

LOW IMPACT HYDROPOWER INSTITUTE RECERTIFICATION APPLICATION

Rolfe Canal Hydroelectric Project (FERC No. 3240, LIHI No. 104)



**Prepared for:
LOW IMPACT HYDROPOWER INSTITUTE**

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TABLE OF CONTENTS

PART I. FACILITY DESCRIPTION..... 1

 Table B-1. Facility Description Information for Rolfe Canal Hydroelectric Project..... 5

PART II. STANDARDS MATRICES..... 9

PART III. SUPPORTING INFORMATION..... 11

 III.A.1 Ecological Flows 11

 III.B.1 Water Quality..... 18

 III.C.1 Upstream Fish Passage..... 23

 III.D.1 Downstream Fish Passage 29

 III.E.1 Watershed and Shoreline Protection..... 33

 III.F.1 Threatened and Endangered Species..... 35

 III.G.1 Cultural and Historic Resources..... 37

 III.H.1 Recreational Resources 39

PART IV. FACILITY CONTACTS..... 42

 Agency Contacts 43

PART V. SWORN STATEMENT 45

List of Appendices 46

- **Appendix 1-1:** Order Issuing License (Major) (Issued December 5, 1984)
- **Appendix 1-2:** FERC Letter (Dated February 28, 1986)
- **Appendix 1-3:** New Hampshire Water Resources Board Lease for York Dam (Dated February 20, 1986)
- **Appendix 1-4:** FERC Order Amending License Article (Issued September 25, 1986)
- **Appendix 1-5:** New Hampshire Water Supply and Pollution Control Commission Letter (Dated February 16, 1983)
- **Appendix 2-1:** New Hampshire Department of Environmental Services Water Quality Testing Protocol (2012)
- **Appendix 2-2:** New Hampshire Department of Environmental Services Water Quality Testing Results – Determination of “No Effect” of Project Operations on WQ (2012)
- **Appendix 2-3:** Penacook Upper Falls LIHI Water Quality Results 2016
- **Appendix 3-1:** Project Boundary Map (revised 11/5/2017)
- **Appendix 3-2:** Recreational Facilities: Map showing Boat Ramp Location
- **Appendix 4-1:** NHFG & USFWS Consultation Re: Downstream Fish Passage (Salmon & Herring)
- **Appendix 4-2:** Rolfe Canal and Penacook Lower Falls 2017 Eel Passage Operations Plan

Rolfe Canal Hydroelectric Project (Recertification, LIHI #104)

- **Appendix 4-3:** NHFG & USFWS Consultation Record Re: Eel Passage Operations at Rolfe Canal and Penacook Lower Falls
- **Appendix 4-4:** Preliminary Design of Downstream Eel Passage
- **Appendix 4-5:** Report from USFWS Site Visit re: Upstream Eel Passage Studies
- **Appendix 4-6:** 2015-2016 Compliance Statement and Eel Passage Update
- **Appendix 4-7:** USFWS Approval of Eel Operations Plan
- **Appendix 5:** Project Photos
- **Appendix 6:** New Hampshire Natural Heritage Bureau – Threatened and Endangered Species Consultation
- **Appendix 6-1:** TE Species Consultation NHFG (Updated Response – Carol Henderson)
- **Appendix 7-1:** Request for Project Review by the New Hampshire Division of Historical Resources (2017)
- **Appendix 7-2:** Response from New Hampshire Division of Historical Resources (2017)
- **Appendix 8:** York and Rolfe Canal Daily Average Pond Levels 2012-2017
- **Appendix 9:** Field Report from 12/7/17 Flows Demonstration & Agency Approval
- **Appendix 9-1:** Draft Flow Management Plan

PART I. FACILITY DESCRIPTION

The Rolfe Canal Hydroelectric Project (FERC No. 3240) (“Rolfe Project” or “Project”) was certified by the Low Impact Hydropower Institute (“LIHI”) on December 4, 2012 for a period of five years, through December 4, 2017. Briar Hydro Associates (“BRHA”), the facility owner and operator hereby submits this application to recertify the Project for a total of eight years: five years plus an additional three years for achieving the PLUS standard for downstream fish passage (in the impoundment zone). **There are no material changes to project operations that should be noted during recertification.**

The Project is located on the Contoocook River in the north end of the city of Concord, New Hampshire. The Contoocook River is a major tributary of the Merrimack River. From the Contoocook River confluence, the Merrimack River flows south to Massachusetts where it turns northeastward to empty into the Atlantic Ocean at Newburyport, travelling a total distance of 101 miles from where the Contoocook enters. The Project is located 2.1 miles upstream of the mouth of the Contoocook River. The Contoocook has a total river length of 71 miles and drains 766 square miles of land.

The Project diverts water from an impoundment created by York Dam, a state-owned structure (See lease agreement, Appendix 1-3). Rolfe Canal is a headrace channel. Flow into the canal is controlled by an intake structure (“Rolfe Canal Gate Inlet”) located at the Island Road bridge. The gate inlet is only closed during flood conditions or to dewater the canal for maintenance purposes. At the lower end of the canal, the Project headworks and intake are located at the Briar hydro dam where generation flows are conveyed to the powerhouse through a 940-foot-long steel underground penstock. A channel about 2,400 feet in length is bypassed by the penstock; the reach includes the old Briar Pipe factory dam, which is about 500 downstream of the penstock intake structure. A 1,200-foot-long tailrace channel carries flows back to the main channel of the Contoocook River. The Project is unmanned, but operation is monitored on a 24/7 basis. The tailrace backs up to the impoundment formed by the immediately-downstream Penacook Upper Falls dam (FERC No. 6689, “PUF”)¹. Immediately downstream of PUF is the Penacook Lower Falls (FERC No. 3342, “PLF”)² project. Rolfe, PUF and PLF are all owned and operated by BRHA.

Project works consist of: (a) a 300-foot-long, 10-foot-high diversion dam (York Dam); (b) a reservoir with negligible storage, a surface area of approximately 1000-acres that extends for approximately 9 miles, and a normal water surface elevation of 342.46 feet NGVD; (c) a 3,800-foot-long, 75-foot-wide, and 10-foot deep power canal (“Rolfe Canal”); (d) a 130-foot-long, 17-foot-high granite block generation dam (Briar hydro dam); (e) a penstock intake structure; (g) a roughly 950-foot-long buried penstock; (h) a roughly 4,000-foot-long bypass reach; (i) a reservoir with surface area of 3-acres with negligible storage, and a normal water surface elevation of 328

¹ This project is certified by LIHI (certificate #52): effective September 25, 2014 and expires September 25, 2019.

² This project is certified by LIHI (certificate #64): effective August 13, 2015 and expires August 13, 2020.

Rolfe Canal Hydroelectric Project (Recertification, LIHI #104)

feet NGVD; (j) a powerhouse containing one generating unit with a total installed capacity of 4,285 kW; (k) 100-foot-long, 4.16-kV generator leads; (l) the 4.16/34.5 kV 3.8 MVA three-phase transformer; (m) the 650-foot-long, 34.5-kV transmission line; and (n) appurtenant facilities.



Figure 1 - Merrimack River Basin showing Project location.

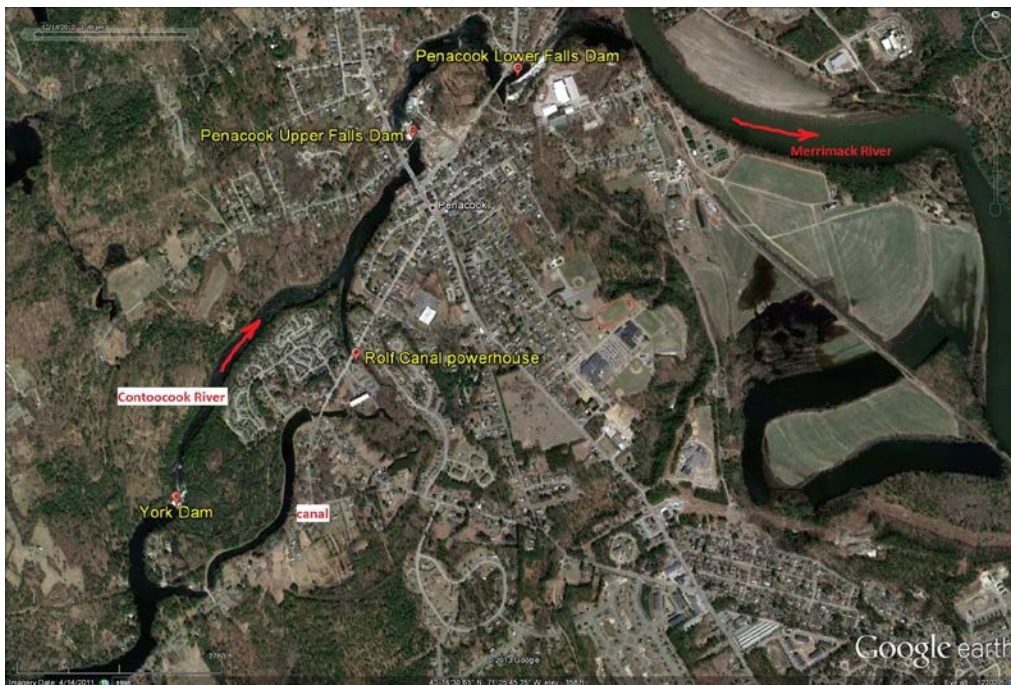


Figure 2 - Rolfe Canal Hydroelectric Project and nearby dams.

Figure 3 - Project Layout

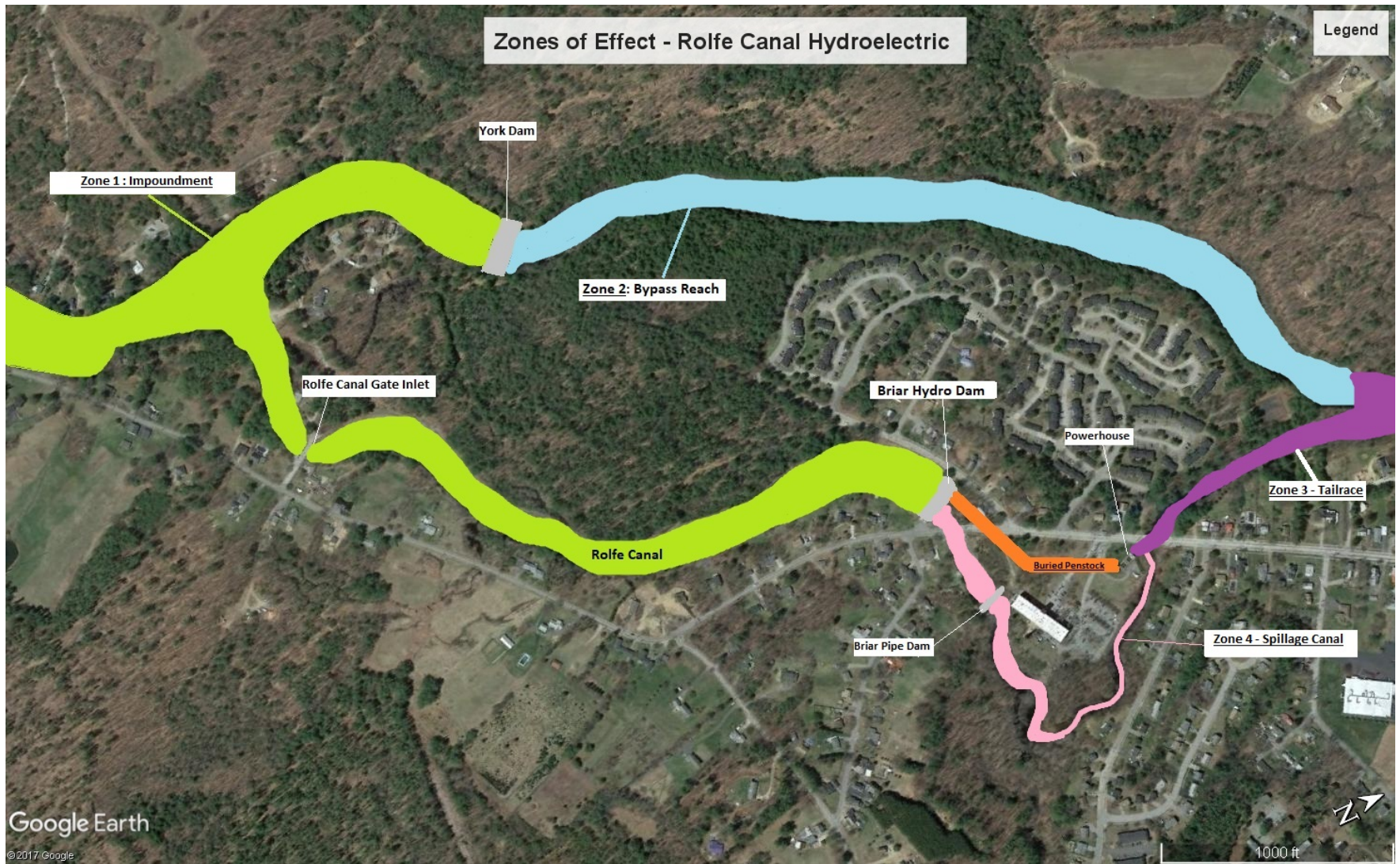


Figure 4 - Designated Zones of Effect

Table B-1. Facility Description Information for Rolfe Canal Hydroelectric Project

Information Type	Variable Description	Response(and reference to further details)
Name of the Facility	Facility name (use FERC project name if possible)	Rolfe Canal Hydroelectric Project
Location	River name (USGS proper name)	Contoocook River
	River basin name	Contoocook River Watershed
	Nearest town, county, and state	City of Concord, Merrimack County, New Hampshire
	River mile of dam above next major river	River Mile 68
	Geographic latitude	43°16'29"N
	Geographic longitude	71°36'14"W
Facility Owner	Application contact names:	Andrew Locke, President, Essex Hydro Associates, (A General Partner of Briar Hydro Associates) Elise Anderson, Regulatory Analyst Essex Hydro Associates
	- Facility owner (individual and company names)	Briar Hydro Associates (Owner and Operator) c/o Essex Hydro Associates, LLC 55 Union Street, 4 th Floor Boston, MA 02108
	- Operating affiliate (if different from owner)	N/A
	- Representative in LIHI certification	Elise Anderson, Regulatory Analyst, Essex Hydro
Regulatory Status	FERC Project Number (e.g., P-xxxxx), issuance and expiration dates	FERC Project No. P-3240 Issued December 5, 1984, Expires 2024
	FERC license type or special classification (e.g., "qualified conduit")	Subsequent Major License
	Water Quality Certificate identifier and issuance date, plus source agency name	N/A
	Hyperlinks to key electronic records on FERC e-library website (e.g., most recent Commission Orders, WQC, ESA documents, etc.)	N/A – Recent submissions include min flow compliance filings, dam safety reports and inspection reports. Other key documents are provided in appendices.
Power Plant Characteristics	Date of initial operation (past or future for operational applications)	1987
	Total name-plate capacity (MW)	4.285 MW
	Average annual generation (MWh)	21,418 MWh (1988-2017)
	Number, type, and size of turbines, including maximum and minimum hydraulic capacity of each unit	1 Full Kaplan Turbine Hydraulic capacity: max. 2,000 and min. 150 cfs
	Modes of operation (run-of-river, peaking, pulsing, seasonal storage, etc.)	Run-of-river

Rolfe Canal Hydroelectric Project (Recertification, LIHI #104)

	Dates and types of major equipment upgrades	On February 28, 1986, FERC authorized a change in the proposed powerhouse location; construction of a new inlet control structure; installation of a single turbine/generator unit, instead of two units as originally licensed; and an increase in the installed generating capacity (4.285 MW instead of 3.350 MW) and max. hydraulic capacity (2,000 cfs instead of 1,600 cfs).
	Dates, purpose, and type of any recent operational changes	There have been no recent operational changes.
	Plans, authorization, and regulatory activities for any facility upgrades	There are no plans for facility upgrades.
Characteristics of Dam, Diversion, or Conduit	Date of construction	1984 – Authorized 1986 – Changed construction plan 1987 – Construction completed
	Dam height	York Dam – 10 feet Briar Hydro Dam (Intake Structure) – 17 feet
	Spillway elevation and hydraulic capacity	York Dam – EL 342.2 feet msl, capacity 14,147 cfs
	Tailwater elevation	Min – 306.0 feet msl
	Length and type of all penstocks and water conveyance structures between reservoir and powerhouse	There is an underground penstock that conveys water from the power canal to the powerhouse, which is roughly 950 feet long.
	Dates and types of major, generation-related infrastructure improvements to dam	None
	Designated facility purposes (e.g., power, navigation, flood control, water supply, etc.)	Power generation
	Water source	Contoocook River
	Water discharge location or facility	Contoocook River
Characteristics of Reservoir and Watershed	Gross volume and surface area at full pool	Gross Reservoir Volume: 32 acre-feet Surface Area: 5 acres
	Maximum water surface elevation (ft. MSL)	342.46 feet MSL
	Maximum and minimum volume and water surface elevations for designated power pool, if available	The normal water surface elevation to ensure ROR operation is 342.46 feet. The automatic pond level control system in the pond behind York dam ensures the project maintains a pond level of EL 342.46 msl (York Dam elevation is 342.2 feet MSL and a spill of 0.26 foot (3.16 inches) is maintained to meet the minimum flow requirements).
	Upstream dam(s) by name, ownership, FERC number (if applicable), and river mile	1. Hopkinton Dam – U.S. Army Corps of Engineers, Hopkinton Lake, located on the Contoocook River in Hopkinton, River Mile 17

Rolfe Canal Hydroelectric Project (Recertification, LIHI #104)

	Downstream dam(s) by name, ownership, FERC number (if applicable), and river mile	Penacock Upper Falls (FERC No. 6689) – Briar Hydro Associates, River Mile 1.0 Penacock Lower Falls (FERC No. 3342) – Briar Hydro Associates, River Mile 0.5		
	Operating agreements with upstream or downstream reservoirs that affect water availability, if any, and facility operation	N/A		
	Area inside FERC project boundary, where appropriate	138 acres (estimate)		
Hydrologic Setting	Average annual flow at the dam	15,047 cfs		
	Average monthly flows (cfs)	January	1,050	
		February	1,060	
		March	2,170	
		April	3,890	
		May	1,920	
		June	982	
		July	475	
		August	334	
		September	465	
October		501		
November		1,000		
December		1,200		
	Location and name of relevant stream gauging stations above and below the facility	USGS Stream Gage 01085500 at West Hopkinton, NH on the Contoocook River Latitude 43°11'34", Longitude 71°44'52" Located at River Mile 16.5, Approximately 14.4 miles upstream of York Dam		
	Watershed area at the dam	766 miles		
Designated Zones of Effect	Number of zones of effect	Zone 1 – Impoundment Zone 2 – Bypass Reach Zone 3 – Tailrace Zone 4 – Spillage Canal		
	Upstream and downstream locations by river miles	Zone 1 – RM 8.0 (approx) to RM 2.1 Zone 2 – RM 2.09 to RM 1.28 Zone 3 –Refer to Figure 4 Zone 4 –Refer to Figure 4		
	Type of waterbody (river, impoundment, by-passed reach, etc.)	Zone 1 –Impoundment Zone 2 – Bypass Reach #1 Zone 3 – Tailwater & Impoundment of Downstream dam <i>(There are no free-flowing reaches; impoundment of downstream dam backs up to tailwater of Rolfe Project)</i> Zone 4 – Spillage Canal (Bypassed reach #2)		
	Delimiting structures	York Dam, Briar Hydro Dam, Briar Pipe Dam		

Rolfe Canal Hydroelectric Project (Recertification, LIHI #104)

	<p>Designated uses by state water quality agency</p>	<p>Penacook Upper Falls impoundment (Assessment Unit NHIMP700030507-06) is currently listed as a Category 5 impaired water for Aquatic Life support due to pH. This includes the reach below York Dam and the Project tailrace. Designated Use Support: Aquatic Life – Severe, Not supporting Swimming – No data Boating – No Data Fish Consumption – Poor, Not Supporting Marginal</p> <p>The Briar Project Intake (Assessment Unit NHIMP700030507-09) is not listed as impaired, but is a Category 3 water, which are those waters for which there is insufficient information upon which to base a determination of designated-use support. Designated Use Support: Aquatic Life – Likely bad, insufficient info., potentially not supporting Swimming – No Data Boating – No Data Fish Consumption – Poor, Not Supporting Marginal</p>
<p>Additional Contact Information</p>	<p>Names, addresses, phone numbers, and e-mail for local state and federal resource agencies</p>	<p>See “PART IV: FACILITY CONTACTS FORM”</p>
	<p>Names, addresses, phone numbers, and e-mail for local non-governmental stakeholders</p>	<p>N/A</p>
<p>Photographs and Maps</p>	<p>Photographs of key features of the facility and each of the designated zones of effect</p>	<p>See Appendix 5 – Site Photos</p>
	<p>Maps, aerial photos, and/or plan view diagrams of facility area and river basin</p>	<p>See Figures 2 & 3, Section I - Facility Description</p>

* Hyperlinks to facility FERC records on FERC e-library website are preferred whenever possible.

PART II. STANDARDS MATRICES

Zone of Effects #1 – Impoundment

Criterion		Alternative Standards Applied				
		1	2	3	4	Plus
A	Ecological Flow Regimes	X				
B	Water Quality			X		
C	Upstream Fish Passage	X				
D	Downstream Fish Passage					X
E	Watershed and Shoreline Protection	X				
F	Threatened and Endangered Species Protection		X			
G	Cultural and Historic Resources Protection	X				
H	Recreational Resources		X			

Zone of Effects #2 – Bypass Reach

Criterion		Alternative Standards Applied				
		1	2	3	4	Plus
A	Ecological Flow Regimes		X			
B	Water Quality			X		
C	Upstream Fish Passage		X			
D	Downstream Fish Passage	X				
E	Watershed and Shoreline Protection	X				
F	Threatened and Endangered Species Protection		X			
G	Cultural and Historic Resources Protection	X				
H	Recreational Resources		X			

Zone of Effects #3 –Tailrace

Criterion		Alternative Standards Applied				
		1	2	3	4	Plus
A	Ecological Flow Regimes		X			
B	Water Quality			X		
C	Upstream Fish Passage		X			
D	Downstream Fish Passage	X				
E	Watershed and Shoreline Protection	X				
F	Threatened and Endangered Species Protection		X			
G	Cultural and Historic Resources Protection	X				
H	Recreational Resources		X			

Zone of Effects #4 – Spillage Canal

Criterion		Alternative Standards Applied				
		1	2	3	4	Plus
A	Ecological Flow Regimes		X			
B	Water Quality			X		
C	Upstream Fish Passage	X				
D	Downstream Fish Passage	X				
E	Watershed and Shoreline Protection	X				
F	Threatened and Endangered Species Protection		X			
G	Cultural and Historic Resources Protection	X				
H	Recreational Resources		X			

PART III. SUPPORTING INFORMATION

III.A.1 Ecological Flows

Zone of Effects #1 – Impoundment

A	1	<p><u>Not Applicable / De Minimis Effect:</u></p> <ul style="list-style-type: none"> • Confirm the location of the powerhouse relative to other dam/diversion structures to establish that there are no bypassed reaches at the facility. • If Run-of-River operation, provide details on how flows, water levels, and operation are monitored to ensure such an operational mode is maintained. • In a conduit project, identify the water source and discharge points for the conduit system within which the hydropower plant is located. <ul style="list-style-type: none"> • For impoundment zones only, explain how fish and wildlife habitat within the zone is evaluated and managed – NOTE: this is required information, but it will not be used to determine whether the Ecological Flows criterion has been satisfied. All impoundment zones can apply Criterion A-1 to pass this criterion.
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Supporting Information:

Fish and wildlife habitat in this zone is evaluated and managed by consulting regularly with USFWS and NHFG on fishery restoration efforts. Downstream anadromous fish passage is provided via the stop log gate through York Dam with a screen. However, downstream catadromous fish passage for American eel will be handled via an innovative eel trap & screen to be placed in the Rolfe canal gate inlet, per the recommendations of the USFWS and NOAA BRHA is requesting a PLUS certification standard for the downstream fish passage due to the adaptive management style of this approach. See downstream fish passage sections III.D.1, appendix 4-2 for eel passage operations plan, 4-3 for a consultation record on the design of the downstream eel screen & trap to be constructed in 2018 at the Rolfe canal inlet, and 4-7 for USFWS approval of the implementation timetable.

Additionally, the agencies have suspended Atlantic salmon restoration activities in the area. River herring passage is not needed since NHFG has not yet stocked river herring in the Contoocook River. (See Appendix 4-1 for consultation record regarding salmon and river herring restoration activities).

Zone of Effects #2 – Bypass Reach

A	2	<p><u>Agency Recommendation (see Appendix A for definitions):</u></p> <ul style="list-style-type: none"> • Identify the proceeding and source, date, and specifics of the agency recommendation applied (NOTE: there may be more than one; identify and explain which is most environmentally stringent). • Explain the scientific or technical basis for the agency recommendation, including methods and data used. This is required regardless of whether the recommendation is or is not part of a Settlement Agreement. • Explain how the recommendation relates to agency management goals and objectives for fish and wildlife. • Explain how the recommendation provides fish and wildlife protection, mitigation and enhancement (including in-stream flows, ramping and peaking rate conditions, and seasonal and episodic instream flow variations).
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Supporting Information:

The FERC License for the Project prescribes minimum flows under Article 32 for the purposes of protecting and enhancing aquatic resources in the Contoocook River. 285 cubic feet per second was prescribed for the confluence of the Contoocook River and the outlet of Rolfe Canal and at least 50 cfs of this minimum flow was to be discharged from York Dam through the bypass reach (Zone 2). Article 32 also requires a minimum flow of 400 cfs at York Dam for May and June (or some other 60 day period to be coordinated with New Hampshire Fish and Game Department (“NHFG”)) at such time that upstream anadromous fish passage facilities are constructed and operational. Such facilities are not operational and have not been requested by the agencies at this time.

The minimum flows prescribed in the license are less than the U.S. Fish and Wildlife Service’s (“USFWS”) summer aquatic base default flow of 0.5 cfs/sq. mile, or csm, as prescribed in the Interim Regional Policy for New England Stream Flow Recommendations.³ Based on the recommendation of USFWS, BRHA increased the minimum flow released at York Dam to 100 cfs effective with the receipt of its LIHI certification in 2012. USFWS staff observed the 100 cfs in 2014 and verbally approved of the flows being protective of fish and aquatic life. Calculations were provided to USFWS to document the 100 cfs flow at the York dam and the 5 cfs flow at the Project intake which is passed down the spillage canal.

The Project has continued to bypass at least 100 cfs through York Dam by passing 50 cfs over the spillway and at least 50 cfs through a stop-log bay-gate, fixed in an open position. The minimum flow over the spillway is measured via a fixed staff gage on the abutment. This gage allows the operators to measure the spillage of water over the dam crest as part of their daily log checks of the facility to ensure that the minimum flow is being maintained over the spillway. Additionally, there is an automatic pond level control system in the pond behind York dam that ensures the

³ <https://www.fws.gov/newengland/pdfs/Flowpolicy.pdf>

project maintains a pond level of EL 342.46 msl (York Dam elevation is 342.2 feet MSL and a spill of 0.26 foot (3.16 inches) is maintained to meet the minimum flow requirements). Appendix 9-1 contains a Draft Flow Monitoring Plan that was circulated to USFWS, NHFG and NHDES in December 2017 with a request for feedback and approval. Once agency approval is obtained, this Plan will be filed with FERC and LIHI.

In December 2017, USFWS and NHDES staff conducted a field exercise (See Report on the Field Exercise, Appendix 9) to observe 100 cfs and 150 cfs and take measurements to determine the suitability of downstream habitat under both flow conditions. The agencies determined that the existing flow of 100 cfs in this zone is acceptable and appropriately protective. USFWS may change the prescribed minimum flows based on the outcome of studies performed during the upcoming relicensing proceeding.⁴

In the absence of a formal habitat study, agency staff cannot comment on what type of aquatic biota is present in the two bypassed reaches of the project. USFWS indicated that they are likely to request habitat and/or flow studies during the upcoming FERC relicensing process, beginning in 2019. Agency staff are also unable to comment at this time on specific fish species or life stages of interest without further studies.

⁴ Relicensing activities will begin in December 2019 in anticipation of filing a Draft License Application in 2022 (24 months before the license expiration date in 2024). It is anticipated that studies associated with relicensing will occur in 2020 and 2021, as necessary.

Zone of Effects #3 – Tailrace

A	2	<p><u>Agency Recommendation (see Appendix A for definitions):</u></p> <ul style="list-style-type: none"> • Identify the proceeding and source, date, and specifics of the agency recommendation applied (NOTE: there may be more than one; identify and explain which is most environmentally stringent). • Explain the scientific or technical basis for the agency recommendation, including methods and data used. This is required regardless of whether the recommendation is or is not part of a Settlement Agreement. • Explain how the recommendation relates to agency management goals and objectives for fish and wildlife. <p>Explain how the recommendation provides fish and wildlife protection, mitigation and enhancement (including in-stream flows, ramping and peaking rate conditions, and seasonal and episodic instream flow variations).</p>
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Supporting Information:

Zone 3 includes areas of water that are impounded by the downstream Penacook Upper Falls (“PUF”) dam. The Rolfe and PUF projects are both operated as run-of-river projects that are regulated using automated pond level control systems. Normal backwater from the PUF project extends close to the upper end of the canal where water is discharged from the Rolfe penstock (Approximately RM 1.36) (See Figure 5 for PUF Project and impoundment boundary) but does not impact operations of the Rolfe Project. There is no tailwater affect downstream of the Rolfe Project powerhouse and no free flowing stretches of river between the projects. The project license notes that the impounded waters from the downstream PUF project may impact the generation of Rolfe since the impoundment backs up into the Rolfe tailwater.

Flows in this zone vary between turbine discharge and the minimum flow of at least 5 cfs when the station is offline. During the field exercise conducted in December 2017, agency staff determined that 5 cfs is an adequately protective minimum flow through Briar Hydro Dam into zone 4 (See report on field exercise, Appendix 9). In the absence of a formal habitat study, agency staff cannot comment on what type of aquatic biota is present in the tailrace zone. USFWS indicated that they are likely to request habitat and/or flow studies during the upcoming FERC relicensing process, beginning in 2019. Agency staff were unable to comment at this time on specific fish species or life stages of interest without further studies.

Zone of Effects #4 – Spillage Canal

A	2	<p><u>Agency Recommendation (see Appendix A for definitions):</u></p> <ul style="list-style-type: none"> • Identify the proceeding and source, date, and specifics of the agency recommendation applied (NOTE: there may be more than one; identify and explain which is most environmentally stringent). • Explain the scientific or technical basis for the agency recommendation, including methods and data used. This is required regardless of whether the recommendation is or is not part of a Settlement Agreement. • Explain how the recommendation relates to agency management goals and objectives for fish and wildlife. <p>Explain how the recommendation provides fish and wildlife protection, mitigation and enhancement (including in-stream flows, ramping and peaking rate conditions, and seasonal and episodic instream flow variations).</p>
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Supporting Information:

In 1986, FERC issued a letter concerning the proposed design changes to the Project as licensed (Appendix 1-2). Per the recommendations of the NHFG and USFWS, the license was amended to include a minimum of 5 cfs to be spilled at the intake control structure (penstock intake structure is located at Briar Hydro Dam) into the bypassed section of the power canal (“Spillage Canal”) that extends behind the Briar Pipe Apartment complex. The 1986 letter states that *“after consultation with USFWS and NHFG, a system of timber weirs will be constructed in the bypass reach of the canal to optimize use of the bypass flow to preserve the existing habitat.”* BRHA installed some flashboards on the concrete wall where the bypass reach meets the tailrace. This created a small pool before the bypassed water falls over the boards and into the tailrace channel. The section of bypass reach, from the penstock intake to the old Briar Pipe dam, was disturbed by construction of the buried penstock and thereafter by a dam failure/breach of the Briar Pipe dam after the project commenced operation. The Briar Pipe Dam, which is not critical to project operations, wasn’t rebuilt after the failure. Minor readjustment of loose granite blocks and concrete work to maintain the remaining sections of the dam was done.

This 5 cfs is maintained by way of a pipe that flows through the Briar Hydro Dam. The maximum hydraulic capacity of this pipe is 5 cfs, and due to leakage around the pipe, the flows passed through the pipe into this zone are likely to exceed 5 cfs. The 5 cfs is maintained at all times, even when the project is offline. The only time that this flow is not maintained is when the Rolfe canal inlet gate is closed for maintenance purposes. FERC advises that BRHA conduct periodic inspections which require closing of the gate inlet to dewater the canal.

During the field exercise conducted in December 2017 (See Appendix 9), agency staff determined that 5 cfs is an adequate minimum flow through Briar Hydro Dam into this zone. USFWS may change the prescribed minimum flows based on the outcome of studies performed during the upcoming relicensing proceeding. In the absence of a formal habitat study, agency staff cannot comment on what type of aquatic biota is present in this zone. Agency staff are also unable to

comment at this time on specific fish species or life stages of interest without further studies. Agency staff observed the upstream and downstream barriers to fish migration into this corridor. Briar operations staff has observed beavers inhabiting this reach.

III.B.1 Water Quality

ZoE #1 - Impoundment

B	3	<p><u>Site-Specific Monitoring Studies:</u></p> <ul style="list-style-type: none"> • Document consultation with appropriate water quality agency to determine what water quality parameters and sampling methods are required. • Present recent water quality data, explain how it satisfies applicable water quality standards, and provide a letter from the appropriate state of other regulatory agency accepting these results.
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Supporting Information:

To support its LIHI application in 2012, BRHA performed water quality sampling in August and September in accordance with a New Hampshire Department of Environmental Services (“NHDES”) sampling protocol (Appendix 2-1) to demonstrate compliance with state water quality standards. Instantaneous handheld meter readings were taken for water temperature and dissolved oxygen in the impoundment, directly above the Briar-Hydro dam (Assessment Unit NHIMP700030507-09) (Referred to as Station ID 03K-CTC in Figure 5). NHDES, in its letter from December 31, 2012 (Appendix 2-2), stated that the Project is not adversely impacting water quality standards for dissolved oxygen, phosphorus and chlorophyll-a. Figure 6 below shows the locations of the 3 monitoring stations, including station 03K-CTC in Zone 1.

The Rolfe Project impoundment is not listed as impaired, but it is listed as a Category 3 water in the 2016 Assessment Report,⁵ which are those waters for which there is insufficient information upon which to base a determination of designated-use support. The Project’s water quality certification was issued in 1983 (see Appendix 1-5).

Due to the fact that the 2012 sampling data and letter from NHDES is more than 5 years old⁶, BRHA is prepared to retest according to DES protocols during the summer of 2018 and share the findings with LIHI upon receipt. NHDES visited the site in December 2017 and discussed the approach to 2018 monitoring, but has yet to provide a formal 2018 testing protocol.

⁵ <https://www.des.nh.gov/organization/divisions/water/wmb/swqa/2016/index.htm> (See “2016 Draft Status of Each Assessment Unit”)

⁶ NHDES 5-yr WQ data requirement is formalized in the state’s CALM assessment methodology as 5 yrs for rivers. See table 3.9 at <https://www.des.nh.gov/organization/divisions/water/wmb/swqa/2014/documents/r-wd-15-9.pdf>

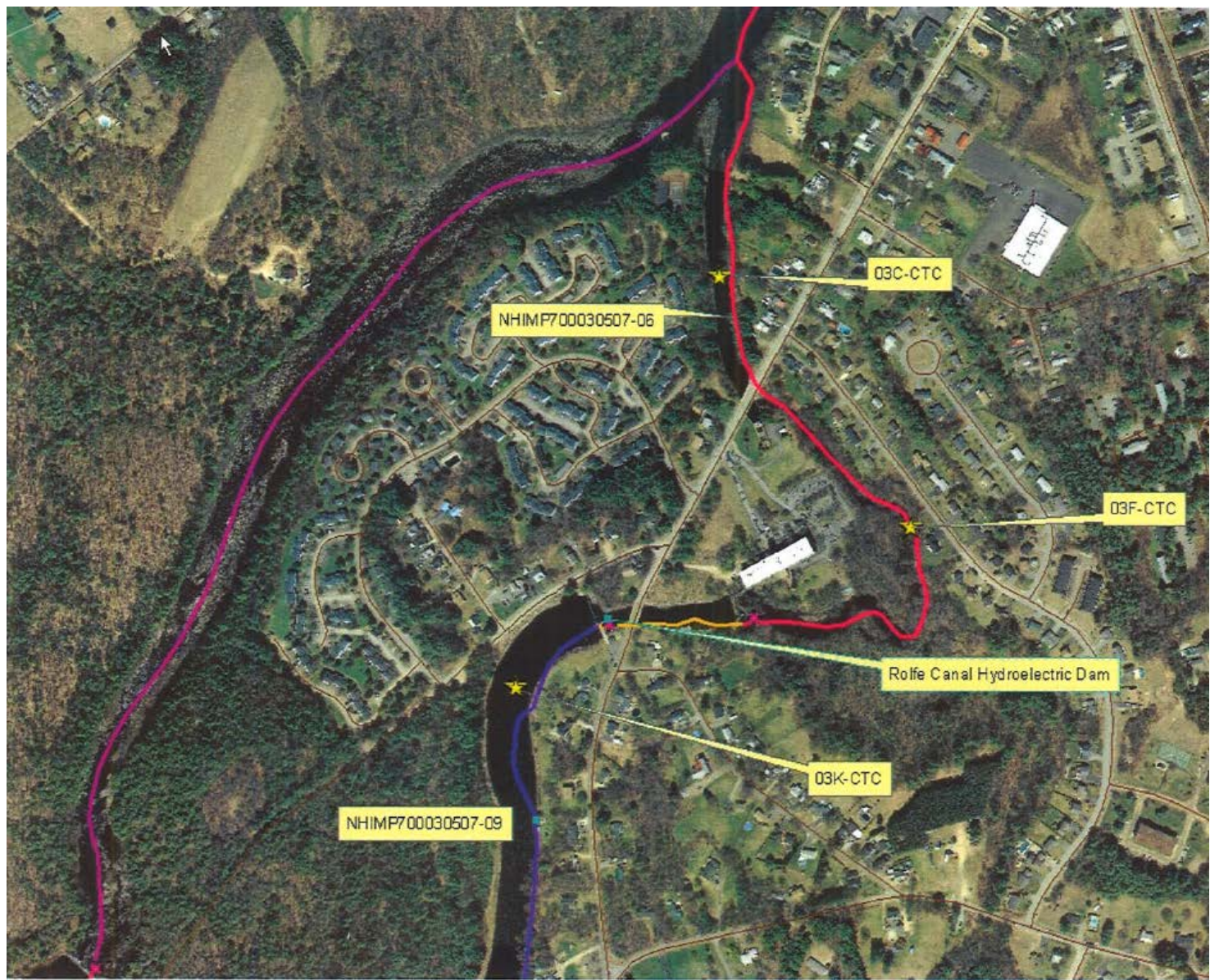


Figure 6 – 2012 Water Quality Monitoring Locations

Zone of Effects #2 – Bypass Reach

B	3	<p><u>Site-Specific Monitoring Studies:</u></p> <ul style="list-style-type: none"> • Document consultation with appropriate water quality agency to determine what water quality parameters and sampling methods are required. • Present recent water quality data, explain how it satisfies applicable water quality standards, and provide a letter from the appropriate state of other regulatory agency accepting these results.
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Supporting Information:

In the 2012 testing protocol, DES did not recommend a monitoring station in the bypassed reach (Zone 2) below York dam. However, this river assessment unit (NHIMP700030507-06) was sampled in 2015 and 2016 because it is the same assessment unit associated with the impoundment of the downstream Penacook Upper Falls (“PUF”) project. According to the 2016 Assessment Report,⁷ the PUF impoundment is currently listed as a Category 5 impaired water for aquatic life support due to pH impairment.

Conditions in the Zone Based on 2016 Sampling: Water quality sampling was conducted in 2015 and 2016 at the Penacook Lower Falls Project, which included deploying data sondes to collect 10 days of continuous dissolved oxygen (“DO”) and temperature data and grab sampling of chlorophyll and phosphorus. A letter confirming that “the (PUF) Project does not appear to be causing or contributing to violations of state water quality standards” is included as Appendix 2-3⁸ Also shown below is the assessment provided by NH DES in 2017 which concludes that conditions in this river assessment unit are fully supporting dissolved oxygen, temperature and other parameter standards for the designated use aquatic life. Additionally, in February 2018 DES concurred with the USFWS that the flows in this zone appeared to adequately protective of aquatic biota and water quality (See Appendix 9, Report on Field Exercise).

Table 1. Assessment Status for Water Quality Monitoring Parameters – Penacook Upper Falls Hydroelectric Project

Assessment Unit and Monitoring Station	Location	Parameter	Designated Use	Assessment Status based upon 2015 and 2016 sampling
NHIMP700030507-06 03-CTC	Penacook Upper Falls Hydroelectric Project - Impoundment	Dissolved Oxygen (mg/L)	Aquatic Life	Fully Supporting
		Dissolved Oxygen (% Sat.)	Aquatic Life	Fully Supporting
		Chlorophyll-a	Primary Contact Recreation	Fully Supporting
			Aquatic Life	Potentially Supporting ^A
		Total Phosphorus	Aquatic Life	Indeterminate ^A
Water Temperature	Aquatic Life	No numeric criteria ^C		

⁷ <https://www.des.nh.gov/organization/divisions/water/wmb/swqa/2016/index.htm> (See “2016 Draft Status of Each Assessment Unit”)

Zone of Effects #3 – Tailrace

B	3	<u>Site-Specific Monitoring Studies:</u> <ul style="list-style-type: none">• Document consultation with appropriate water quality agency to determine what water quality parameters and sampling methods are required.• Present recent water quality data, explain how it satisfies applicable water quality standards, and provide a letter from the appropriate state or other regulatory agency accepting these results.
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Supporting Information:

This river assessment unit (NHIMP700030507-06) that encompasses Zone 3 was sampled in 2015 and 2016 because it is the assessment unit associated with the impoundment of the downstream Penacook Upper Falls (“PUF”) project. *See Zone 2, Section III.B.1*

For Comments on the sufficiency of the 5 cfs to maintain water quality in this zone, please see Appendix 9 for a report on a field exercise conducted in December 2017 and DES comments on the sufficiency of 5 cfs.

Zone of Effects #4 – Spillage Canal

B	3	<u>Site-Specific Monitoring Studies:</u> <ul style="list-style-type: none">• Document consultation with appropriate water quality agency to determine what water quality parameters and sampling methods are required.• Present recent water quality data, explain how it satisfies applicable water quality standards, and provide a letter from the appropriate state or other regulatory agency accepting these results.
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Supporting Information:

See Zone 1, Section III.B.1

During the 2012 sampling effort, a water quality monitoring station was set up in the spillage canal (referred to as “bypass reach”, 03F-CTC, in Figure 6) to monitor dissolved oxygen and temperature continuously for a 10 day period under critical low flow/high temperature conditions. However, due to the fact that the sampling data at this station is 5 years old, BRHA is prepared to retest according to DES protocols at station 03F-CTC during the summer of 2018. BRHA will provide an updated testing protocol for 2018 testing once it becomes available.

III.C.1 Upstream Fish Passage

ZoE #1 - Impoundment

C	1	<p><u>Not Applicable / De Minimis Effect:</u></p> <ul style="list-style-type: none"> • Explain why the facility does not impose a barrier to upstream fish passage in the designated zone. • Document available fish distribution data and the lack of migratory fish species in the vicinity. • If migratory fish species have been extirpated from the area, explain why the facility is or was not the cause of this.
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Supporting Information:

This zone does not contain a barrier to upstream fish passage.

Zone of Effects #2 – Bypass Reach

C	2	<p><u>Agency Recommendation:</u></p> <ul style="list-style-type: none"> • Identify the proceeding and source, date, and specifics of the agency recommendation applied (NOTE: there may be more than one; identify and explain which is most environmentally stringent). • Explain the scientific or technical basis for the agency recommendation, including methods and data used. This is required regardless of whether the recommendation is or is not part of a Settlement Agreement. • Describe any provisions for fish passage monitoring or effectiveness determinations that are part of the agency recommendation, and how these are being implemented.
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Supporting Information:

Shad, Herring and Salmon

According to the *Strategic Plan & Status Review, Anadromous Fish Restoration Plan, Merrimack River*,⁹ anadromous fish, including Atlantic salmon, American shad, and river herrings (alewives and blueback herring) have historically populated the Merrimack River basin. Salmon were present in most of the major tributaries, including the Contoocook River, although the Pemigewasset River watershed in the upper Merrimack basin served as the principal salmon spawning and rearing area. Shad and river herrings likely occurred upstream as far as the Winnepesaukee River watershed. In 1847, the Essex Dam in Lawrence, Massachusetts was constructed at River Mile 30, blocking anadromous fish access to critical upstream habitat. Atlantic salmon became extirpated, while shad and river herring maintained diminished populations by using available habitat downstream of Essex Dam.

Article 30 of the Rolfe Project’s FERC license provided for the construction of fish passage facilities after consultation with the USFWS and NHEG. Both upstream and downstream fish passage

⁹ Technical Committee for Anadromous Fishery Management of the Merrimack River Basin and Advisors to the Technical Committee, October 16, 1997

facilities were required within one year after completion of fish passage facilities at the downstream Garvins Falls Dam, the Hooksett Dam, the Amoskeag Dam and the Pawtucket Dam. At the time the license was issued, a fish lift had already been installed at Essex Dam (1982) and facilities are now in place at the Pawtucket and Amoskeag dams as well. The license required the Project, after consultation with the NHFG and the USFWS, to file functional design drawings with the Commission no later than July 1, 1988.

On September 25, 1986, the FERC amended Article 30, requiring functional design drawings be filed within two years after the annual passage of 15,000 adult American shad at the Garvins Falls Project (FERC No. 1893)¹⁰, or through the fish facilities of the proposed Sewalls Falls Project (FERC No. 7216) if constructed, but in no case later than July 1, 2004, and installation of fish passage facilities within 5 years of the same triggering event. The Sewalls Falls Project was not constructed and is no longer licensed.

The USFWS fishway prescription (December 20, 2006) that applies to the Eversource-owned dams on the Merrimack River mainstem requires operational anadromous upstream passage at Hooksett Dam within three years after annual passage of either 9,500 shad or 22,500 river herring at Amoskeag Dam. It also requires upstream passage at Garvins Dam after annual passage of either 9,800 shad or 23,200 river herring at Hooksett Dam (unless the Hooksett passage facility is built without a fish counting facility, in which case the trigger will be either 19,300 shad or 45,800 river herring at Amoskeag).

According to the latest annual report to FERC from Eversource (February 23, 2017¹¹), USFWS declared in January 2017 that based on 2016 passage numbers, the trigger for constructing fish passage at Hooksett has been met. Currently, Eversource is evaluating the results of their Upstream Fish Passage Feasibility Study and has not yet constructed upstream passage. The earliest that the Rolfe Canal Project will be required to install fish passage facilities is 2020.

American Eel

There have been some studies of baseline catadromous American eel populations in the Contoocook basin; however, according to John Magee, a NHFG fisheries biologist, eel were found in 2001 in Clement Pond (Hopkinton), which is upstream of the York Dam, and are present in other Merrimack River tributaries to the north and south. Additionally, electrofishing conducted by NHFG and USFWS staff collected 48 eels near the mouth of the Contoocook River, at the confluence of the Contoocook and Merrimack rivers from July 2015 through August 2016.¹² It appears eels are present downstream of all three projects and have been able to find natural passage routes at York dam and all downstream dams in order to maintain their population upstream of the dam in diminished numbers.

¹⁰ FERC No. 1983, "Merrimack River Project," includes Garvin Falls, Hookset and Amoskeag Dams

¹¹ https://elibrary.ferc.gov/idmws/doc_info.asp

¹² Personal Communication w/ Matt Carpenter, NHFG on July 31, 2017.

Per Condition 4¹³ of Rolfe's 2012 LIHI certification, BRHA has been working collaboratively with NHFG and USFWS on a downstream and upstream eel passage plan for the Rolfe, Penacook Upper and Penacook Lower Falls Projects. Please refer to Appendix 4-2 for a letter that outlines the agree-upon schedule for upstream passage implementation and Appendix 4-7 which shows the response from USFWS approving the plan (Approval applies to downstream and upstream passage).

Per the recommendation of USFWS and NHFG, temporary upstream eel passage routes are currently installed at Penacook Lower Falls and Penacook Upper Falls projects. USFWS staff conducted site visits at all three projects to evaluate potential locations and methods for providing upstream passage. BRHA manufactured Irish traps in close consultation with USFWS (Doug Smithwood) and these have been operating for the 2017 season. Figure 7 below shows locations of Irish traps at Penacook Lower Falls. (See report on upstream passage, Appendix 4-5). USFWS noted that passage at Penacook Upper Falls represents the most significant barrier to upstream passage at the projects and worked with BRHA to assemble a rope/chain climbing matrix to assist eels in ascending the ledge areas at PUF. Eels captured at Upper and Lower Falls are transported above the Rolfe Canal Project.

Upstream passage facilities have not been installed at all three projects concurrently because this was not recommended by the agencies and the recommended placement of permanent upstream passage structures at all three dams is yet unclear. For the past several years, BRHA has installed temporary traps in various locations in order to evaluate the baseline population of eel and the appropriateness of potential locations for permanent upstream passage. BRHA will continue to work collaboratively with the agencies on the adaptive management of upstream eel passage at all three projects.

¹³ **Certification Condition 4 Language:** By August 1, 2013, BRHA shall enter into and provide LIHI with a copy of an agreement reached between the U.S. Fish and Wildlife Service, the New Hampshire Department of Fish and Game and BRHA for providing safe, timely and effective interim and permanent downstream passage and permanent upstream passage for American eel. The agreement shall address 1) measures to be taken to provide interim downstream passage, which shall be operational by August 15, 2013; 2) the consultative process for design and implementation of a permanent downstream passage, which shall be operational by August 1, 2016, subject to a reserved right by the resource agencies to amend that deadline as they deem necessary; and 3) the consultative process and schedule for design and implementation of permanent upstream passage. BRHA shall notify LIHI within two weeks of completion of permanent passage measures. In the event that the USFWS and NHDFG determine prior to the installation of permanent downstream passage that the initial interim downstream passage measures are not providing safe, timely and effective interim passage for out-migrating eels, BRHA shall implement other reasonable interim measures as requested by these agencies.



Figure 7 - Location of Upstream Eel Passage at Penacook Lower Falls

Zone of Effects #3 – Tailrace

C	2	<p><u>Agency Recommendation:</u></p> <p>Identify the proceeding and source, date, and specifics of the agency recommendation applied (NOTE: there may be more than one; identify and explain which is most environmentally stringent).</p> <p>Explain the scientific or technical basis for the agency recommendation, including methods and data used. This is required regardless of whether the recommendation is or is not part of a Settlement Agreement.</p> <p>Describe any provisions for fish passage monitoring or effectiveness determinations that are part of the agency recommendation, and how these are being implemented.</p>
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Supporting Information:

See Zone 2, Section III.C.1

It does not appear likely that flows in the tailrace channel would misdirect upstream migrants. Currently, eels are being trapped at Penacook Upper and Lower falls project. Agency staff have visited the site multiple times and have not expressed concern for this issue. The traps at Upper falls are only a few hundred feet away from the tailrace zone of Rolfe. Eels collected in these traps are transported upstream and released in the York Dam impoundment.

Zone of Effects #4 – Spillage Canal

C	1	<p><u>Not Applicable / De Minimis Effect:</u></p> <ul style="list-style-type: none"> • Explain why the facility does not impose a barrier to upstream fish passage in the designated zone. • Document available fish distribution data and the lack of migratory fish species in the vicinity. • If migratory fish species have been extirpated from the area, explain why the facility is or was not the cause of this.
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Supporting Information:

See Zone 2, Section III.C.1

During the field exercise conducted in December 2017, agency staff observed the upstream and downstream barriers to fish migration into this corridor. Briar operations staff has observed beavers inhabiting this reach. Agency staff has indicated they expect to conduct a formal habitat study during the relicensing process that may include this zone. In the absence of a formal habitat study, agency staff cannot comment on what type of aquatic biota is present in this zone. Agency staff is also unable to comment at this time on specific fish species or life stages of interest without further studies.

Agency staff has not recommended the installation of upstream fish passage at Briar Pipe or Briar Hydro Dam. USFWS has stated that the biggest barrier to upstream eel passage is the Penacook Upper Falls project and temporary passages are currently operational. Eels collected in these traps are transported upstream and released in the York Dam impoundment.

III.D.1 Downstream Fish Passage

ZoE #1 - Impoundment

D	PLUS	<p><u>Bonus Activities¹⁴:</u></p> <ul style="list-style-type: none"> • If advanced technology has been or will be deployed, explain how it will increase fish passage success relative to other options. • If a basin-scale redevelopment strategy is being pursued, explain how it will increase the abundance and sustainability of migratory fish species in the river system. • If adaptive management is being applied, describe the management objectives, the monitoring program pursuant to evaluating performance against those objectives, and the management actions that will be taken in response to monitoring results.
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Supporting Information:

It has been difficult to understand the baseline population of eel attempting to move upstream and therefore difficult to establish a baseline population from which to test the efficacy of any downstream passage. Downstream passage for American eel is currently provided via the 50 cfs gate release at York Dam and a bypass pipe at the facility headworks.

As part of condition number 4 of the 2012 certification, BRHA was required to meet certain obligations for downstream and upstream eel passage starting August 1, 2013. In order to meet these obligations, BRHA investigated various downstream solutions, including trap and truck, underwater barrier and guidance systems and altering plant operations. In addition, BRHA hired a former Maine Department of Marine Fisheries eel expert who has developed and implemented over twenty eel passages to evaluate the site and develop a plan for downstream passage.

Due to the very limited number of eel observed at the project, in 2013 BRHA consulted with John Warner at U.S. Fish and Wildlife Services and asked for his approval to delay implementation of downstream passage until we could gather more information about the existing eel population.

In 2014-2016, BRHA implemented a formal process to monitor the eel population at the project. Specifically, BRHA deployed fyke nets in the power canal and bypass reach and a trap at the York Dam to capture any eels. Project operators recorded any observations of eels at the trash racks at the inlet to the penstock and in traps. (See Appendix 4-6 for 2015-2016 Conditions Update on Eel passage).

The salmon restoration program in the Merrimack River basin has been abandoned (See Appendix 4-1). The Appendix 3-1 project boundary map shows a downstream fish passage system at the lower end of the canal. This was developed to accommodate salmon smolt passage and is

¹⁴ STANDARD D-PLUS: In addition to satisfying one of the standards above, the Facility has deployed an advanced technology, the primary purpose of which is to improve downstream fish passage or reduce the losses of riverine fish, or is part of a basin-scale redevelopment strategy and is evaluating the technology in the context of an adaptive management program.

no longer operated. Additionally, NHFG did not stock river herring above the Rolfe canal project and therefore downstream passage for river herring is also not required at this time.

PLUS Standard Activities

On June 13, 2017, following a collaborative design review process, USFWS approved BRHA to move forward with construction of an eel exclusion screen with traps and hoists. This will serve as a downstream eel passage system and will be located at the first gate inlet of Rolfe Canal (See Appendix 4-3 for consultation record and 4-4 for a preliminary design). This design was modeled after a similar design that has been implemented successfully in Sweden. BRHA and agency staff agreed that due to the novelty of the design application in New England, the screen and associated traps will need to undergo operational testing and may require operational or structural changes in future years based upon experience gained through operation (by way of an adaptive management approach). BRHA intends to have the eel screen operational by the beginning of the 2018 downstream passage season, on or before August 1, 2018. BRHA will work collaboratively with the agencies to develop an appropriate monitoring program; however, the volume of eels collected will likely depend upon increased numbers of upstream migrants. In 2017, there were very few upstream migrants however BRHA is working to with the agencies to improve upstream passage numbers. BRHA is committed to working with the agencies on implementing a long-term strategy for basin-scale improvement of eel population numbers.

The deadline extension for installation of permanent downstream eel passage was granted (See Appendix 4-2 for the Proposed Operations Plan and Appendix 4-7 for the subsequent approval by USFWS to delay installation until 2018).

Zone of Effects #2 – Bypass Reach

D	1	<p><u>Not Applicable / De Minimis Effect:</u></p> <ul style="list-style-type: none"> • Explain why the facility does not impose a barrier to downstream fish passage in the designated zone, considering both physical obstruction and increased mortality relative to natural downstream movement (e.g., entrainment into hydropower turbines). • For riverine fish populations that are known to move downstream, explain why the facility does not contribute adversely to the sustainability of these populations or to their access to habitat necessary for successful completion of their life cycles. • Document available fish distribution data and the lack of migratory fish species in the vicinity. • If migratory fish species have been extirpated from the area, explain why the facility is or was not the cause of this.
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Supporting Information:

There are no downstream fish passage facilities specific to this zone. *See Zone 1, III.D.1*

Zone of Effects #3 – Tailrace

D	1	<p><u>Not Applicable / De Minimis Effect:</u></p> <ul style="list-style-type: none"> • Explain why the facility does not impose a barrier to downstream fish passage in the designated zone, considering both physical obstruction and increased mortality relative to natural downstream movement (e.g., entrainment into hydropower turbines). • For riverine fish populations that are known to move downstream, explain why the facility does not contribute adversely to the sustainability of these populations or to their access to habitat necessary for successful completion of their life cycles. • Document available fish distribution data and the lack of migratory fish species in the vicinity. • If migratory fish species have been extirpated from the area, explain why the facility is or was not the cause of this.
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Supporting Information:

There are no downstream fish passage facilities specific to this zone. *See Zone 1, III.D.1*

Zone of Effects #4– Spillage Canal

D	1	<p><u>Not Applicable / De Minimis Effect:</u></p> <ul style="list-style-type: none">• Explain why the facility does not impose a barrier to downstream fish passage in the designated zone, considering both physical obstruction and increased mortality relative to natural downstream movement (e.g., entrainment into hydropower turbines).• For riverine fish populations that are known to move downstream, explain why the facility does not contribute adversely to the sustainability of these populations or to their access to habitat necessary for successful completion of their life cycles.• Document available fish distribution data and the lack of migratory fish species in the vicinity.• If migratory fish species have been extirpated from the area, explain why the facility is or was not the cause of this.
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Supporting Information:

There are no downstream fish passage facilities specific to this zone. *See Zone 1, III.D.1*

III.E.1 Watershed and Shoreline Protection

Zone of Effects #1 – Impoundment

E	1	<p><u>Not Applicable / De Minimis Effect:</u></p> <ul style="list-style-type: none"> • If there are no lands with significant ecological value associated with the facility, document and justify this (e.g., describe the land use and land cover within the project boundary). • Document that there have been no Shoreline Management Plans or similar protection requirements for the facility.
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Supporting Information:

The Applicant does not own any of the land abutting the York Dam impoundment, the bypassed reach of the Contoocook River, the shoreline of the inlet canal, or the shoreline of the tailrace channel. The dam is leased from the State of New Hampshire (See Appendix 1-3). No protected buffer zones have been created along the riverine impoundment through a settlement agreement or the license. There is no shoreland protection plan. There have been no observed areas of high erosion during the 24 years that the Project has been operated. There are neither recommendations nor a shoreland management plan related to the Project. The canal banks consist of sections that are riprapped with stone in areas of high flow and earthen banks in the remaining sections of the canal.

Zone of Effects #2 – Bypass Reach

E	1	<p><u>Not Applicable / De Minimis Effect:</u></p> <ul style="list-style-type: none"> • If there are no lands with significant ecological value associated with the facility, document and justify this (e.g., describe the land use and land cover within the project boundary). • Document that there have been no Shoreline Management Plans or similar protection requirements for the facility.
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Supporting Information:

See Zone 1, III.E.1

Zone of Effects #3 –Tailrace

E	1	<p><u>Not Applicable / De Minimis Effect:</u></p> <ul style="list-style-type: none"> • If there are no lands with significant ecological value associated with the facility, document and justify this (e.g., describe the land use and land cover within the project boundary). • Document that there have been no Shoreline Management Plans or similar protection requirements for the facility.
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Supporting Information:

The tailrace banks immediately downstream of the powerhouse are stabilized with riprap. See Zone 1, III.E.1

Zone of Effects #4 – Spillage Canal

E	1	<p><u>Not Applicable / De Minimis Effect:</u></p> <ul style="list-style-type: none">• If there are no lands with significant ecological value associated with the facility, document and justify this (e.g., describe the land use and land cover within the project boundary).• Document that there have been no Shoreline Management Plans or similar protection requirements for the facility.
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Supporting Information:

See Zone1, III.E.1

III.F.1 Threatened and Endangered Species

Zone of Effects #1 –Impoundment

F	2	<p><u>Finding of No Negative Effects:</u></p> <ul style="list-style-type: none"> • Identify all listed species in the facility area based on current data from the appropriate state and federal natural resource management agencies. • Provide documentation of a finding of no negative effect of the facility on any listed species in the area from an appropriate natural resource management agency.
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Supporting Information:

BRHA requested a consultation dated May 27, 2017 from the New Hampshire Natural Heritage Bureau (“NHB”) indicating that four state-listed species are present in the vicinity of the Project: wood turtle (species of concern), spotted turtle (threatened), Northern leopard frog (species of concern) and the rapids clubtail (species of concern). Carol Henderson of the NHFG was consulted on August 7, 2017 (See Appendix 6-1) for any suggested mitigation for these plant and animal species of concern and concluded that “this project will not pose any threat to the listed species of concern identified in the NHB17-2030 report.”

As a condition of the Project’s certification in 2012, BRHA is required to consult with the NHB prior to any dredging or drawdown that may imperil the long leaved pondweed, which was previously identified in the vicinity of the Project. However, this plant species was not identified in the 2017 plant and animal species record (See Appendix 6-1). Therefore, Condition 6 of the Rolfe certification is no longer applicable.

Zone of Effects #2 – Bypass Reach

F	2	<p><u>Finding of No Negative Effects:</u></p> <ul style="list-style-type: none"> • Identify all listed species in the facility area based on current data from the appropriate state and federal natural resource management agencies. • Provide documentation of a finding of no negative effect of the facility on any listed species in the area from an appropriate natural resource management agency.
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Supporting Information: See Zone 1, Section III.F.1

Zone of Effects #3 –Tailrace

F	2	<p><u>Finding of No Negative Effects:</u></p> <ul style="list-style-type: none"> • Identify all listed species in the facility area based on current data from the appropriate state and federal natural resource management agencies. • Provide documentation of a finding of no negative effect of the facility on any listed species in the area from an appropriate natural resource management agency.
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Supporting Information: See Zone 1, Section III.F.1

Zone of Effects #4 – Spillage Canal

F	2	<u>Finding of No Negative Effects:</u> <ul style="list-style-type: none">• Identify all listed species in the facility area based on current data from the appropriate state and federal natural resource management agencies.• Provide documentation of a finding of no negative effect of the facility on any listed species in the area from an appropriate natural resource management agency.
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Supporting Information: *See Zone 1, Section III.F.1*

III.G.1 Cultural and Historic Resources

Zone of Effects #1 – Impoundment

G	1	<p><u>Not Applicable / De Minimis Effect:</u></p> <ul style="list-style-type: none"> • Document that there are no cultural or historic resources located on facility lands that can be affected by construction or operations of the facility. • Document that the facility construction and operation have not in the past adversely affected any cultural or historic resources that are present on facility lands.
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Supporting Information:

There is no cultural resources management plan for this project. Article 34 of the license requires, prior to any future construction, consultation with the State Historic Preservation Office. BRHA is currently in compliance with this license article and no future construction activities are planned.

The Applicant submitted a Request for Project Review to the New Hampshire Division of Historical Resources in July 2017 (See Appendix 7). The Division’s response is included as Appendix 7-2. In their response, they referenced their 2012 correspondence and state that York Dam may be eligible for National Register listing. If project modifications are proposed in the future, then archeological surveys would be necessary. York dam is the only potentially qualifying historic structure within the project boundary and no activities are proposed that would warrant archeological surveys at this time. York Dam is a state-owned structure.

Zone of Effects #2 – Bypass Reach

G	1	<p><u>Not Applicable / De Minimis Effect:</u></p> <ul style="list-style-type: none"> • Document that there are no cultural or historic resources located on facility lands that can be affected by construction or operations of the facility. • Document that the facility construction and operation have not in the past adversely affected any cultural or historic resources that are present on facility lands.
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Supporting Information:

See Zone 1, III.G.1

Zone of Effects #3 –Tailrace

G	1	<u>Not Applicable / De Minimis Effect:</u> <ul style="list-style-type: none">• Document that there are no cultural or historic resources located on facility lands that can be affected by construction or operations of the facility.• Document that the facility construction and operation have not in the past adversely affected any cultural or historic resources that are present on facility lands.
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Supporting Information:

See Zone 1, III.G.1

Zone of Effects #4 – Spillage Canal

G	1	<u>Not Applicable / De Minimis Effect:</u> <ul style="list-style-type: none">• Document that there are no cultural or historic resources located on facility lands that can be affected by construction or operations of the facility.• Document that the facility construction and operation have not in the past adversely affected any cultural or historic resources that are present on facility lands.
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Supporting Information:

See Zone 1, III.G.1

III.H.1 Recreational Resources

Zone of Effects #1 – Impoundment

H	2	<p><u>Agency Recommendation:</u></p> <ul style="list-style-type: none"> • Document any comprehensive resource agency recommendations and enforceable recreation plan that is in place for recreational access or accommodations. • Document that the facility is in compliance with all such recommendations and plans.
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Supporting Information:

The Project provides limited recreational opportunities due to insufficient shorelands ownership by BRHA (see Figure 8 showing the Project lands). The City of Concord owns a large tract of forested land that is located immediately downstream of the intake to the Rolfe Canal and between the Contoocook River and the canal. Although the City has identified this land as a potential location for a park, no formal development has yet occurred, and the area is primarily used for hiking and serves as access for angling.

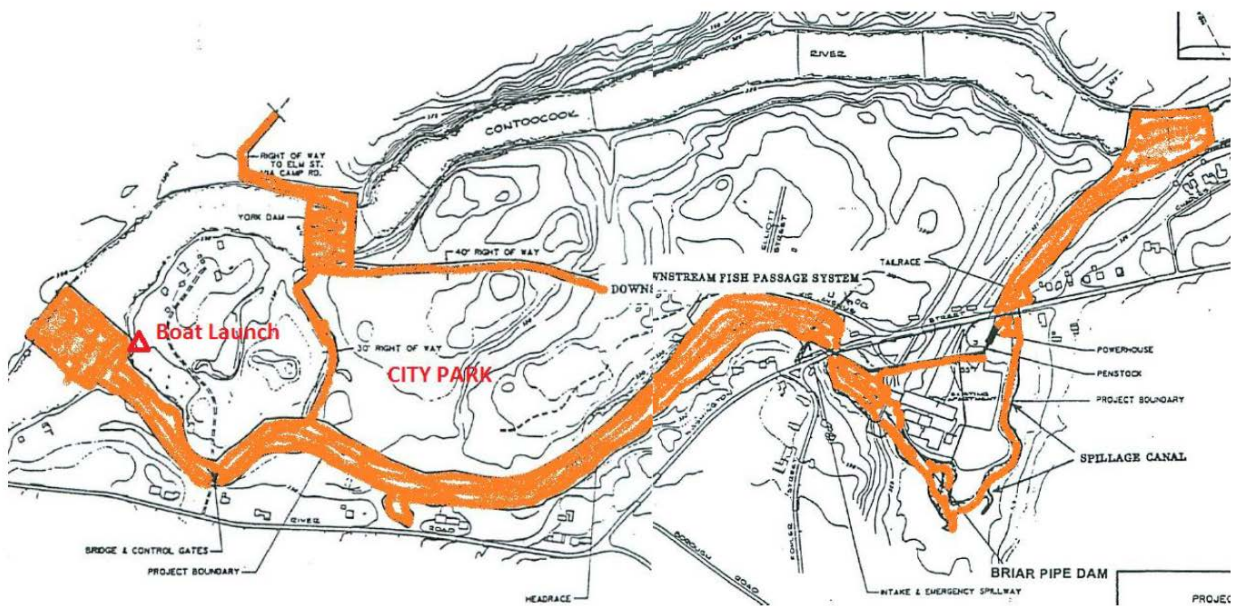


Figure8 - Map of Project Lands and Recreation Access

Prior to Project development, the City of Concord maintained a boat launch (See Figure 9) on the riverbank at the canal inlet. The license indicated that BRHA would protect the City’s existing boat launch during Project construction and operation; however, unsafe currents were identified during a FERC inspection in 1990 and an order was issued requiring the BRHA to relocate the boat launch. FERC subsequently issued an order on January 22, 1993 approving a redesign with the launch remaining in the original location but with a breakwater to create a slack-water area for safe launching. The order requires the completion of a study within nine months to determine

the maximum safe velocity for use of the launch with gating off of the launch when velocities exceed the safe level. FERC approved the boat launch operation plan by letter order dated June 24, 1993. The license does not require development of a recreation plan.

During the licensing process, the USFWS recommended that the Applicant provide access across project lands for angling opportunities, especially as related to increased pressure once salmon¹⁵ and shad are restored. BRHA does not consider its limited ownership of lands in the area conducive to such use. Standard Article 18 of the license requires free public access for public outdoor recreation, including hunting and fishing, except where such use would conflict with project operations or present a risk to public safety.



Figure 9 - Photo of the Boat Launch

¹⁵ As stated in the Downstream Passage section and Appendix 4-1, the salmon restoration program has been discontinued.

Zone of Effects #2 – Bypass Reach

H	2	<u>Agency Recommendation:</u> <ul style="list-style-type: none"> • Document any comprehensive resource agency recommendations and enforceable recreation plan that is in place for recreational access or accommodations. • Document that the facility is in compliance with all such recommendations and plans.
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Supporting Information:

See Zone 1, section III.H.1. There are no additional recreational resources in this zone.

Zone of Effects #3 –Tailrace

H	2	<u>Agency Recommendation:</u> <ul style="list-style-type: none"> • Document any comprehensive resource agency recommendations and enforceable recreation plan that is in place for recreational access or accommodations. • Document that the facility is in compliance with all such recommendations and plans.
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Supporting Information:

See Zone 1, section III.H.1. There are no additional recreational resources in this zone.

Zone of Effects #4 – Spillage Canal

H	2	<u>Agency Recommendation:</u> <ul style="list-style-type: none"> • Document any comprehensive resource agency recommendations and enforceable recreation plan that is in place for recreational access or accommodations. • Document that the facility is in compliance with all such recommendations and plans.
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Supporting Information:

See Zone 1, section III.H.1. There are no additional recreational resources in this zone.

PART IV. FACILITY CONTACTS

Project Owner: Briar Hydro Associates, LLC	
Name and Title	Andrew Locke, President
Company	Essex Hydro Associates, A General Partner
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Project Operator (if different from Owner):	
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Company	Essex Power Services, Inc.
Phone	617-367-0032
Email Address	dsherman@essexhydro.com
Mailing Address	c/o Essex Hydro Associates, 55 Union St, 4 th Floor Boston, MA 02108
Consulting Firm / Agent for LIHI Program (if different from above):	
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Compliance Contact (responsible for LIHI Program requirements):	
Name and Title	Elise Anderson, Regulatory Analyst
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Phone	(617) 367-0032
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Mailing Address	c/o Essex Hydro Associates, 55 Union Street, Boston, MA 02108
Party responsible for accounts payable:	
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Agency Contacts

Agency Contact (Check area of responsibility: Flows <input checked="" type="checkbox"/> , Water Quality <input type="checkbox"/> , Fish/Wildlife Resources <input checked="" type="checkbox"/> , Watersheds <input checked="" type="checkbox"/> , T/E Spp. <input type="checkbox"/> , Cultural/Historic Resources <input type="checkbox"/> , Recreation <input type="checkbox"/>):	
Agency Name	US Fish and Wildlife Service
Name and Title	John Warner, Manager of Federal Activities
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Mailing Address	70 Commercial Street, Suite 300 Concord, NH 03301-5087

Agency Contact (Check area of responsibility: Flows <input type="checkbox"/> , Water Quality <input checked="" type="checkbox"/> , Fish/Wildlife Resources <input type="checkbox"/> , Watersheds <input checked="" type="checkbox"/> , T/E Spp. <input type="checkbox"/> , Cultural/Historic Resources <input type="checkbox"/> , Recreation <input type="checkbox"/>):	
Agency Name	New Hampshire Department of Environmental Services, Water Division
Name and Title	Greg Comstock, Supervisor, Water Quality Planning Section
Phone	603-271-2983
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Mailing Address	6 Hazen Drive P.O. Box 95

Agency Contact (Check area of responsibility: Flows <input type="checkbox"/> , Water Quality <input type="checkbox"/> , Fish/Wildlife Resources <input type="checkbox"/> , Watersheds <input type="checkbox"/> , T/E Spp. <input checked="" type="checkbox"/> , Cultural/Historic Resources <input type="checkbox"/> , Recreation <input type="checkbox"/>):	
Agency Name	New Hampshire Natural Heritage Bureau
Name and Title	Amy Lamb
Phone	(603) 271-2214
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Agency Contact (Check area of responsibility: Flows <input type="checkbox"/> , Water Quality <input type="checkbox"/> , Fish/Wildlife Resources <input type="checkbox"/> , Watersheds <input type="checkbox"/> , T/E Spp. <input type="checkbox"/> , Cultural/Historic Resources <input type="checkbox"/> , Recreation <input checked="" type="checkbox"/>):	
Agency Name	National Parks Service, Rivers and Special Studies Branch
Name and Title	Kevin Mendik
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Mailing Address	15 State Street, Boston, MA 02109

Rolfe Canal Hydroelectric Project (Recertification, LIHI #104)

Agency Contact (Check area of responsibility: Flows __, Water Quality __, Fish/Wildlife Resources __, Watersheds __, T/E Spp. __, Cultural/Historic Resources <u>X</u> , Recreation __):	
Agency Name	New Hampshire Division of Historical Resources
Name and Title	Nadine Miller Preservation Project Reviewer
Phone	(603) 271-6628
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Mailing Address	19 Pillsbury Street - 2nd floor Concord, NH 03301-3570

Agency Contact (Check area of responsibility: Flows __, Water Quality __, Fish/Wildlife Resources <u>X</u> , Watersheds __, T/E Spp. __, Cultural/Historic Resources __, Recreation __):	
Agency Name	National Marine Fisheries Service (NOAA)
Name and Title	Susan Tuxbury, Fisheries Biologist
Phone	978-281-9176
Email address	Susan.tuxbury@noaa.gov
Mailing Address	55 Great Republic Drive

Agency Contact (Check area of responsibility: Flows <u>X</u> , Water Quality __, Fish/Wildlife Resources <u>X</u> , Watersheds <u>X</u> , T/E Spp. __, Cultural/Historic Resources __, Recreation __):	
Agency Name	NH Fish and Game Department
Name and Title	Carol Henderson
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Email address	Carol.henderson@wildlfe.nh.gov
Mailing Address	11 Hazen Drive, Concord, NH 03301

PART V. SWORN STATEMENT

SWORN STATEMENT

As an Authorized Representative of Briar Hydro Associates, the Undersigned attests that the material presented in the application is true and complete.

The Undersigned acknowledges that the primary goal of the Low Impact Hydropower Institute's Certification Program is public benefit, and that the LIHI Governing Board and its agents are not responsible for financial or other private consequences of its certification decisions.

The undersigned further acknowledges that if certification of the applying facility is issued, the LIHI Certification Mark License Agreement must be executed prior to marketing the electricity product as LIHI Certified.

The undersigned Applicant further agrees to hold the Low Impact Hydropower Institute, the Governing Board and its agents harmless for any decision rendered on this or other applications, from any consequences of disclosing or publishing any submitted certification application materials to the public, or on any other action pursuant to the Low Impact Hydropower Institute's Certification Program.


Company Name: Essex Hydro Associates, L.L.C., A General Partner Briar Hydro Associates

Authorized Representative Name: [Signature] Title President
ANDREW J. LOCKE

Commonwealth
State of Massachusetts
County of Suffolk

On this, the 28 day of August, 2017, before me a notary public, the undersigned officer, personally appeared Andrew Locke, known to me (or satisfactorily proven) to be the person whose name is subscribed to the within instrument, and acknowledged that he executed the same for the purposes therein contained. In witness hereof, I hereunto set my hand and official seal.

Notary Public [Signature]

 **LIANE M. SHERMAN**
Notary Public
Commonwealth of Massachusetts
My Commission Expires
November 3, 2017

List of Appendices

- Appendix 1-1: Order Issuing License (Major) (Issued December 5, 1984)
- Appendix 1-2: FERC Letter (Dated February 28, 1986)
- Appendix 1-3: New Hampshire Water Resources Board Lease for York Dam (Dated February 20, 1986)
- Appendix 1-4: FERC Order Amending License Article (Issued September 25, 1986)
- Appendix 1-5: New Hampshire Water Supply and Pollution Control Commission Letter (Dated February 16, 1983)
- Appendix 2-1: New Hampshire Department of Environmental Services Water Quality Testing Protocol (2012)
- Appendix 2-2: New Hampshire Department of Environmental Services Water Quality Testing Results – Determination of “No Effect” of Project Operations on WQ (2012)
- Appendix 2-3: Penacook Upper Falls LIHI Water Quality Results 2016
- Appendix 3-1: Project Boundary Map (revised 11/5/2017)
- Appendix 3-2: Recreational Facilities: Map showing Boat Ramp Location
- Appendix 4-1: NHFG & USFWS Consultation Re: Downstream Fish Passage (Salmon & Herring)
- Appendix 4-2: Rolfe Canal and Penacook Lower Falls 2017 Eel Passage Operations Plan
- Appendix 4-3: NHFG & USFWS Consultation Record Re: Eel Passage Operations at Rolfe Canal and Penacook Lower Falls
- Appendix 4-4: Preliminary Design of Downstream Eel Passage
- Appendix 4-5: Report from USFWS Site Visit re: Upstream Eel Passage Studies
- Appendix 4-6: 2015-2016 Compliance Statement and Eel Passage Update
- Appendix 4-7: USFWS Approval of Eel Operations Plan
- Appendix 5: Project Photos
- Appendix 6: New Hampshire Natural Heritage Bureau – Threatened and Endangered Species Consultation
- Appendix 6-1: TE Species Consultation NHFG (Updated Response – Carol Henderson)
- Appendix 7-1: Request for Project Review by the New Hampshire Division of Historical Resources (2017)
- Appendix 7-2: Response from New Hampshire Division of Historical Resources (2017)
- Appendix 8: York and Rolfe Canal Daily Average Pond Levels 2012-2017
- Appendix 9: Field Report from 12/7/17 Flows Demonstration & Agency Approval
- Appendix 9-1: Draft Flow Management Plan