

# **PENACOOK UPPER HYDROELECTRIC PROJECT, LIHI #52**

## **REVIEW OF APPLICATION FOR RE-CERTIFICATION BY THE LOW IMPACT HYDROPOWER INSTITUTE**

Prepared by Nicholas Funk

January 28, 2020

### **I. INTRODUCTION**

This report summarizes the reviews findings of the application submitted by Essex Power Services, Inc. for Briar Hydro Associates (Applicant) to the Low Impact Hydropower Institute (LIHI) for recertification of the Penacook Upper Falls Hydroelectric Project, LIHI #52, FERC P-6689 (Project). The Project is located on the lower Contoocook River in Merrimack County in the southeastern New Hampshire Village of Penacook. The Project was first certified by LIHI on September 25, 2009 and recertified on September 25, 2014. The most recent five-year term expired on September 25, 2019 and was extended to February 28, 2020 and again to April 15, 2020 to accommodate the current recertification process.

The Project's 2014 LIHI Certificate had two conditions:

1. The Applicant shall consult with the New Hampshire Department of Environmental Services (NHDES) to determine the most appropriate and efficient way to report on minimum flows and pond level fluctuations, then, after reaching agreement with NHDES on best methods, complete the subject summary report on or before the end of December 2016. The owner shall provide a copy of this report to LIHI along with all related correspondence.
2. Within 30 days after LIHI recertification, the Applicant shall complete consultation with the NHDES to finalize the details of an alternative approach for spot testing the current water quality conditions at the facility. The owner shall provide LIHI with all related correspondence pertaining to resolution of this issue and with the water quality data once testing has been completed. The owner shall complete the water quality testing before the end of December 2016, weather permitting.

Both conditions were satisfied in 2017. Expanded discussion relating to these conditions is presented under the applicable criteria.

### **II. RECERTIFICATION PROCESS AND STANDARDS**

Under the current LIHI Handbook, reviews are a two-phase process starting with a limited review of a completed LIHI application, focused on three questions:

- (1) Is there any missing information from the application?

(2) Has there been a material change in the operation of the certified facility since the previous certificate term?

(3) Has there been a change in LIHI criteria since the Certificate was issued?

In accordance with the Recertification Standards, if the only issue is that there is some missing information, a Stage II review may not be required. These standards also state that "material changes" mean non-compliance and/or new or renewed issues of concern that are relevant to LIHI's criteria. If the answer to either question (2) or (3) is "Yes," a more thorough review of the application using the LIHI criteria in effect at the time of the recertification application, and development of a complete Stage II Report, is required. As a result, all Projects currently applying for renewal must go through a full review unless their most recent certification was completed using the current Handbook.

### **III. ADEQUACY OF APPLICATION**

The 2019 recertification application stated that there were no material changes at the Project during the term of the previous certification. However, there have been material changes in the LIHI criteria or certification process since the Project was last certified in that a new Certification Handbook has been published by LIHI. This current review was made using the new 2nd Edition LIHI Certification Handbook (Revision 2.03, December 20, 2018). On November 25, 2019 LIHI received a complete application for Low Impact recertification of the Project.

This Stage II assessment included review of the application package, supplemental information provided by the Applicant, public records in the Federal Energy Regulatory Commission's (FERC) eLibrary since LIHI last reviewed the Project for recertification in 2014, and the annual compliance statements received by LIHI during the past term of recertification.

### **IV. PROJECT DESCRIPTION**

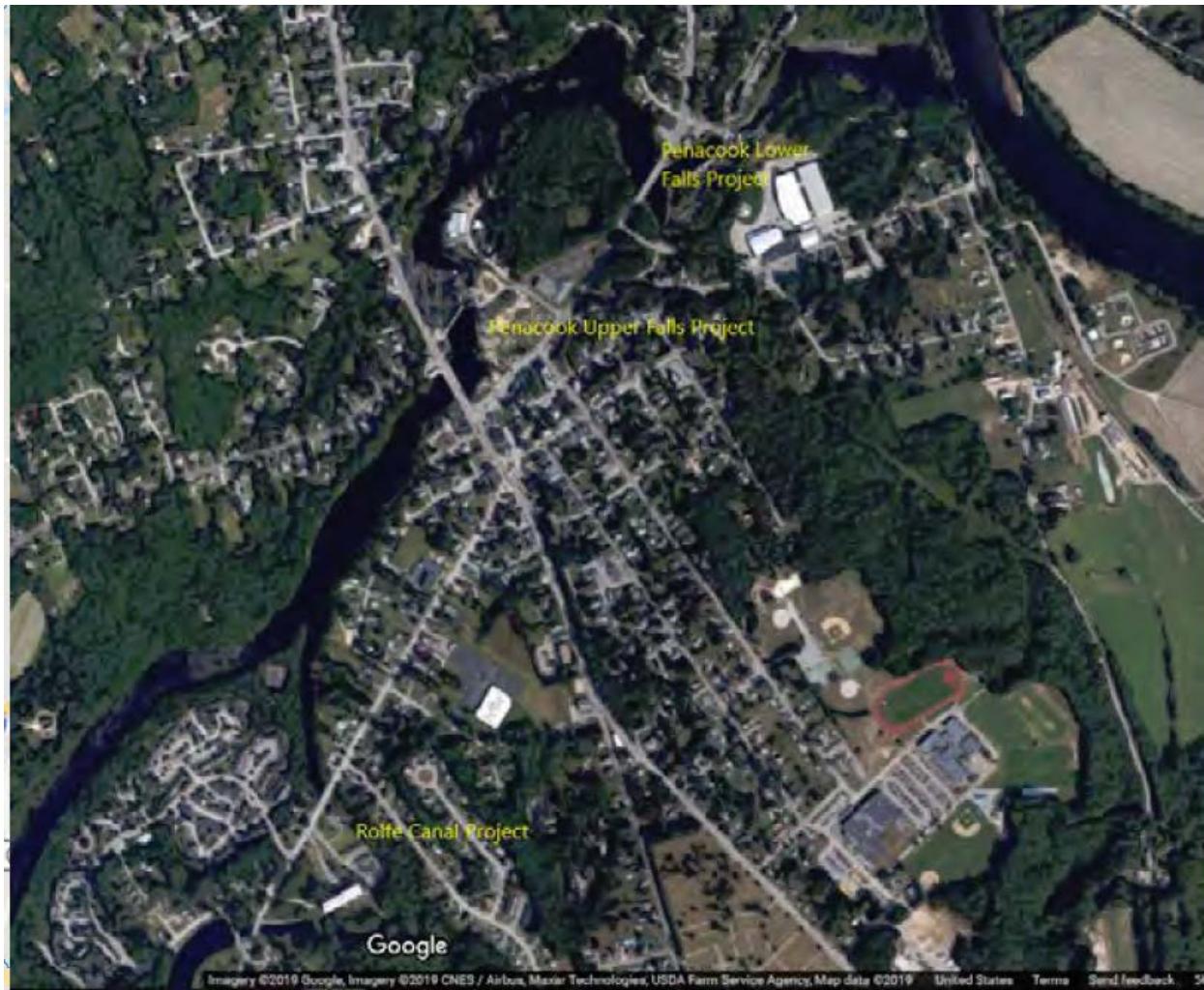
The Project is a 3.02 megawatt (MW) run-of-river hydroelectric generating station located on the Contoocook River in the Village of Penacook, New Hampshire. The Project is operated as a run-of-river facility and utilizes a previously existing impoundment. The Project is unmanned but is remotely monitored on a 24/7 basis.

Constructed from 1984 to 1986, the Project consists of a 21-foot-high timber stoplog dam; a 187-foot-long concrete spillway with 15 gates (6 operable steel gates, 9.5-feet-wide and 15.5-feet-high; 7 fixed timber stoplog gates; and 2 operable ice gates, 12-feet-wide and 3.5-feet-high); a reservoir with a surface area of 11.4 acres and normal water surface elevation of 306 feet mean sea level (msl); a 47-foot-wide and 350-foot-long tailrace; a 15-foot-long and 58-foot-wide forebay; a 81-foot-long and 44-foot-wide concrete powerhouse at the east side of the dam with 1 horizontal Kaplan turbine/generating unit with an installed capacity of 3,020 kilowatts (kW); a 35-foot-long, 4.16 kV generator lead; a 4.16/34.5-kV 3.6 MVA three-phase transformer; and a 50-foot-long 34.5-kV transmission line. A Project layout is provided below (Figure 1).



**Figure 1 – Penacook Upper Project Layout**

Located at River Mile (RM) 0.9, the Project is the second dam upstream from the Contoocook River's confluence with the Merrimack River. The Project is upstream of the Penacook Lower Falls Hydroelectric Project (LIHI #64) at RM 0.5, and downstream of York Dam (part of the Rolfe Canal Hydroelectric Project, LIHI #104) at RM 2, and the Hopkinton Hydroelectric Project at RM 10.5, all of which are owned by the Applicant except for the Hopkinton Project which is owned by Contoocook Hydro, LLC. A map of the Project's location relative to downstream and upstream dams is shown below (Figure 2).

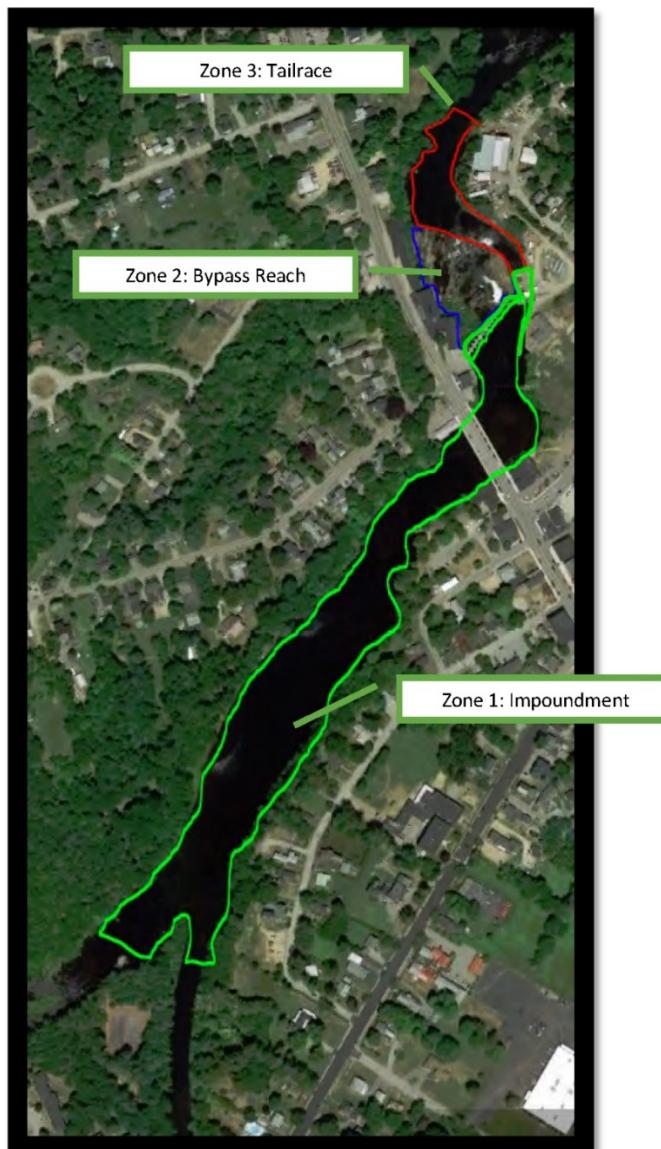


**Figure 2 – Penacook Upper Project Geographic Location Map**

## V. **ZONES OF EFFECT AND SUMMARY OF COMPLIANCE WITH LIHI CRITERIA**

Three Zones of Effect (ZOE) were designated by the Applicant and were determined to be appropriate. Their locations are shown in Figure 3.

- Zone of Effect #1 is located in the Project impoundment area and defined by the Applicant as extending approximately  $\frac{1}{4}$  of a mile upstream from the Project dam.
- Zone of Effect #2 is located in the bypass reach just below the Project dam and defined by the Applicant as extending from the Project dam approximately 370 feet to where the bypassed reach waters join the Project outflow.
- Zone of Effect #3 is defined by the Applicant as extending from the Project outflow to a point in the Contoocook River approximately 660 feet downstream.



**Figure 3 – Penacook Upper Project Zone of Effects**

The following tables summarize the standards selected by the Applicant for the Project. I found that in some cases the Applicant chose a standard that was not the most appropriate alternative for the selected criterion. Reviewer recommended standards are presented in **RED** text. Specific details of compliance with the criteria are presented in Section VIII.

#### ZOE #1 – Upper Penacook Project Impoundment

Criterion	Alternative Standards				
	1	2	3	4	Plus
A Ecological Flow Regimes	x	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		

#### ZOE #2 – Upper Penacook Project Bypassed Reach

Criterion	Alternative Standards				
	1	2	3	4	Plus
A Ecological Flow Regimes		x			
B Water Quality			x		
C Upstream Fish Passage		x			
D Downstream Fish Passage	x	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			

#### ZOE #3 – Upper Penacook Project Downstream (Tailrace) Reach

Criterion	Alternative Standards				
	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			

## **VI. REGULATORY AND COMPLIANCE STATUS**

### FERC License

On December 5, 1984, FERC issued an order granting an original license to construct, operate, and maintain the Project.<sup>1</sup> The FERC license was issued for a period of 40 years with an expiration date of December 5, 2024. The Project recently began the relicensing process by filing a Preliminary Application Document (PAD) on November 28, 2019. The PAD includes this Project, as well as the Penacook Lower and Rolfe Canal Projects which are on the same relicensing schedule.

On September 25, 1986, FERC issued an order amending license article 24 to reflect an agreement regarding the construction of fish passage facilities at mainstem dams on the Merrimack River.<sup>2</sup>

On January 4, 1993, FERC issued an order approving transfer of license from Penacook Hydro Associates to the Applicant. The Applicant agreed to accept all of the terms and conditions of the license and to be bound by the license as if it were the original licensee.

### Minimum Flow

In a letter dated October 1, 1982,<sup>3</sup> the United States Fish and Wildlife Service (USFWS) recommended an instantaneous discharge from the Project of at least 338 cubic feet per second (cfs) or inflow to the Project reservoir, whichever is less.

### Water Quality Certification

The current water quality certification for the Project was issued on May 6, 1983.<sup>4</sup>

### Regulatory Compliance

A review of the FERC database (eLibrary) from September 25, 2014 through January 20, 2020 found no instances of license non-compliance by the Applicant.

## **VII. PUBLIC COMMENT RECEIVED OR SOLICITED BY LIHI**

The application was posted for public comment on November 26, 2019 and the notice was forwarded to agencies and stakeholders listed in the application. The deadline for submission of comments on the LIHI certification application was January 25, 2020.

With no material changes since the last certification and the Project's limited footprint, no

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<sup>1</sup> Appendix 1 of Project LIHI application.

<sup>2</sup> Appendix 5 of Project LIHI application.

<sup>3</sup> Appendix 2 of Project LIHI application

<sup>4</sup> [https://lowimpacthydro.org/wp-content/uploads/2010/04/Penacook-Upper-2015-Recert\\_Appendix-1-3.pdf](https://lowimpacthydro.org/wp-content/uploads/2010/04/Penacook-Upper-2015-Recert_Appendix-1-3.pdf)

additional outreach was conducted. A comment email was received from USFWS on January 10, 2020 (see Appendix A) and is discussed in the upstream and downstream passage sections below.

## **VIII. DETAILED CRITERIA REVIEW**

### **A. ECOLOGICAL FLOW REGIMES**

**Goal:** The flow regimes in riverine reaches that are affected by the facility support habitat and other conditions suitable for healthy fish and wildlife resources.

#### **Assessment of Criterion Passage:**

The Applicant selected **Standard A-2, Agency Recommendation** for ZOE #1. However, based on the Project's run-of-river operations **Standard A-1, Not Applicable/De Minimis Effect** is more appropriate for ZOE #1. The Applicant has appropriately selected **Standard A-2, Agency Recommendation** for ZOE #2 and ZOE #3.

The Project is operated as a run-of-river facility. To mitigate impacts to fish and other aquatic wildlife resources, Article 26 of the Project FERC license requires the Applicant to discharge a continuous minimum flow below the tailrace of 338 cfs or the inflow to the reservoir, whichever is less. This flow was recommended by USFWS based on historical streamflow records to protect downstream aquatic habitat. USGS gage station 01088000 was located about 0.5 miles downstream of the Project in the Penacook Lower impoundment. It recorded data from 1928 to 1977. According to the PAD<sup>5</sup> the 7Q10 flow during that period was 94 cfs indicating that the minimum flow requirement is 3½ times higher than critical low flow levels.

Condition 1 of the Project's 2014 LIHI Certificate required the Applicant to consult with NHDES to determine the most appropriate and efficient way to report on minimum flows and pond level fluctuations. The Applicant provided NHDES with 2010-2014 annual reports submitted to FERC that certify compliance with the required minimum flows. In 2015, FERC notified the Applicant that they no longer were required to submit annual certifications of minimum flow and only need to notify FERC staff if there is a deviation that occurs from the required minimum flow. In a letter dated May 17, 2016, the Applicant confirmed with NHDES that the minimum flow operations at the Project have not changed since the original LIHI certification in 2010. In a letter dated October 2, 2017, NHDES confirms that no minimum flow deviations occurred in 2015 or 2016. NHDES's October 2017 letter confirms that the Applicant has satisfied Condition 1 of the Project's 2014 LIHI Certificate. The Applicant provided the NHDES's October 2017 letter in Appendix 3 of the application.

Based upon a review of available submissions on FERC's eLibrary, no minimum flow deviations occurred in 2017, 2018, or 2019.

Based on my review of the application, supporting documentation, and publicly available information, the Project continues to satisfy the Ecological Flow Regimes criterion.

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<sup>5</sup> <https://elibrary.ferc.gov/idmws/common/opennat.asp?fileID=15415314>

## B. WATER QUALITY

**Goal:** Water Quality is protected in waterbodies directly affected by the facility, including downstream reaches, bypassed reaches, and impoundments above dams and diversions.

### Assessment of Criterion Passage:

The Applicant appropriately selected **Standard B-3, Site-Specific Studies**, for all ZOEs.

The water quality impacts of the Project are monitored by NHDES through the Project's water quality certification issued May 6, 1983.

The Contoocook River is classified as Class B, waters that shall provide, wherever attainable, the protection and propagation of fish, shellfish, and wildlife, and for recreation in and on.<sup>6</sup>

In a letter dated October 7, 2015, NHDES commented that new monitoring data was needed at the Project for NHDES to determine whether or not the Project is complying with New Hampshire surface water quality standards in the Contoocook River. On April 28, 2016, the Applicant notified NHDES via email that there were no changes in Project operation since the original LIHI certification in 2010 and thus no new impacts to surface water quality in the Project area. However, the Applicant agreed to NHDES's October 2015 request by proposing an alternative water quality testing protocol for the Project by performing "spot tests" that would verify the Applicant's claim that water quality has not been impacted by Project operations.

In a letter dated October 2, 2017, NHDES notes that the Applicant collected water quality data for dissolved oxygen (DO), water temperature, total phosphorus, and chlorophyll-a. Monitoring locations in the upstream impoundment and in the downstream tailrace section of the river were monitored continuously for water temperature and DO using multi-parameter dataloggers for two periods of time (August 2015 and August 2016). Between June and August 2015, the Applicant also collected ten weekly samples of total phosphorus and chlorophyll-a at both upstream and downstream locations. In their October 2017 letter NHDES concluded that after assessing the water quality data in 2015 and 2016, the water quality in the impoundment and downstream section of the Contoocook River, under the Project operating conditions and flow conditions during which the data was collected, is meeting existing water quality criteria or thresholds for DO, total phosphorus, and chlorophyll-a. At the time of the deployment and retrieval of the dataloggers, a vertical profile of DO and water temperature measured at the station in the impoundment indicated that the impoundment was not thermally stratified. NHDES's October 2017 letter confirms that the Applicant satisfied Condition 2 of the Project's 2014 LIHI Certificate. The Applicant provided the NHDES's October 2017 letter in Appendix 3 of the application.

NHDES's most recent Clean Water Act Section 303(d) submission to US EPA (2018)<sup>7</sup> does not list the Contoocook River as impaired in the Project area. However, the 2018 303(d) listing does

<sup>6</sup> [New Hampshire Surface Water Quality Regulations](#)

<sup>7</sup> <https://www.des.nh.gov/organization/divisions/water/wmb/swqa/2018/index.htm>

include a line item “NHIMP700030507-06, CONTOOCOOK RIVER – PENACOOK UPPER FALLS DAM” indicating pH as a parameter of interest. However, the same listing also notes a “LOW” total maximum daily load (TMDL) priority for the pH parameter.<sup>8</sup>

Based on my review of the application, supporting documentation, and publicly available information, the Project continues to satisfy the Water Quality criterion.

### C. UPSTREAM FISH PASSAGE

**Goal:** The facility allows for the safe, timely, and effective upstream passage of migratory fish. This criterion is intended to ensure that migratory species can successfully complete their life cycles and maintain healthy, sustainable fish and wildlife resources in areas affected by the facility.

#### Assessment of Criterion Passage:

The Applicant has appropriately selected **Standard C-1, Not Applicable/De Minimis Effect** for ZOE #1 and **Standard C-2, Agency Recommendation** for ZOE #2 and ZOE #3.

In the original FERC license, the U.S. Department of the Interior (Interior) commented that the Project is located in a section of the Contoocook River that is scheduled for restoration of anadromous fishes, primarily American shad. Interior also stated that the river upstream of the Project would be used for rearing of juvenile Atlantic salmon. Interior, therefore, recommended that upstream passage facilities be installed at the Project by 1988. However, the Project owner at that time proposed (and FERC agreed) to construct upstream fish passage facilities at the Project when anadromous fish appear below the downstream Penacook Lower Falls Project. FERC concluded that upstream fish passage facilities at the Penacook Upper Falls Project would protect and enhance the anadromous fishery of the Contoocook River and, therefore, included Article 24 in the final Project license which required the construction of upstream fish passage facilities at the Project within 1 year after completion of construction of fish passage facilities at the downstream Garvins Falls Dam, Hooksett Dam, Amoskeag Dam.<sup>9</sup>

On September 25, 1986, FERC issued an order amending license Article 24 to reflect an agreement between the Public Service Company of New Hampshire (PSNH) and state and federal fishery agencies regarding the construction of fish passage facilities at mainstem dams on the Merrimack River. The revision of Article 24 provided for construction of fish passage facilities at the Project on a schedule consistent with the agreement on mainstem fish passage and based on the success of the anadromous fish restoration program on the Merrimack River. Specifically, revised Article 24 requires the licensee to provide upstream fish passage facilities at the Project within 5 years after the annual passage of 15,000 adult American shad through the fish facilities at the Garvins Falls Dam.

NHDES’s October 2, 2017 letter indicates that barring changes to river conditions or fish management plans, the schedule for design and installation of upstream fish passage infrastructure will be governed by the construction and successful function of upstream fish

<sup>8</sup> [Appendix A.1 – 2018, 303\(d\) List \(Excel file\)](#)

<sup>9</sup> All three developments are part of the Merrimack River Project, P-1893.

passage facilities located on the Merrimack River downstream of the confluence with the Contoocook River. NHDES also notes New Hampshire Fish and Game (NHFG) and the USFWS have indicated their concurrence with the current status of upstream fish passage.

As of 2019, the Merrimack River fish restoration program has not yet achieved its original goals. A letter dated December 19, 2018 from Central Rivers Power<sup>10</sup> (owner of the Merrimack River Project, FERC P-1893, which includes the Hooksett Project (LIHI #162)) notes that while the trigger number for river herring (22,500 or more in any given year) at the Amoskeag Dam was reached during the 2016 migration season requiring upstream fish passage facilities to be constructed at the Hooksett Dam, the trigger number requiring upstream fish passage facilities at Garvins Falls Dam has yet to be met. Therefore, the Penacook Upper Falls Project is not yet required to add upstream fish passage facilities and remains in compliance with the requirements of the FERC license. The Applicant remains committed to installation of upstream fish passage when needed, and states that they remain committed to the successful restoration of anadromous fish passage in the Merrimack River basin.

American eel are present in the Contoocook River both upstream and downstream of the Project. The Applicant filed a combined Preliminary Application Document (PAD) for the Penacook Upper, Penacook Lower, and Rolfe Canal projects on November 28, 2019 to initiate FERC relicensing of all three Projects.<sup>11</sup> The PAD notes that the Applicant has been working collaboratively with NHFG and USFWS on upstream eel passage at all three Projects, focused on the Penacook Upper Project over the last two years since it is believed that eels are finding passage through the Penacook Lower Project on their own. USFWS commented on the Applicant's request to use FERC's Integrated Licensing Process<sup>12</sup> and stated that the agency has worked to resolve issues related to American eel passage at the three Projects, but permanent passage measures are not yet in place and will need to be addressed, along with passage for anadromous species, during the relicensing proceedings.

The PAD reports that the Applicant and USFWS are in the process of developing and modifying upstream eel passage measures and that evaluation of the baseline population of eels and their passage efficiency rates will continue for the next several seasons, and notes that relicensing studies may be requested in 2020 by resource agencies.

In their January 2020 recertification application comments,<sup>13</sup> USFWS reports American eel are present downstream of Penacook Upper Falls. The Project has an experimental eel ladder which was installed by USFWS in 2017, and eels have passed the Project estimated by USFWS at 3,000 to 4,000 per year. Therefore, USFWS recommends that LIHI recertification of the Project require the Applicant to implement upstream eel passage within two years after receiving LIHI recertification, with interim measures put in place as soon as possible after recertification and based on consultation with, and approval of, USFWS personnel.

Based on my review of the application, supporting documentation, and publicly available

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<sup>10</sup> Appendix 6 of Project LIHI application.

<sup>11</sup> <https://elibrary.ferc.gov/idmws/common/opennat.asp?fileID=15415314>

<sup>12</sup> <https://elibrary.ferc.gov/idmws/common/opennat.asp?fileID=15427998>

<sup>13</sup> Included in Appendix A of this recertification report.

information, the Project continues to satisfy the Upstream Fish Passage criterion. Relicensing has just begun and USFWS has indicated they may request upstream passage studies for anadromous species and/or for American eel. The Applicant continues to work collaboratively with resource agencies on providing upstream passage. Therefore, it seems premature to require installation of upstream eel passage at the Project until relicensing studies have identified the specifics of passage provisions including an appropriate location and design for passage facilities. However, if the Applicant chooses to voluntarily install interim or permanent upstream eel passage in advance of issuance of a new license, the Project should be awarded a PLUS standard at that time. A LIHI certification condition regarding potential voluntary early upstream eel passage is included in Section IX of this recertification report.

#### D. DOWNSTREAM FISH PASSAGE AND PROTECTION

**Goal:** The facility allows for the safe, timely, and effective downstream passage of migratory fish. For riverine (resident) fish, the facility minimizes loss of fish from reservoirs and upstream river reaches affected by Facility operations. All migratory species are able to successfully complete their life cycles and to maintain healthy, sustainable fish and wildlife resources in the areas affected by the Facility.

##### Assessment of Criterion Passage:

The Applicant selected **Standard D-2, Agency Recommendation** for ZOE #1 and **Standard D-1, Not Applicable/De Minimis Effect** for ZOE #2 and ZOE #3. The Reviewer finds that Standard D-2 is more appropriate for ZOE #2, the bypassed reach.

Information obtained from the New Hampshire Fish Survey Map<sup>14</sup> on October 10, 2019 shows that resident fish species near the Project include American eel, brown bullhead, common shiner, common sunfish, common white sucker, fallfish, largemouth bass, longnose dace, margined madtom, redbreast sunfish, and smallmouth bass. Alewives and blueback herring are also stocked in the Contoocook River by NHFG when available.

Article 25 of the FERC Project license requires the licensee to consult with USFWS and the NHFG regarding the introduction of Atlantic salmon to the Contoocook River, and cooperate with these agencies in providing safe downstream passage of salmon smolts at the Project, if salmon migrations occurred prior to completion of the upstream fish passage facilities required by Article 24.

The Applicant submitted designs to the resource agencies and installed the downstream fish passage facilities at the Project in 2006. When river discharge is less than or equal to the combined hydraulic capacity of the turbine and the downstream fish passage, migrants pass through a passage facility that is 26 inches wide and 4 feet deep and is located in the gate bay immediately to the left of the powerhouse intake. This passage releases a constant 40 cfs of outfall which is channeled into a flume running down the left side of the powerhouse and is discharged into the tailrace. A current inducer designed to direct fish toward the passage and

<sup>14</sup> <https://www.arcgis.com/apps/MapJournal/index.html?appid=d6549e90155b441fa0e29bdc44eebc2b>

away from the turbine intake is installed upstream of the passage on the right downstream retaining wall. When river discharge exceeds the combined hydraulic capacity of the turbine and the downstream fish passage, additional river flow passes via one or more of the bottom opening slide gates comprising the Project's gated spillway. The downstream fish passage facility at the Project is shown in Figure 4 below.<sup>15</sup>



**Figure 4 – Downstream Fish Passage**

The downstream fish passage facility was operated from 2006 through 2016. In 2017, following the permanent cancellation of the Atlantic salmon smolt, river herring, and shad stocking program for that season and additional guidance from USFWS regarding the suspension of fish stocking efforts,<sup>16</sup> the downstream passage facility was not operated. The facility was operated in 2018 following notice of stocking that year by NHFG. The passage was not operated in 2019 due to no notice of stocking and the Project's turbine being taken offline for an overhaul. As noted in their LIHI recertification application, the Applicant is committed to operating the downstream fish passage facility upon notice of agency fish stocking in the river.

The PAD notes that USFWS has discussed the possibility of requiring turbine survival studies and fish passage effectiveness testing including PIT tagging and radio telemetry studies. These studies would be requested in 2020 as part of the relicensing process.

With regard to American eel, NHDES's October 2, 2017 letter indicates that downstream passage at the Project is contingent on passage at the upstream Rolfe Canal Project. In February of 2017, the Applicant met with USFWS and NHFG staff to discuss design of a permanent downstream eel passage measure to include a sloping screen and eel traps at the Rolfe Canal Project.

The PAD states that beginning in 2018 during the downstream eel passage season from August 15 to November 15, the Applicant began shutting down all three Projects (Rolfe Canal, Penacook Upper and Penacook Lower) for three nights in a row following periods of ½ inch or more of rain. In 2019, the Applicant deployed a downstream eel screen at Rolfe Canal for the purpose of trapping downstream migrating eels for transport around the Penacook Upper and Penacook Lower Projects. That method would avoid the need for nighttime shutdowns. However, the

<sup>15</sup> Appendix 7 of the Project LIHI application.

<sup>16</sup> Appendix 8 of Project LIHI application.

method was not effective. No eels were captured, and the screen often clogged with leaves. The Applicant continues to work collaboratively with USFWS and has committed to redesign the screen for the 2020 downstream eel passage season and to continue to modify downstream eel passage measures at all three Projects and evaluate the baseline population of eels and their passage efficiency over the next several seasons.

In their January 2020 recertification application comments, USFWS indicates American eel are present upstream of Penacook Upper Falls given the experimental upstream eel ladder, which was installed by USFWS in 2017 and has allowed eels to pass the Project. Therefore, USFWS recommends that LIHI recertification require the Applicant to implement downstream eel passage within two years after receiving LIHI recertification with interim measures put in place as soon as possible after recertification, and in consultation with, and approval of, USFWS personnel.

Based on my review of the application, supporting documentation, and publicly available information, the Project continues to satisfy the Downstream Fish Passage and Protection criterion. Relicensing has just begun and USFWS has indicated they may request downstream passage studies for both anadromous species and American eel. The Applicant continues to work collaboratively with resource agencies on providing passage. Therefore, it seems premature to require installation of modified downstream eel passage at the Project until relicensing studies and/or ongoing efforts to provide downstream passage at the upstream Rolfe Canal Project that are needed for the continued passage of eels through the Penacook Upper Project. It should be noted that the Rolfe Canal LIHI Certification includes an optional PLUS standard if/when the downstream eel passage measures being developed there prove to be effective, which has not yet occurred. Therefore, this review finds that the general relicensing condition recommended in Section IX is sufficient and no additional condition is warranted for downstream passage.

## E. SHORELINE AND WATERSHED PROTECTION

**Goal:** The Facility has demonstrated that sufficient action has been taken to protect, mitigate and enhance the condition of soils, vegetation and ecosystem functions on shoreline and watershed lands associated with the facility.

### Assessment of Criterion Passage:

The Applicant appropriately selected **Standard E-1, Not Applicable/De Minimis Effect** for all three Project ZOEs.

No shoreline management plan is in effect, nor are there any protection requirements for the facility. The Project is located within a heavily developed area of land in the center of the Village of Boscawen. The impoundment formed by the Project dam is divided by a bridge that crosses the Contoocook River immediately upstream of the Project. A commercial building and an industrial building are situated on the western riverbank below the bridge. The western riverbank immediately upstream of the bridge is occupied by a commercial building and the

remainder of this riverbank is heavily sloped and vegetated. None of the western riverbank is owned by the Applicant nor is the riverbank suitable for watershed protection. The Penacook Downtown River Park is located farther upstream on the eastern riverbank. During project construction the Applicant provided funds to assist in the construction of the waterfront park. The eastern riverbank below the bridge also has been subjected to extensive development. Part of this riverbank is occupied by a commercial/residential building and the remainder consists of land formerly occupied by a leather mill, now vacant. In 2008, the Applicant entered into an agreement with the City of Concord that amended certain property rights held by the Applicant in order to assist the City of Concord in development of a river walk related to other city development plans.

Given the very small impoundment area of the Project and commercial and industrial development in and around the Project there is little need or opportunity for Project watershed protection other than the Penacook Downtown River Park and the potential development of a riverwalk.

Based on my review of the application, supporting documentation, and publicly available information, the Project continues to satisfy the Shoreline and Watershed Protection criterion.

## F. THREATENED AND ENDANGERED SPECIES PROTECTION

**Goal:** The Facility does not negatively impact federal or state listed species.

**Assessment of Criterion Passage:**

The Applicant appropriately selected **Standard F-1, Not Applicable/De Minimis Effect** for all three Project ZOEs.

In a report dated October 1, 2019<sup>17</sup>, the New Hampshire National Heritage Bureau (NHNHB) indicates there are no state or federally listed threatened or endangered species in the Project area. The report notes however that the state-threatened Bald Eagle and Spotted turtle have been reported within one mile of the Project. A September 2019 check of USFWS IPac online mapping<sup>18</sup> (<https://ecos.fws.gov/ipac/>) for the Project area shows the federally threatened Northern long-eared bat potentially within the Project vicinity, but no critical habitats for them are present.

Based on previous consultation with NHDES, the Project does not affect aquatic organisms during normal Project operations and the agency's October 2, 2017 letter confirms that minimum flow operations and fish passage circumstances have not changed since the original LIHI certification in 2010. Therefore, I do not believe the Project affects any potential threatened and endangered aquatic species in a negative manner. The Northern long-eared bat range includes the Project area but given the very small Project footprint and its urban location, it is very unlikely that the Project would affect this species if it were present.

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<sup>17</sup> Appendix 10 of Project LIHI application.

<sup>18</sup> Appendix 11 of Project LIHI application.

Based on my review of the application, supporting documentation, and publicly available information, the Project continues to satisfy the Threatened and Endangered Species criterion.

## G. CULTURAL AND HISTORIC RESOURCE PROTECTION

**Goal:** The facility does not unnecessarily impact cultural or historic resources that are associated with the Facility's lands and waters, including resources important to local indigenous populations, such as Native Americans.

### Assessment of Criterion Passage:

The Applicant appropriately selected **Standard G-1, Not Applicable/De Minimis Effect** for all three Project ZOEs.

During the original license application process, no properties of historic, architectural, or archaeological significance were included in or found to be eligible for inclusion in the National Register of Historic Places. A September 29, 1982 letter<sup>19</sup> from the New Hampshire Department of Resources and Economic Development indicates:

*"The Historic Preservation Office has determined that the project will have no effect upon known architectural, historical, archeological or other cultural resources. Should such resources be discovered as a result of project planning or implementation, appropriate measures should be undertaken according to 36 CFR 800 and other appropriate federal laws and regulations that apply to historic and cultural resources."*

License Article 32 of the Project license requires the Applicant to consult with the New Hampshire State Historic Preservation Office (SHPO) prior to the commencement of any construction at the Project, including any cultural resource survey and salvage work that may be needed.

Based on a January 2020 web search, there are no historic structures associated with the Project that are included in the National Register,<sup>20</sup> and there have been no material changes to the Project. The Applicant continues to consult with the applicable SHPO in advance if any structural changes or ground disturbing activity occur at the Project.

Based on my review of the application, supporting documentation, and publicly available information, the Project continues to satisfy the Cultural and Historic Resource Protection criterion.

## H. RECREATIONAL RESOURCES

**Goal:** The facility accommodates recreation activities on lands and waters controlled by the facility and provides recreational access to its associated lands and waters without fee or charge.

<sup>19</sup> Appendix 12 of Project LIHI application.

<sup>20</sup> <https://www.nps.gov/subjects/nationalregister/database-research.htm>

### **Assessment of Criterion Passage:**

The Applicant appropriately selected **Standard H-2, Agency Recommendation** for all three Project ZOEs.

As noted in the Project license, DOI recommended that, because annual runs of shad and salmon will likely develop on the Contoocook River, the licensee should be required to provide access for public utilization of fish and wildlife resources whenever possible. Article 13 of the license provides for public recreational access to the Project where public safety is not jeopardized. Access to the Contoocook River in the Project vicinity is not readily available. The right bank is steep and rocky and access on the left bank would involve crossing over private residential property. Access for fishing and boating is available downstream in the vicinity of the Penacook Lower Falls Hydroelectric Project (LIHI #64).

The Project footprint is quite small and safety considerations preclude additional recreation facilities within the Project boundary. However, there are existing recreational opportunities in the immediate vicinity of the Project including the Penacook Downtown River Park, a popular area that borders and overlooks the Project's impoundment area. The city of Concord river walk provides direct access to the eastern riverbank immediately upstream of the Project's powerhouse forebay.

Based on my review of the application, supporting documentation, and publicly available information, the Project continues to satisfy the Recreational Resources criterion.

## **IX. GENERAL CONCLUSIONS AND REVIEWER RECOMMENDATION**

Based on my review, I believe the Project meets the requirements of Low Impact facilities and recommend it be re-certified for a five (5)-year period, with an option to extend the term for three years if upstream eel passage is voluntarily implemented in advance of FERC relicensing.

**Condition 1:** Since the Project is in relicensing and is likely to receive a new FERC license during the new LIHI Certification term, the facility Owner shall provide to LIHI as part of the annual compliance reports, a brief status summary of the FERC licensing progress listing significant agency interactions that have occurred in the past year that are relevant to any LIHI criteria, the results of any relicensing studies, and highlighting major topics of agreement or disagreement. LIHI reserves the right to modify conditions and/or reassess Certification in light of new agency recommendations or if a new license changes Project operations or facilities related to the LIHI criteria.

**Condition 2 (optional):** If at any time prior to six months before the expiration of the Certification term the Facility Owner has implemented upstream eel passage at the Project in advance of a new FERC license, LIHI will review that information and determine whether or not to award a PLUS standard and extend the Certificate term for three additional years.

## **APPENDIX A**

### **Stakeholder Comment Letter**

1/10/2020

Lowimpacthydro.org Mail - Fwd: Penacook Upper Falls Project (FERC No. 6689; LIHI No. 52) Comments



Whitman Constantineau <[wconstantineau@lowimpacthydro.org](mailto:wconstantineau@lowimpacthydro.org)>

Fwd: Penacook Upper Falls Project (FERC No. 6689; LIHI No. 52) Comments

1 message

**Certification Comments** <comments@lowimpacthydro.org>  
To: wconstantineau@lowimpacthydro.org

Fri, Jan 10, 2020 at 9:09 AM

----- Forwarded message -----

From: Rosset, Julianne <julianne\_rosset@fws.gov>

Date: Thu, Jan 9, 2020 at 4:08 PM

Date: Thu, Jan 3, 2008 at 4:00 PM  
Subject: Penacook Upper Falls Project (FERC No. 6689; LHI No. 52) Comments

To: <[nicholas.funk@wsp.com](mailto:nicholas.funk@wsp.com)>, <[comments@lowimpacthydro.org](mailto:comments@lowimpacthydro.org)>

#### Greetings -

The United States Fish and Wildlife Service (Service) has reviewed Essex's Power Services (EPS) LIHI recertification application for the Penacook Upper Falls Hydroelectric Project (FERC No. 6689; LIHI No. 52) and has the following comments.

### Unstream Fish Passage

The recertification document does not provide information regarding upstream or downstream American eel passage and protection measures. As indicated in EPS's Pre-Application Document (FERC eLibrary Accession No. 20191129-5029), American eel are present upstream and downstream of Penacook Upper Falls. Currently, the Project has an experimental eel ladder, which was installed by the Service in 2017. Eels have passed the Project in the thousands (Service biologists estimate 3000-4000 per year) since ladder install. Therefore, the Service recommends that any LIHI recertification issued for the Penacook Upper Falls Project require EPS to implement upstream and downstream eel passage within two years after receiving LIHI recertification (though interim measures should be in place as soon as possible after recertification). Implementation of effective upstream and downstream eel passage will require consultation with, and approval of, Service personnel.

The Service appreciates the opportunity to provide information relative to fish and wildlife resource issues in the LIHI recertification process and thank you for your interest in these resources. If you have any questions, please feel free to call or email me.

Kind regards,  
Julianne

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