
17. Install and stabilize scour countermeasure stone along each abutment.
18. Remove sandbag coffer dam and pumps.
19. Reconstruct culvert approaches north and south of the new culverts.
20. Install guardrail and pavement sections.
21. Clear staging areas in preparation for demobilization.
22. Stabilize construction staging area and work zones.
23. Upon site stabilization, remove erosion control measures as needed.
24. Demobilize from site.

5. NH NATURAL HERITAGE BUREAU REVIEW



To: CLD Engineers Vermont Office
28 Gates Street, Suite #100
White River Junction, VT 05001

Date: 11/10/2015

From: NH Natural Heritage Bureau

Re: Review by NH Natural Heritage Bureau of request dated 11/10/2015

NHB File ID: NHB15-3583

Applicant: CLD Engineers Vermont
Office

Location: Tax Map(s)/Lot(s):
New London

Project Description: The proposed project consists of removing structurally deficient culverts in two locales along Brookside Drive and replacing them with aluminum box culverts. The existing culverts channel Lion Brook, a tier 3 stream, and are located at centroid coordinates (N43°23'45.33" W71°58'24.50" ; N43°23'50.66" W71°58'26.03"). **NOTE:** Brookside Drive road does not show up on the provided outdated USGS map. The existing culverts are in poor condition and are on the State DOT Bridge Red List.

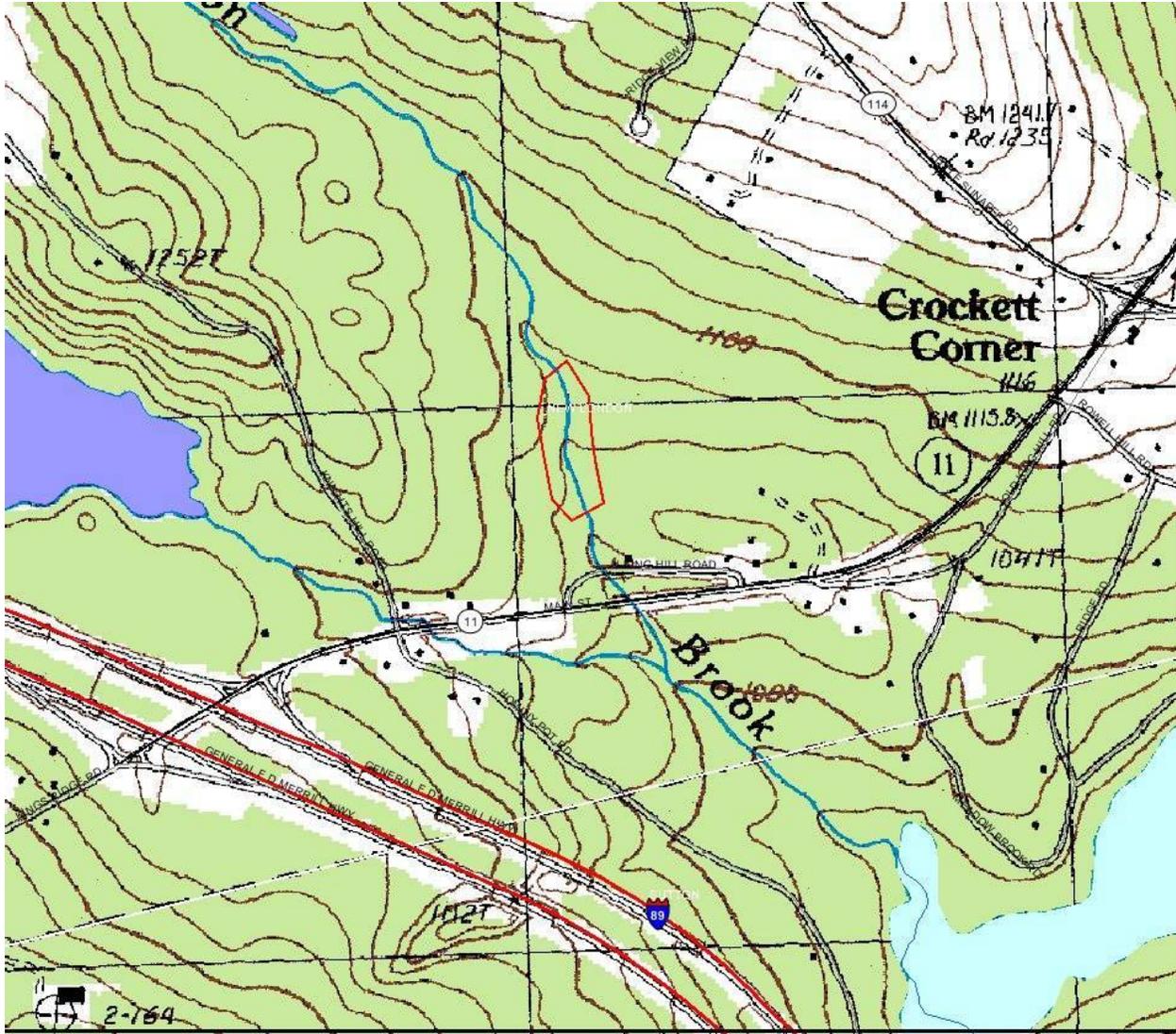
The NH Natural Heritage database has been checked for records of rare species and exemplary natural communities near the area mapped below. The species considered include those listed as Threatened or Endangered by either the state of New Hampshire or the federal government. We currently have no recorded occurrences for sensitive species near this project area.

A negative result (no record in our database) does not mean that a sensitive species is not present. Our data can only tell you of known occurrences, based on information gathered by qualified biologists and reported to our office. However, many areas have never been surveyed, or have only been surveyed for certain species. An on-site survey would provide better information on what species and communities are indeed present.

This report is valid through 11/9/2016.



MAP OF PROJECT BOUNDARIES FOR NHB FILE ID: NHB15-3583



6. NH PGP REQUIREMENTS



**US Army Corps
of Engineers** ®
New England District

Programmatic General Permit (PGP)

Appendix B - Required Information and Corps Secondary Impacts Checklist

In order for the Corps of Engineers to properly evaluate your application, applicants must submit the following information along with the DES Wetlands Bureau application or permit notification forms. Some projects may require more information. For a more comprehensive checklist, go to www.nae.usace.army.mil/regulatory, “Forms/Publications” and then “Application and Plan Guideline Checklist.” Check with the Corps at (978) 318-8832 for project-specific requirements. For your convenience, this Appendix B is also attached to the State of New Hampshire DES Wetlands Bureau application and Permit by Notification forms.

All Projects:

- Corps application form ([ENG Form 4345](#)) as appropriate.
- Photographs of wetland/waterway to be impacted.
- Purpose of the project.
- Legible, reproducible black and white (no color) plans no larger than 11”x17” with bar scale. Provide locus map and plan views of the entire property.
- Typical cross-section views of all wetland and waterway fill areas and wetland replication areas.
- In navigable waters, show mean low water (MLW) and mean high water (MHW) elevations. Show the high tide line (HTL) elevations when fill is involved. In other waters, show ordinary high water (OHW) elevation.
- On each plan, show the following for the project:
- Vertical datum and the NAVD 1988 equivalent with the vertical units as U.S. feet. Don’t use local datum. In coastal waters this may be mean higher high water (MHHW), mean high water (MHW), mean low water (MLW), mean low lower water (MLLW) or other tidal datum with the vertical units as U.S. feet. MLLW and MHHW are preferred. Provide the correction factor detailing how the vertical datum (e.g., MLLW) was derived using the latest National Tidal Datum Epoch for that area, typically 1983-2001.
- Horizontal state plane coordinates in U.S. survey feet based on the [insert state grid system] for the [insert state] [insert zone] NAD 83.
- Show project limits with existing and proposed conditions.
- Limits of any Federal Navigation Project in the vicinity of the project area and horizontal State Plane Coordinates in U.S. survey feet for the limits of the proposed work closest to the Federal Navigation Project;
- Volume, type, and source of fill material to be discharged into waters and wetlands, including the area(s) (in square feet or acres) of fill in wetlands, below the ordinary high water in inland waters and below the high tide line in coastal waters.
- Delineation of all waterways and wetlands on the project site, including vernal pools:
- Use Federal delineation methods and include Corps wetland delineation data sheets. See GC 2; Endnotes 1, 6, 7 and 15 in Appendix A; and www.nero.noaa.gov/hcd for eelgrass survey guidance.
- Appendix A, (e) Moorings, contains eelgrass survey requirements for the placement of moorings.
- For activities involving discharges of dredged or fill material into waters of the U.S., include a statement describing how impacts to waters of the U.S. are to be avoided and minimized, and either a statement describing how impacts to waters of the U.S. are to be compensated for (or a conceptual or detailed mitigation plan) or a statement explaining why compensatory mitigation should not be required for the proposed impacts. Please contact the Corps for guidance.



**US Army Corps
of Engineers**®
New England District

**New Hampshire Programmatic General Permit (PGP)
Appendix B - Corps Secondary Impacts Checklist
(for inland wetland/waterway fill projects in New Hampshire)**

1. Attach any explanations to this checklist. Lack of information could delay a Corps permit determination.
2. All references to “work” include all work associated with the project construction and operation. Work includes filling, clearing, flooding, draining, excavation, dozing, stumping, etc.
3. See PGP, GC 5, regarding single and complete projects.
4. Contact the Corps at (978) 318-8832 with any questions.

1. Impaired Waters	Yes	No
1.1 Will any work occur within 1 mile upstream in the watershed of an impaired water? See http://des.nh.gov/organization/divisions/water/wmb/section401/impaired_waters.htm to determine if there is an impaired water in the vicinity of your work area.*		X
2. Wetlands	Yes	No
2.1 Are there are streams, brooks, rivers, ponds, or lakes within 200 feet of any proposed work?	X	
2.2 Are there proposed impacts to SAS, shellfish beds, special wetlands and vernal pools (see PGP, GC 26 and Appendix A)? Applicants may obtain information from the NH Department of Resources and Economic Development Natural Heritage Bureau (NHB) website, www.nhnaturalheritage.org , specifically the book Natural Community Systems of New Hampshire .		X
2.3 If wetland crossings are proposed, are they adequately designed to maintain hydrology, sediment transport & wildlife passage?	X	
2.4 Would the project remove part or all of a riparian buffer? (Riparian buffers are lands adjacent to streams where vegetation is strongly influenced by the presence of water. They are often thin lines of vegetation containing native grasses, flowers, shrubs and/or trees that line the stream banks. They are also called vegetated buffer zones.)		X
2.5 The overall project site is more than 40 acres.		X
2.6 What is the size of the existing impervious surface area?	6848	
2.7 What is the size of the proposed impervious surface area?	6848	
2.8 What is the % of the impervious area (new and existing) to the overall project site?	45%	
3. Wildlife	Yes	No
3.1 Has the NHB determined that there are known occurrences of rare species, exemplary natural communities, Federal and State threatened and endangered species and habitat, in the vicinity of the proposed project? (All projects require a NHB determination.)		X
3.2 Would work occur in any area identified as either “Highest Ranked Habitat in N.H.” or “Highest Ranked Habitat in Ecological Region”? (These areas are colored magenta and green, respectively, on NH Fish and Game’s map, “2010 Highest Ranked Wildlife Habitat by Ecological Condition.”) Map information can be found at: <ul style="list-style-type: none"> • PDF: www.wildlife.state.nh.us/Wildlife/Plan/highest_ranking_habitat.htm. • Data Mapper: www.granit.unh.edu. • GIS: www.granit.unh.edu/data/downloadfreedata/category/databycategory.html. 		X

3.3 Would the project impact more than 20 acres of an undeveloped land block (upland, wetland/waterway) on the entire project site and/or on an adjoining property(s)?		X
3.4 Does the project propose more than a 10-lot residential subdivision, or a commercial or industrial development?		X
3.5 Are stream crossings designed in accordance with the PGP, GC 21?	X	
4. Flooding/Floodplain Values	Yes	No
4.1 Is the proposed project within the 100-year floodplain of an adjacent river or stream?	X	
4.2 If 4.1 is yes, will compensatory flood storage be provided if the project results in a loss of flood storage?	NA	
5. Historic/Archaeological Resources		
For a minor or major impact project - a copy of the Request for Project Review (RPR) Form (www.nh.gov/nhdhr/review) shall be sent to the NH Division of Historical Resources as required on Page 5 of the PGP**	X	

*Although this checklist utilizes state information, its submittal to the Corps is a Federal requirement.

** If project is not within Federal jurisdiction, coordination with NH DHR is not required under Federal law..

Please mail the completed form and required material to:

New Hampshire Division of Historical Resources
State Historic Preservation Office
Attention: Review & Compliance
19 Pillsbury Street, Concord, NH 03301-3570

RECEIVED
DEC 10 2015

DHR Use Only	
R&C #	1278
Log In Date	12/10/15
Response Date	12/16/15
Sent Date	12/16/15

Request for Project Review by the New Hampshire Division of Historical Resources

- This is a new submittal
 This is additional information relating to DHR Review & Compliance (R&C) #:

GENERAL PROJECT INFORMATION

Project Title BROOKSIDE DRIVE CULVERT REPLACEMENT

Project Location THE INTERSECTION OF LYON BROOK AND BROOKSIDE DRIVE

City/Town NEW LONDON Tax Map N/A Lot # N/A

NH State Plane - Feet Geographic Coordinates: Easting 902566.77 Northing 326,880.21
(See RPR Instructions and R&C FAQs for guidance.)

Lead Federal Agency and Contact (if applicable) N/A
(Agency providing funds, licenses, or permits)
Permit Type and Permit or Job Reference # N/A

State Agency and Contact (if applicable) N/A
Permit Type and Permit or Job Reference # NHDES AoT 15-0184

APPLICANT INFORMATION

Applicant Name TOWN OF NEW LONDON

Mailing Address 184 SOUTH PLEASANT ST Phone Number 603-526-6337

City NEW LONDON State NH Zip 03257 Email NLHD@TDS.NET

CONTACT PERSON TO RECEIVE RESPONSE

Name/Company BRIAN VINCENT / CLD Engineers

Mailing Address 28 GATES ST - SUITE 100 Phone Number 802-698-0370

City WHITE RIVER JUNCTION State VT Zip 05001 Email CLDUV@cldengineers.com

This form is updated periodically. Please download the current form at www.nh.gov/nhdhr/review. Please refer to the Request for Project Review Instructions for direction on completing this form. Submit one copy of this project review form for each project for which review is requested. Include a self-addressed stamped envelope to expedite review response. Project submissions will not be accepted via facsimile or e-mail. This form is required. Review request form must be complete for review to begin. Incomplete forms will be sent back to the applicant without comment. Please be aware that this form may only initiate consultation. For some projects, additional information will be needed to complete the Section 106 review. All items and supporting documentation submitted with a review request, including photographs and publications, will be retained by the DHR as part of its review records. Items to be kept confidential should be clearly identified. For questions regarding the DHR review process and the DHR's role in it, please visit our website at: www.nh.gov/nhdhr/review or contact the R&C Specialist at christina.st.louis@dcr.nh.gov or 603.271.3558.

PROJECTS CANNOT BE PROCESSED WITHOUT THIS INFORMATION

Project Boundaries and Description

- Attach the relevant portion of a 7.5' USGS Map (photocopied or computer-generated) *indicating the defined project boundary.* (See RPR Instructions and R&C FAQs for guidance.)
- Attach a detailed narrative description of the proposed project.
- Attach a site plan. The site plan should include the project boundaries and areas of proposed excavation.
- Attach photos of the project area (overview of project location and area adjacent to project location, and specific areas of proposed impacts and disturbances.) (Informative photo captions are requested.)
- A DHR file review must be conducted to identify properties within or adjacent to the project area. Provide file review results in **Table 1.** (Blank table forms are available on the DHR website.)
File review conducted on 12/04/2015.

Architecture

Are there any buildings, structures (bridges, walls, culverts, etc.) objects, districts or landscapes within the project area? Yes No
If no, skip to Archaeology section. If yes, submit all of the following information:

Approximate age(s): 30

- Photographs of *each* resource or streetscape located within the project area, with captions, along with a mapped photo key. (Digital photographs are accepted. All photographs must be clear, crisp and focused.)
- If the project involves rehabilitation, demolition, additions, or alterations to existing buildings or structures, provide additional photographs showing detailed project work locations. (i.e. Detail photo of windows if window replacement is proposed.)

Archaeology

Does the proposed undertaking involve ground-disturbing activity? Yes No
If yes, submit all of the following information:

- Description of current and previous land use and disturbances.
- Available information concerning known or suspected archaeological resources within the project area (such as cellar holes, wells, foundations, dams, etc.)

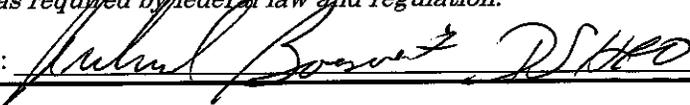
Please note that for many projects an architectural and/or archaeological survey or other additional information may be needed to complete the Section 106 process.

DHR Comment/Finding Recommendation *This Space for Division of Historical Resources Use Only*

- Insufficient information to initiate review. Additional information is needed in order to complete review.
- No Potential to cause Effects No Historic Properties Affected No Adverse Effect Adverse Effect

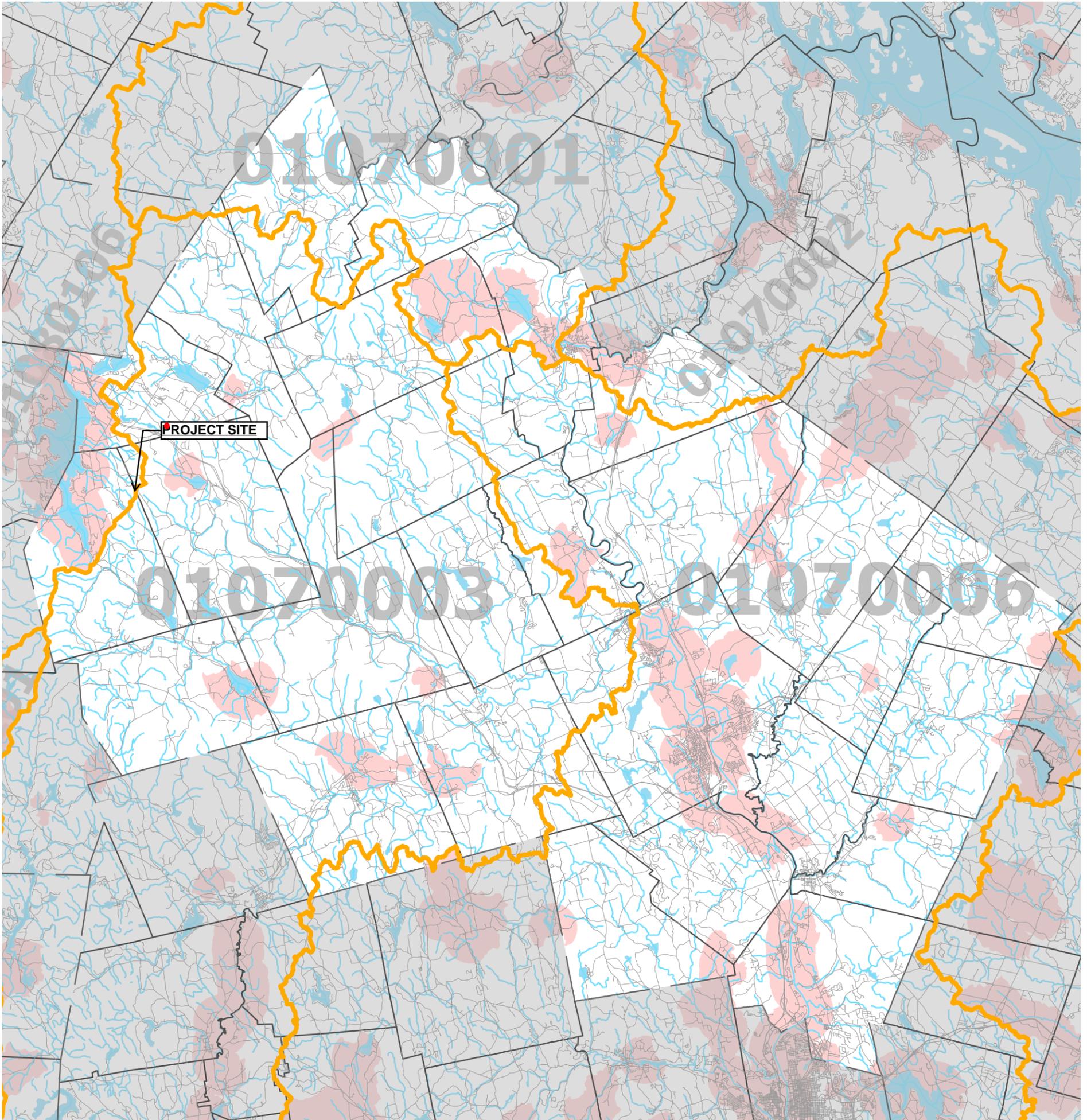
Comments: _____

If plans change or resources are discovered in the course of this project, you must contact the Division of Historical Resources as required by federal law and regulation.

Authorized Signature:  Date: 12-16-15

7. DESIGNATED RIVER CHECK

Merrimack County: Impaired Waters Vicinity* for which No Additional Loading Criteria Applies



*Vicinity based upon a 1 mile buffer of Assessment Units impaired in the 2006 SWQA for one or more of the following:

- Invertebrates,
- Cadmium,
- Chlorophyll *a*,
- Copper,
- Cyanobacteria,
- Dissolved Oxygen (% Sat or mg/L),
- Enterococcus,
- *E. coli*,
- Algal Growth,
- Fecal Coliform,
- Lead,
- Total Phosphorus,
- Sedimentation & Siltation,
- Zinc.

For more information on the 2006 Surface Water Quality Assessments see:

<http://des.nh.gov/wmb/swqa/>



- Major Divides (HUC8)
- Roads(NHDOT)
- State Boundary
- County Boundary
- Town Boundary
- 2006 Assessment Unit ID Lines (1:100k NHD)
- 2006 Assessment Unit ID Polygons(1:100k NHD)
- One Mile Buffer on No Additional Loading AUIDs

This map is intended solely as a screening tool to assist you in identifying areas within 1 mile upstream in the watershed of an impaired waterbody. This map is not intended to show analytical results regarding pollutant loading or any other information related to sections 305(b) or 401 of the Clean Water Act or any other State or federal laws.

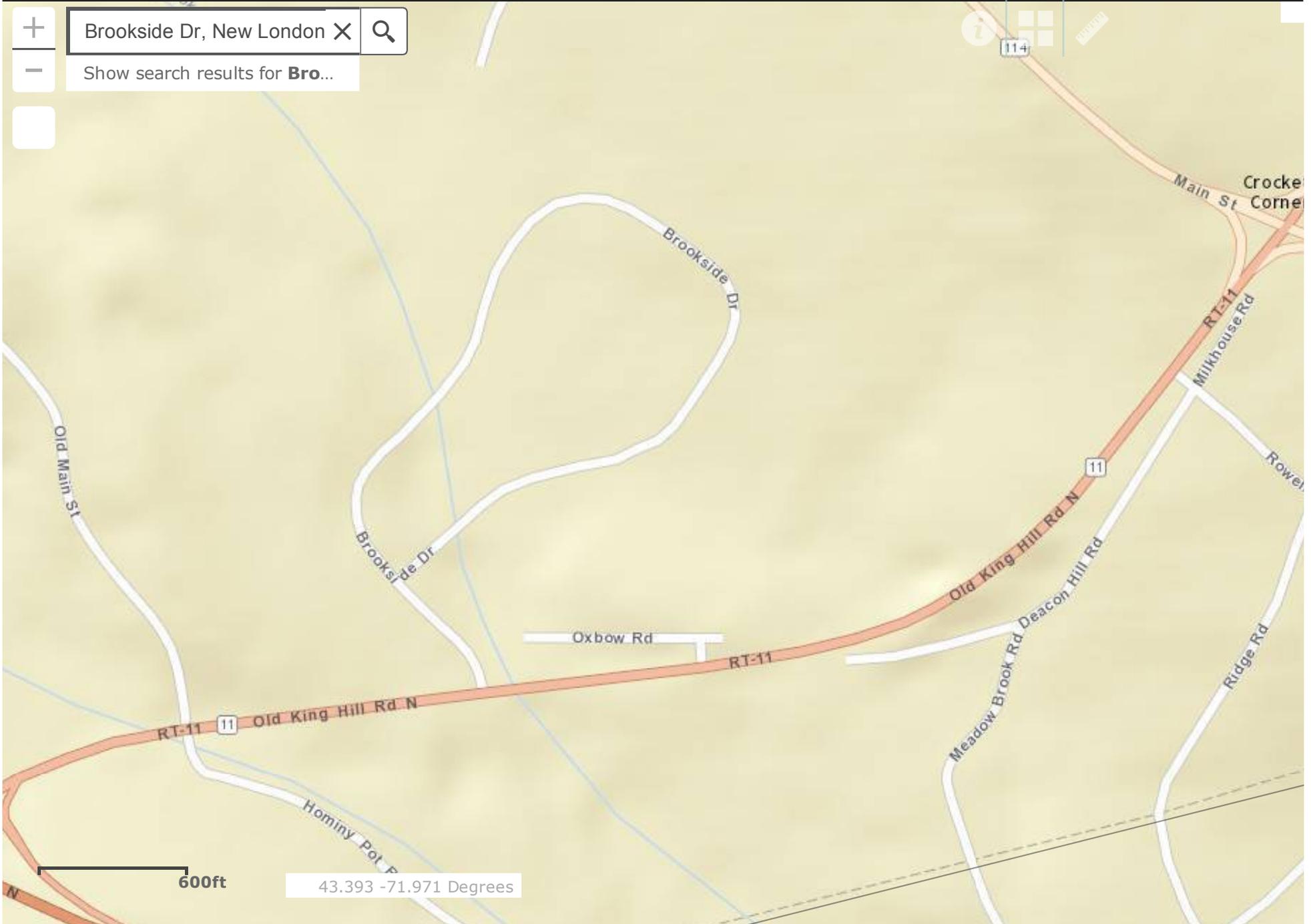
The coverages presented in this program are under constant revision as new sites or facilities are added. They may not contain all of the potential or existing sites or facilities. The Department is not responsible for the use or interpretation of this information, nor for any inaccuracies.

Map Prepared July 17, 2007.

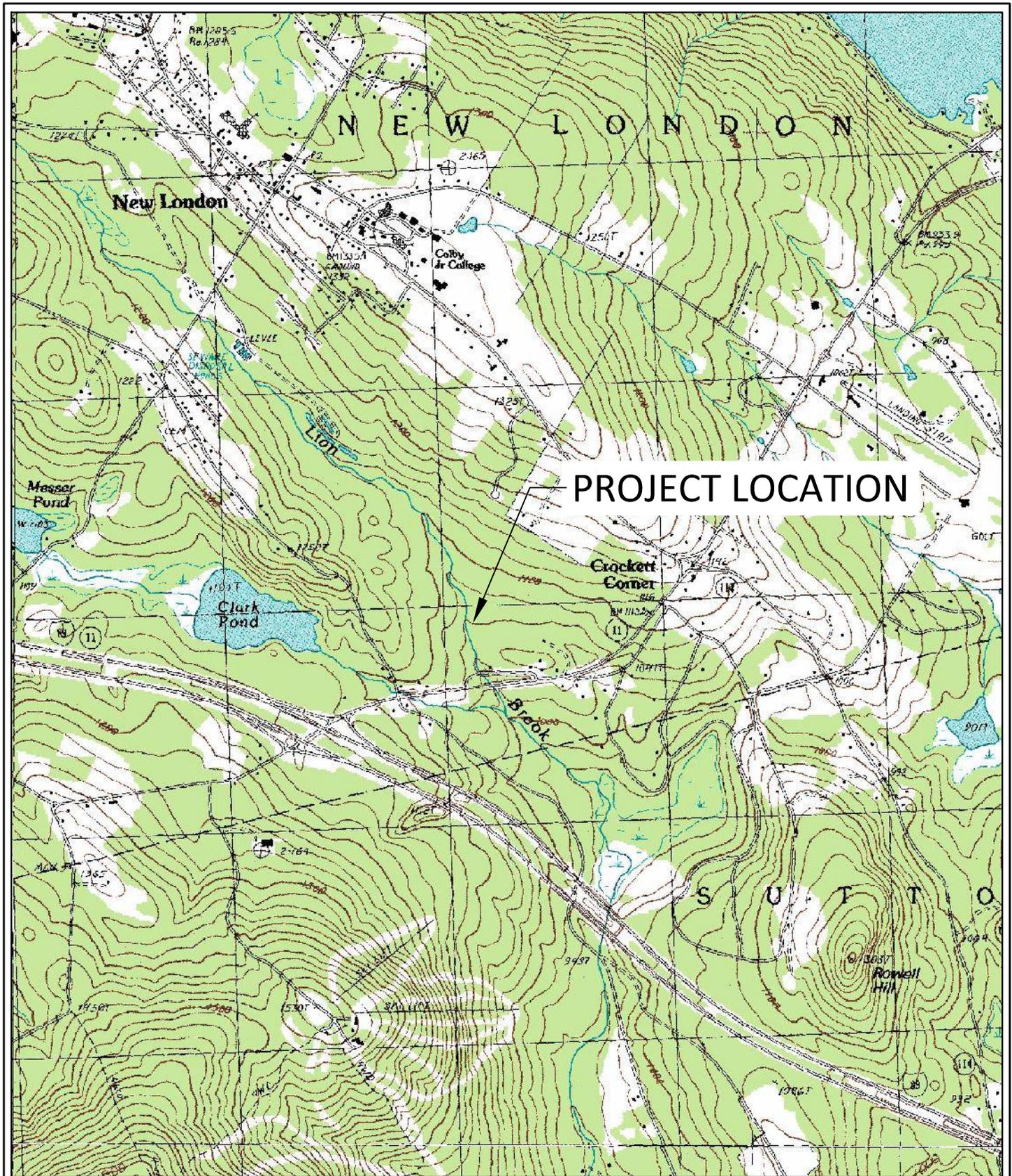


Designated River Corridor Web Map

NH Rivers Management and Protection Program



8. USGS MAP



PROJECT #:	DATE:
15-0184	1/24/2015
DWG. NO.:	SCALE:
USGS	1"=2000'

**BROOKSIDE DRIVE
CULVERT REPLACEMENT**

**BROOKSIDE DRIVE
NEW LONDON, NH**

**CONSULTING
ENGINEERS**

28 Gates Street Suite 100
White River Junction, VT 05001
(802) 698-0370 Fax: (877) 895-4949

OWNER:

**TOWN OF NEW LONDON
184 SOUTH PLEASANT ST
NEW LONDON, NH 03257**

9. PHOTOGRAPHS



Photo 1: Site #1, Culvert Outlets Section View from Downstream



Photo 2: Site #1, Culvert Section View of Beveled Ends at Outlet



Photo 3: Site #1, Culvert Inlets



Photo 4: Site #1, Inlet Section View



Photo 5: Site #2, Pipe Degradation

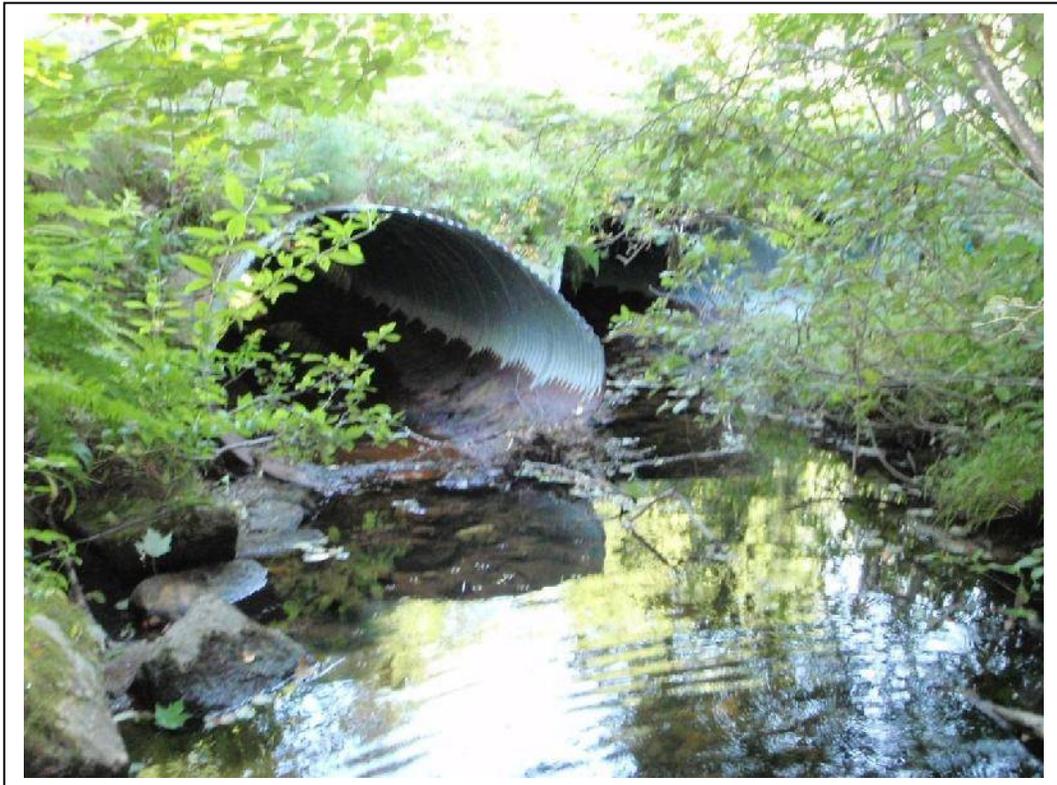


Photo 6: Site #2, Pipe Outlets

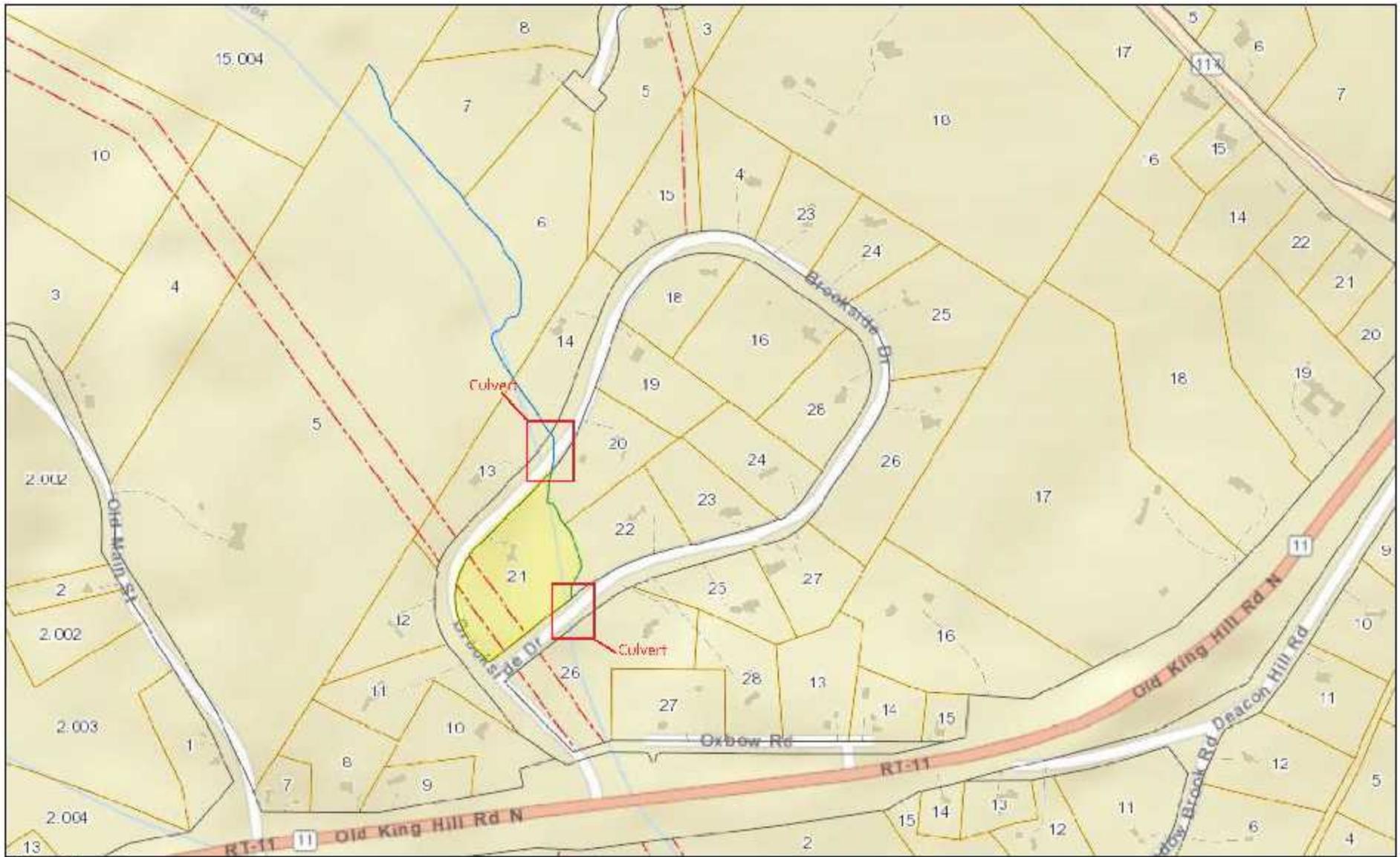


Photo 7: Site #2, View of Culvert Inlets from Road



Photo 8: Site #2, Culvert Inlets Section View

10. TAX MAP



**Brookside Drive
New London, NH**

1 Inch = 500 Feet
January 08, 2016



11. ABUTTER'S LIST & NOTIFICATIONS



Abutters List

Subject Property

Brookside Drive Culverts

Town of New London
Brookside Drive
Newbury, NH 03257

Tax Map 121-013-000

Victoria & Richard Simek
438 Brookside Drive,
New London, NH 03257

Tax Map 121-020-000

Allan & Ann Hoffman
PO Box 263
New London, NH 03257

Tax Map 121-014-000

Robert & Melissa
Carroll
378 Brookside Drive,
New London, NH 03257

Tax Map 121-021-000

Jonathan Cushman & Leah
Brewer
467 Brookside Drive
New London, NH 03257

Tax Map 121-022-000

Harrison Wareham & Joanna Henderson
135 Brookside Drive,
New London, NH 03257

Tax Map 121-026-000

Ernest & Sophia Tyler
120 Brookside Drive
New London, NH 03257

Municipality

Town of New London
375 Main Street
New London, NH 0325

Agent

CLD Consulting Engineers, Inc.
28 Gates Street – Suite 100
White River Junction, VT 05001