New Hampshire Department of Environmental Services
WATER QUALITY CERTIFICATION
In Fulfillment of
NH RSA 485-A:12, III

Certification Number	WQC 2021-FERCX-001
Activity Name	Jackson Mills Hydroelectric Project (FERC Project No. 7590; NH Dam No. D165002)
Activity Location (of Project Dam)	Nashua, New Hampshire Hillsborough County
Potentially Affected Surface Waters Near the Activity (other affected surface waters may exist)	Nashua River: NHIMP700040402-05 (impoundment upstream of Dam) NHRIV700040402-09 (immediately downstream of Dam) Unnamed wetlands
Owner/Applicant	City of Nashua, New Hampshire
Agent Filing Application on Behalf of Owner/Applicant	John R. Lavigne Jr., P.E., CFM Senior Associate The H.L. Turner Group 27 Locke Road Concord, NH 03301
Applicable Federal License or Permit Requiring Section 401 water quality certification	Federal Energy Regulatory Commission (FERC) – Amendment to Exemption
Decision (subject to Conditions in Section E below)	Approved
Date of Issuance	March 7, 2022

A. INTRODUCTION

The City of Nashua, New Hampshire (aka, Applicant, City, Licensee) filed an application with the Federal Energy Regulatory Commission (FERC) for an Amendment of Exemption for the 1.0 megawatt (MW) Jackson Mills Hydroelectric Project located on the Nashua River in Nashua, New Hampshire (Project or Activity). The exemption amendment is for proposed improvements to the existing facility, which include, but are not limited to, removal and replacement of the existing turbine, generator, and controls. It is proposed to continue operating the Project as run-of-river. A more complete description of the Activity is provided in Findings D-4 through D-8 of this certification.

In accordance with the Section 401 of the federal Clean Water Act (CWA) and New Hampshire law (RSA 485-A:12, III) the Applicant has applied for a water quality certification (WQC or certification) from the New Hampshire Department of Environmental Services (NHDES). The purpose of the certification is to provide reasonable assurance that the proposed Activity will comply with New Hampshire surface water quality

standards (NH RSA 485-A:8 and NH Code of Administrative Rules Env-Wq 1700). Additional details are provided herein.

This certification includes the following:

A – Introduction
B – Decision
C – Facts and Law
D – Findings
E – Certification Conditions
F – Enforcement
G – Appeal Process
H – Signature and Date

Documents cited in this certification that were filed with FERC, can be accessed on the FERC elibrary by date or Accession Number for FERC Project No P-7590.

B. DECISION

Based on the facts, laws, findings, and conditions included herein, NHDES has determined that there is reasonable assurance that construction and operation of the proposed Activity will be conducted in a manner which will not violate New Hampshire surface water quality standards (RSA 485-A:8 and Env-Wq 1700) [1]. NHDES hereby issues this certification in accordance with RSA 485-A:12, III, subject to the conditions in Section E of this certification. This certification replaces the certification issued in 1983 (see Fact C-58).

C. FACTS AND LAWS

Federal 401 Certification Laws and Regulations

C-1. Section 401(a)(1) of the federal Clean Water Act (CWA) (33 U.S.C. §1341(a)(1)) requires any applicant for a federal license or permit to conduct any activity including, but not limited to, the construction or operation of facilities, which may result in any discharge into the navigable waters, shall provide the licensing or permitting agency a certification from the State in which the discharge originates or will originate…that any such discharge will comply with the applicable provisions of the CWA. The CWA provision most applicable for this project is compliance with state surface water quality standards. CWA section 303 (33 U.S.C § 1313).

C-2. Section 401(d) (33 U.S.C §1341(d)), of the CWA provides that: "Any certification provided under this section [401] shall set forth any effluent limitations and other limitations, and monitoring requirements necessary to ensure that any applicant for a Federal license or permit will comply with [enumerated provisions of the CWA]… and with any other appropriate requirement of State law set forth in such certification, and shall become a condition on any Federal license or permit subject to the provisions of this section."

C-3. According to a 1994 U.S. Supreme Court decision [2], although §401(a) refers to compliance of the

[1] This language is required by federal regulations. See Fact C-5.
[2] *PUD No. 1 of Jefferson County v. Washington Department of Ecology*, 511 U.S. 700, 712 (1994).

"discharge" with certain provisions of the CWA, §401(d) expands the State's authority in that it provides that any certification shall set forth "any effluent limitations and other limitations … necessary to ensure that any applicant" will comply with various provisions of the Act and appropriate state law requirements. That is "…401(d) is most reasonable read as authorizing additional conditions and limitations on the activity as a whole once the threshold condition, the existence of a discharge, is satisfied".

C-4. Federal regulations regarding Section 401 water quality certification may be found in the Code of Federal Regulations (CFR), Title 40, PART 121 (40 CFR 121) titled "State Certification of Activities Requiring a Federal License or Permit". On July 13, 2020, the U.S. Environmental Protection Agency (EPA) published final revisions to this rule in the Federal Register (Vol. 85, No. 134, pages 42210 to 42287), which became effective on September 11, 2020 (2020 Rule). As indicated on EPA's website, on October 21, 2021, the U.S. District Court for the Northern District of California issued an order[3] remanding and vacating EPA's 2020 Rule. The vacatur is nationwide. The order requires a temporary return to EPA's 1971 Rule until EPA finalizes a new certification rule.

C-5. 40 CFR 121.2(a)(3) through (5)) of EPA's 1971 Rule require the following to be included in certifications:

"(3) A statement that there is a reasonable assurance that the activity will be conducted in a manner which will not violate applicable water quality standards;
(4) A statement of any conditions which the certifying agency deems necessary or desirable with respect to the discharge of the activity; and
(5) Such other information as the certifying agency may determine to be appropriate."

The term "discharge" is not defined in EPA's 1971 Rule.

C-6. 40 CFR 121.2(b) of EPA's 1971 Rule states the following with regards to modification of certifications:

"(b) The certifying agency may modify the certification in such manner as may be agreed upon by the certifying agency, the licensing or permitting agency, and the Regional Administrator[4]."

C-7. The term "discharge," as applied under section 401 of the Clean Water Act means the potential for a discharge. It does not need to be a certainty, only that it may occur should the federal license or permit be granted. Further, the discharge does not need to involve the addition of pollutants (such as water released from the tailrace of a dam). As the U.S. Supreme Court has stated "[w]hen it applies to water, 'discharge' commonly means a 'flowing or issuing out'" and an addition of a pollutant is not "fundamental to any discharge." [5]

C-8. The CWA Section 502(7) (33 U.S.C. §1362(7)) defines "navigable waters," as "waters of the United States".

C-9. Waters of the United States are defined in 40 CFR §122.2.

State 401 Certification Law

[3] In re Clean Water Act Rulemaking, No. 20-cv-4636, et al. (Oct. 21, 2021)
[4] 40 CFR 121.1(d) of EPA's 1971 Rule defines "Regional Administrator" as "…the Regional designee appointed by the Administrator, Environmental Protection Agency".

[5] The Supreme Court case that is referred to is *S.D. Warren Co. v. Maine Board of Environmental Protection et al*, 547 U.S. 370, 126 S. Ct. 1853 (2006).

C-10. NH RSA 485-A:12, III, states: "No activity, including construction and operation of facilities, that requires certification under section 401 of the Clean Water Act and that may result in a discharge, as that term is applied under section 401 of the Clean Water Act, to surface waters of the state may commence unless the department certifies that any such discharge complies with the state surface water quality standards applicable to the classification for the receiving surface water body. The department shall provide its response to a request for certification to the federal agency or authority responsible for issuing the license, permit, or registration that requires the certification under section 401 of the Clean Water Act. Certification shall include any conditions on, modifications to, or monitoring of the proposed activity necessary to provide assurance that the proposed discharge complies with applicable surface water quality standards. The department may enforce compliance with any such conditions, modifications, or monitoring requirements as provided in RSA 485-A:22."

State Surface Water Quality Standards [6]

C-11. NH RSA 485-A:8 and Env-Wq 1700 (Surface Water Quality Standards), together fulfill the requirements of Section 303 of the Clean Water Act (CWA) (33 U.S.C 1313) that the State of New Hampshire adopt water quality standards consistent with the provisions of the CWA.

C-12. Env-Wq 1701.01 Purpose. "The purpose of these rules is to establish water quality standards for the state's surface water uses as set forth in RSA 485-A:8, I, II, III and V. These standards are intended to protect public health and welfare, enhance the quality of water and serve the purposes of the federal Clean Water Act, 33 U.S.C. 1251 et seq., and RSA 485-A. These standards provide for the protection and propagation of fish, shellfish, and wildlife, and provide for such uses as recreational activities in and on the surface waters, public water supplies, agricultural and industrial uses, and navigation in accord with RSA 485-A:8, I and II."

C-13. Env-Wq 1701.02, titled "Applicability," states that these rules shall apply to:

"(a) All surface waters; and
(b) Any person who:
(1) Causes any point or nonpoint source discharge of any pollutant to surface waters;
(2) Undertakes hydrologic modifications, such as dam construction or water withdrawals; or
(3) Undertakes any other activity that affects the beneficial uses or the water quality of surface waters."

C-14. Env-Wq 1702.44 defines surface waters as "surface waters of the state" as defined in NH RSA 485-A:2, XIV and waters of the United States as defined in 40 CFR 122.2.

NH RSA 485-A:2, XIV defines "surface waters of the state" as "perennial and seasonal streams, lakes, ponds and tidal waters within the jurisdiction of the state, including all streams, lakes, or ponds bordering on the state, marshes, water courses and other bodies of water, natural or artificial."

NH RSA 482-A:2, X. defines "Wetlands" as "[a]n area that is inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support, and that under normal conditions does support, a prevalence of vegetation typically adapted for life in saturated soil conditions."

[6] All New Hampshire surface water quality standards apply to the Activity. The standards specifically called out in the certification should not be interpreted as the only standards that may apply.

C-15. Env-Wq 1702.07 states that ""Best management practices" means those practices that are determined, after problem assessment and examination of all alternative practices and technological, economic and institutional considerations, to be the most effective practicable means of preventing or reducing the amount of pollution generated by point or nonpoint sources to a level compatible with water quality goals."

C-16. Env-Wq 1702.05 states that ""Benthic community" means the community of plants and animals that live on, over, or in the substrate of the surface water."

C-17. Env-Wq 1702.06 states that ""Benthic deposit" means any sludge, sediment, or other organic or inorganic accumulations on the bottom of the surface water."

C-18. Env-Wq 1702.08 states that ""Biological integrity" means the ability of an aquatic ecosystem to support and maintain a balanced, integrated, adaptive community of organisms having a species composition, diversity, and functional organization comparable to that of similar natural habitats of a region."

C-19. Env-Wq 1702.26 states that ""Mixing zone" means a defined area or volume of the surface water surrounding or adjacent to a wastewater discharge where the surface water, as a result of the discharge, might not meet all applicable water quality standards."

C-20. Env-Wq 1702.15 states that ""Cultural eutrophication" means the human-induced addition of wastes that contain nutrients to surface waters, resulting in excessive plant growth or a decrease in dissolved oxygen, or both."

C-21. Env-Wq 1702.17 states that ""Designated uses" means those uses specified in water quality standards for each water body or segment whether or not such uses are presently occurring. The term includes the following:

(a) "Swimming and other recreation in and on the water, meaning the surface water is suitable for swimming, wading, boating of all types, fishing, surfing, and similar activities;
(b) Fish consumption, meaning the surface water can support a population of fish free from toxicants and pathogens that could pose a human health risk to consumers;
(c) Shellfish consumption, meaning the tidal surface water can support a population of shellfish free from toxicants and pathogens that could pose a human health risk to consumers;
(d) Aquatic life integrity, meaning the surface water can support aquatic life, including a balanced, integrated, and adaptive community of organisms having a species composition, diversity, and functional organization comparable to that of similar natural habitats of the region;
(e) Wildlife, meaning the surface water can provide habitat capable of supporting any life stage or activity of undomesticated fauna on a regular or periodic basis; and
(f) Potential drinking water supply, meaning the surface water could be suitable for human intake and meet state and federal drinking water requirements after adequate treatment."

C-22. Env-Wq 1702.18 states that ""Discharge" means:

(a) "The addition, introduction, leaking, spilling, or emitting of a pollutant to surface waters, either directly or indirectly through the groundwater, whether done intentionally, unintentionally, negligently or otherwise; or
(b) The placing of a pollutant in a location where the pollutant is likely to enter surface waters."

C-23. Env-Wq 1702.22 states that ""Existing uses" means those uses, other than assimilation waste transport, that actually occurred in the waterbody on or after November 28, 1975, whether or not they are included in the water quality standards."

C-24. Env-Wq 1702.33 states that ""Nuisance species" means any species of flora or fauna living in or near the water whose noxious characteristics or presence in sufficient number or mass prevent or interfere with a designated use of those surface waters."

C-25. Env-Wq 1702.37 states that "Point source" means a discernible, confined, and discrete conveyance from which pollutants are or might be discharged, excluding return flows from irrigated agriculture or agricultural stormwater runoff. The term includes, but is not limited to, a pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, or vessel or other floating craft.

C-26. Env-Wq 1702.38 states that ""Pollutant" means "pollutant" as defined in 40 CFR 122.2." According to 40 CFR 122.2, "pollutant" means "dredged spoil, solid waste, incinerator residue, filter backwash, sewage, garbage, sewage sludge, munitions, chemical wastes, biological materials (except those regulated under the Atomic Energy Act of 1954, as amended (42 U.S.C. 2011 et seq.)), heat, wrecked or discarded equipment, rock, sand, cellar dirt, and industrial, municipal, and agricultural waste discharged into water."

C-27. Env-Wq 1703.01 titled "Water Use Classifications; Designated Uses" states the following:

(a) All surface waters shall be classified as provided in RSA 485-A:8, based on the standards established therein for class A and class B waters. Each classification shall identify the most sensitive use it is intended to protect.
(b) All surface waters shall be restored to meet the water quality criteria for their designated classification including existing and designated uses, and to maintain the chemical, physical, and biological integrity of surface waters.
(c) All surface waters shall provide, wherever attainable, for the protection and propagation of fish, shellfish and wildlife, and for recreation in and on the surface waters.
(d) Unless high or low flows are caused by naturally-occurring conditions, surface water quantity shall be maintained at levels that protect existing uses and designated uses.

C-28. Env-Wq 1703.03 titled "General Water Quality" includes the following:

(c)(1) "All surface waters shall be free from substances in kind or quantity that:
a. Settle to form harmful benthic deposits;
b. Float as foam, debris, scum or other visible substances;
c. Produce odor, color, taste or turbidity that is not naturally occurring and would render the surface water unsuitable for its designated uses;
d. Result in the dominance of nuisance species; or
e. Interfere with recreational activities."

C-29. Env-Wq 1703.06 includes water quality criteria for bacteria.

C-30. Env-Wq 1703.07 titled "Dissolved Oxygen" includes the following:

"(a) Class A waters shall have a dissolved oxygen content of at least 75% saturation, based on a daily average, and an instantaneous minimum of at least 6 mg/l at any place or time except as naturally occurs.
(b) Except as naturally occurs and subject to (c) and (e), below, class B waters shall have a dissolved oxygen content of:
(1) At least 75% of saturation, as specified in RSA 485-A:8, II, based on a daily average; and
(2) An instantaneous minimum dissolved oxygen concentration of at least 5 mg/l.
(c) In areas identified by the New Hampshire fish and game department (NHF&G) as cold water fish spawning areas of species whose early life stages are buried in the gravel on the bed of the surface water, the 7 day mean dissolved oxygen concentration shall be at least 9.5 mg/l and the instantaneous minimum dissolved oxygen concentration shall be at least 8 mg/l for the period from October 1 of one year to May 14 of the next year, provided that the time period shall be extended to June 30 for a specific discharge to a specific waterbody if modeling done in consultation with the NHF&G determines the extended period is necessary to protect spring spawners or late hatches of fall spawners, or both.
(d) Unless naturally occurring or subject to (a), above, surface waters within the top 25 percent of depth of thermally unstratified lakes, ponds, impoundments, and reservoirs or within the epilimnion shall contain a dissolved oxygen content of at least 75 percent saturation, based on a daily average and an instantaneous minimum dissolved oxygen content of at least 5 mg/l. Unless naturally occurring, the dissolved oxygen content below those depths shall be consistent with that necessary to maintain and protect existing and designated uses.
(e) As specified in RSA 485-A:8, III, waters in a temporary partial use area established under RSA 485-A:8, II as a surface water that is receiving a combined sewer overflow discharge shall contain not less than 5 parts per million of dissolved oxygen for the duration of the discharge and up to 3 days following cessation of the discharge."

C-31. Env-Wq 1703.08 titled "Benthic Deposits" states the following:

"(a) Class A waters shall contain no benthic deposits, unless naturally occurring.
(b) Class B waters shall contain no benthic deposits that have a detrimental impact on the benthic community, unless naturally occurring."

C-32. Env-Wq, 1703.09, 1703.10 and 1703.12 include water quality criteria for oil and grease, color and slicks, odors, and surface floating solids, respectively.

C-33. Env-Wq 1703.11 titled "Turbidity" states the following:

"(a) Class A waters shall contain no turbidity, unless naturally occurring.
(b) Class B waters shall not exceed naturally occurring conditions by more than 10 NTUs.
(c) Turbidity in waters identified in RSA 485-A:8, III shall comply with the applicable long-term combined sewer overflow plan prepared in accordance with Env-Wq 1703.05(c).
(d) For purposes of state enforcement actions, if a discharge causes or contributes to an increase in turbidity of 10 NTUs or more above the turbidity of the receiving water upstream of the discharge or otherwise outside of the visible discharge, a violation of the turbidity standard shall be deemed to have occurred."

C-34. Env-Wq 1703.13 titled "Temperature" states the following:

"(a) There shall be no change in temperature in class A waters, unless naturally occurring.
(b) Temperature in class B waters shall be in accordance with RSA 485-A:8, II, and VIII."

NH RSA-A:8, II states the following for Class B waters "Any stream temperature increase associated with the discharge of treated sewage, waste or cooling water, water diversions, or releases shall not be such as to appreciably interfere with the uses assigned to this class."

NH RSA-A:8, VIII states the following: "In prescribing minimum treatment provisions for thermal wastes discharged to interstate waters, the department shall adhere to the water quality requirements and recommendations of the New Hampshire fish and game department, the New England Interstate Water Pollution Control Commission, or the United States Environmental Protection Agency, whichever requirements and recommendations provide the most effective level of thermal pollution control."

C-35. Env-Wq 1703.14, titled "Nutrients" states the following:

"(a) Class A waters shall contain no phosphorous or nitrogen unless naturally occurring.
(b) Class B waters shall contain no phosphorous or nitrogen in such concentrations that would impair any existing or designated uses, unless naturally occurring.
(c) Existing discharges containing either phosphorous or nitrogen which encourage cultural eutrophication shall be treated to remove phosphorus or nitrogen to ensure attainment and maintenance of water quality standards.
(d) There shall be no new or increased discharge of phosphorous into lakes or ponds.
(e) There shall be no new or increased discharge(s) containing phosphorous or nitrogen to tributaries of lakes or ponds that would contribute to cultural eutrophication or growth of weeds or algae in such lakes and ponds."

C-36. Nutrient Numeric Thresholds: New Hampshire does not currently have numeric surface water quality citeria for nutrients (total phosphorus and total nitrogen) in regulation (i.e., Env-Wq 1700) but has established numeric thresholds for nutrient response parameters such as chlorophyll-a that are used for surface water quality assessments. These numeric thresholds are included in the State's Consolidated Assessment and Listing Methodology or CALM[7]. The CALM states the following regarding the numeric chlorophyll-a threshold established to protect the recreation designated use: "Excessive algal growth (high biomass and high chlorophyll-a values) can impair the public safety and aesthetic enjoyment of surface waters. The General Water Quality Criteria (Env-Wq 1703.03) require that surface waters be free of substances which: produce color or turbidity making the water unsuitable for the designated use, or interfere with recreational activities (Env-Wq 1703.03 (c)(1) c & e). For assessment purposes, chlorophyll-a concentrations in excess of 15 µg/L in fresh water and 20 µg/L in salt water are indicators of excessive algal growth that interferes with recreational activities."

C-37. Env-Wq 1703.18, titled "pH" states the following:

"(a) The pH of Class A waters shall be as naturally occurs.
(b) As specified in RSA 485-A:8, II, the pH of Class B waters shall be 6.5 to 8.0, unless due to natural causes.
(c) As specified in RSA 485-A:8, III, the pH of waters in temporary partial use areas shall be 6.0 to 9.0 unless due to natural causes."

C-38. Env-Wq 1703.19, titled "Biological and Aquatic Community Integrity" states the following:

[7] State of New Hampshire 2018 Section 305(b) and 303(d) Consolidated Assessment and Listing Methodology. New Hampshire Department of Environmental Services. R-WD-19-04. 2018 CALM (nh.gov).

"(a) All surface waters shall support and maintain a balanced, integrated and adaptive community of organisms having a species composition, diversity, and functional organization comparable to that of similar natural habitats of a region.
(b) Differences from naturally-occurring conditions shall be limited to non-detrimental differences in community structure and function."

C-39. Env-Wq 1703.21 titled "Water Quality Criteria for Toxic Substances" states the following:

"(a) Unless naturally occurring or allowed under part Env-Wq 1707, all surface waters shall be free from toxic substances or chemical constituents in concentrations or combinations that:

(1) Injure or are inimical to plants, animals, humans or aquatic life; or
(2) Persist in the environment or accumulate in aquatic organisms to levels that result in harmful concentrations in:
a. Edible portions of fish, shellfish, or other aquatic life; or
b. Wildlife that might consume aquatic life."

C-40. Antidegradation provisions are included in Env-Wq 1702 and Env-Wq 1708.

a. Env-Wq 1702.03 states that ""Antidegradation" means a provision of the water quality standards that maintains and protects existing water quality and uses."
b. Env-Wq 1708.02 states that "Antidegradation shall apply to: (a) Any proposed new or increased activity, including point source and nonpoint source discharges of pollutants, that would lower water quality or adversely affect the existing or designated uses; (b) Any proposed increase in loadings to a waterbody when the proposal is associated with existing activities; (c) Any increase in flow alteration over an existing alteration; and (d) Any hydrologic modifications, such as dam construction and water withdrawals."
c. Antidegradation applies to all parameters as evidenced by Env-Wq 1708.08 (Assessing Waterbodies) which states "The applicant shall characterize the existing water quality and determine if there is remaining assimilative capacity for each parameter in question."
d. According to Env-Wq 1708.03 (b), "A proposed discharge or activity shall not eliminate any existing uses or the water quality needed to maintain and protect those uses."
e. Env-Wq 1702.04 states that ""Assimilative capacity" means the amount of a pollutant or combination of pollutants that can safely be released to a waterbody without causing violations of applicable water quality criteria or negatively impacting uses."
f. Env-Wq 1708.08 describes the process for assessing waterbodies to determine if there is remaining assimilative capacity for each parameter in question.
g. Env-Wq 1708.09 titled "Significant or Insignificant Determination" states the following: "(a) Any discharge or activity that is projected to use 20% or more of the remaining assimilative capacity for a water quality parameter, in terms of either concentration or mass of pollutants, or volume or flow rate for water quantity, shall be considered a significant lowering of water quality.
(b) The department shall not approve a discharge or activity that will cause a significant lowering of water quality unless the applicant demonstrates, in accordance with Env-Wq 1708.10, that the proposed lowering of water quality is necessary to achieve important economic or social development in the area where the waterbody is located."
h. Env-Wq 1708.01(b)(1), in general, states that: For significant changes in water quality, where

the quality of the surface waters exceeds levels necessary to support propagation of fish, shellfish, and wildlife, and recreation in and on the water, that quality shall be maintained and protected unless the department finds, after full satisfaction of the intergovernmental coordination and public participation provisions and the analysis required by Env-Wq 1708.10, that allowing lower water quality is necessary to accommodate important economic or social development in the area in which the surface waters are located. In allowing such degradation or lower water quality, the department shall ensure water quality adequate to fully protect existing uses. Further, the department shall ensure that the highest statutory and regulatory requirements shall be achieved for all new and existing point sources and that all cost effective and reasonable best management practices for nonpoint source control shall be implemented.

i. Env-Wq 1708.01(b)(2) states the following: "The department shall not approve any proposed discharge or activity that might cause degradation or lower water quality, without such conditions as are necessary to ensure that: a. Water quality will be adequate to protect existing uses; b The highest statutory and regulatory requirements will be achieved for all new and existing point sources; and c All cost effective and reasonable best management practices for nonpoint source control will be implemented."

C-41. Env-Wq 1708.04 titled "Protection of Water Quality in ORW" states the following:

"(a) Surface waters of national forests and surface waters designated as natural under NH RSA 483:7-a, I, shall be considered outstanding resource waters (ORW).
(b) Subject to (c), below, water quality shall be maintained and protected in surface waters that constitute ORW.
(c) The department shall allow a limited point or nonpoint source discharge to an ORW only if:
    (1) The discharge will result in no more than temporary and short-term changes in water quality, wherein "temporary and short-term" means that degradation is limited to the shortest possible time;
    (2) The discharge will not permanently degrade water quality or result at any time in water quality lower than that necessary to protect the existing and designated uses in the ORW; and
    (3) All practical means of minimizing water quality degradation are implemented."

C-42. Env-Wq 1708.05 titled "Protection of Class A Waters" states the following:

"(a) As specified in RSA 485-A:8, I, discharges of sewage or waste to class A waters shall be prohibited.
(b) Proposed new or increased activities that the department determines do not involve the discharge of sewage or waste shall be reviewed in accordance with this part."

C-43. Env-Wq 1708.06 titled "Protection of Water Quality in High Quality Waters" states the following:

"(a) Subject to (b) through (d) below, high quality waters shall be maintained and protected.
(b) The department shall evaluate and authorize insignificant changes in water quality as specified in Env-Wq 1708.09.
(c) The department shall allow degradation of significant increments of water quality, as determined in accordance with Env-Wq 1708.09, in high quality waters only if the applicant can demonstrate to the department, in accordance with Env-Wq 1708.10, that allowing the water quality degradation is necessary to accommodate important economic or social

development in the area in which the receiving water is located.

(d) If the waterbody is Class A Water, the requirements of Env-Wq 1708.05 shall also apply."

C-44. Env-Wq 1708.12(a) states the ""transfer" means the intentional conveyance of water from one surface water to another surface water for the purpose of increasing volume of water available for withdrawal from the receiving surface water. The term does not include the transfer of stormwater, for the purpose of managing stormwater during construction, between basins created or otherwise lawfully used for stormwater detention or treatment, or both, and does not include the discharge of stormwater from a detention or treatment basin to a surface water."

C-45. The Nashua River in the vicinity of the Project Activity is Class B. (NH Chapter Law 1991, 371:7, VIII which amended Chapter law 1985, 41:1, and NH Chapter Law 1985, 41:1 which amended NH Chapter Law 1965, 10:1, I.)

C-46. A "Designated River" is a river that is managed and protected for its outstanding natural and cultural resources in accordance with the Rivers Management and Protection Act (RSA 483).

C-47. Env-Wq 2102 includes requirements for Water Use Registration and Reporting (WURR).

C-48. NH RSA 485:61 regarding Rules for Water Conservation, states the following:

"I. The department shall adopt rules, pursuant to RSA 541-A, for water conservation practices for water users. These rules shall strike a reasonable balance between environmental, energy, and economic impacts and be consistent with current industry standards and practices for different types of water users.

II. The water conservation rules in paragraph I of this section shall apply to all new permit applicants and applications for water withdrawals subject to the provisions of RSA 485:3, RSA 485:48, RSA 485-C:21 and section 401 of the Clean Water Act.

III. Water conservation rules shall be consistent with applicable state or federal rules and regulations."

Water Conservation Rules were adopted May 14, 2005 and are currently codified as Env-Wq 2101.

C-49. Env-Wq 2101.24 titled "Water Conservation Plan Required," states the following:

"(a) The applicants for approval of a source that would be a conservation source shall submit a water conservation plan that demonstrates compliance with the applicable provisions of Env-Wq 2101.05 through Env-Wq 2101.22 in accordance with the following:"

"(5) For a new withdrawal from a surface water associated with a project requiring a 401 Water Quality Certification, the water conservation plan shall be submitted prior to or in conjunction with the application for a 401 Water Quality Certification pursuant to Section 401 of the federal Clean Water Act;

(6) For a new withdrawal from a surface water that requires water quality certification pursuant to RSA 485-A:12, IV, the water conservation plan shall be submitted prior to or in conjunction with the certification request."

Env-Wq 2101.23, titled "Waivers", allows NHDES to grant waivers of certain provisions in Env-Wq 2101 provided the person requesting the waiver submits a written request to NHDES that includes the

information specified in Env-Wq 2101.23(d).

C-50. On January 6, 2022, the Applicant submitted a water conservation waiver request to NHDES since the Activity does not involve a consumptive use of water. On January 7, 2022, NHDES approved the waiver request with the following condition: "The waiver shall be valid for no more than four years from the date of this approval. Prior to the expiration of the waiver, a waiver request shall be sought in order to be considered an extension of the original waiver approval."In 2010, NHDES published guidance (hereinafter called the 2010 instream flow guidance or 2010 ISF guidance) for estimating instream flow requirements for the protection of aquatic life.

C-51. Section 303(d) of the Clean Water Act (33 U.S.C. 1313(d)) and the regulations promulgated thereunder (40 C.F.R. 130.0 – 40 C.F.R. 130.11) require states to identify and list surface waters that are violating state water quality standards (i.e., Section 303(d) List) that do not have an approved Total Maximum Daily Load (TMDL) for the pollutants causing impairment. For these water quality-impaired waters, states must establish TMDLs for the pollutants causing the impairments and submit the list of impaired surface waters and TMDLs to the U.S. Environmental Protection Agency (EPA) for approval. TMDLs include source identification, determination of the allowable load and pollutant reductions (by source) necessary to meet the allowable load. Once a TMDL is conducted, the pollutant/surface water is transferred to the list of impaired waters with approved TMDLs (known as Category 4A waters). The Section 303(d) List is, therefore, a subset of all impaired waters. The most recent Section 303(d) list of impaired waters approved by EPA is the 2018 Section 303(d) List. A list of all impaired waters is available through the NHDES website.

C-52. On December 20, 2007, EPA approved the Northeast Regional Mercury TMDL which addressed mercury impairments in all New Hampshire fresh surface waters.

C-53. On September 21, 2010, EPA approved the Statewide Bacteria TMDL for 394 surface waters listed as impaired on the 2008 303(d) List of impaired waters.

C-54. When a surface water does not meet water quality standards (i.e., when it is impaired), the addition of pollutants causing or contributing to impairment should be avoided as indicated in the following regulation and statute:

> Env-Wq 1703.03(a) states that "The presence of pollutants in the surface waters shall not justify further introduction of pollutants from point or nonpoint sources, alone or in any combination."
>
> NH RSA 485-A:12, I (Enforcement of Classification) states that "After adoption of a given classification for a stream, lake, pond, tidal water, or section of such water, the department shall enforce such classification by appropriate action in the courts of the state, and it shall be unlawful for any person or persons to dispose of any sewage, industrial, or other wastes, either alone or in conjunction with any other person or persons, in such a manner as will lower the quality of the waters of the stream, lake, pond, tidal water, or section of such water below the minimum requirements of the adopted classification."

C-55. 18 CFR § 4 Subpart K, includes procedures for exemption on a case-specific basis from all or part of Part I of the Federal Power Act (Act), including licensing, for small hydroelectric power projects as defined in § 4.30(b)(31).

C-56. 18 CFR Section 4.106, Standard terms and conditions of case-specific exemption from licensing includes

the following article:

"(b) *Article 2.* The construction, operation, and maintenance of the exempt project must comply with any terms and conditions that the United States Fish and Wildlife Service, the National Marine Fisheries Service, and any state fish and wildlife agencies have determined are appropriate to prevent loss of, or damage to, fish or wildlife resources or otherwise to carry out the purposes of the Fish and Wildlife Coordination Act, as specified in exhibit E of the application for exemption from licensing or in the comments submitted in response to the notice of exemption application."

C-57. 18 CFR Section 4.104, Amendment of Exemption states the following:

"(b) If an exemption holder desires to change the design, location, method of construction or operation of its project, it must first notify the appropriate Federal and state fish and wildlife agencies and inform them in writing of the changes it intends to implement. If these agencies determine that the changes would not cause the project to violate the terms and conditions imposed by the agencies, and if the changes would not materially alter the design, location, method of construction or operation of the project, the exemption holder may implement the changes. If any of these agencies determines that the changes would cause the project to violate the terms and conditions imposed by that agency, or if the changes would materially alter the design, location, method of construction or the operation of the project works, the exemption holder may not implement the changes without first acquiring authorization from the Commission to amend its exemption or acquiring a license for the project works that authorizes the project, as changed."

C-58. FERC Exemption and Exemption Amendment Applications and Orders:

a. On August 28, 1983, NHDES received the original application for a FERC exemption for the Jackson Mills Project and on September 7, 1983 the New Hampshire Water Supply and Pollution Control Commission (now NHDES) issued a Section 401 water quality certification for the Project. On April 24, 1984, FERC issued an Order [8] granting the Jackson Mills Hydroelectric Project an Exemption from licensing.

b. In 2012, Nashua Hydro Associates (Nashua), exemptee for the Jackson Mills Project, filed an application for an amendment of the exemption from licensing to construct, install, operate, and maintain a pneumatic crest gate facility, within the existing overflow spillway of the Jackson Mills Dam, to alleviate upstream flooding. By letter filed with FERC on December 21, 2012, NHDES advised that it would not be amending the existing 401 Water Quality Certification issued in 1983. On January 11, 2013 FERC issued an Order amending the exemption [9].

c. On December 3, 2021, and pursuant to 18 CFR Section 4.104(b), the City of Nashua, New Hampshire (Applicant) filed an Application for Amendment of Exemption for the Jackson Mills Hydroelectric Project with the Federal Energy Regulatory Commission (FERC) [10] to remove and replace the existing turbine/generator/controls equipment.

C-59. *Operations Plan:* In accordance with the 2013 FERC Order that amended the exemption (see Fact C-58.b), the Applicant filed an operations plan FERC that is dated March 31, 2014 [11]. On May 21, 2014,

[8] Original 1984 FERC Order granting Exemption: Accession No. 19840426-0156.
[9] January 11, 2013 FERC Order Amending the Exemption: Accession No. 20130111-3015.
[10] Application for Amendment of Exemption: Accession No. 20211203-5060.
[11] Operations Plan, Jackson Mills Flood Mitigation, Crest Gate. Jackson Mills Project, FERC No. 7590-007, Nashua Hydro

FERC issued "Order Modifying and Approving Operations Plan" for the Jackson Mills Hydroelectric Project [12] which approved, with modification, the operations plan.

C-60. On March 28, 2017 FERC issued "Order Modifying and Approving As-Built Exhibits A, B, and G and Revising Project Description [13] which revised the Project description based on the As-Built drawings.

C-61. *NHDES Wetlands Permit:* On August 11, 2021, the NHDES Wetlands Bureau issued Wetlands Permit No. 2021-00788, with conditions, to address the temporary and permanent wetland impacts associated with construction of the proposed new turbine and generator in the power house and re-contouring the ledge tailrace.

C-62. *Army Corps of Engineers General Permit:* On November 4, 2021, the Army Corps of Engineers notified the City of Nashua that the work described in NHDES Wetlands Permit No. 2021-00788 is conditionally authorized under General Permit 17 of the Federal Permit known as the Department of Army General Permits for the State of New Hampshire (GPs), pending final concurrence with the Wetlands Bureau approval by the Governor and Executive Council and with the understanding that all work must be performed in accordance with terms and conditions of the GP.

C-63. *Water Quality Certification Application:* On August 20, 2021, NHDES notified the City of Nashua that the proposed Project will require a new Clean Water Act (CW) Section 401 Water Quality Certification. On October 12, 2021 NHDES received an application (aka certification request) for a CWA Section 401 certification for the Activity. A copy of the application is available on the FERC website [14] . The record for this certification decision includes the information provided in the certification application, the references in this certification, as well as information filed with FERC for this relicensing through December 28, 2021, which includes the Application for Amendment of Exemption (see Fact C-58.c).

C-64. *USFWS Terms and Conditions:* Pursuant to 18 CFR 4.106(b) (see Fact C-56), on November 19, 2021 the U.S. Department of Interior (USDI) through the U.S. Fish and Wildlife Service (USFWS) filed revised modified terms and conditions [15] for the Activity with FERC to prevent loss of, or damage to, fish and wildlife resources or to otherwise carry out the purposes of the Fish and Wildlife Coordination Act". Modified terms and conditions were warranted to address potential impacts, unresolved fish passage issues, and/or outstanding compliance issues.

C-65. *Natural Resource Agencies:* Natural Resource Agencies include, but are not limited to, NHDES, NHFGD, USFWS of USDI, NMFS of the NOAA, as defined in footnote 16.

C-66. *Public Comment and Revisions to Draft Certification:* NHDES issued a draft section 401 Water Quality Certification for public comment from January 26, 2022 to 4 p.m. on February 25, 2022. No comments were received. This final Certification includes revisions made to the draft Certification which are not considered substantive and primarily included the following:

Associates. March 31, 2014.

[12] May 21, 2014 FERC Order: Accession No. 20140521-3051

[13] March 28, 2017 FERCC Order: Accession No. 20170328-3042

[14] 401 Water Quality Certification Application: Accession No. 20211012-5452.

[15] USFWS modified terms and conditions: Accession No. 20211119-5108.

[16] NHDES means New Hampshire Department of Environmental Services; NHFGD means New Hampshire Fish and Game Department; USFWS means United States Fish and Wildlife Service of the US Department of Interior (USDI); NMFS means National Marine Fisheries Service of the National Oceanic and Atmospheric Administration (NOAA).

a. Minor formatting and grammatical corrections;
b. revisions to Fact 66 regarding public comment and revisions to the draft Certification;
c. revisions to Finding D-33 and Condition E-10 to reflect that fact that the Applicant received a conditional waiver of the NHDES Water Conservation regulations; and
d. addition of Facts C-2, C-5 and C-10, and Finding D-13 to most of the certification conditions in section E as these facts and findings provide federal and state authorization to include conditions in the certification.

D. FINDINGS

D-1. The Applicant has submitted an Application to the Federal Energy Regulatory Commission (FERC) for an Amendment of Exemption for the 1.0 megawatt (MW) Jackson Mills Hydroelectric Project, FERC No. 7590 (see Fact C-58.c).

D-2. The Applicant has submitted an application (aka, request) to NHDES for a Clean Water Act (CWA) Section 401 water quality certification (aka WQC or certification) (see Fact C-63).

D-3. Before the Activity in this certification can be constructed and operated, FERC must issue a federal "Order Amending Exemption" (aka Exemption Order). The Exemption Order serves as a federal permit to operate the Activity subject to the conditions in the Order (see Fact C-55 through C-57), and, at the same time, it exempts the Applicant from the licensing provisions of Part I of the Federal Powers Act. As such, the Exemption Order meets the definition of a federal license or permit.

Existing and Proposed Project Facilities and Operation [17]

D-4. *Background:* The Jackson Mills Hydroelectric Project (aka Project) is located on the Nashua River in Hilsborough County, in the City of Nashua, New Hampshire. The Nashua River runs for 56 miles through north-central Massachusetts and south-central New Hampshire with the mainstem joining the Merrimack River in Nashua, New Hampshire. Overall, the Nashua River watershed drains a total area of approximately 538 square miles of which approximately 454 square miles is in Massachusetts. The drainage area to the Project is approximately 531.9 square miles. The drainage area to the U.S. Geological Survey (USGS) gage on the Nashua River in Pepperell, MA (gage 01096500) is approximately 435 square miles. Of the four dams on the mainstem of the Nashua River, the Jackson Mills Dam is located furthest downstream.

D-5. *Existing Facilities [17]:* The City of Nashua, New Hampshire is the owner of the Project and the exemption-holder. Major features of the existing Project include the following.
a. A 180-foot-long, 33-foot-high stone masonry gravity dam with an 8-foot-high pneumatic crest gate with an elevation at the top of the pneumatic crest gate of 116.1 ft. NGVD [18] and the top of the permanent concrete crest of 108.5 ft.NGVD;
b. a 15-foot-wide, 21.4-foot-high , 53-foot-long intake structure with a head gate, an inlet elevation of 94.7 feet NGVD, and a 15-foot-wide, 33-foot-high trash rack with 3 inch clear spacing;
c. a 20-foot-wide, 44-foot-long, 32-foot-high concrete powerhouse with one single regulated adjustable runner, 5 blade Goban turbine with a rated speed of 180 rpm, a rated flow of 740 cfs,

[17] A more complete description of the existing and proposed facilities and operation is provided in the Exemption Amendment Application (see Fact C-58.c) and Water Quality Certification Application (see Fact C-63).
[18] Elevations are based on the National Geodetic Vertical Datum (NGVD) of 1929.

a rated power of 1,000 kW, a rated head of 20.5 feet, and a minimum and and maximum hydraulic capacity of 130 cfs and 800 cfs respectively;

d. an ASEA, induction generator with a total installed capacity of 1.0 MW;
e. an impoundment with normal pool elevation of 116.1 ft NGVD (top of pneumatic crest gate), a surface area of 40 acres, a volume of 150 acre-feet, an average depth of 9.7 feet, and a maximum depth of 21.4 feet;
f. a tailrace with tailwater elevation of 95.1 feet NGVD;
g. an approximate 100-foot-long bypass channel;
h. fish passage faciliites that were installed in 1983 and designed for shad and Atlantic salmon, which include a Denil-style wooden and concrete fish ladder, a fish bypass gate and pipe system that draws fish at the plant's intake/trashrack and conveys them to the Project tailrace; and
i. associated transmission facilities and access road.

D-6. *Existing Operation [17]:*

The following is from the Water Quality Certification Application (see Fact C-63):

"The project is required by its FERC Exemption to operate in run-of-river mode; meaning all river inflows must equal river outflows instantaneously. This is accomplished by holding the normal impoundment elevation of 116.1 NGVD '29 while maintaining flows through the turbine, fish facilities and operation of the pneumatically controlled crest gate. When river flows exceed the capacity of the turbine and fish passage facilities, the crest gate is incrementally lowered to pass flows following the FERC Exemption Amendment (2013) operating rule curve, Figure E-6. The impoundment/river level is continually monitored using a pressure transducer that sends a water level signal to a PLC that regulates the pneumatic gate compressor to lower (or raise) the gate to maintain run-of-river operation. The gate PLC also sends a signal to the PLC controlling the turbine and gates regulating flows to the fish passage facilities to make discharge adjustments accordingly. The transducer accuracy is 1-inch ±. " The "…100-foot-long bypass reach from the dam to the tailrace, normally remains wet all the time because of a small natural rock berm just beyond the toe of the dam".

The operating rule curve was also included in Attachment F of the CEII version of the Application for Amendment of Exemption filed with FERC on September 20, 2012[19].

D-7. *Proposed Facilities [17]:* The Applicant proposes to replace the existing, 37-year-old turbine, generator and controls (TGC) with a new, more efficient TGC. The existing turbine/generator is prone to numerous outages and failures due to component failures, and, as such, is at the end of its useful life.

A comparison of the existing and proposed turbines and generators is provided in the table below. As indicated in the table, the new turbine/generator will have the same rated capacity (1000 kW), a lower maximum hydraulic capacity (750 cfs vs. 800 cfs), a higher minimum hydraulic capacity (150 cfs vs. 130 cfs), one less turbine blade (4 vs 5) and a smaller runner diameter (5.9 feet vs 7.5 feet). The proposed replacement turbine will have a 4-blade Kaplan runner (with adjustable blades and wicket gates) connected to a new speed increaser and a new synchronous generator.

[19] Accession No. 20120920-5013.

TURBINES	EXISTING	PROPOSED
Number of Units	1	
Unit Type	Single regulated adjustable runner – 5 blade	Double regulated Kaplan bulb type – 4 blade
Manufacturer	Goban	Mavel
Runner Diameter	2,286 mm (7.5 feet)	1,800 (5.9 feet)
Rated Speed	180 rpm	240 rpm
Rated Flow	740 cfs	750 cfs
Rated kW or HP	1,000 kW	1,000 kW
Rated Head	20.5 feet	19.9 feet
Minimum Hydraulic Capacity	130 cfs	150 cfs
Maximum Hydraulic Capacity	800 cfs	750 cfs
GENERATORS	**EXISTING**	**PROPOSED**
Number of Units	1	1
Manufacturer & Type	ASEA, Induction	GAEM, Synchronous

(Excerpt from Table 1-1 in Exhibit A of the Exemption Amendment Application (Finding D-1))

The array of Project controls will also be replaced with consolidated electrical hardware to effectively control the turbine/generator, regulate the headpond crest gate to meet run-of-river regulation and operate existing fish passage facilities to supply sufficient flows for effective fish movement.

To accomplish the TGC replacement, the existing powerhouse will be demolished and a new concrete powerhouse having the same "on-the-ground" footprint as the existing powerhouse and draft tube extension will be constructed. The new powerhouse will have part of its upper level, main operations room extended (cantilevered) beyond the end of the "on-the-ground" footprint.

To do that portion of the work that is in the river, a rock-fill cofferdam will be placed around the existing powerhouse and tailrace. While the tailrace is exposed, approximately 400 cubic yards of ledge will be removed to slightly flatten its slope to improve its operating hydraulic performance. The length of the tailrace will not change.

There will be a new steel transition fabrication between the existing powerhouse waterway/flume penstock and the upstream side of the turbine. Similarly, a steel draft tube replacement will be fabricated per the turbine manufacturer's specifications and installed within the same footprint as the existing draft tube.

Concrete work includes setting forms, installing reinforcing steel, and placing concrete for all portions of the powerhouse floor, new left side wall, floors, and upper walls and roof structure. Construction will be accomplished in stages such that the turbine components can be cast in as they arrive on-site. The concrete work shall also include stoplog slots at the end of the concrete encased draft tube. The new slots allow for steel stoplogs to be installed so that work can be accomplished on the turbine without drawing down river levels.

All in-river work is proposed to be conducted during the low flow period (June 23rd to October 1st).

D-8. *Proposed Operation* [17]*:* The new turbine will operate in run-of-river mode utilizing the same flow and head regimes as the existing turbine. During construction, access and operation of the upstream and downstream fish passage facilities will be maintained.

CWA Section 401 WQC Required

D-9. The Nashua River is a water of the United States (see Facts C-8 and C-9 and C-14).

D-10. The Activity may include discharges from upstream of the Project dam to downstream of the dam including, but not limited to, through the turbines, various gates and/or over the dam spillway (see Fact C-7 and Findings D-5 through D-8).

D-11. Because the Project may involve discharges (as that term is used in the CWA) to a water of the United States in New Hampshire, and because the Project requires a federal license or permit, a CWA section 401 water quality certification (aka certification) is required from New Hampshire unless certification is waived (see Facts C-1, C-7, C-9, C-10 and Findings D-1, D-3, D-9, and D-10).

D-12. The New Hampshire Department of Environmental Services (NHDES) is the authority (aka certifying authority) responsible for issuing CWA Section 401 water quality certifications in New Hampshire (see Fact C-10).

State Authority for Certification Conditions, Modifications and Monitoring

D-13. RSA 485-A:12, III (see Fact C-10) states the following: "Certification shall include any conditions on, modifications to, or monitoring of the proposed activity necessary to provide assurance that the proposed discharge complies with applicable surface water quality standards." Monitoring includes, but is not limited to, the following:

- monitoring to determine compliance with conditions in this certification;
- on-site inspections;
- development, submission and implementation of monitoring plans;
- analysis, preparation and submittal of reports summarizing monitoring results;
- notifying appropriate authorities in a timely manner when excursions from conditions in this certification occur; and
- uploading monitoring data into the NHDES Environmental Database (EMD) so that is readily accessible to the public and useable by NHDES for surface water qualty assessments required by section 305(b) and 303(d) of the federal Clean Water Act.

Potential Environmental Impacts of Hydroelectric Projects

D-14. The following description of potential environmental impacts of hydroelectric projects is from a summary report of the 2010 summit meeting on Environmental Mitigation Technology for Hydropower[20]. "Although hydroelectric power plants have many advantages over other energy sources, they also have potential environmental impacts (Table 1). Most of the adverse impacts of dams are caused by habitat alterations. Reservoirs associated with large dams can inundate large areas of terrestrial and river habitat. Diverting water from the stream channel or curtailing reservoir releases in order to store water for future electrical generation can dry out streamside (riparian) vegetation. Insufficient water releases degrade habitat for fish and other aquatic organisms in the river below the dam. Water in a reservoir is stagnant compared to that in a free-flowing river. Consequently, water-borne sediments and nutrients can be trapped, resulting in the undesirable proliferation of algae and aquatic weeds (eutrophication) and a change in water quality in the reservoir and in reservoir releases. In some cases water spilled from high dams may become supersaturated with nitrogen gas resulting in gas-bubble disease in aquatic organisms inhabiting the tailwaters. Hydropower projects can also affect

[20] Environmental Mitigation Technology for Hydropower: Summary Report on Summit Meeting Convened by Oak Ridge National Laboratory, the National Hydropower Association, and the Hydropower Research Foundation. Washington, D.C. June 2-3, 2010. EMTSSummit4.pdf (hydro.org)

aquatic organisms directly. The dam can block upstream movements of fish, which can have severe consequences for anadromous fish (e.g., salmon, steelhead, American shad), catadromous fish (e.g., American eels), or riverine fish that make seasonal migrations to spawn (e.g., sturgeon and paddlefish). Fish moving downstream may be drawn into the power plant intake flow (entrained). Entrained fish are exposed to physical stresses (pressure changes, shear, turbulence, strike) as they pass through the turbine that may cause disorientation, physiological stress, injury, or mortality."

Potentially Affected Surface Waters and Applicable Water Quality Standards

D-15. NHDES has assigned Assessment Unit (AU) identification numbers to many, but not all surface water waters in New Hampshire, with many surface waters divided into smaller segments based on their characteristics. AUs (where available) for surface waters located immediately upstream and downstream of the Activity are shown in the table below. Because these surface waters are located closest to the Activity, the designated uses (e.g., aquatic life integrity) in these surface waters have the most potential to be impacted by the Activity. It is possible, however, that other surface waters may also be affected by the Activity (e.g., flow alterations caused by the Activty may also affect aquatic habitat in river reaches further downstream, and lack of adequate fish passage can impact fish communities located further upstream and downstream).

Assessment Unit ID	Description
NHIMP700040402-05	Nashua River - impoundment upstream of Dam
NHRIV700040402-09	Nashua River - riverine segment immediately downstream of Dam
	Unnamed wetlands along the riverbanks of each of the above Assessment Units.

D-16. New Hampshire surface water quality standards are summarized in Facts C-11 through C-45 and apply to all New Hampshire surface waters as defined in Fact C-14, including the potentially affected surface waters identified in Finding D-15.

D-17. The Nashua River in the vicinity of the Project is a warmwater fishery with diadromous fish [21].

D-18. The potentially affected surface waters (see Finding D-15) are classified as Class B (see Fact C-45).

D-19. The goal of Class A and B surface waters is to support the designated uses defined in Env-Wq 1702.17, which include swimming and recreation in and on the water, fish consumption, shellfish consumption (for tidal waters), aquatic life integrity, wildlife, and after adequate treatment as a water supply. Designated uses apply "…whether or not such uses are presently occurring" (Env-Wq 1702.17 –see Fact C-21).

D-20. The Activity is not within ¼ mile of a Designated River under the Designated Rivers Program (RSA 483, see Fact C-46). As such, the Activity is not within the jurisdiction of the Designated Rivers Program.

D-21. The surface waters in the vicinity of the Activity are not Outstanding Resource Waters (Env-Wq 1708.04, see Fact C-41).

[21] From NHFGD staff (Carol Henderson) on December 28, 2021.

NHDES Wetlands Permit and U.S. Army Corps of Engineers General Permit

D-22. The NHDES Wetlands Bureau issued a wetlands permit in August, 2021 (see Fact C-61) which includes conditions to help protect water quality and aquatic life during construction. Examples of requirements include, but are not limited to, the following:

a. Submission of a construction monitoring plan to NHDES prior to construction that addresses erosion, sedimentation and water quality control monitoring;
b. Restricting the time when work can be conducted to protect passage of anadromous fish and eel (see Finding D-27);
c. Use of "Wildlife-friendly erosion control materials";
d. Maintenance of existing aquatic organism and passage and stream flow during and after construction at appropriate times to allow migration of fish and aquatic organism passage;
e. Use of only clean fill and removal of all temporary fill upon completion of work;
f. Restrictions on mobile heavy equipment working in the water;
g. Work must be conducted in a way that will comply with State surface water quality standards;
h. Work must be conducted in a manner that will minimize erosion, minimize sediment transfer to surface waters and minimize turbidity in surface waters;
i. Work must be conducted in a manner that protects any rare, threatened or endangered species; and
j. All work in waters subject to the jurisdiction of the U.S. Army Corps of Engineers shall comply with all conditions in the applicable state general permit (see Finding D-23).

D-23. On November 4, 2021, the Army Corps of Engineers notified the City of Nashua that the work described in NHDES Wetlands Permit No. 2021-00788 is conditionally authorized under General Permit 17 of the Federal Permit known as the Department of Army General Permits for the State of New Hampshire (GPs), and that all work must be performed in accordance with terms and conditions of the GP (see Fact C-62).

D-24. Compliance with the NHDES Wetlands Permit conditions will help prevent exceedances of State surface water quality standards (see Finding D-16 and D-17) during construction. Condition E-9 includes a requirement to comply with the NHDES Wetlands Permit (which includes a requirement to comply with the U.S. Army Corps of Engineers General Permit).

Rare, Threatened and Endangered Species

D-25. *Federal Rare, Threatened and Endangered (RTE) Species*: The Water Quality Certification Application (see Fact C-63) includes results obtained from the USFWS' ECOS –IpaC website [22] and a letter from the United States Department of Interior Fish and Wildlife Service (USFWS) dated August 31, 2020 which includes a list of federally threatened and endangered species that may occur in the proposed project location, and/or may be affected by the proposed project. The list included one threatened species, the Northern Long-eared Bat (*Myotis septentrionalis*) but stated that there are no critical habitats for this species in the Project area that are under the USFWS's jurisdiction. The letter also advises that bald and golden eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 *et seq.*) and that projects affecting these species may require development of an eagle conservation plan. According to the Applicant, the proposed project will have no impact on the USFWS' identified Long-eared Bat, as there are no trees to be removed as part of this project. Further, according to the Applicant there are also no anticipated impacts to American Bald Eagles or Golden Eagles as the project maintains river flow and does not remove any trees.

[22] USFWS Information for Planning and Consultation IPAC website (IPaC: Home (fws.gov).

D-26. *State Listed Species.* The Certification Application (see Fact C-63) includes correspondence from the NH Natural Heritage Bureau (NHB) which indicates the presence of the Blanding's Turtle (*Emydoidea blandingii*) (a State endangered species) and the Wood Turtle (*Glyptemys insculpta*) (a State species of Special Concern), upstream of the Project. The Certification Application also includes a July 6, 2020 email from staff in the NHFGD Nongame and Endangered Wildlife Program that states the following:

> "We do not expect impacts to the wood turtle and Blanding's turtle as the tailrace will be further excavated within its existing footprint to provide a smoother turbine discharge flow back to the main river channel, so habitat does not appear to be impacted." The email references an email dated July 6, 2020 from staff in the NHFGD regarding recommended timing for the work to minimize impacts to anadromous fish and eel that use the fish ladder. The email stated that work that would affect fish ladder operation should not commence until the end of the fish passage season, which conservatively would be June 30, but that NHFGD is willing to discuss an earlier start date depending on the end of the upstream migration season (in the year that construction is scheduled to begin).

D-27. The NH Wetlands Permit issued for the Project (see Fact C-61) includes the following conditions to further protect RTEs as well as anadromous fish and eel using the fish ladder:

a. Not starting work prior to June 30th without prior authorization from NHFGD;
b. That the Applicant exercise due diligence with regards to protection of RTEs because unidentified species or communities may be present since many areas have never been surveyed, or only cursory surveys performed.

D-28. Based on the responses from the USFWS, the NH NHB and the Applicant (see Finding D-25 and D-26) , and conditions in the NHDES Wetlands Permit (see Finding D-27), the Project is not expected to have an adverse impact on RTEs or Species of Special Concern.

Water Chemistry

D-29. *Current surface water quality assessment*: According to the 2018 305(b)/303(d) lists of impaired waters (Fact C-51), the following surface waters in the vicinity of the proposed Activity are listed as impaired. All impairments, with the exception of those highlighted in bold (which have approved TMDLs) and "Habitat Assessment," are on the Section 303(d) List.

Assessment Unit (AU)	**Waterbody Name**	**Cause of Impairment (Designated Use Impaired)**
NHIMP700040402-05	Nashua River – Jackson Mills Dam impoundment	Non-native Aquatic Plants (AL) **Mercury (FC)** **Escherichia Coli (PCR)**
NHRIV700040402-09	Nashua River - riverine segment immediately downstream of Dam	Non-native Aquatic Plants (AL) **Mercury (FC)** **Escherichia Coli (PCR)**
Notes: AL = Aquatic Life, PCR = Primary Recreation, SCR = Secondary Recreation, FC = Fish Consumption, SFC = Shellfish Consumption Impairments highlighted in bold have approved TMDLs. All other impairments are on the Section 303(d) List. All fresh surface waters are impaired mercury due to elevated levels of mercury in fish tissue which has resulted in statewide fish consumption advisory.		

When a surface water does not meet water quality standards (i.e., when it is impaired), the addition of pollutants causing or contributing to impairment should be avoided (see Fact C-54). As noted above, all fresh surface waters in New Hampshire are impaired for mercury due to concentrations found in fish tissue which have resulted in a statewide fish consumption advisory. On December 20, 2007, EPA approved the Northeast Regional Mercury TMDL which addressed mercury impairments in all New Hampshire fresh surface waters (see Fact C-52). The primary source of mercury addressed in the TMDL is atmospheric deposition from in-state and out-of-state emissions. Atmospheric deposition from in-state and out-of-state emissions of fossil fuel byproducts can also cause low pH in rain (aka, acid rain) which can contribute to pH violations in surface waters. Other pollutant sources can also impact mercury concentrations and pH in surface waters. A Statewide bacteria TMDL was conducted in 2010 (see Fact C-53). Non-native aquatic plants (i.e., invasive species) are present in many parts of the Nashua River (see Finding D-47).

D-30. *Water Quality Monitoring During Construction:* Construction of the proposed new turbine will involve work in the river that includes, but is not limited to, installing, maintaining and removing the river cofferdam, and removal of ledge and rock in the tailrace. Such work could result in exceedances of State surface water quality criteria for turbidity (Env-Wq 1703.11, see Fact C-33) and visible plumes (Env-Wq 1703.03(c)(1)b, see Fact C-28). NHDES Wetlands Bureau Wetlands Permit No. 2021-00788 issued in 2021 (see Fact C-61) includes conditions to help prevent water quality exceedances during construction but does not include a requirement to monitor the river, should it be deemed necessary, to confirm that water quality standards will be met during construction. Section 4.3.1 of the Application for Amendment of Exemption (see Fact C-58) states that "Turbidity levels will be monitored throughout the entire construction period".

Condition E-16 addresses ambient water quality monitoring during construction.

D-31. The Project has altered the wetted natural river channel (deeper) and associated discharge characteristics (slower, more stagnant) which makes the river more prone to adverse water quality impacts (Finding D-14). These alterations, combined with the effluent discharges containing nutrients and other pollutants from the upstream wastewater treatment plants, as well as other sources, can contribute to dissolved oxgyen, temperature, pH and chlorophyll-a exceedances of New Hampshire surface water quality standards in the Project impoundment and downstream.

D-32. *Water Quality Monitoring and Reporting After Construction:* Essex Hydro Associates conducted water quality monitoring in 2015, 2016, and 2017 for certification of the existing hydropower project by the Low Impact Hydropower Institute (LIHI). Additional monitoring is needed to confirm that operation of the Project will not result in violations of New Hampshire surface water quality standards for the following reasons:

a. The dissolved oxygen data collected in 2015-2016 was not conclusive[23];
b. Monitoring conducted for LIHI purposes does not meet current guidance [24] used by NHDES for hydropower projects applying for new FERC licences or amendments;
c. Monitoring does not reflect operation of the Project with the proposed new turbine;
d. The data is almost five years old which, according to the New Hampshire Consolidated Assessment and Listing Methodology [7], is the maximum data age for water quality assessments

[23] Accession No. 20210616-5008.

[24] The current NHDES monitoring and reporting guidance for FERC projects, which is updated periodically, is the following: Sampling Guidance #1 for Hydropower Studies (Dissolved Oxygen, Temperature, pH, Nutrients, Chlorophyll-a, Secchi Disk and Flow). New Hampshire Department of Environmental Services. April 23, 2021.

for parameters that do not indicate impairment;

e. Factors such as climate change may lead to higher water temperatures and lower flows which can further lower dissolved oxygen level and cause higher chlorophyll-a levels;

Long-term monitoring is needed because FERC Exemptions last for the life of the Project, which can be for many decades. During that time, conditions in the watershed that could affect water quality in the Project impoundment and Project discharges to the tailrace and bypass reach, can change. For example, due to climate change "Warmer summer temperatures will likely lead to an increase in drought (through increased evaporation, heat waves, and more frequent and extreme convective precipitation events)."[25] An increase in the frequency and magnitude of lower river flows and higher temperatures could result in an increase in the frequency and magnitude of dissolved oxygen exceedances and chlorophyl-a levels. To determine the impact of the Project and Project discharges on these parameters in the future, and if New Hampshire surface water quality standards are met, additional monitoring is needed. Condition E-17 addresses this need. Inclusion of monitoring conditions is authorized by RSA 485-A:12,III (Fact C-10) which states the following: "Certification shall include any conditions on, modifications to, or monitoring of the proposed activity necessary to provide assurance that the proposed discharge complies with applicable surface water quality standards".

As indicated in Condition E-17, NHDES is proposing that water quality monitoring in the Nashua River be conducted every five years beginning the first year after construction is complete and the new turbine is operational and continuing until for the life of the Project, unless otherwise authorized by NHDES. Every five years is considered a reasonable interval between monitoring periods to track water quality changes and is also the maximum age of data for rivers specified in the NHDES Consolidated Assessment and Listing Methodology [7] that can be used by NHDES to affirmatively assess a water as being supportive of a designated use (such as aquatic life integrity).

The purpose of the monitoring is to 1) determine the future effects of Project operation during the duration of the new license, both spatially and temporally (in terms of flow, impoundment elevation and power generation, 2) to compare results to New Hampshire surface water quality standards, and 3) to determine if additional changes in Project operation are necessary to comply with surface water quality standards.

In each year that monitoring is conducted, Condition E-17, requires submittal of a monitoring and reporting plan to NHDES for review and approval. This is so the plan can be updated (if necessary) to conform to NHDES' latest monitoring protocols and/or to any changes in surface water quality standards (Env-Wq 1700, see C-11). Condition E-17, also includes some specifics of what the monitoring and reporting plan shall include such as submittal of data in a working spreadsheet and input of all data into the NHDES Environmental Monitoring Database (EMD) so the data is accessible to the public and is available to NHDES for conducting surface water quality assessments that are required every two years by sections 305(b) and 303(d) of the federal Clean Water Act.

Lastly, if results indicate that water quality standard exceedances persist, the Applicant must consult with NHDES regarding changes to Project operation to improve water quality, implement the NHDES approved revisions to Project operation and update the flow and impoundment level monitoring and compliance plan (FICMP) discussed in Condition E-13.

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[25] Wake, Cameron P.; Burakowski, Elizabeth A.; Wilkinson, Peter; Hayhoe, Katharine; Stoner, Anne; Keeley, C.; and LaBranche, Julie, "Climate Change in Southern New Hampshire: Past, Present and Future" (2014). The Sustainability Institute. 2. https://scholars.unh.edu/sustainability/

D-33. *Water Use Registration and Reporting and Water Conservation Plan*: Based on discussions in November 2021 with staff in the NHDES Water Use Registration and Reporting program (WURRP), the Activity is currently registered with the WURRP and must continue to report under this program in accordance with Env-Wq 2102 (see Fact C-47). The purpose of Env-Wq 2102 is to "…is to implement RSA 488 by establishing requirements relative to documenting the identity and location of water uses and collecting accurate water use data to support management of the state's water resources." Staff also stated that the Applicant should contact them to determine if a water conservation plan (in accordance with Env-Wq 2102.24 – see Facts C-48 and C-49) is required for the Activity. If a water conservation plan is not required, the Applicant will need to request a waiver in accordance with Env-Wq 2101.23. On January 6, 2022, the Applicant submitted a water conservation waiver request, which was approved by NHDES on January 7, 2022 with the following condition: "The waiver shall be valid for no more than four years from the date of this approval. Prior to the expiration of the waiver, a waiver request shall be sought in order to be considered an extension of the original waiver approval." The waiver request was approved because the Activity does not involve a consumptive use of water (see Fact C-49).

The WURRP provides valuable data for tracking discharges (such as those from the Project) to and withdrawal volumes from surface waters and other sources throughout the state. The Water Conservation program (Env-Wq 2101) helps to conserve water resources by reducing unnecessary waste. These programs assist NHDES with managing water resources to help ensure surface waters have sufficient water to support the designated uses (see Fact C-21) specifed in the New Hampshire surface water quality standards (NH RSA 485-A:8 and Env-Wq 1700, see Fact C-11).

Condition E-10 addresses Water Use Registration and Reporting program and Water Conservation program requirements.

Flow / Impoundment Management

D-34. *Applicant's Proposal:* See Findings D-6 and D-8 for existing and proposed operation.

D-35. *Run-of-River:* The Applicant is required by its FERC Exemption to operate the Project in an instaneous run-of-river mode (see Findings D-6 and D-8). This is consistent with the USFWS's modifed terms and conditions filed with FERC (see Fact C-64) which states that the Project "operate in an instantaneous run-of-river mode whereby inflow to the Project equals outflow from the Project at all times and water levels above the dam are not drawn down for the purpose of generating power. Run-of-river operation may be temporarily modified if required by operating emergencies beyond the control of the Licensee, or for short periods upon mutual agreement between the Exemptee, the Service, and the New Hampshire Department of Environmental Services (NHDES)."

NHDES concurs with the USFWS' terms and conditions to operate the Project in an instantaneous run-of-river mode whereby outflow (i.e., discharges) from the Activity equals inflow on an instantaneous basis except during emergencies beyond the control of the Applicant and for short periods upon mutual agreement of the resource agencies. Operating in this manner will minimize impoundment fluctuations and maintain a more natural flow regime downstream of the tailrace, which will protect habitat for a range of aquatic and riparian species and help to ensure compliance with State surface water quality standards including, but not limited to, "Biological and Aquatic Community Integrity" (Env-Wq 1703.19 – see Fact C-38) and Env-Wq 1703.01(d) regarding maintaining surface water quantity at levels that protect existing uses and designated uses (see Fact C-27). Condition E-11.a addresses this Finding.

D-36. *Impoundment Water Level:* The Applicant proposes to generate power and hold impoundment water

level (i.e., steady pond conditions) at the top of pneumatically controlled crest gate (elevation 116.1 NGVD '29) when river inflow is within the minimum and maximum hydraulic capacities of the turbine plus the required fish passage flow (see the table below). For example, as shown in the table below, for the period May 1 to September 15, steady pond conditions during power generation will occur when inflow is between 205 cfs and 815 cfs with the existing turbine, and between 225 cfs and 825 cfs with the new turbine. Based on the annual frequency duration curve (Figure E-3) provided in the Application for Exemption Amendment (see Finding D-1) steady pond conditions with the unit operating from May 1 to September 15 is expected to occur approximately 55% of the time (i.e., 85% - 30%).

When river flows exceed these flows the excess will be passed over the pneumatic crest gate, and impoundment water surface elevation will vary as river flow increases and decreases and as the pneumatic crest gate is incrementally lowered (to prevent upstream flooding) and raised (as high flows recede) in accordance with the FERC Exemption Amendment (2013) operating rule curve. A copy of the operating rule curve is provided in the Certification application (see Finding D-2, pdf page 182) and in the Application for Exemption Amendment (see Finding D-1, Figure E-6). At river flows less than minimum turbine flow plus the minimum fish passage flow, all river flow will be passed through the fish passage facilities and/or over the pneumatic crest gate. Hydropower operations cease when the difference in elevation between the headwater and tailwater is about 14 feet (approximately 6,000 cfs). A summary of the flow conditions for generation is provided in the table below.

Current Flow conditions for Power Generation and "Steady Pond"		
	Existing	Proposed
Min Turbine Flow	130 cfs	150 cfs
Max Turbine Flow	740 cfs	750 cfs
Fish Passage Flows [a]		
May 1 to November 15 (Downstream Passage)	20 cfs	20 cfs
May 1 to September 15 (Upstream Passage)	55 cfs	55 cfs
Range of River Inflow With Power Production and Steady Pond (elevation 116.1 NGVD '29) [a]		
May 1 to September 15	205 cfs to 815 cfs	225 cfs to 825 cfs
September 16 to November 15	150 cfs to 760 cfs	170 cfs to 770 cfs
November 16 to April 30	130 cfs to 740 cfs	150 cfs to 750 cfs
Maximum River Inflow Flow for Power Production	6000 cfs	6000 cfs

a. These flows are subject to change by the USFWS and/or NHFGD (see Finding D-41) and results of the bypass reach zone of passage study (see Finding D-45). In addition, the steady pond elevation of 116.1 may change depending on analyses (see Condition E-13) to determine if there is sufficient head at elevation 116.02 to pass the required fish passage flow. Elevation 116.02 is equal to 116.1 minus 0.08 feet (i.e., 1 inch) which is the reported accuracy of the transducer in the pond level control system. The accuracy of the pond level control system needs to be accounted for to ensure the required fish passage flows are provided at all times (unless inflow is less).

NHDES concurs with minimizing the frequency and magnitude of fluctuations in the impoundment because holding the pond at a steady elevation (116.1 NGVD 29) whenever inflow allows, helps to protect the flora and fauna in the littoral and riparian zones of the impoundment and helps to ensure compliance with State surface water quality standards including, but not limited to, "Biological and Aquatic Community Integrity" (Env-Wq 1703.19 – Fact C-38). Condition E-11.b addresses this Finding.

D-37. *Impoundment Refill Procedures:* Following drawdowns authorized by the resource agencies, a refill procedure is required to ensure adequate flow (i.e., discharge) from the Project is maintained downstream of the Project dam and adequate flow is available to refill the impoundment at an

appropriate rate to protect aquatic habitat and aquatic life. According to agency consultation documentation in the 2014 Operations Plan (see C-59), the standard refill protocol typically used by USFWS is to refill by passing 90% of inflow downstream and using the remaining 10% for refill (aka, 90/10 refill rate). The USFWS recommended the 90/10 refill rate for the Project unless there are specific conditions that would warrant changing this protocol. The Applicant responded that because drawdown and refill is accomplished by passing flow through the turbine passage which has a hydraulically operated 12-foot-wide bottom opening gate thar requires manual operation, and because 10% of inflow during the summer months (when maintenance is likely to occur) is only approximately 25 cfs (based on mean monthly summer flows of approximately 225 cfs), regulating flow with only the manually adjusting gate will not be successful. However, a 75% (pass)/25% refill ratio is reported in the operations plan to be the "maximum passage/refill ratio feasible based on the hydraulics of the existing hydro facility system".

Though not the typical standard refill protocol used by USFWS, passing at least 75% of inflow downstream and using no more than 25% of inflow for refill will still help to minimize dramatic and sudden reductions in downstream flow (i.e., discharges) due to Project operation, while still providing sufficient flow to refill the pond to the normal elevation after impoundment refill. These measures will help to maintain sufficient habitat for aquatic life and help to ensure compliance with State surface water quality standards, including, but not limited to, "Biological and Aquatic Community Integrity" (Env-Wq 1703.19 – Fact C-38). Condition E-11.c addresses this Finding.

D-38. *Impoundment Drawdown Rate During Scheduled Maintenance:* The NHFGD recommends controlling Project discharges when drawing the impoundment down for maintenance, so that the impoundment level decreases by no more than approximately six (6) inches per day. This is done to allow adequate time for the less mobile aquatic organisms (including, but not limited to mussels), to move and stay sufficiently submerged as the water level gradually recedes. NHDES also recommends that the Applicant be provided the opportunity to modify these maintenance impoundment drawdown procedures on a case-by-case basis with prior approval from NHFGD.

These measures to control Project discharges during drawdowns will help to maintain sufficient habitat for aquatic life and help to ensure compliance with State surface water quality standards, including, but not limited to, "Biological and Aquatic Community Integrity" (Env-Wq 1703.19 – Fact C-38). Condition E-11.d addresses this Finding.

D-39. *Flow and Impoundment Compliance Monitoring Plan:* The USFWS' modified terms and conditions (see Fact C-64) included the following condition:

"The Exemptee shall prepare a plan for maintaining and monitoring instantaneous run-of-river operation at the Project. The Exemptee will prepare the plan in consultation with the Service and the NHDES, and the plan must be approved by the agencies prior to filing it with the Commission. The plan shall include a description of the mechanisms and structures that will 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 the Service, the Commission, and the NHDES. An agency-approved plan shall be submitted to the Commission no later than December 31, 2022." Page 31 of the Application for Exemption Amendment (see Finding D-1) states that the Applicant is in agreement with USFWS's recommendation to prepare the plan described above and is in the process of developing a plan consistent with USFWS's schedule of December 1, 2022.

NHDES concurs that development and implementation of a plan describing how flow and impoundment water level will be managed, monitored and reported (as allowed by RSA 485-A:12, III – Fact C-10 and

Finding D-13) will help determine if the Project will comply with this certification and, therefore, comply with New Hampshire surface water quality regulations (Env-Wq 1700). Condition E-13 addresses this Finding.

Fish Passage (Excluding Bypass Reach)

D-40. *Impact of Dams on Fish Migrations:* "Dams can impact both upstream and downstream fish migration in rivers (Limburg and Waldman 2009, p. 961). Dams not only block or impede fish migration, but also alter the rivers' hydrology and aquatic habitat availability. Upstream of dams, where water flow is slowed, lake-like conditions, rather than riverine ones, prevail. Water flow downstream of dams, particularly at peaking hydroelectric projects, can be altered significantly (Limburg and Waldman 2009, p. 961) with dramatic changes in water depth and velocity occurring over short time periods. Depending on the severity and location of blockages and changes to hydrology, migratory fish populations can be severely reduced or extirpated due to dams (Limburg and Waldman 2009, p. 960)." (Source: Fact C-64.)

D-41. *Current Fish Passage Facilities and Seasonal Fish Passage Flows:* The existing upstream fish passage facilities include a Denil-style wooden and concrete fish ladder. Downstream fish passage facilities include a surface overlay of the trash racks to mitigate entrainment of surface-oriented species, a 3-foot wide by 1.8-foot deep surface bypass entrance, a collection gallery behind the trashrack/overlay, and a 2-foot diameter bypass pipe that discharges into the tailrace. These fish passage elements were designed for shad and Atlantic salmon and installed in 1983. Current seasonal fish passage flow requirements based on conversations with USFWS staff[26] include the following:

Downstream bypass for eels and alosines: 20 cfs from May 1 to November 15.

Upstream fish ladder: 55 cfs from May 1 to June 30 (with 30 cfs discharged from the spillway entrance and 25 cfs from the tailrace entrance).

Upstream eelway: 55 cfs from May 1 to September 15 (with 30 cfs discharged from the spillway entrance and 25 cfs from the tailrace entrance).

The above translates to a total of 75 cfs for up and downstream fish passage from May 1 to September 15 and 20 cfs from September 16 to November 15. These flows and the dates they apply may be changed by the USFWS and/or NHFGD.

D-42. *USFWS Terms and Conditions:* According to 18 CFR Section 4.106(b) exempt projects must comply with any terms and conditions that the United States Fish and Wildlife Service, the National Marine Fisheries Service, and any state fish and wildlife agencies have determined are appropriate to prevent loss of, or damage to, fish or wildlife resources or otherwise to carry out the purposes of the Fish and Wildlife Coordination Act (see Fact C-56). Pursuant to 18 CFR Section 4.106(b), on November 19, 2021 the U.S. Department of Interior (USDI) through the U.S. Fish and Wildlife Service (USFWS) filed revised modified terms and conditions [27] for the Activity (see Fact C-64). The USFWS's terms and conditions includes a Fish Passage Facilities Improvement Plan (FPIP) that includes measures and a timeline for providing upstream passage of anadromous fish and American Eel, as well as downstreaqm diadromous fish passage (alosine and American Eel).

D-43. *Applicant's Proposed Fish Passage Measures:* In Section 4.4.2 of the Application for Exemption

[26] Per emails with Melissa Grader of the USFWS on January 4, 2022.
[27] USFWS modified terms and conditions: Accession No. 20211119-5108.

Amendment (see Finding D-1), the Applicant stated that it "…agrees with the USFWS November 19, 2021 recommended terms and conditions, and schedule included in the FPIP Implementation Table".

D-44. Adequate upstream and downstream fish passage is required to comply with State surface water quality standards, including, but not limited to, support of the aquatic life designated use (Env-Wq 1707.17(d) - Fact C-21), protection and propagation of fish (Env-Wq 1701.01 - Fact C-12), and to help ensure compliance with the "Biological and Aquatic Community Integrity" surface water quality standard (Env-Wq 1703.19 – Fact C-38). Because the Project has created conditions and discharge characteristics that prevent adequate passage up and downstream, and, therefore, compliance with State surface water quality standards, fish passage conditions are necessary. It is expected that implementation of the USFWS's terms and conditions (Finding C-64), and any future modifications required by USFWS and/or the NHFGD, as well as implementation of downstream zone of passage study in the bypass reach will result in compliance with state surface water quality standards regarding fish passage.

Condition E-14 addresses this Finding.

Fish Passage (Bypass Reach)

D-45. According to the Certification Application (see Finding D-2), the Activity includes a approximate 100-foot bypass reach from the dam to the tailrace which remains wet all the time because of a small natural rock berm just beyond the toe of the dam." "During project work when the cofferdam is in-place, the bypass reach will be continually wetted because all river flows will be diverted and spilled from the dam crest gate." According to the Application for Exemption Amendment (see Finding D-1), "Regardless of hydropower operation the bypass reach is always watered. The rock berm just 50 feet below the dam's toe naturally impounds water while releasing flow through several openings (>12 inches) between the rocks. The last 50 feet of the bypass remains watered from the hydroplant's tailwater; elevations 94.5 to 96.0 depending on river flow. Supplemental water (fish ladder entrances, eelways, and the downstream fish bypass) contribute between 20 to 35 cfs of water into the bypass reach depending on the time of the year of fish movement".

D-46. There is currently no requirement to ensure there is adequate habitat in the bypass reach to prevent stranding and safely pass fish downstream. A study is needed to determine conditions in the bypass reach (i.e., flow, water surface elevation) that 1) will provide sufficient zone of passage for fish and other aquatic organisms to safely pass downstream, 2) will meet New Hampshire surface water quality standards such as those for dissolved oxygen (Env-Wq 1703.07 – see Fact C-30) and Biological and Aquatic Community Integrity (Env-Wq 1703.19 – see Fact C-38).

Condition E-15 addresses this Finding.

Invasive Species

D-47. Water in impoundments created by dams is relatively stagnant compared to that in a free-flowing rivers. Consequently, water-borne sediments and nutrients can be trapped, resulting in the undesirable proliferation of algae and aquatic weeds (eutrophication) and a change in water quality in the impoundment and releases from the impoundment (see Finding D-14). Such slow moving conditions can contribute to the proliferation of invasive plant species. According to the 2018 305(b)/303(d) lists of impaired waters (see Finding D-29), the Project impoundment and river segment immediately below the Project dam are impaired for the Aquatic Life Designated Use because of "Non-native aquatic plants"

(i.e., invasive plant species). According to staff in the NHDES Invasive Species Program[28], and based on surveys conducted at the upstream Mines Falls Dam Hydroelectric Project (FERC No. 3442) the Nashua River in the vicinity of the Jackson Mills Project likely has variable and Eurasian milfoils, fanwort, curly-leaf pondweed, spiny naiad and water chestnut. Monitoring is needed to confirm this assumption. If not properly managed, invasive species can result in detrimental differences in community structure that are not naturally occurring (which is a violation of Env-Wq 1703.19, Biological and Aquatic Community Integrity – see Fact C-38) and result in a dominance of nuisance species (which is a violation of Env-Wq 703(c)(1)(d), General Water Quality criteria – see Fact C-28).

Condition E-18 addresses this Finding.

E. CERTIFICATION CONDITIONS

Unless otherwise authorized or directed by NHDES, the following conditions shall apply:

E-1. **Effective Date and Expiration of Certification:** This certification shall become effective on the date of issuance and shall remain effective for the term of the FERC Exemption Order. This certification replaces the certification issued in 1983 (see Fact C-58.a).

E-2. **Conditions in Federal License or Permit:** Conditions of this certification shall become conditions of the federal license or permit, which includes FERC Exemption Orders.

(For an explanation and citations, see Facts C-2, C-5, and C-10, and Findings D-3 and D-13)

E-3. **Compliance with Water Quality Standards:** The Activity shall not cause or contribute to a violation of New Hampshire surface water quality standards.

(For an explanation and citations, see Facts C-2, C-5, C-10, C-11, and C-54 and Finding D-13.)

E-4. **Proposed Modifications to the Activity:** The Applicant shall consult with and receive prior written approval from NHDES regarding any proposed modifications to the Activity that could have a significant or material effect on the findings or conditions of this certification, including any changes to operation of the Activity. If necessary, to ensure compliance with New Hampshire surface water quality standards and associated management objectives, NHDES may alter or amend this certification in accordance with condition E-5.

(For an explanation and citations, see Facts C-2, C-5, C-10 and Finding D-13.)

E-5. **Modification of Certification**: The conditions of this certification may be altered or amended at any time by NHDES to ensure compliance with New Hampshire surface water quality standards and associated management objectives, when authorized by law, and, if necessary, after notice and opportunity for hearing.

(For an explanation and citations, see Facts C-2, C-5, C-10 and Finding D-13.)

E-6. **Reopening of Exemption**: NHDES reserves the right to request, at any time, that FERC reopen the Exemption Order to consider modifications to the license to ensure compliance with New Hampshire surface water quality standards.

[28] Communication with Amy Smagula, Manager of the NHDES Invasive Species Program on December 27, 2021.

(For an explanation and citations, see Facts C-2, C-5, C-10 and Finding D-13.)

E-7. **Compliance Inspections:** In accordance with applicable laws, the Applicant shall allow NHDES to inspect the Activity and affected surface waters to monitor compliance with the conditions of this certification.

(For an explanation and citations, see Facts C-2, C-5, C-10 and Finding D-13.)

E-8. **Transfer of Certification:** Should this certification be transferred to a new owner, contact information for the new owner (including name, address, phone number and email) shall be provided to NHDES within 30 days of the transfer.

E-9. **Compliance with Other Permits:** The Applicant shall comply with all applicable permits associated with the Activity, and any amendments or reissuances including, but not limited to, the following:

- NHDES Wetlands Permit.
- U.S. Army Corps of Engineers section 404 General Permit

The conditions of these permits shall become conditions of this Certification upon issuance of this Certification. Should there be any discrepancies between permit requirements, the more stringent requirement as it relates to compliance with New Hampshire surface water quality standards shall apply. Construction shall not begin until all applicable permits have been obtained.

For an explanation and citations, see Facts C-2, C-5, and C-10 and Findings D-13 and D-22 through D-24).

E-10. **NHDES Water Use Registration and Reporting and Water Conservation:** The Applicant shall register, measure, and report all withdrawals and discharges with the NHDES Water Use Registration and Reporting program (WURRP) in accordance with RSA 488:3 and its supporting regulations in Env-Wq 2102. The Applicant shall comply with the requirements of the NHDES WURRP program (Env-Wq 2102) and the NHDES Water Conservation regulations (Env-Wq 2101).

(For an explanation and citations, see Facts C-2, C-5, and C-10 and Findings D-13 and D-33.)

E-11. **Flow / Impoundment Management:** The following requirements (items a. through d.) may be temporarily modified if required by operating emergencies beyond the control of the Applicant and/or as specified below.

a. **Instantaneous Run-of-River Flow:** The Applicant shall operate the Activity in an instantaneous run-of-river mode whereby inflow to the Project equals outflow from the Project at all times and water levels above the dam are not drawn down for the purpose of generating power. Run-of-river operation may be temporarily modified if required by operating emergencies beyond the control of the Applicant or for short periods upon mutual agreement by NHDES, USFWS and NHFGD.

(For an explanation and citations, see Facts C-2, C-5, and C-10 and Findings D-13 and D-35.)

b. **Impoundment Water Level:** Subject to analyses to confirm that all fish passage flows can be passed at a water surface elevation of 116.02 feet NGVD ’29 (equal to 116.1 minus 0.08 feet which is the

reported accuracy of the pond level control system transponder[29]), the impoundment water elevation shall be held steady at the top of the pneumatic crest gate (elevation 116.1 feet NGVD '29) when power is generated and river inflow is within the minimum and maximum hydraulic capacity of the turbine plus all required fish passage flows. When river flows exceed the capacity of the turbine and fish passage facilities, the pneumatic crest gate shall be incrementally adjusted to pass flows following the FERC Exemption Amendment (2013) operating rule curve. When flows are less than the minimum hydraulic capacity of the turbine all river inflow shall be passed through the fish passage facilities (if required by NHDES, NHFGD and USFWS) and/or over the pneumatic crest gate. The Applicant shall minimize the magnitude and frequency of fluctuations in the impoundment to the maximum extent practicable and shall not draw the water level in the impoundment down for the purpose of generating power. This requirement may be modified upon mutual agreement by NHDES, NHFGD, and USFWS.

(For an explanation and citations, see Facts C-2, C-5, and C-10 and Findings D-13 and D-36.)

c. **Impoundment Refill:** When refilling the impoundment after drawdown for maintenance or emergencies, the Applicant shall release no less than 75 percent of inflow in the Nashua River downstream and use the remaining 25 percent for refill of the impoundment, but shall strive to release 90 percent of inflow downstream and use the remaining 10 percent for refill. This refill procedure may be modified upon mutual agreement by NHDES, NHFGD, and USFWS.

(For an explanation and citations, see Facts C-2, C-5, and C-10 and Findings D-13 and D-37.)

d. **Drawdown Procedure for Scheduled Maintenance:** When drawing the water level in the impoundment down for scheduled maintenance, the Applicant shall lower the impoundment water level no more than six (6) inches per day. This drawdown procedure may be modified with prior approval of NHFGD.

(For an explanation and citations, see Facts C-2, C-5, and C-10 and Findings D-13 and D-38.)

E-12. **Flow/Impoundment – Notification and Annual Report:** The Applicant shall comply with the following notification and reporting requirements:

a. If the Activity causes a deviation from requirements specified in Condition E-11, E-14 and/or E-15 the Applicant shall notify NHDES, NHFGD and USFWS no later than 24 hours after each such incident. The notification shall include, to the extent known, an explanation as to why the deviations occurred, a description of corrective actions taken, and how long it will take until operations will comply with these conditions.

b. Within 45 days after each incident, the Applicant shall submit a report to NHDES, NHFGD and USFWS that contains, to the extent possible, the cause, severity, and duration of the incident, any observed or reported adverse environmental impacts from the incident, pertinent data, and a description of corrective measures.

c. By April 1 of each year (beginning the first April after the date the FERC license is reissued), the Applicant shall submit to NHDES, NHFGD, and USFWS a summary report for the previous calendar year with appropriate tables, graphs, text and supporting documentation that demonstrates compliance with the requirements specified in Condition E-11, E-14 and/or E-15. Where excursions

[29] The accuracy of the pond level control transducer is reported to be 1 inch (see Finding D-6)

occurred, the summary shall indicate when the excursion occurred, the duration of the excursion and a description of corrective actions taken to prevent such excursions from reoccurring.

(For an explanation and citations, see Facts C-2, C-5, and C-10 and Finding D-13)

E-13. F**low/Impoundment Compliance Monitoring Plan (FICMP):** Within 90 days of when FERC issues an Exemption Amendment for the proposed Activity, the Applicant shall submit a flow and impoundment level monitoring and compliance plan (FICMP) to NHDES, NHFGD, and USFWS that, as a minimum, includes the following:

a. a description of the mechanisms and structures (including accuracy of all flow and impoundment elevation monitoring equipment and gages) to be used for maintaining compliance with operational requirements in Conditions E-11, E-14, and E-15.
b. a description of the level of manual, automatic, on-site and remote operation;
c. a description of the methods used for recording data to demonstrate compliance with the operational requirements in Conditions E-11, E-14, and E-15;
d. a description of how data will be collected, how continuous data (i.e., no less frequent than hourly and preferably every 15 minutes) to demonstrate compliance with the operational requirements in Conditions E-11, E-14, and E-15 will be recorded, and how data will be maintained for inspection by the NHDES, NHDES, USFWS and FERC;
e. a detailed description of how the Project will be operated under all conditions (i.e., normal operating conditions as well as during low flow, high flow, maintenance and emergency conditions) to maintain compliance with the flow and impoundment level management requirements in Conditions E-11, E-14, and E-15;
f. a description of the maximum expected impoundment water level fluctuation when the Project is generating power and river inflow is within the hydraulic capacity of the turbine (i.e., steady pond conditions – see Finding D-36).
g. a description of how and when fish passage flows will be passed; results of hydraulic flow calculations and/or flow measurement showing the required minimum impoundment water surface elevation necessary to pass the required fish passage flows; and set point elevations for passing the required fish passage flows that account for the accuracy of the pond level control system [30,31] ;
h. a description of how all required fish passage flows will be maintained during scheduled drawdowns
i. procedures for maintaining and calibrating monitoring equipment; and
j. rating curves and hydraulic calculations for all methods of releasing flow downstream (including a working excel spreadsheet if requested by NHDES).

The FICMP, including any proposed revisions, shall be developed in consultation with NHDES, NHFGD and the USFWS and must be approved by the agencies prior to filing it with FERC. The agency-approved plan shall be submitted to FERC no later than December 31, 2022. The FICMP shall be kept up-to-date so that it reflects current operation and any modifications to the FICMP shall be subject to approval by NHDES, NHFGD, and USFWS. The Applicant shall implement the agency-approved FICMP.

(For an explanation and citations, see Facts C-2, C-5, and C-10 and Finding D-13 and D-39.)

[30] If requested by NHDES in writing, the Applicant shall provide NHDES with a working spreadsheet showing the hydraulic calculations. The spreadsheet shall be provided to NHDES within seven days of receiving a written request.
[31] Set point elevations for providing fish passage flows shall account for the accuracy of the pond level sensor equipment. For example, if the accuracy is +/- 0.1 feet, the sensor should be set 0.1 feet above the elevation determined to provide the fish passage flows in order to ensure that the fish passage flows will be provided at all times (unless inflow is less).

E-14. **Fish Passage (Excluding Bypass Reach):** The Applicant shall comply with the November 19, 2021 mandatory terms and conditions required by the USFWS (Finding D-42), which includes conditions related to upstream passage of anadromous fish and American eel and downstream diadromous passage and any subsequent modifications made to the terms and conditions required by the USFWS and the NHFGD. The timing, magnitude, and method of providing flows for fish and eel passage shall be acceptable to NHDES, NHFGD and the USFWS.

(For an explanation and citations, see Facts C-2, C-5, and C-10 and Findings D-13 and D-40 through D-44.)

E-15. **Fish Passage – Bypass Reach:** Within 180 days of when this certification is issued (or other date acceptable to NHDES), the Applicant shall consult with and submit a plan to the NHDES, NHFGD and USFWS (i.e., the resource agencies) for approval to determine habitat conditions in the bypass reach that 1) will meet dissolved oxygen standards (Env-Wq 1703.07), and 2) will provide adequate zone of passage in the bypass reach for fish and other aquatic organisms to safely pass downstream and how those conditions will be maintained and monitored. The approved plan shall then be implemented. The plan shall include a schedule for implementing the approved study and submitting study results and recommendations to NHDES, NHFGD, and USFWS for review and approval. Study recommendations shall include a description of how compliance will be monitored and recorded on a near continuous basis, and reported to the resource agencies. The approved method for providing adequate zone of passage in the bypass reach, including any future modifications, shall be included in the Flow / Impoundment Compliance Monitoring Plan (Condition E-13). Bypass Reach zone of passage requirements may be temporarily modified if required by operating emergencies beyond the control of the Applicant or for short periods upon mutual agreement between the Applicant, NHDES, NHFGD and the USFWS.

(For an explanation and citations, see Facts C-2, C-5, and C-10 and Findings D-13, D-45 and D-46.)

E-16. **Construction Water Quality Monitoring and Reporting:** Unless otherwise authorized or directed by NHDES in writing, the Applicant shall prepare, submit, and implement a NHDES-approved Construction Water Quality Monitoring and Reporting Plan (Plan), as described herein. The Plan shall be submitted to NHDES at least 45 days prior to construction in the Nashua River. The purpose of the Plan is to determine if construction activities associated with the Project in the Nashua River comply with State water quality criteria for turbidity (Env-Wq 1703.11, see Fact C-33) and visible plumes (Env-Wq 1703.03(c)(1)b, see Fact C-28). The Plan shall include, but not be limited to, the location and frequency of monitoring, the make/model and accuracy of field meters, and quality assurance/quality control provisions. Weekly monitoring results shall be submitted to NHDES and shall include a description of construction activities, monitoring results and corrective actions taken if exceedances occurred. NHDES shall be notified via email (or other approved method) within 24 hours of when any exceedances occurred.

(For an explanation and citations, see Facts C-2, C-5, and C-10, and Findings D-13 and D-30.)

E-17. **Long Term Water Quality Monitoring and Reporting:** Unless otherwise authorized or directed by NHDES in writing, the Applicant shall conduct water quality monitoring and report results as described herein. The Applicant shall conduct water quality in the Nashua River every five years beginning the first year after the new turbine is operational and lasting for the life of the Project. This monitoring requirement may be revised upon written concurrence by NHDES. The purpose of the monitoring is to 1) determine the future effects of Project operation during the duration of the Project, both spatially and temporally (in terms of flow, impoundment elevation and power generation) on water

temperature, dissolved oxygen (mg/L and percent saturation), pH, chlorophyll-a, total phosphorus and total nitrogen and 2) to compare results to New Hampshire surface water quality standards and thresholds, and 3) to determine if additional changes in Project operation are necessary to comply with surface water quality standards.

At least 90 days prior to monitoring in each year monitoring is conducted, the Applicant shall submit a monitoring and reporting plan to NHDES for review and approval that describes, in detail, how, when and where monitoring will be conducted and results reported. The Applicant shall then implement the NHDES approved plan. Unless otherwise authorized or directed by NHDES, the plan shall comply with the NHDES monitoring and reporting guidance for FERC hydropower projects[24].

By December 31st of each year that monitoring is conducted, the Applicant shall submit a report and supplemental information that clearly demonstrates via text, tables and plots, the spatial and temporal effect of project operation (in terms of inflow and flow in the bypass reach and tailrace, impoundment elevation and power generation) on surface water quality and if New Hampshire surface water quality standards are met. Results of quality assurance/quality control checks (calibration, hand-held meter checks, duplicates, etc.) and identification of any deviations from the monitoring and reporting plan shall be clearly identified. In addition to the report, water quality (including uncorrected and any corrected data), continuous impoundment elevation, and continuous flow data (including calculations) should be provided in a working MS Excel workbook or other database acceptable to NHDES. The Applicant shall also enter all data into the NHDES Environmental Monitoring Database (EMD) within 120 days of when each monitoring effort is completed.

Should monitoring indicate that water quality standard exceedances persist, the Applicant shall consult with NHDES, NHFGD and USFWS regarding proposed changes to Project operation to improve water quality, and then implement the NHDES approved revisions to Project operation. Any NHDES approved changes to Project operation shall be included in the Flow/Impoundment Compliance Monitoring Plan (Condition E-13) and submitted to NHDES for approval within 60 days of learning that revisions are necessary.

(For an explanation and citations, see Facts C-2, C-5 and C-10, and Findings D-13 and D-32)

E-18. **Invasive Species Detection and Control**: If requested by NHDES in writing, the Applicant shall submit a plan to NHDES for approval to monitor for invasive plant species and to report the results to NHDES. The plan shall be submitted to NHDES within 90 days of receiving a request by NHDES. Monitoring frequency shall be determined by NHDES and shall be no more frequent than annually. The Applicant shall then implement the approved Plan. If NHDES notifies the Applicant in writing that invasive species control efforts are needed in the river segments impacted by Project operation, the Applicant shall assist by seeking funding for implementation of control efforts and by temporarily modifying Project operation as necessary to facilitate those control efforts.

(For an explanation and citations, see Facts C-2, C-5, and C-10 and Findings D-13 and D-47.)

F. Enforcement

Certification conditions are subject to enforcement mechanisms available to the federal licensing or permitting agency and to the state of New Hampshire.

G. Appeal Process

"Any person aggrieved by this decision may appeal to the N.H. Water Council ("Council"). An Environmental Fact Sheet with information on appealing a decision of the N.H. Department of Environmental Services can be found at the following link: CO-7 (nh.gov). A link to the Council's rules, is available on the New Hampshire Environmental Council website (or more directly at the Water Council page). Copies of the rules also are available from the NHDES Public Information Center at (603) 271-2975.

If you have questions regarding this certification, please contact Gregg Comstock at (603) 271-2983 or william.g.comstock@des.nh.gov or James Tilley at (603) 271-0699 or james.w.tilley@des.nh.gov.

H. Signature & Date

Rene J. Pelletier, P.G., Director
NHDES Water Division

3/7/22
Date

cc via email:
FERC e-file
Deb Chisholm, City of Nashua
John Lavigne, H.L. Turner Group
Matt Carpenter, NHFGD
Melissa Grader, USFWS
Ted Diers, NHDES