ENVIRONMENTAL ASSESSMENT

FOR NON-CAPACITY AMENDMENT OF EXEMPTION

JACKSON MILLS HYDROELECTRIC PROJECT
FERC No. 7590-016
New Hampshire

Federal Energy Regulatory Commission
Office of Energy Projects
Division of Hydropower Administration and Compliance
888 First Street, N.E.
Washington, DC 20426

December 9, 2022

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LIST OF ABBREVIATIONS

Advisory Council	Advisory Council on Historic Preservation
APE	area of potential effects
CFR	Code of Federal Regulations
Commission	Federal Energy Regulatory Commission
Corps	U.S. Army Corps of Engineers
cfs	cubic feet per second
DO	dissolved oxygen
EA	Environmental assessment
EJ	Environmental Justice
EFH	essential fish habitat
EPA	Environmental Protection Agency
FWS	U.S. Fish and Wildlife Service
FPA	Federal Power Act
FPFIP	Fish Passage Facilities Improvement Plan
IPaC	Information for Planning and Consultation database
MW	megawatt
National Register	National Register of Historic Places
New Hampshire DES	New Hampshire Department of Environmental Services
New Hampshire DFG	New Hampshire Department of Fish and Game
New Hampshire SHPO	New Hampshire Division of Historic Resources
NHPA	National Historic Preservation Act
NGVD	National geodetic vertical datum 1929
NMFS	National Marine Fisheries Service
RM	river mile
Section 7	Section 7 of the Endangered Species Act
Section 106	Section 106 of the National Historic Preservation Act
USGS	U.S. Geological Survey
WQC	Water Quality Certification under Section 401 of the Clean Water Act

1.0 INTRODUCTION

1.	Application:	Non-Capacity Amendment of Exemption
2.	Date Filed:	January 31, 2022
3.	Applicant:	City of Nashua, New Hampshire
4.	Water body:	Nashua River
5.	County and State:	Hillsborough, New Hampshire
6.	Federal Lands:	There are no federal lands within the project boundary.

1.1 BACKGROUND

On January 31, 2022, as supplemented on March 23, 2022, the City of Nashua, New Hampshire (City or exemptee), exemptee for the Jackson Mills Hydroelectric Project No. 7590 (Jackson Mills Project or project), filed an application to amend its exemption.[1] The project consists of a dam, reservoir, powerhouse, and fishway all within the city limits of Nashua, New Hampshire, on the Nashua River (Figure 1). The exemptee proposes to amend the exemption to replace the current turbine/generator, demolish and reconstruct certain portions of the powerhouse building to fit the new turbine/generator arrangement, remove a ledge and rock from the existing tailrace to allow the installation of a replacement draft tube, and improve the hydraulic performance of existing turbine flows. The exemptee does not propose any changes to the project's

[1] Nashua Hydro Associates, 27 FERC ¶ 62, 078 (1984). Nashua Hydro Associates notified the Commission by letter on January 23, 2015 that it transferred the exemption to the City of Nashua, New Hampshire.

existing operating regime.

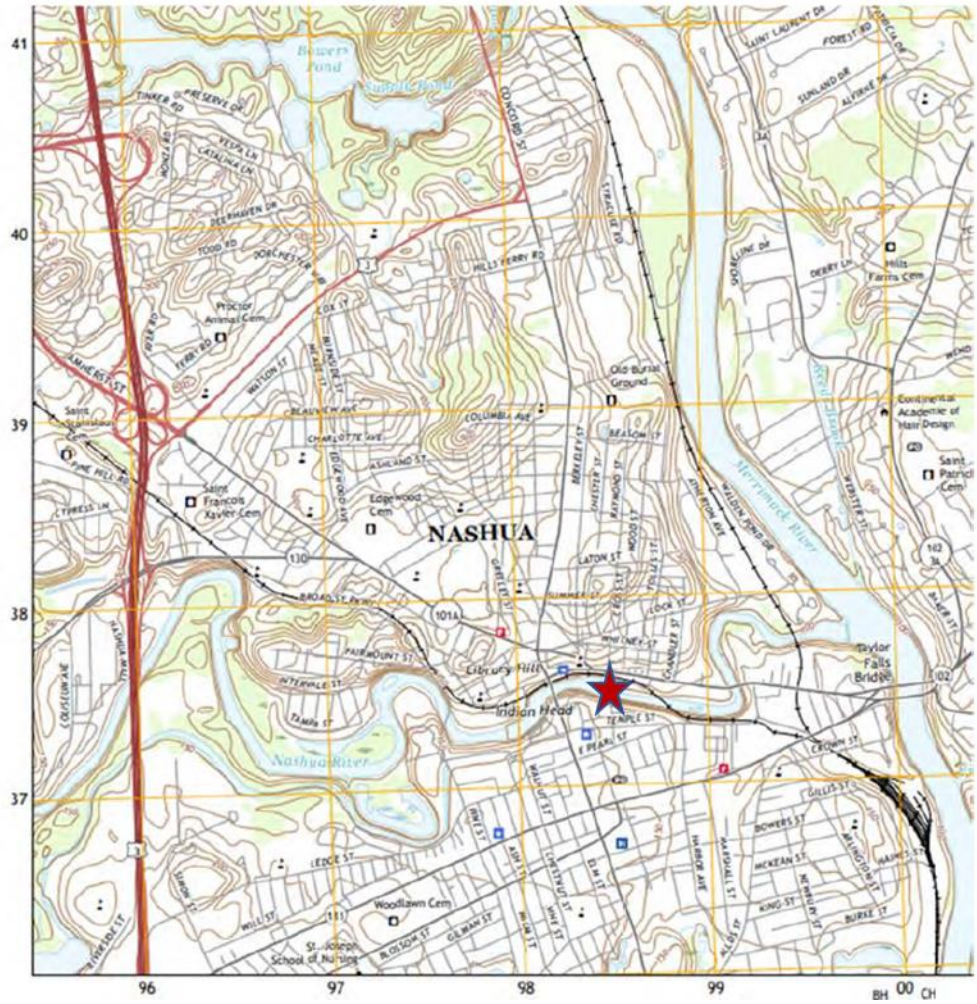

Figure 1. Location of the Jackson Mills Development.

1.2 PROJECT DESCRIPTION

The Jackson Mills Project is located on the Nashua River in Hillsborough County, New Hampshire. The exempted project is municipally owned by the City of Nashua. The project occupies a former mill dam with all project facilities located in the downtown area of the City of Nashua. The surrounding area consists of commercial, industrial and residential areas. The streambank is heavily altered by human activity with no adjacent natural lands and little non-herbaceous vegetation.

1.2.1 Existing Project Facilities

On April 24, 1984, Commission staff issued an exemption for the 1-megawatt (MW) project. The project consists of: (1) an existing 33-foot-high, 178-foot-long stone masonry uncontrolled spillway dam with a 6-foot-high pneumatic crest gate system on

140 feet of the spillway; (2) an existing 40-acre reservoir with no usable storage capacity and a normal maximum water surface elevation of 116.1 feet National Geodetic Vertical Datum 1929 (NGVD); (3) an existing powerhouse located at the north dam abutment containing a 1 MW turbine-generator; (4) a tailrace channel; (5) a transmission line; (6) a Denil-style fishway; and (7) appurtenant facilities (see figure 2). A non-project bypass reach, approximately 100 feet in length, originates at the toe of the dam and predominantly affects the southern side of the river.

Figure 2. Aerial view of the Jackson Mills Project

The existing turbine has a 5-blade, semi-Kaplan (blade adjustable only) runner connected to a speed increaser and induction generator. The existing turbine/generator is approximately 40 years old, is prone to numerous outages due to component failures and as such, is at the end of its useful life.

1.2.2 Existing Project Operation

The project is operated in run-of-river mode. The hydraulic capacity of the project is 130 – 800 cubic feet per second (cfs) generating up to 1 MW. The project's Denil-style fish ladder operates from April 1 to June 30, to provide fish upstream passage and

passes a minimum of 190 cfs. The downstream fish passage pipe passes 20 cfs from May 1 to November 15. When the turbine is not in operation all other flows pass over the dam crest. In 2013, a pneumatic crest gate was installed to mitigate increased reservoir levels at high flows. This crest gate deflates when stream discharge reaches 7,500 cfs to allow for greater discharge over the dam crest.

2.0 PURPOSE AND NEED FOR ACTION

The Commission must decide whether to approve the exemptee's proposed amendment and what conditions should be included in any amendment order issued. In addition to power and development under the Federal Power Act (FPA), the Commission must give equal consideration to the purposes of energy conservation; the protection, mitigation of damage to and enhancement of fish and wildlife (including related spawning grounds and habitat); the protection of recreational opportunities; and the preservation of other aspects of environmental quality.

In accordance with the National Environmental Policy Act[2] and the Commission's regulations (18 C.F.R. Part 380), this environmental assessment (EA) assesses the effects of the proposed amendment, evaluates alternatives to the proposed action, and makes recommendations to the Commission on whether to approve the exemptee's amendment application, and if approved, recommends conditions to become part of any order issued.

The EA examines the affected environment and the environmental effects of the proposed action and the No-Action Alternative (today's status quo).

3.0 PROPOSED ACTION AND ALTERNATIVES

3.1 PROPOSED ACTION

The exemptee proposes to replace the current turbine/generator, which has completed its functional life cycle, and as part of ongoing maintenance. To remove the existing turbine/generator and install the new one, the exemptee proposes to demolish and reconstruct certain portions of the powerhouse building to fit the new, in kind, turbine/generator arrangement, including a replacement draft tube. To conduct the proposed construction, the exemptee proposes to install a temporary cofferdam at the downstream toe of the dam to encompass and isolate the draft tube and tailrace. The exemptee would remove a ledge and rock from the existing tailrace to allow the

[2] On July 16, 2020, the Council on Environmental Quality issued a final rule, *Update to the Regulations Implementing the Procedural Provisions of the National Environmental Policy Act* (Final Rule, 85 Fed. Reg. 43,304), which was effective as of September 14, 2020.

installation of the replacement draft tube and to improve hydraulic performance of exiting turbine flows. The exemptee does not propose any changes to the project's existing operating requirements. The proposed action would include in-stream and out of water work. The City proposes to complete the proposal in four distinct phases.

(1) Phase One: The exemptee would construct a cofferdam to isolate the current draft tube and tailrace area. The cofferdam would be an earthen, clean gravel, and rock fill structure with a sheet pile core. The cofferdam would be approximately 190 linear feet long and would extend from the north riverbank and turn upstream to abut the existing dam face just to the right of the fishway. The earthen portion of the cofferdam would be installed first, followed by the installation of a sheet pile core which would act as a water barrier to minimize seepage through the cofferdam. The cofferdam would have a maximum elevation of 104 feet NGVD and an average of 6 to 8 feet high. The river flow would be bypassed to the right side of the cofferdam, which is sufficient to handle flows up to 2,700 cfs.

(2) Phase Two: The exemptee would demolish most of the existing walls of the powerhouse because the existing structure was built around the existing turbine/generator unit. The right-hand wall, adjacent to the fishway, and the upstream wall are the only portions of the powerhouse that would remain intact. The floor of the powerhouse would be excavated to accommodate the additional space needed for the new draft tube. This new draft tube extends past the existing powerhouse walls so this excavation would continue into the tailrace. The tailrace would also be recontoured to improve hydraulic performance for the new unit. The City expects to excavate approximately 400 cubic yards of rock from the tailrace.

(3) Phase Three: The exemptee would fabricate the upstream transition and draft tube. The new draft tube would be attached to the existing powerhouse flume so that no disturbance would be made to upstream structures. Once the draft tube is connected to the flume it would be cast in concrete. The final casting would also include stoplog slots at the end of the encased draft tube. The new slots allow for steel stoplogs to be installed so that future turbine/generator work can be accomplished without changing surrounding water levels.

(4) Phase Four: The exemptee would install the new controlling and connecting equipment and reconstruct the powerhouse. The new controls would include a single master programable logic controller that would operate the turbine/generator, dam crest gate, fish passage gates/pumps, and automatic trashrack cleaner.

The exemptee proposes to install the cofferdam beginning in late June with construction planned for late July. Construction would conclude in August and the

cofferdam would be removed at the end of November to reduce the likelihood of constructing during high flows associated with spring runoff. The City's contractor has developed a flow operation plan to mitigate for unexpected high-water events. After completion of the project the cofferdam would be completely removed.

The hydraulic capacity of the project is currently 130 – 800 cubic feet per second (cfs) with the proposed capacity of 150 – 750 cfs; the generating capacity at the project would remain at 1 MW. No other operational changes are proposed.

3.2 NO-ACTION ALTERNATIVE

Under the No-Action Alternative, the exemptee would continue to operate and maintain the project under the current exemption and would be unable to replace the turbine/generator. The environmental resources in the project area would remain the same as they currently exist and are the basis for the existing environment sections in this EA. Because the turbine/generator is unreliable and need to be replaced, the no-action alternative is not a viable option.

4.0 STATUTORY COMPLIANCE

4.1 STATUTORY COMPLIANCE

4.1.1 Clean Water Act Section 401

Section 401(a)(1) of the Clean Water Act requires that an applicant for a federal license or permit to conduct activities that may result in a discharge into the navigable waters of the United States, must provide the licensing or permitting agency a water quality certification (WQC). If the state "fails or refuses to act on a request for certification, within a reasonable period of time (which shall not exceed one year) after receipt of such request," then certification is waived.[3]

The New Hampshire Water Supply and Pollution Control Commission (now the New Hampshire Department of Environmental Services (New Hampshire DES)) issued an original WQC for the project on September 7, 1983. On December 3, 2021, the City applied to New Hampshire DES for a WQC for the proposed action. New Hampshire DES timely issued a WQC on March 7, 2022, and filed a copy with the Commission on March 9, 2022, requiring the following terms and conditions for the protection of the environment at the project.

WQC condition E-11 requires that the project operate in run-of-river mode, whereby inflow to the project equals outflow from the project at all times, and water

[3] 33 U.S.C. § 1341(a)(1).

levels above the dam are not to be drawn down for the purpose of generating power. When drawing the impoundment water level down for scheduled maintenance, the City shall lower the water level no more than six inches per day. When refilling the impoundment after drawdown for maintenance or emergencies, the City shall release no less than 75% of inflow into the Nashua River downstream of the project and use the remining 25% for refill but shall strive to release 90% of inflow downstream and use the remining 10% for refill.

WQC condition E-13 requires that the City prepare and submit a Flow Impoundment Compliance Monitoring Plan. This plan shall be submitted to the New Hampshire DES, New Hampshire FGD and the FWS, within 90 days of the Commission approving the amendment proposal. This plan shall outline operations, data management strategies, and compliance metrics and be approved by resource agencies.

WQC condition E-17 requires that the City shall develop a long-term water quality monitoring plan. This plan should include a five-year rotational sample of a wide array of water quality metrics. Results need to be promptly reported and any deviance from New Hampshire water quality standards would need to be accompanied by consultation with the resource agencies to develop improvement options. The City shall submit a study plan to determine how the bypass reach would provide adequate water quality to ensure aquatic organisms safely pass downstream and how these conditions would be monitored. The results of this study would be used to develop the section of the Flow Impoundment Compliance Monitoring Plan related to the bypass reach.

4.1.2 Endangered Species Act

Section 7 of the Endangered Species Act[4] requires federal agencies to ensure that their actions are not likely to jeopardize the continued existence of federally listed threatened or endangered species, or result in the destruction or adverse modification of the critical habitat of such species.

Commission staff utilized the U.S. Fish and Wildlife Service's (FWS) Information for Planning and Consultation Database (IPaC) and identified one federally-listed species, the threatened northern long-eared bat (*Myotis septentrionalis*), as potentially present in the project vicinity (FWS 2019). As discussed below in section 5.7, *Threatened and Endangered Species*, Commission staff concluded that there is not suitable habitat for this species within the project area, therefore the proposed amendment would have no effect on the northern long-eared bat.

[4] 16 U.S.C. § 1536(a).

4.1.3 Magnuson-Stevens Fisheries Conservation and Management Act

Section 305(b) of the Magnuson-Stevens Fisheries Conservation and Management Act[5] requires federal agencies to consult with the National Marine Fisheries Service (NMFS) on all actions that may adversely affect essential fish habitat (EFH). The New England Fisheries Management Council designated EFH for Atlantic salmon as part of the *Omnibus Essential Fish Habitat Amendment 2*, as approved by NMFS in 2018.[6] Large portions of the Nashua River Basin were designated EFH for Atlantic salmon, including the entire project area.

The exemptee consulted with NMFS on its proposal to replace the existing turbine/generator. On March 3, 2022 the Commission issued an additional information request that requested clarification of the status of Atlantic salmon essential fish habitat. The supplemental filing of March 23, 2022 included a response from NMFS date March 8, 2022, where NMFS concluded that Atlantic salmon are essentially extirpated from the Merrimack River basin; however, the project area is still listed as EFH for Atlantic salmon and therefore requires a review of the proposal. NMFS concluded that as the result of Condition 1 of the FWS' mandatory terms and conditions to develop a Fish Passage Facilities Improvement Plan (FPFIP), discussed below in section 4.1.6, *Mandatory Conditions*, the approval of the amendment would have a long-term beneficial effect on Atlantic salmon as well as other diadromous fish. Provided the proposed measures of the FPFIP are successfully implemented, NMFS has no additional EFH conservation recommendations at this time, however they reserve the right to reinitiate consultation if new information becomes available or the project is further revised.

4.1.4 National Historic Preservation Act

Section 106 of the National Historic Preservation (NHPA[7]) and its implementing regulations[8] requires that federal agencies "take into account" how each of its undertakings could affect historic properties and afford the Advisory Council on Historic Preservation (Advisory Council) a reasonable opportunity to comment on the

[5] 16 U.S.C. § 1801 et seq.

[6] 83 FR 15240 (2018)

[7] 54 U.S.C. § 306108 et seq.

[8] 36 C.F.R. pt. 800.5(a)(2)(vii).

undertaking.[9] Historic properties are districts, sites, buildings, structures, traditional cultural properties, and objects significant in American history, architecture, engineering, and culture that are eligible for inclusion in the National Register of Historic Places (National Register). In this document, we also use the term "cultural resources" for properties that have not been evaluated for eligibility for the National Register. Cultural resources represent items, structures, places, or archaeological sites that can be either prehistoric or historic in origin. In most cases, cultural resources less than 50 years old are not considered historic. Section 106 also requires that the Commission seek concurrence with the state historic preservation office on any finding involving effects or no effects on historic properties, and consult with interested Native American Tribes or Native Hawaiian organizations that attach religious or cultural significance to historic properties that may be affected by an undertaking.

In its January 31, 2021, filing, the City included its request for project review by the New Hampshire Division of Historical Resources.[10] On August 25, 2020 the New Hampshire SHPO concluded that no historic properties would be affected by the proposal. Any effects to cultural resources are discussed below in Section 5.9 *Cultural and Historic Resources*.

4.1.6 Mandatory Conditions

Pursuant to section 30(c) of the FPA, 16 U.S.C. § 823a(c), federal and state fish and wildlife agencies have mandatory conditioning authority on exempted projects. The City has been in active consultation with the FWS, NMFS, New Hampshire DES, and New Hampshire Department of Fish and Game (New Hampshire DFG). The agencies collectively agree that two of the six existing mandatory terms and conditions are out of date and should be completely replaced. The final agency conditions were included in the City's amendment application and are summarized below. Some of the conditions required by the resource agencies are not related to the proposed action, but are however, related to the long-term operation of the project.

Condition 1 of the FWS' mandatory terms and conditions for the project requires safe, timely, and effective fish passage through the project be provided. To accomplish this requirement the City shall develop a Fish Passage Facilities Improvement Plan

[9] An undertaking means "a project, activity, or program funded in whole or in part under the direct or indirect jurisdiction of a Federal agency, including those carried out by or on behalf of a Federal agency; those carried out with Federal financial assistance; and those requiring a Federal permit, license, or approval." 36 C.F.R. § 800.16(y). Here, the undertaking is the proposed amendment to the project's design.

[10] The New Hampshire Division of Historical Resources functions as the state historic preservation office (New Hampshire SHPO).

(FPFIP) in consultation with the resource agencies. The FPFIP should address identified issues with the existing fish passage facilities and outline the mechanism(s) to provide effective passage for all target species no later than 2025. Once the FPFIP is approved by the agencies it must be filed for Commission approval. Although the FPFIP is outside the scope of the proposed action, this condition is considered mandatory and would be added to the exemption.

FWS Condition 2 requires that the project shall operate in run-of-river mode, whereby inflow to the project would equal outflow from the project, at all times, and water levels above the dam are not drawn down for the purpose of generating power. A plan for maintaining and monitoring instantaneous run-of-river operation shall be developed in consultation with the resource agencies. The plan shall include a description of the mechanisms and structures that would be used, the level of manual and automatic operation, the methods to be used for recording data on run-of-river operation, an implementation schedule, and a plan for maintaining the data for inspection by resource agencies. This is a condition set by the FWS and New Hampshire DES, and these agencies must approve the plan before it is filed with the Commission, for approval. An annual reporting requirement would help determine the exemptee's compliance with this mandatory condition.

4.2 PRE-FILING CONSULTATION AND PUBLIC COMMENT

The Commission's regulations (18 C.F.R. section 4.38) require exemptees to consult with appropriate resource agencies, Native American Tribes, and other entities before filing an application for an amendment of exemption. Pre-filing consultation must be complete and documented according to the Commission's regulations. The section below describes the public outreach and resource agency consultation conducted by the exemptee prior to filing its application with the Commission.

4.2.1 Pre-filing Consultation

The exemptee consulted with local, state, and federal agencies while developing its amendment application. On June 17, 2020, the exemptee held a pre-filing consultation meeting for stakeholders and local, state, and federal resource agencies to introduce the proposed amendment, and to field questions, concerns, or potential issues to be addressed in the draft application. Agencies participating in the consultation meeting included: the New Hampshire DES, New Hampshire DFG, New Hampshire SHPO, and the New Hampshire Water Management Bureau. On September 16, 2020 the exemptee provided a project information package with the New Hampshire DES, New Hampshire DFG, New Hampshire SHPO, FWS, Corps, and local non-governmental organizations having an interest in the project.

On October 7, 2020, the exemptee sent out follow-up notification letters requesting comments and asking if parties wished to continue receiving information about the proposal. The exemptee received written comments on the draft application from: NMFS, FWS, Corps, New Hampshire DES, and the Nashua River Watershed Association. In its amendment application filed with the Commission, the exemptee addresses and incorporates comments provided by the agencies and entities, and includes copies of the comments received on the draft application.

The Ko'asek (Co'wasuck) Traditional Band of the Sovereign Abenaki Nation commented on its concerns over the possibility that the removal of soil may have negative impacts on the state listed Blanding's turtle as well as other wildlife resources.

The company adjacent to the project, BAE Systems, commented on the need to develop a formal agreement for use of their parking area during construction.

4.2.2 Public Comment

On March 3, 2022, the Commission issued a notice that the exemptee's application to amend the exemption was accepted for filing, soliciting comments, motions to intervene, and protests.[11] The notice established a 30-day deadline, or April 4, 2022, for filing responses to the notice. The FWS and NMFS both filed timely motions to intervene on April 4, 2022. No other comments or motions to intervene were received.

5.0 ENVIRONMENTAL ANALYSIS

In this section, Commission staff describes the environmental setting for the proposed action and the scope of our effects analysis. We also present our analysis of the environmental effects of the proposed action. Sections are organized by resource areas. Under each resource area, we first describe the current conditions. The existing condition is the baseline against which the environmental effects of the proposed action are compared, including an assessment of the effects of proposed mitigation, protection, and enhancement measures, and any potential cumulative effects. Our conclusions and recommended measures are discussed in Section 6.0, *Conclusions and Recommendations* of the EA.

5.1 GENERAL SETTING

The project is located within the city limits of Nashua, New Hampshire. The city is in the southern most portion of the state, sharing a boarder with the state of Massachusetts. The project is the downtown area and is therefore surrounded by urban

[11] 87 *Fed. Reg.* 13,290 – 13,291 (2022)

and industrial land use. The Nashua River watershed is approximately 533 square miles and receives 48 inches of rainfall per year.

The Nashua River was used heavily for industry including many paper mills, particularly in the Fitchburg, Massachusetts area. Over 275 dams, in various condition, remain in the watershed as a reminder of its industrial past. The project, approximately 1.4 river miles (RM) from the confluence with the Merrimack River, is the lowermost of four mainstem dams on the Nashua River. Each of the mainstem dams are used to produce hydroelectricity.

5.1.1 Geologic and Soil Resources

AFFECTED ENVIRONMENT

The City of Nashua lies within the Seaboard Lowland section of the New England physiographic province and is part of the coastal plain. Known for its rolling topography with elevations mostly below 150 feet NGVD, the Nashua area is composed of glacial till, the unsorted and unstratified sediments deposited by glaciers, as well as stratified drift, the sorted and layered sediments deposited by glacial meltwater. In the Nashua area, these outwash deposits typically contain well-sorted sand, gravel, silt, and clay, with the sand and gravel deposits typically located closer to the areas where the glacial meltwater velocities were higher. The majority of bedrock in the Nashua area trends northeast-southwest and is composed of two major bedrock formations: the Berwick Formation of the Merrimack Group and the New Hampshire Plutonic Suite. Although most of Nashua is underlain by the Berwick Formation, in the immediate area around and including the Jackson Falls Dam, the bedrock is classified as the New Hampshire Plutonic Suite, which is a two-mica granite.

In the project area, the majority of soils are anthropogenically altered and classified as urban land. These soils are composed of original till or alluvial parent material mixed with fill and debris such that no single attribute defines all soils within the classification. In addition, the river embankment in the project area is vegetated or stabilized with hard armor such as riprap, concrete, or asphalt.

ENVIRONMENTAL EFFECTS

Under the proposed action, construction activities resulting in ground disturbance include excavation in the powerhouse area and in the tailrace area. The exemptee would excavate approximately 200 cubic yards of granite, contained within the existing powerhouse, in order to install a new reinforced concrete foundation for the new turbine-generator unit and draft tube. The exemptee would rebuild the powerhouse so that the new powerhouse would have the same footprint as the existing powerhouse; however, part of the upper level of the new powerhouse would cantilever over the ground below.

In the tailrace area, the exemptee would excavate approximately 400 cubic yards of granite so that the tailrace would slope uniformly from the new draft tube outlet at the powerhouse to the main channel of the river. The material excavated would include only ledge and bedrock; the exemptee does not propose to remove any soils during construction. In order to perform the construction work, the exemptee proposes to construct a cofferdam on the existing riverbank bedrock. No excavation would be necessary for the cofferdam construction.

The effects of construction on geology and soil resources would primarily occur through erosion of disturbed rock while excavation is performed for the new powerhouse and the improved tailrace. However, to reduce the likelihood of adverse effects on geology and soils, the exemptee proposes to implement a construction erosion and sediment control plan, which includes measures such as the installation of a silt sock, construction fencing, a filter bag, and a turbidity curtain.

The Wetlands and Non-Site Specific Permit issued by the New Hampshire DES on August 11, 2021,[12] for the proposed project, requires the exemptee to prepare and submit for approval, prior to the start of construction, a construction monitoring plan that includes erosion, sedimentation, and water quality control monitoring. Consistent with this permit requirement, condition E-16 of the WQC requires that the exemptee implement a Construction Water Quality Monitoring and Reporting Plan, which must be approved by the New Hampshire DES. The Corps General Permit[13] calls for similar sediment control measures and additionally calls for erosion control materials to be biodegradable and wildlife friendly.

The erosion control measures contained in the exemptee's proposed erosion and sediment control plan, as well as the provisions specified under the New Hampshire DES Wetlands and Non-Site Specific Permit, condition E-16 of the WQC, and the Corps General Permit, should reduce effects from the proposed action. Commission staff, therefore, concludes that the construction work would have a minor, short-term adverse effect on the geology and soil resources in the immediate project area.

5.1.2 Water Quantity

AFFECTED ENVIRONMENT

[12] Permit number 2021-00788, August 11, 2021.

[13] Permit number NAE-2021-01741, November 4, 2021. As a general condition, the General Permit specifies that appropriate soil erosion and sediment controls must be used and maintained in effective operating condition during construction.

There are over 1,000 miles of rivers and streams in the 533 square-mile Nashua watershed, however the flow diversion at the Wachusett Reservoir diverts 108 square-miles of the watershed to serve as drinking water storage. The headwaters begin in north-central Massachusetts flowing north-northeast through three other run-of-river hydropower projects. The nearest USGS gage 01096500 (East Pepperell), approximately 13 RM upstream of the project, reports the average daily flow range from approximately 300 cfs in the summer to 2,000 cfs in the spring. Discharge to the project can only be estimated as the Nissitissit River flows into the Nashua River between the USGS gage and the project. As the third largest watershed in the Merrimack river basin, Nashua River flows provide a significant water volume input for the lower Merrimack River.

The project is located in an urban environment with little inflow other than the mainstem of the Nashua River. The dam crest is 116.6 feet NGVD and impounds a roughly 40-acre reservoir with a volume of 15-acre-feet and negligible storage capacity.

The project's Denil-style fish ladder operates from April 1 to June 30, to provide fish upstream passage and passes a minimum of 190 cfs. The downstream fish passage pipe passes 20 cfs from May 1 to November 15. When the turbine is not in operation all other flows pass over the dam crest. In 2013, a pneumatic crest gate was installed to mitigate increased reservoir levels at high flows. This crest gate deflates when stream discharge reaches 7,500 cfs to allow for greater discharge over the dam crest. The non-project bypass reach stretches for approximately 100-feet between the toe of the dam and the powerhouse outlet. This short bypass reach primarily consists of ledge and due to the uneven terrain and dam spill over, remains wet even at low summer flows.

ENVIRONMENTAL EFFECTS

While the cofferdam is temporarily installed, flows would continue to be directed through the fish passage structures. Both the fishway and downstream fish passage pipe would be modified to continue operations during construction. The downstream end of the fishway would be extended and angled to exit through the cofferdam. The downstream fish passage pipe would be extended to reach past the cofferdam on its current trajectory. Temporary flash boards would be installed on the dam crest upstream of the cofferdam so the remaining river flow would be diverted over the dam crest to the right of the cofferdam and into the bypass reach. The bypass reach is sufficient to handle flows of up to 2,700 cfs. Though the cofferdam may be overtopped in the event of higher flows, it would not significantly impede downstream water flow during an extreme event.

The exemptee's proposed replacement generator and draft tube are designed for improved operating efficiency using the same flow and head regime that satisfy the requirements of the existing exemption from licensing. The exemptee's proposed turbine/generator unit would operate at flows between 150 and 750 cfs, compared to the existing operating range of 130 to 740 cfs. The additional capacity at high flows would

have no impact to water quantity as the exemptee proposes to continue to operate the project in run-of-river mode. The tailrace excavation would create minor changes in flow direction but this would have no discernable impact to water quantity downstream of the project. The exemptee does not propose to change flows through the fishway or over the crest gate.

The FWS proposed modifications to its existing mandatory conditions in the exemption, and the New Hampshire DES WQC conditions, would require the City to prepare a plan for maintaining and monitoring instantaneous run-of-river operation at the project. The plan would be developed in consultation with the FWS and the New Hampshire DES and approved by these agencies before filing with the Commission for approval. This plan would describe the mechanisms and structures that would be used, the extent of manual and automatic operation, and the methods for recording data on run-of-river operation. If implemented, this plan and the resulting data would have a beneficial effect on water quantity at the project.

Commission staff concludes that the exemptee's proposal would have permanent, minor effects on water quantity and flows by changing the turbine's operational range. However, these effects are neither adverse nor beneficial. Under the proposed operational conditions, overall water quantity would not significantly vary from existing conditions and the monitoring plan would provide evidence of adequate water quantity at the project.

5.1.3 Water Quality

AFFECTED ENVIRONMENT

The reach of the Nashua River encompassing the project is classified by New Hampshire as Class B waters.[14] New Hampshire's water quality standards for class B waters include: dissolved oxygen (DO) with an instantaneous minimum concentration of 5 milligrams per liter and at least 75% saturation based on a daily average; geometric mean *E. coli* count of 126 per 100 milliliters, or not more than 406 *E. coli* per 100 milliliters per single sample period; naturally occurring turbidity conditions shall not exceed 10 nephelometric turbidity units; and all surface waters shall be free of toxic substances.[15]

[14] Class B waters are those which are high quality waters with no objectionable physical characteristics, are acceptable for fishing, swimming, and other recreational purposes, and, after adequate treatment, for use as water supplies.

[15] New Hampshire Revised Statues Annotated, Chapter 485-A:8, Section 485-A-8.

To effectively assess water quality, the New Hampshire DES divided surface waters into smaller segments called assessment units. The project's dam is the boundary between two assessment units, one above the dam and one below the dam. As the amendment does not propose work upstream of the dam only the downstream assessment segment was considered. The downstream assessment unit contains the proposed construction area and extends to the confluence with the Merrimack River.

In the 2020 Water Quality Assessment, conducted by the New Hampshire DES, the unit that contains the proposed construction area listed the overall water quality as "poor" with non-native aquatic plants and *E. coli* outbreaks principally responsible for the rating. The report does not specify the source of the bacterium but has found *E. coli* volumes exceed the state defined threshold in the most recent sample taken in 2016. The report did not list the types of invasive plants found, so it is difficult to determine the potential effects these plants may have on water quality. In addition, the City executed an invasive plant management program in the summer of 2020, and this may have induced changes in the current status. Available satellite imagery suggest that plant species do not currently have a significant impact in this reach. DO levels were rated as "good" at this unit but no other metrics were collected in the 2020 sample. Although turbidity was not assessed at this unit, it is rated as "likely good" at the confluence of the Nashua and Merrimack Rivers. The U.S. Environmental Protection Agency (EPA) lists the Nashua River as "impaired" for aquatic life, fish consumption, and primary contact recreation.[16] No toxic substances have been reported in the area downstream of the dam.

ENVIRONMENTAL EFFECTS

During the proposed construction period, work below the water line is likely to cause a short-term disturbance to the streambed with some effect to water quality by increasing local turbidity. However, this disturbance is expected and permitted by the New Hampshire DES Wetlands and Non-Site Specific Permit and the Corps general permit. To minimize effects, the exemptee proposes to limit construction activities to the low-water season of July 1 through October 31. The exemptee also attached a draft Erosion and Sediment Control Plan to its application. The City proposes to utilize turbidity curtains surrounding the river-side of the proposed cofferdam, install a sediment trap at the dewatering pump, and conduct routine maintenance throughout the construction process to reduce construction site runoff. The New Hampshire DES WQC, condition E-16 requires that the exemptee develop and implement a Construction Water Quality Monitoring and Reporting Plan, which must be approved by the New Hampshire DES.

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[16] Final Massachusetts Integrated list of Water for the Clean Water Act 2018/2020 Reporting Cycle. Available at https://www.epa.gov/system/files/documents/2022-02/2018-2020-ma-303d-list-report.pdf. Accessed September 16, 2022.

Excavations at the tailrace would be limited to ledge and rock. The exemptee would remove excavated material from the site; onsite stockpiling would be limited to no longer than 24 hours. The exemptee indicates that fine sediment does not occur in the tailrace, therefore, the proposed tailrace excavation is not expected to result in increased turbidity or toxicity.

Under the proposed amendment, the exemptee would continue to operate the project as it does currently. Tailrace recontouring is likely to modify localized flow conditions but not have effects on scour, as the area is predominantly ledge. Water quality metrics, such as DO, turbidity, entrainment of toxic substances and the presence of *E. coli*, are not expected to be altered by the City's proposal as the replacement turbine and associated draft tube would be in the same orientation and operational use as the existing project.

The New Hampshire DES WQC conditions would likely have long term beneficial effects on water quality because the WQC requires additional studies and monitoring be conducted. The water quality study in the bypass reach, required by WQC condition E-15, is likely to produce a long-term positive effect as the City and resource agencies would gain a better understanding of conditions under the range of operational conditions within the bypass reach. The New Hampshire DES WQC condition E-17 requirement to develop a long-term water quality monitoring and reporting plan would ensure continued long term beneficial effects.

Commission staff, therefore, concludes that adverse effects to water quality due to the proposed construction activities would be mitigated and any adverse effects due to turbidity would be temporary, minor in nature, and conclude at the end of construction. Long-term effects should not vary significantly from existing conditions and could be beneficial because new monitoring efforts would ensure continued water quality at the project.

5.1.4 Aquatic Resources

AFFECTED ENVIRONMENT

The project is located in a plane-bed river reach that is dominated by bedrock substrate and steep, human armored, riverbanks. The bedrock and swift moving water do not provide favorable habitat for aquatic vegetation or non-insect macroinvertebrates.

In 2021, the exemptee conduced a fish presence-absence survey as part of its recertification from the Low Impact Hydro Institute. The resident fish community is dominated by warmwater species including black crappie, bluegill, brown bullhead, chain pickerel, golden shiner, largemouth bass, pumpkinseed, rock bass, white sucker, and

yellow perch with brown bullhead as the most prolific. No fish stocking is reported at, or near, the project area.

A wide array of diadromous fishes move through the project including American eel, American shad, alewife, blueback herring, and sea lamprey. Atlantic salmon were historically present in the Nashua River and are presumed to have used the project area, but were extirpated in the 1800's. The Connecticut River Atlantic Salmon Commission attempted to restore Atlantic salmon to the Merrimack basin beginning in 1983, though restoration efforts were paused in 2014.

The project's Denil-style fish ladder operates from April 1 to June 30 to provide upstream fish passage. The fish ladder flows range from 190 to 1,965 cfs with an additional 30 cfs gravity feed attraction flow near the ladders downstream end. The fishway was constructed in 1984 and it has reached the end of its functional lifespan. Eel boards, installed in the fishway in 2018, use pegs and geotextile fabric to facilitate upstream passage through the existing fishway. The downstream fish passage pipe passes 20 cfs and operates from May 1 to November 15 to cover a longer downstream passage period than is available through the fishway. This pipe is protected from blockage by a 3-inch, non-angled trashrack that has a long history of failure. Poor attraction flows (both up and downstream), outdated structure design, and lack of proper fish diversion screening have been a recuring issue for fish passage at the project.

ENVIRONMENTAL EFFECTS

During construction and installation of the cofferdam, a significant portion of the streambed would be dewatered, stranding some resident fish. Commission staff recommend the City develop a Cofferdam Dewatering and Fish Protection Plan to mitigate the effects dewatering this portion of the streambed would have on fish. Cofferdam construction would take place in July/August to minimize the potential of stranding diadromous fishes since these species are not actively migrating through the project area at this time of year.

The exemptee proposes to continue operation of the existing Denil-style fish ladder and downstream passage pipe throughout the construction period to facilitate any fish migration during the cofferdam installation. However, the inadequacies of these fish passage structures are likely to have a continued negative effect on diadromous fish throughout the construction period.

The exemptee proposes to clean all equipment to be used in the project prior to arriving on site to prevent to prevent the introduction of non-native species to the project area, invasive or otherwise, by ensuring that no living animals or plants are knowingly transmitted to the project site. Further, the City proposes to source clean gravel and rock

fill for cofferdam construction to reduce the likelihood of introducing aquatic invasive species.

Cofferdam installation is likely to increase local turbidity while introducing new fill below the water line. To reduce local turbidity, the exemptee proposes to employ construction best practices, to be described in the Erosion and Sediment Control Plan, to mitigate the turbidity impacts to fish (see section 5.4 *Water Quality*).

The new turbine operating range would be 150 to 750 cfs compared to the existing range of 130 to 740 cfs. The change in low-end operating range means that more water would remain in the river at low flow periods, rather than be diverted through the project. The 10 cfs increase at the high end of the operating range would not have an effect on the aquatic environment because stream flows of 750 cfs, or higher, are generally accompanied by dam overflow through the bypass reach that would mitigate any effects brought about by the change in operation discharge.

The exemptee's proposed turbine would rotate at 60 revolutions per second slower than the existing turbine and would have one less blade. Pursuant to a NMFS request the City conducted an analysis on fish strikes with the proposed turbine design. The results of the analysis show the new configuration would result in an 11.2% reduction in fish struck by turbine blades. This would provide additional long-term benefits for fish that are inadvertently entrained in the turbine.

Regardless of the flow range, the proximity of the turbine to the existing fish passage structures creates attraction currents that confuse fish when they are selecting a route through the project area, therefore jeopardizing safe and effective passage. The FWS, NMFS, New Hampshire DFG, and the New Hampshire DES have collectively agreed to the requirement to develop and execute the FPFIP. The FPIP would provide a long-term beneficial effect by providing additional screening, to reduce the number of fish entrained in the turbine; more directed attraction flows, to guide fish to the passage system; and providing other possible solutions to effectively pass fish through the project. The FPFIP is currently being drafted with an agreed upon timeline that would complete construction of new downstream passage facilities by 2023, and upstream passage facilities by December of 2029.[17] The FPFIP requires agency approval before being approved by the Commission. The final FPFIP shall meet the objectives of the Merrimack River Watershed Comprehensive Plan for Diadromous Fishes by improving

[17] See Appendix I (FPIP Implementation Table) of the FWS Revised Terms and Conditions for Amendment of Exemption Application filed on November 19, 2021.

both upstream and downstream fish passage.[18] The development and execution of the FPFIP therefore constitutes a significant long-term benefit to aquatic resources.

The Commission staff, therefore, concludes that proposed construction would have some minor negative effects on the aquatic environment, but these effects would be temporary. The development, approval, and implementation of the FPFIP would have significant positive long-term effects on the aquatic environment.

5.1.5 Terrestrial Resources

AFFECTED ENVIRONMENT

The project area is dominated by existing commercial and industrial development. Centuries of land-use driven ground disturbance combined with the City's 2020 invasive species control project has left the project area fairly denuded of vegetation. The list of invasive species targeted for control was not available, however the soils and climate of the project area present an opportunity for a wide array of invasive and/or non-native plants.

The project area may provide marginal habitat for avian species including waterfowl and shorebirds. Given the urban setting, any wildlife species using the riparian edge habitat available within the immediate project area are expected to be tolerant of human development and activity and/or have a sporadic and transitory use. There are no known wetlands where ground disturbing activities would occur.

ENVIRONMENTAL EFFECTS

The ground disturbing activities related to the proposed construction would only affect areas immediately adjacent to the dam and powerhouse. The City plans to continue to operate the project as required by the existing project exemption and the WQC issued March 9, 2022. Since there are no wetlands in the affected area and very little existing habitat for wildlife, the proposed action is expected to have minimal to no effects on terrestrial resources.

5.1.6 Threatened and Endangered Species

Commission staff accessed the IPaC (FWS 2019) to determine the presence of threatened and endangered species at the project. Only one species of concern was returned from the web-based query, the northern long-eared bat. Additionally, staff

[18] Merrimack River Watershed Comprehensive Plan for Diadromous Fishes, submitted June 17, 2021 and approved June 21, 2021.

accessed any potential effects on the state endangered Blanding's turtle, due to the concerns expressed by the Ko'asek (Co'wasuck) Traditional Band of the Sovereign Abenaki Nation.

Northern Long-Eared Bat

AFFECTED ENVIRONMENT

The northern long-eared bat, federally listed as threatened, is a medium-sized bat with a body length of 3 to 3.7 inches, and a wingspan of 9 to 10 inches. Traditional ranges include much of the eastern and north central United States, and all Canadian provinces from the Atlantic Ocean west to the southern Yukon Territory and eastern British Columbia, coinciding with the greatest abundance of forested areas (FWS, 2015). New Hampshire DFG states that the northern long-eared bats in New Hampshire tend to be less common (fewer than 1% of hibernating bats) in the large hibernacula such as Mascot Lead Mine, intermediate (less than 20%) at medium-sized mines such as Paddock Cooper Mine and Mt. Kearsarge Lead Mine, and relatively abundant in small hibernacula such as Bristol Mine, Beebe River Mine, and the Red Mine (New Hampshire DFG, 2015).

New Hampshire DFG states that seven mines and one artificial northern long-eared bat hibernacula have been identified in New Hampshire. The New Hampshire Natural Heritage Survey has ranked all known northern long-eared bat hibernacula according to habitat quality and prospects for long-term conservation. Of the known hibernacula in New Hampshire, none are located in Hillsborough County. Numbers of northern long-eared bats have declined by up to 99% in the Northeast due to the white-nose syndrome (FWS, 2015).[19] No critical habitat has been designated for the northern long-eared bat. The closest known population is more than 25 miles from the project.

Additionally, note that on March 23, 2022, the FWS published a proposal to reclassify the northern long-eared bat as endangered. The U.S. District Court for the District of Columbia has ordered the FWS to complete a new final listing determination for the northern long-eared bat by November 2022. The bat, currently listed as threatened, faces extinction due to the range-wide impacts of white-nose syndrome.

ENVIRONMENTAL EFFECTS

[19] White-nose syndrome is a fungal infection that agitates hibernating bats, causing them to rouse prematurely and burn fat supplies. Mortality results from starvation or in some cases exposure.

Under the proposed amendment, construction, operation, and maintenance of the project would not disturb or injure nearby roosting or foraging northern long-eared bats. Land disturbance for construction of the project would occur in a previously disturbed area, adjacent to the existing powerhouse. No tree cutting would be needed for the proposed construction. Furthermore, there is no information suggesting that the northern long-eared bat occurs within the limited area of disturbance. Therefore, Commission staff concludes that construction and operation of the Jackson Mills Project, as proposed, would have no effect on the northern long-eared bat, per Rule 4(d).

Blanding's Turtle

AFFECTED ENVIRONMENT

The Blanding's turtle is listed as a New Hampshire endangered species however, it has no federal listing. The adult Blanding's turtle has a 7 to 9 inch body length with yellow speckles that often run together to from streaks on the carapace. It is easily identified when basking from its characteristic yellow throat and chin. It prefers wetland habitat with permanent shallow water and emergent vegetation such as marshes, swamps, bogs, and ponds. These turtles use vernal pools extensively during the spring. Although these turtles may travel within a wide range of terrestrial habitats, they prefer to utilize vernal pools, and slow rivers and streams to reach other wetlands.

Within the state of New Hampshire, the range of Blanding's turtle is predominantly in the southeast. There are known populations of Blanding's turtles within Hillsborough County and the city of Nashua, New Hampshire.

ENVIRONMENTAL EFFECTS

The City conducted a survey of the proposed work area and concluded that there was no suitable habitat at, or effected by, the project. The City consulted with the New Hampshire DFG and on May 5, 2020, the agency concurred. According to New Hampshire DFG, the closest known habitat that supports Blanding's turtle is over 0.5 mile away across heavily urbanized terrain. Therefore, Commission staff concludes that construction and operation of the Jackson Mills Project, as proposed, would have no effect on the Blanding's turtle.

5.1.7 Recreation Resources

AFFECTED ENVIRONMENT

There are no recreation resources within the project boundary. The nearest recreational sites are Bicentennial Park, approximately 0.16 RM upstream, a rail bridge with a dedicated foot path, approximately 0.23 RM downstream, and a river trail at the

crest of the south bank. All of these recreation facilities are owned by the City but managed by a separate department than those managing the project. There is no access for canoeing/kayaking at the project however, a boat barrier and catch cables are present upstream of the project's dam, for public safety.

Construction parking, equipment staging, and material storage would be in a parking area near the foot bridge abutment but would not impede recreational traffic flow. The City's contractor has requested access to the rail/foot bridge during the construction process to conduct visual monitoring of the construction process, but this monitoring would not prevent recreation access to the foot bridge.

ENVIRONMENTAL EFFECTS

The City's proposed construction activities would be limited to weekday and daylight operations. Because the predominant recreational activities occur in the evening hours of the weekday and throughout the weekend, the proposed construction cycle would minimize impacts to recreation on adjacent recreational resources. Recreationists participating in activities during weekday hours would have limited expectations of a quiet and uncongested experience given the project's downtown location. An increase in construction-related traffic is expected due to the proposed construction, however this increase would likely be undetectable given the commercial/industrial land use adjacent to the project area. An increase in parking congestion and noise near the pedestrian footbridge is likely but would be limited to the construction period. Bicentennial Park is visually obstructed from the construction site by a bend in the river. Although some noise from the construction site may carry to this park, the effect would be short-term and minimal. Operation of the new turbine would be commensurate with the existing operation and therefore create no significant alteration in effects to recreational resources. Therefore, Commission staff find that the construction and operation of the proposed project would not have an adverse effect on recreational access or opportunities near the project.

5.1.8 Cultural and Historic Resources

Section 106 of the NHPA of 1966, as amended, requires the Commission evaluate the potential effects on properties listed or eligible for listing on the National Register. Such properties listed or eligible for the National Register are called historic properties. In this case, the Commission must take into account whether any historic property could be affected within the project's area of potential of effects (APE).

AFFECTED ENVIRONMENT

No known archaeological or historic resources are reported in the project area. A formal determination of eligibility, conducted in 2012 by the City and the New

Hampshire SHPO, found that no portion of the project meets the criteria for listing in the National Register due to loss of integrity of the dam, powerhouse, and former mill buildings.

ENVIRONMENTAL EFFECTS

On August 11, 2020, the New Hampshire SHPO concluded, by letter, that no historic properties would be affected due to the proposed amendment.[20] The heavily industrialized nature of the riparian community within the APE are unlikely to contain any unidentified cultural resources. Therefore, Commission staff find that the construction and operation of the proposed project would not have an adverse effect on cultural and historic resources of the project.

5.1.9 Land Use and Aesthetic Resources

AFFECTED ENVIRONMENT

The project is completely contained within the city limits of Nashua, New Hampshire. As of the 2020 census, the city had a population of 91,322 residents, with a population density of 2,962 per square mile. The original mill building is no longer part of the project but is attached to the powerhouse and currently serves as a restaurant. The city library is located to the south of the dam abutment. The land uses along the north side of the river to the east of the restaurant are predominantly industrial and to the west they are commercial. On the south side of the river, the land usage to the east of the library is predominantly urban residential with commercial uses lying to the west. Along both banks above and below the dam the vegetation consists of planted ornamentals and those types typical of disturbed ground.

Aesthetic features at the project include views of the reservoir, river, dam, powerhouse, and surrounding non-project mill buildings. Invasive species management conducted by the City in 2020 cleared invasive plant species from the riparian corridor as well as the trees and vegetation that were impacted by the invasive species. This left clear site lines, from the city to the river, as very little vegetation remains in the project area proximal to the dam. The City proposes to stage construction materials and equipment in an adjacent parking lot to the north and east of the construction area. These materials would be moved from the staging area to the construction site via an already existing access road that runs parallel to the river along the north bank.

[20] See appendix A (NH Division of Historical Resources / Section 106 Documentation) of the application for amendment, filed January 31, 2022.

ENVIRONMENTAL EFFECTS

Visual and noise impacts are likely during the proposed construction period. The cofferdam and dewatered portion of the streambed would be visible from vantage points along the riparian corridor, adjacent to and downstream of the construction zone. The proposed action involves visible destruction and reconstruction to the existing, non-historic, powerhouse. The footprint of construction would be within a previously disturbed areas within the project boundary with some construction material and equipment staging in an adjacent industrial area. Construction best management practices would mitigate sediment flows into the river and there are no planned changes to reservoir levels or stream flow. Safe viewing of the project's aesthetic resources, and construction process would continue to be available from the adjacent public library and City's' trail system south of the construction area.

The reconstructed powerhouse would not be a replica of the existing powerhouse but would comport to the existing aesthetics. Proposed excavations to the tailrace would be shallow and occur underwater, and therefore would not be visible on return to project operation. No changes to land use or aesthetic resources are expected after the end of the construction period.

Although the exemptee's proposed amendment involves visible modifications to the powerhouse, Commission staff finds that the proposed action would not significantly affect existing land use and aesthetic qualities and resources at the project.

5.1.10 Environmental Justice

AFFECTED ENVIRONMENT

According to the U.S. Environmental Protection Agency (EPA), "environmental justice is the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies." Fair treatment means that no group of people should bear a disproportionate share of the negative environmental consequences resulting from industrial, governmental, and commercial operations or policies (EPA, 2021). Meaningful involvement means:

1. people have an opportunity to participate in decisions about activities that may affect their environment and/or health;

2. the public's contributions can influence the regulatory agency's decision;

3. community concerns will be considered in the decision-making process; and

4. decision makers will seek out and facilitate the involvement of those potentially affected (EPA, 2021).

In conducting NEPA reviews of proposed hydropower projects, the Commission follows the instruction of Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low Income Populations*, which directs federal agencies to identify and address "disproportionately high and adverse human health or environmental effects" of their actions on minority and low-income populations (i.e., environmental justice communities).[21] Executive Order 14008, *Tackling the Climate Crisis at Home and Abroad*, also directs agencies to develop "programs, policies, and activities to address the disproportionately high and adverse human health, environmental, climate-related and other cumulative impacts on disadvantaged communities, as well as the accompanying economic challenges of such impacts."[22] The term "environmental justice community" includes disadvantaged communities that have been historically marginalized and overburdened by pollution.[23] Environmental justice communities include, but may not be limited to minority populations, low-income populations, or indigenous peoples.[24]

Commission staff used the Federal Interagency Working Group on Environmental Justice & NEPA Committee's publication, *Promising Practices for EJ Methodologies in NEPA Reviews* (*Promising Practices*) (EPA, 2016), which provides methodologies for conducting environmental justice analyses throughout the NEPA process for this project. Commission staff's use of these methodologies is described throughout this section.

Commission staff used EJScreen 2.0, EPA's environmental justice mapping and screening tool, as an initial step to gather information regarding minority and/or low-income populations; potential environmental quality issues; environmental and demographic indicators; and other important factors. EPA recommends that screening tools, such as EJScreen, be used for a "screening-level" look and a useful first step in understanding or highlighting locations that may require further review.

Meaningful Engagement and Public Involvement

[21] Exec. Order No. 12,898, 59 Fed. Reg. 7629, at 7629, 7632 (Feb. 11, 1994).

[22] Exec. Order No. 14,008, 86 Fed. Reg. 7619, at 7629 (Jan. 27, 2021).

[23] *Id*.

[24] See USEPA, *EJ 2020 Glossary* (Sep. 6, 2022), https://www.epa.gov/environmentaljustice/ej-2020-glossary.

The Council on Environmental Quality's (CEQ) *Environmental Justice Guidance Under the National Environmental Policy Act (CEQ Environmental Justice Guidance)* (CEQ, 1997) and *Promising Practices* recommend that federal agencies provide opportunities for effective community participation in the NEPA process, including identifying potential effects and mitigation measures in consultation with affected communities and improving the accessibility of public meetings, crucial documents, and notices.[25] They also recommend using adaptive approaches to overcome linguistic, institutional, cultural, economic, historical, or other potential barriers to effective participation in the decision-making processes of federal agencies. In addition, Section 8 of Executive Order 13985, *Advancing Racial Equity and Support for Underserved Communities Through the Federal Government*, strongly encourages independent agencies to "consult with members of communities that have been historically underrepresented in the Federal Government and underserved by, or subject to discrimination in, federal policies and programs."

As discussed in section 4.2.2 *Public Comments* of this EA, there have been opportunities for public involvement during the Commission's review process, although the record does not demonstrate that these opportunities were targeted at engaging environmental justice communities. The Commission's communication and involvement with the surrounding communities began when the Notice of Application Accepted for Filing and Soliciting Comments, Motions to Intervene, and Protests was issued on March 3, 2022, which established a 30-day comment period and intervention deadline. Commission staff addressed the comments received on the amendment application in section 4.2.2 *Public Comments* of this EA.

All documents that form the administrative record for these proceedings are available to the public electronically through the internet on the FERC's website (www.ferc.gov). We recognize that not everyone has internet access or is able to file electronic comments. Anyone may comment to FERC about the proceeding, either in writing or electronically. Commission staff has consistently emphasized with the public that all comments receive equal weight by FERC staff for consideration in the EA

Regarding future engagement and involvement, in 2021, the Commission established the Office of Public Participation (OPP) to support meaningful public engagement and participation in Commission proceedings. OPP provides members of the public, including environmental justice communities, landowners, Tribal citizens, and consumer advocates, with assistance in FERC proceedings—including navigating

[25] CEQ, *Environmental Justice: Guidance Under the National Environmental Policy Act*, 4 (Dec. 1997) (CEQ's *Environmental Justice Guidance*), https://www.energy.gov/sites/default/files/nepapub/nepa_documents/RedDont/GCEQ-EJGuidance.pdf.

Commission processes and activities relating to the Project. For assistance with interventions, comments, requests for rehearing, or other filings, and for information about any applicable deadlines for such filings, members of the public are encouraged to contact OPP directly at 202-502-6592 or OPP@ferc.gov for further information.

Identification of Environmental Justice Communities

According to the CEQ*'s Environmental Justice Guidance* and *Promising Practices*, minority populations are those groups that include: American Indian or Alaskan Native; Asian or Pacific Islander; Black, not of Hispanic origin; or Hispanic. Following the recommendations set forth in *Promising Practices*, FERC uses the **50 percent** and the **meaningfully greater analysis** methods to identify minority populations. Using this methodology, minority populations are defined in this EA where either: (a) the aggregate minority population of the block groups in the affected area exceeds 50 percent; or (b) the aggregate minority population in the block group affected is 10 percent higher than the aggregate minority population percentage in the county. The guidance also directs low-income populations to be identified based on the annual statistical poverty thresholds from the U.S. Census Bureau. Using *Promising Practices'* **low-income threshold criteria** method, low-income populations are identified as census block groups where the percent of low-income population in the identified block group is equal to or greater than that of the county. Here, Commission staff selected Hillsborough County, New Hampshire, as the comparable reference community to ensure that affected environmental justice communities are properly identified. A reference community may vary according to the characteristics of the particular project and the surrounding communities.

Table **1** identifies the minority populations (by race and ethnicity) and low-income populations within New Hampshire, Hillsborough County, and census block groups[26] within vicinity of the project site. For this project, staff chose a 1-mile radius around areas impacted by the amendment (i.e., powerhouse, and cofferdam). Staff found that a 1-mile radius is the appropriate unit of geographic analysis given the limited scope of the proposed amendment and concentration of project-related effects near the powerhouse. To ensure we are using the most recent available data, we use U.S. Census American

[26] Census block groups are statistical divisions of census tracts that generally contain between 600 and 3,000 people. U.S. Census Bureau. 2022. Glossary: Block Group. Available online at: https://www.census.gov/programs-surveys/geography/about/glossary.html#par_textimage_4. Accessed October 2022.

Community Survey File# B03002 for the race and ethnicity data and Survey File# B17017 for poverty data at the census block group level.[27]

Within the 1-mile radius, staff identified twenty-seven total block groups of which twenty-two block groups are environmental justice communities. Figure **3** provides a geographic representation of these communities relative to the area impacted by the amendment. Table **1** provides a breakdown of which block groups meet the criteria for inclusion as an environmental justice community and shows which metric triggered that inclusion.

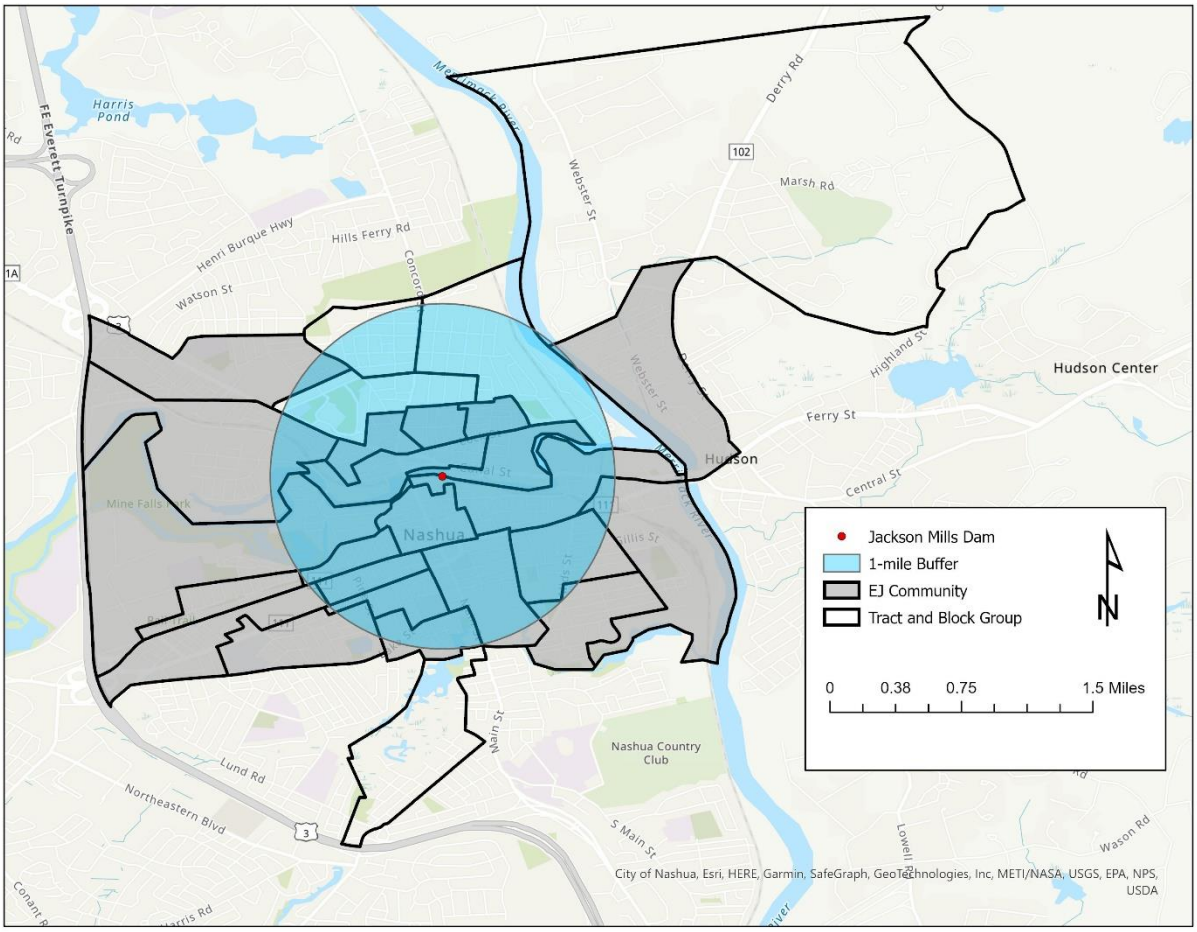

Figure 3. Block Groups within 1-mile of the proposed work area (Source: Staff).

[27] U.S. Census Bureau, American Community Survey 2019 ACS 5-Year Estimates Detailed Tables, File# B17017, *Poverty Status in the Past 12 Months by Household Type by Age of Householder*, https://data.census.gov/cedsci/table?q=B17017; File #B03002 *Hispanic or Latino Origin by Race*, https://data.census.gov/cedsci/table?q=b03002.

Table 1. Minority populations by race and ethnicity and low-income populations within one-mile of the proposed work area.

Demographic Composition within the Work Area											
State/County/Census Tract and Block Group	Race and Ethnicity Columns										Low-Income Column
	Total Population	White[a]	Black or African American[a]	American Indian & Alaska Native[a]	Asian[a]	Native Hawaiian & Other Pacific Islander[a]	Some Other Race[a]	Two or More Races[a]	Hispanic or Latino (any race)[a]	Total Minority Population[a]	House-holds in Poverty[b]
State of New Hampshire	1,348,124	90.1%	1.40%	0.1%	2.7%	>0.1%	0.1%	1.8%	3.7%	9.9%	7.9%
Hillsborough County, NH	413,035	84.4%	2.3%	0.1%	4.0%	>0.1%	0.2%	2.1%	6.8%	15.0%	7.8%
Census Tract 010400, Block Group 1	1,291	98.1%	0.0%	0.0%	1.9%	0.0%	0.0%	0.0%	0.0%	1.9%	0.0%
Census Tract 010400, Block Group 2	781	93.0%	0.0%	0.0%	0.0%	0.0%	1.8%	1.9%	3.3%	7.0%	0.0%
Census Tract 010400, Block Group 3	1,017	97.7%	0.0%	0.0%	2.3%	0.0%	0.0%	0.0%	0.0%	2.3%	3.4%
Census Tract 010400, Block Group 4	1,080	66.6%	0.0%	0.0%	0.0%	0.0%	0.0%	9.4%	24.0%	33.4%*	11.7%*
Census Tract 010400, Block Group 5	1,018	89.7%	0.3%	0.0%	3.9%	0.0%	0.0%	5.6%	0.5%	10.3%	10.2%*
Census Tract 010500, Block Group 1	372	59.4%	10.8%	0.0%	0.0%	0.0%	0.0%	9.7%	20.2%	40.6%*	19.0%*
Census Tract 010500, Block Group 2	900	64.3%	2.6%	0.0%	2.1%	0.0%	0.0%	0.0%	31.0%	35.7%*	19.8%*
Census Tract 010500, Block Group 3	569	55.5%	12.8%	0.0%	8.8%	1.9%	0.0%	11.1%	9.8%	44.5%*	19.0%*
Census Tract 010500, Block Group 4	949	58.1%	0.0%	1.1%	12.9%	0.0%	0.0%	6.3%	21.7%	41.9%*	18.6%*
Census Tract 010500, Block Group 5	1,261	60.7%	0.0%	0.0%	0.8%	0.0%	0.0%	5.2%	33.3%	39.3%*	21.1%*
Census Tract 010600, Block Group 1	1,393	52.9%	0.0%	0.0%	4.4%	0.0%	0.0%	0.0%	42.7%	47.1%*	17.1%*
Census Tract 010600, Block Group 2	1,190	77.3%	0.0%	0.0%	4.0%	0.0%	0.0%	0.3%	18.3%	22.7%*	11.2%*
Census Tract 010600, Block Group 3	1,623	68.5%	16.9%	0.0%	0.0%	0.0%	0.0%	0.0%	14.6%	31.5%*	0.0%

Demographic Composition within the Work Area											
State/County/Census Tract and Block Group	Race and Ethnicity Columns										Low-Income Column
	Total Population	White[a]	Black or African American[a]	American Indian & Alaska Native[a]	Asian[a]	Native Hawaiian & Other Pacific Islander[a]	Some Other Race[a]	Two or More Races[a]	Hispanic or Latino (any race)[a]	Total Minority Population[a]	House-holds in Poverty[b]
Census Tract 010600, Block Group 4	1,347	67.3%	4.2%	0.0%	5.7%	0.0%	0.0%	1.3%	21.4%	32.7%*	34.2%*
Census Tract 010700, Block Group 1	691	68.5%	4.6%	0.0%	4.1%	0.0%	0.0%	8.1%	14.8%	31.5%*	29.0%*
Census Tract 010700, Block Group 2	887	82.1%	2.7%	0.0%	0.0%	0.0%	0.0%	10.8%	4.4%	17.9%*	34.2%*
Census Tract 010800, Block Group 1	1,373	81.9%	0.0%	0.0%	6.7%	0.0%	0.0%	0.4%	10.9%	18.1%*	10.4%*
Census Tract 010800, Block Group 2	1,301	46.3%	2.1%	0.0%	0.0%	0.0%	0.0%	0.0%	51.7%	53.7%*	7.4%
Census Tract 010800, Block Group 3	1,430	29.8%	2.9%	0.0%	0.0%	0.0%	0.0%	0.0%	67.3%	70.2%*	45.8%*
Census Tract 010800, Block Group 4	1,964	45.2%	1.2%	0.0%	8.7%	0.0%	0.0%	10.5%	34.5%	54.8%*	40.2%*
Census Tract 010800, Block Group 5	1,295	54.8%	16.5%	0.0%	1.6%	0.0%	0.0%	1.8%	25.3%	45.2%*	24.7%*
Census Tract 010800, Block Group 6	762	54.7%	0.0%	5.4%	0.0%	0.0%	0.0%	0.0%	39.9%	45.3%*	17.7%*
Census Tract 010900, Block Group 1	1,056	43.9%	9.0%	0.0%	4.3%	0.0%	0.0%	0.0%	42.8%	56.1%*	5.2%
Census Tract 010900, Block Group 2	1,804	65.3%	1.6%	0.0%	1.6%	0.0%	0.0%	6.5%	25.1%	34.7%*	21.8%*
Census Tract 011000, Block Group 4	864	86.0%	4.4%	0.0%	0.0%	0.0%	0.0%	0.0%	9.6%	14.0%	0.3%
Census Tract 012100, Block Group 2	3,551	94.8%	0.0%	0.0%	4.3%	0.0%	0.0%	0.4%	0.5%	5.2%	1.1%
Census Tract 012200, Block Group 2	1,743	82.2%	0.7%	0.0%	2.1%	1.9%	0.0%	1.0%	12.0%	17.8%*	15.4%*

A blue shaded cell with red text and an * denotes a qualifying value for inclusion as an environmental justice community.
[a] U.S. Census Bureau, 2019a
[b] U.S. Census Bureau, 2019b

ENVIRONMENTAL EFFECTS

No entity provided comments or recommendations regarding the effects of the project on environmental justice communities in response to the Commission's public notice. The project and all proposed construction work would be located within identified environmental justice (EJ) communities within census tract 010600 block group 1 and census tract 010500 block group 4. An increase in construction-related activities would also be expected in the adjacent census tract 010500 block group 5, as this would serve as the principal access corridor. The area immediately adjacent to the construction zone has a high density of commercial and industrial properties, comprising approximately 63% of the surrounding buildings. Residential buildings are in the vicinity, including a condominium building immediately upstream of the project. Construction traffic and noise would be the likely source of concerns to existing environmental justice communities.

As noted throughout Section 5.1 the proposed project would not result in any permanent changes to project operations and therefore the project would have no operational adverse effects on environmental justice communities for any environmental resources. As discussed in Section 5.1.9 the powerhouse will be demolished as part of the construction process. The reconstructed powerhouse would not be a replica of the existing powerhouse but would comport to the existing aesthetics and therefore have no long-term adverse impacts on visual resources.

With respect to temporary construction effects on traffic, as noted above and in Section 5.1.9, the project is located downtown and adjacent to many commercial and industrial properties, where baseline traffic density is high during normal business hours. Accordingly, it would be difficult to perceive project-related construction traffic effects from the effects of the existing high traffic density. This is particularly true where construction vehicles will be limited in number and the exemptee proposes to limit construction to daylight hours so that the associated traffic would be restricted to the existing periods of high use in the affected area. Staff concludes there will be no perceptible adverse impacts related to traffic on environmental justice communities.

As noted in section 5.1.7, there are no anticipated adverse recreational effects. Environmental justice communities may rely more heavily on non-motorized travel paths, such as the trail network adjacent to the project area. Some construction monitoring may take place from the foot bridge, however these monitoring events are compact in space and time, and would therefore not restrict the ability to utilize the trail for travel. Trail access would provide opportunities for the local community to view construction events and progress. Staff concludes there will be no adverse recreational impacts on environmental justice communities.

Construction activities would increase the ambient noise surrounding the work

area and has the potential to affect the area EJ communities. Approximately 25% of the surrounding buildings are classified as residential, one within 200 feet of the construction area. As noted above, construction includes demolishing and rebuilding the powerhouse, construction of a temporary cofferdam, and the removal of bedrock in the tailrace. Construction activities associated with the project would be performed with standard heavy equipment such as track-excavators, backhoes, cranes, bulldozers, concrete trucks, and dump trucks. Noise would also be generated by trucks and other light vehicles traveling in and near construction areas. The changing number and type of construction equipment at construction sites would result in varying levels of noise. Noise levels in environmental justice communities would be highest at residences in the immediate vicinity of construction activities and would diminish with distance from the work areas. Substantially more noise would be produced during the powerhouse demolition and bedrock removal portions of construction. There will be a temporary, moderate, adverse effects on environmental justice communities given the residences in close proximity to the sound produced by demolition and high noise intensity bedrock removal. Commission staff concludes that the effects of these sounds would be temporary and moderately significant.

Commission staff recommends limiting construction activities to 7 a.m. to 7 p.m. Monday through Saturday to eliminate construction noise at night when noise effects would be the most disruptive to residents and would also provide a break from construction noise during the weekend; however, noise would still be temporarily elevated during the daytime 6 days per week throughout the construction period. Further Commission staff recommend the exemptee provide public notice (e.g., town website, local newspaper, mailers, etc.), in English and Spanish, at least two weeks prior to the start of the high noise volume construction actions of powerhouse demolition and bedrock removal. These noise levels would have a temporary adverse effect on residences within environmental justice communities that are close to the construction site. Nonetheless, with staff's recommended time limits on construction, and public notice, the noise effects of project construction on nearby residents within environmental justice communities would be less than significant.

With respect to construction impacts on aesthetics, the exemptee proposed to remove all construction related debris. Commission staff therefore conclude that following the installation of the replacement turbine the construction area would return conditions nearly identical to existing conditions. Given the scale, nature, and duration of construction activities, Commission staff concludes that there are temporary adverse effects from construction related to visual resources on environmental justice communities, however these effects are not significant.

Determination of Disproportionately High and Adverse Impacts on Environmental Justice Communities

In consideration of the included census data, the scope of the proposed project, and the existing baseline conditions, we conclude that the project would have construction-related adverse effects on noise and visual resources. Because these adverse impacts would be predominately borne by environmental justice communities, they would result in a disproportionately high and adverse impact on the neighboring environmental justice communities. However, the effects would be short-term and temporary and at a level that is less than significant.

5.2 Cumulative Effects

Aside from the proposed action, the foreseeable federal actions proximal to the project are the implementation of additional fish passage pursuant to the Merrimack River Watershed Comprehensive Plan for Diadromous Fishes. This includes improved fish passage at the remaining two hydro operations on the Nashua River (Mine Falls Hydroelectric Project No. 3442 and Pepperell Hydroelectric Project No. 12721), upstream of the Jackson Mills Project. The next most downstream dam, the Lowell Hydroelectric Project No. 2790 (Lowell Project), is on the mainstem Merrimack River. The licensee for the Lowell Project, Boott Hydropower, LLC, has filed an Offer of Settlement for Fish Passage that will result in greater upstream passage toward the Jackson Mills Project.[28] Final implementation of increased fish passage throughout the Nashua River and lower Merrimack River is estimated to be completed within the next decade.

The Pepperell Hydroelectric Project recently received approval of an administrative amendment to remove the option to add a low flow generator, with no expected environmental effects. The Lowell project is currently undergoing the relicensing process so final protection, mitigation, and/or enhancement measures required by any new license are unknown. Commission staff is not aware of any other proposed actions that may affect the environment proximal to the Jackson Mills Project.

Long-term cumulative effects are therefore principally derived by an increase in diadromous fish passage throughout the Jackson Mills Project connected watershed. Commission staff therefore conclude that the proposed action would have an incremental, positive cumulative effect on environmental resources in combination with past, present, and reasonably foreseeable future federal projects.

[28] Lowell Hydroelectric Project (FERC No. 2790-074) Offer of Settlement for Fish Passage, filed with the Commission on August 22, 2022.

6.0 CONCLUSIONS AND RECOMMENDATIONS

Under the proposed amendment, the exemptee would deconstruct most of the existing powerhouse, remove the existing turbine, excavate the bedrock at the tailrace, replace the turbine, and reconstruct the powerhouse. The proposed best management practices during construction would mitigate adverse effects. Following the proposed construction, the exemptee would continue to operate the project as run-of-river, consistent with the existing exemption, though with a slightly wider hydraulic operating range. Any adverse effects at the project would be related to construction and therefore would be temporary in nature.

Commission staff finds that proposed project operations would not have significant adverse effects on the environment. However, the existing fish passage system does not meet the current mandatory condition of providing safe, timely, and effective fish passage. Although this mandatory condition would be modified if the proposed action were to be approved, the overarching fish passage goal remains the same. If this amendment application were to be approved, the development, approval, and implementation of the Fish Passage Facilities Improvement Plan would aid in the project meeting the goals of the Merrimack River Watershed Comprehensive Plan for Diadromous Fishes and would have a significant, positive long-term effect on migratory fish species.

Commission staff recommend the following modifications to the exemptee's proposal. Fish may be isolated, suffocated or otherwise stressed as the area within the cofferdam is dewatered. The City should, in consultation with the agencies, develop and submit for approval a Cofferdam Dewatering and Fish Protection Plan, to outline resource protection measures related to the completion of the cofferdam. Although not specified in agency conditions, so that the Commission remains informed of resource protection actions at the project, Commission staff recommend that the following plans and related reports are submitted for Commission review following agency approval: Operations, Flow, and Impoundment Compliance Monitoring Plan; Water Quality 5-Year Monitoring Plan; Fish Passage Facilities Improvement Plan; and the Invasive Species Control Plan should it become required by New Hampshire DES.

Construction noise would pose moderate, short-term, adverse effects that would be predominately borne by environmental justice communities. Commission staff recommend the following modifications to the exemptee's proposal. The exemptee restrict construction to 7 am to 7 pm, Monday through Saturday. Further the exemptee provide public notice (e.g., town website, local newspaper, mailers, etc.), in English and Spanish, at least two weeks prior to the start of the high noise volume construction actions of powerhouse demolition and bedrock removal. These efforts would mitigate sound disruptions to the EJ communities.

7.0 FINDING OF NO SIGNIFICANT IMPACT

The proposed amendment of exemption from licensing for the Jackson Mills Project to replace the existing turbine, and to operate the new turbine in run-of-river mode, consistent with the existing exemption, would allow the exemptee to generate electric power more efficiently than current operation. On the basis of our independent analysis, we find that the proposed exemption amendment would not constitute a major federal action significantly affecting the quality of the human environment.

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