

**Water Quality Certification  
(33 U.S.C. §1341)**

In the matter of:                      Green Mountain Power Corp.  
   163 Acorn Lane  
   Colchester VT, 05446

**APPLICATION FOR MIDDLESEX HYDROELECTRIC PROJECT DAM  
REPAIR, RESURFACING, AND OPERATIONS**

Section 401 of the federal Clean Water Act requires that 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 that any such discharge will comply with other substantive provisions of the Clean Water Act. 33 U.S.C. § 1341(a)(1). The certifying State may set forth any effluent limitations and other limitations, and monitoring requirements necessary to assure that any applicant for a Federal license or permit will comply with the Clean Water Act and with any other appropriate requirement of State law. 33 U.S.C. § 1341(d). The Secretary of the Agency of Natural Resources has delegated the authority to make certification determinations to the Department of Environmental Conservation (Department).

The Department has reviewed a water quality certification application dated May 27, 2020 filed by the Green Mountain Power Corp. to conduct repair work on the Middlesex Hydroelectric dam. Supporting documentation for the application includes the Applicant's request for a Regional General Permit pursuant to Section 10 of the Section 10 of the Rivers and Harbors Act of 1899 (33 USC 403) filed with the U.S. Army Corps of Engineers (NAE-2014-00721), information on the water level and flow management during the repair work and operation proposals; supporting documents were received on May 5, 2020. Collectively, these materials are referred to as the "application."

The current application is subject to review under the Vermont Water Quality Standards promulgated by the Agency of Natural Resources and effective beginning January 15, 2017 (Environmental Protection Rule, Chapter 29A) (Standards). (Standards, § 29A1-01(a) Applicability).

The Department, based on the application and record before it, makes the following findings and conclusions.

**I.            Applicable Statutes and Regulations**

**A.           Applicable provisions of the Vermont Water Quality Standards**

1.           The applicable 2017 Vermont Water Quality Standards (Environmental Protection Rule, Chapter 29A) (Standards) were adopted by the Secretary of the Agency of Natural Resources pursuant to 10 V.S.A., Chapter 47, Water Pollution Control. Section 1252 of the chapter provides for the classification of high quality waters as either Class A(1), A(2), B(1) or B(2)

and authorizes the adoption of standards of water quality to achieve the purpose of classification.

2. The Anti-Degradation Policy in the Standards requires that “[a]ll waters shall be managed in accordance with [Standards] to protect, maintain, and improve water quality.” (Standards, § 29A-105).
3. The Hydrology Policy in the Standards requires that “[t]he proper management of water resources now and for the future requires careful consideration of the interruption of the natural flow regime and the fluctuation of water levels resulting from the construction of new, and the operation of existing, dams, diversions, and other control structures.” (Standards, § 29A-103(f)(1)).
4. All waters of the State shall be managed to support their designated and existing uses. A body of water may be assigned different classifications for different uses. (Standards, § 29A-104(a)-(b)).
5. The designated uses in the Water Quality Standards are: aquatic biota and wildlife that may utilize or are present in the waters; aquatic habitat to support aquatic biota, wildlife, or plant life; the use of waters for swimming and other primary contact recreation; the use of waters for boating and related recreational uses; the use of waters for fishing and related recreational uses; the use of waters for the enjoyment of aesthetic conditions; the use of the water for public water source; and the use of water for irrigation of crops and other agricultural uses. (Standards, § 29A-104(d)).
6. The affected reach of Winooski River have been classified as Class B(2) for all uses.
7. The management objectives for waters classified as Class B(2) for aquatic biota and wildlife are: “Waters shall be managed to achieve and maintain good biological integrity.” (Standards, § 29A-306(a)(3)(A)). The Class B(2) criteria for aquatic biota and wildlife and aquatic habitat use require “Change from the natural condition for aquatic macroinvertebrate and fish assemblages not exceeding moderate changes in the relative proportions of taxonomic, functional, tolerant, and intolerant aquatic organisms.” (Standards, § 29A-306(a)(3)(B)).
8. The management objectives for waters classified as Class B(2) for aquatic habitat are: “Waters shall be managed to achieve and maintain high quality aquatic habitat. The physical habitat structure, stream processes, and flow characteristics of rivers and streams and physical character and water level of lakes and ponds necessary to fully support all life-cycle functions of aquatic biota and wildlife, including overwintering and reproductive requirements, are maintained and protected.” (Standards, § 29A-306(b)(A)). The Class B(2) criteria for aquatic habitat use in rivers and streams are: “Changes to flow characteristics, physical habitat structure, and stream processes limited to moderate differences from the natural condition and consistent with the full support of high quality aquatic habitat. (Standards, § 29A-306(b)(3)(B)(i). Additionally, “waters shall comply with the Hydrology Criteria in § 29A-304” of the Standards. (Standards, § 29A-306(b)(3)(B)(iii)).
9. To effectively implement the hydrology policy and the Class B(2) criteria for aquatic habitat use in rivers and streams, hydrology criteria shall be achieved and maintained, where

applicable. The hydrology criteria require that for Streamflow Protection, waters classified as Class B(2) for aquatic habitat “any change from the natural flow regime shall provide for maintenance of flow characteristics that ensure the full support of uses and comply with the applicable water quality criteria.” The preferred method for ensuring compliance with this subsection is a site- specific flow study or studies. In the absence of a site-specific study, the use of general hydrologic standards is also accepted. (Standards, § 29A-304(b)(3)).

10. The management objectives for waters classified as Class B(2) for aesthetics are: “Waters shall be managed to achieve and maintain good aesthetic quality.” (Standards, § 29A-306(c)(3)(A)). The Class B(2) criteria for aesthetics use in rivers and streams are: “Water character, flows, water level, bed and channel characteristics, and flowing and falling water of good aesthetic value.” (Standards, § 29A-306(c)(3)(B)(i)).
11. The management objectives for waters classified as Class B(2) for fishing are: “Waters shall be managed to achieve and maintain level of water quality compatible with good quality fishing. (Standards, § 29A-306(e)(3)(A)). The Class B(2) criteria for fishing are “measures of wild salmonid densities, biomass, and age composition indicative of good population levels” and compliance with the temperature criteria in Section 29A-302(B) of the Standards. ((Standards, § 29A-306(e)(3)(B)(i)) and (§ 29A-306(e)(3)(B)(ii)).
12. The Winooski River is designated as cold-water fish habitat. (Standards, § 29A-308).
13. In waters designated as cold-water fish habitat, the dissolved oxygen (D.O.) standard is not less than 7mg/L and 75 percent saturation at all times, nor less than 95 percent saturation during late egg maturation and larval development of salmonids in waters that the Secretary determines are salmonid spawning or nursery areas important to the establishment or maintenance of the fishery resource. In all other waters designated as a cold-water fish habitat, the standard is not less than 6 mg/L and 70 percent saturation at all times. (Standards, § 29A-302(5)(A)).
14. The general temperature standard for waters is “[c]hange or rate of change in temperature, either upward or downward, shall be controlled to ensure full support of aquatic biota, wildlife, and aquatic habitat uses.” (Standards, § 29A-302(1)(A)).
15. In waters designated as cold-water fish habitat and classified as Class B(2) for the fishing use, the total increase from ambient temperature due to all discharges and activities shall not exceed 1.0° F. (Standards, § 29A-302(1)(B)(iii)).
16. The turbidity standard as an annual average under dry weather base-flow conditions is 10 NTU for cold-water fish habitat. (Standards, § 29A-302(4)(A)).
17. The water level fluctuation criteria for lakes, ponds, reservoirs, riverine impoundments, and any other waters classified as B(2) for aquatic habitat or boating establish that “waters may exhibit artificial variations in water level when subject to water level management, but only to the extent that such variations ensure full support of uses.” (Standards, § 29A-304(d)(2)).

## **B. Agency Procedure for Determining Acceptable Minimum Stream Flows**

18. The Applicant's proposal is subject to review under the *Agency Procedure for Determining Acceptable Minimum Stream flows* (July 14, 1993). Conservation flows in the reach of the Winooski River bypassed by the diversion of water to the hydroelectric project are subject to review under this procedure.
19. The Agency Procedure for Determining Minimum Stream Flows sets forth four methods to determine acceptable conservation flows: regional or site-specific seasonal median flows, stream hydrologic analysis, the Instream Flow Incremental Methods, or other methods acceptable to the Agency.

## **II. Factual Findings**

### **A. Background and General Setting**

20. The Middlesex Hydroelectric Project has been operated by Green Mountain Power (Applicant) since 1928. The Project is located on the Winooski River in Middlesex, Vermont, at river mile 49.3, approximately one mile upstream from confluence of the Mad River with the Winooski.
21. The Winooski River is the largest tributary to Lake Champlain that lies entirely in Vermont. The Winooski River flows 90 miles in a generally westerly direction from the Town of Cabot in the east to its terminus in Lake Champlain in the Town of Colchester. The Winooski River has a total drainage area of 1080 square miles, and the Middlesex Hydroelectric Project utilizes runoff of 519 square miles.
22. The Project is not licensed by the Federal Energy Regulatory Commission (FERC).<sup>1</sup>

### **B. Project and Civil Works**

#### *Existing Development*

23. The Project includes a 283-foot long and 50-foot high concrete dam with a crest elevation of 487 feet with two low level sluice gates. The dam has 2.5-foot-high flashboards raising the impoundment elevation to 489.5 feet (NGVD 29).<sup>2</sup> The impoundment has a surface area of 33 acres with 69 acre-feet of useable storage that extends upstream approximately two miles.
24. The headwork structure at the Project contains two 9-foot-diameter penstocks that are both 80-feet-long. The powerhouse contains two identical Francis units with a maximum capacity of 515 cfs. The Project has a total install generation capacity of 3.2 MW. The elevation of the tailraces is approximately 438 feet.

#### *Current Operations*

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<sup>1</sup> FERC Order Dismissing Applications for License issued August 24, 1979

<sup>2</sup> Letter from Adam Haskell, PE of Kleinschmidt Associates to Jason Lisa of GMP. May 4, 2020.

25. The Project does not have a license, permit, or certification regulating operations. The Applicant and the Agency of Natural Resources entered an agreement in April 1985 where GMP agreed to maintain a minimum 228 cfs in the tailrace below the Project.<sup>3</sup>
26. There is currently no required conservation flow in the bypassed reach<sup>4</sup> of the Winooski River, except leakage. Additionally, there is no regulation of the water level fluctuation in the impoundment or generation flows. In the past, GMP has reported the project would operate as a daily peaking mode which would drawdown the impoundment 3 feet, except during the winter months where the drawdown was reported to be limited to 0.75 feet.<sup>5</sup>
27. The Applicant currently states the Middlesex Project is operated in a voluntary run-of-river mode.

*Applicant Proposed Dam Repair Project*

28. The Applicant is proposing to conduct work at the dam including the installation of vertical rock anchors through the crest of the dam and concrete resurfacing along the crest and downstream face of the dam.<sup>6</sup>
29. To facilitate the work, GMP is proposing to install a 142-foot-long water control structure on the upstream side of the dam. The structure will be comprised of steel beams equally spaced with timbers in between the beams.
30. To both install and remove the water control structure, GMP proposes to drawdown the impoundment 12 to 18 inches below the dam crest for a period of 5 to 7 days.
31. To drawdown the impoundment, GMP proposes to pass 10 percent more than inflow.
32. During construction, the hydroelectric project will be operated in either a run-of-river mode or passing a minimum of 228 cfs.
33. To refill the impoundment, the Applicant proposes to pass 90 percent of inflow until refill is complete.
34. Additional work proposed for 2021 will involve resurfacing of the dam face with the flashboards installed and no drawdown or use of a water control structure.

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<sup>3</sup> Agreement between Green Mountain Power Corporation and the State of Vermont. April 16, 1985.

<sup>4</sup> The bypass or bypass reach is the section of the river between the headworks (dam) and tailrace where a portion of the river flow is diverted through the penstock.

<sup>5</sup> Hydropower in Vermont Report: An Assessment of Environmental Problems and Opportunities. Vermont Agency of Natural Resources. 1988.

<sup>6</sup> Letter from Adam Haskell, PE of Kleinschmidt Associates to Jason Lisa of GMP. May 4, 2020.

*Applicant Proposed Operations*

35. The Applicant proposes no change to the existing operations of the hydroelectric project.<sup>7</sup>

**C. River Hydrology**

36. There are six U.S. Geological Survey (USGS) stream gaging stations that have historically operated on the Winooski River. The gage in Montpelier has been in operation since July 1914. This station has a watershed area of 397 square miles. The Dog River, a major tributary of the Winooski River, gage has been operated since November 1934 and has a watershed area of 76 square miles.
37. Hydrologic information is tabulated below for the project. These statistics are derived from the data collected at USGS Montpelier (No. 04286000) and the Dog River (No. 04287000) stations located upstream of the hydroelectric project which comprises 91 percent of the drainage area at the Project.

	<b>Winooski River at Middlesex Hydro*</b>
Drainage Area (sq. miles)	519
Annual Runoff (inches)	24.4
10% Exceedance Flow (cfs)	2,140
50% Exceedance Flow (cfs)	563
90% Exceedance Flow (cfs)	185
7Q10 (cfs)	75.3

**D. Current Status**

38. The Winooski River has been classified as Class B(2) for all designated uses. Class B(2) waters are of a quality which achieves good biological integrity, provides high quality aquatic habitat that supports the life-cycle functions of aquatic biota and wildlife, and consistently exhibits good aesthetic value. Designated uses of the Winooski River also include boating, swimming, public water supply with filtration and disinfection, and irrigation and other agriculture uses.
39. In 2018, the U.S. Environmental Protection Agency approved a list of waters considered to be impaired based on water quality monitoring efforts and in need of total maximum daily load (TMDL) development to address the impairment. The Department submitted the list under Section 303(d) of the federal Clean Water Act. According to the State of Vermont 2018 303(d) List of Impaired Surface Waters in need of a TDML, there are no listed waters within or near the project area (State of Vermont 2018 303(d) List of Waters, Part A – Impaired Surface Waters in Need of TMDL, September 2018)

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<sup>7</sup> *Id.*

40. The Department concurrently issued as a four-part List of Priority Surface Waters Outside the Scope of the Clean Water Act Section 303(d) in 2018. Part F lists those surface waters where aquatic habitat and/or other designated uses are not fully supported because the waters are altered by flow regulation. The Winooski River, both above and below the Project are listed on the 2018 List of Priority Surface Waters Part F based on the water level fluctuations of the impoundment and the lack of a conservation flow in the bypassed reach of the Winooski River.

#### **E. Water Chemistry**

41. There is no recent water quality data collected from the Winooski River in the vicinity of the Middlesex hydroelectric project. Historical data indicated a potential issue with dissolved oxygen levels below the Project due to a lack of flow in the bypass reach and inadequate flow below the tailrace.<sup>8</sup>
42. During maintenance drawdowns in 1981, 1983, and 1999 sediment was mobilized from behind the dam, resulting in a discharge affecting water quality downstream. The proposed drawdown associated with the dam repair work also has the potential to impact water quality by mobilizing sediment.

#### **F. Aquatic Biota**

43. “Aquatic Biota” means all organisms that, as part of their natural life cycles, live in or on waters. (Standards, Section 29A-102(5)). Aquatic biota includes, for example, fish, aquatic insects, amphibians, and some reptiles such as turtles.
44. There has been limited site-specific fish survey work in the vicinity of the Middlesex hydroelectric project. In 1999, fish sampling occurred below the project which found rainbow trout (*Oncorhynchus mykiss*), brown trout (*Salmo trutta*), longnose dace (*Rhinichthys cataractae*), creek chub (*Semotilus atromaculatus*), and *Catostomus spp.* (longnose and/or white suckers).
45. Upstream sampling at the confluence of Great Brook and the Winooski River occurred in 1996. The fish sampling found rainbow trout (*Oncorhynchus mykiss*), brown trout (*Salmo trutta*), brook trout (*Salvelinus fontinalis*), longnose dace (*Rhinichthys cataractae*), creek chub (*Semotilus atromaculatus*), white sucker (*Catostomus commersonii*), and slimy sculpin (*Cottus cognatus*)
46. There are currently no diadromous or adfluvial fish species that reach the project area.
47. The Vermont Fish and Wildlife Department stocks brown upstream of the project and rainbow trout are stock downstream of project in the Winooski River.

#### *Fish Protection Measures*

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<sup>8</sup> Hydropower in Vermont Report: An Assessment of Environmental Problems and Opportunities. Vermont Agency of Natural Resources. 1988.

48. Properly sized, spaced, and positioned intake screening is necessary to minimize impingement<sup>9</sup> and entrainment<sup>10</sup> of resident fish.
49. The current trashrack configuration at the project was not specified by the Applicant.
50. The US Fish and Wildlife Service’s design criteria for hydroelectric intakes requires angled trashracks with one-inch spacing (full depth) and an approach velocity of two feet per second or less, in conjunction with a conveyance device to provide a safe avenue of passage past the dam.

**G. Aquatic Habitat**

51. “Aquatic Habitat” means the physical, chemical, and biological components of the water environment. (Standards, Section 29A-102(6)). Aquatic habitat includes, for example, aquatic plants, woody debris, and an adequate flow regime.
52. The impoundment is 33 acres with the flashboards in place and extends approximately two miles upstream. The impoundment varies in depths with portions being relatively shallow due to accumulation of sediment. Maintenance drawdowns of the impoundment in the past have resulted in mobilization of the sediment impacting aquatic habitat downstream of the project.
53. The bypass reach of the Winooski River below the dam is known as Middlesex gorge. The bypass reach is approximately 415 feet in length. The reach is comprised of a relatively narrow channel with a vertical ledge outcrop on river right. The habitat features in the reach include a plunge pool at the base of the dam and a series of riffles before the confluence with the tailrace. It is likely that little to no reproduction occurs in the project area due to limited extent of gravel.
54. Downstream of the confluence of the tailrace and bypass reach is a 1000-foot river reach with a hydraulic bedrock control. The habitat from upstream to downstream consists of a glide that transitions into a riffle and run before a short cascade.

*Water Level Fluctuation of the Impoundment*

55. The proposed drawdown of the impoundment of 12 to 18 inches below the dam crest will dewater a significant portion of the nearshore habitat upstream of the dam and has the potential to mobilize sediment and further degrade aquatic habitat.
56. In the past, the Applicant has reported an average impoundment drawdown of 3 feet, except during the winter months associated with power generation.<sup>11</sup> The fluctuations associated

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<sup>9</sup> Impingement refers to when a fish is held in contact with the intake screen by the flow of water and is unable to free itself.

<sup>10</sup> Entrainment refers to when a fish and other aquatic organisms is drawn into a water intake and travels through the turbine.

<sup>11</sup> *Id.* At 120.



with the Project continuing to generate hydropower have the potential to impact aquatic habitat in the impoundment.

#### *Flow Needs to Protect Aquatic Habitat*

57. The Applicant is not required to and does not consistently maintain a conservation flow in the bypass reach of the Winooski River, which impacts aquatic habitat in the reach.
58. GMP and the Department entered an agreement on April 16, 1985 that established a 228 cfs minimum flow below the tailrace of the project in connection with GMP's redevelopment of the Bolton Falls Hydroelectric Project. The minimum flow was not based on a site-specific flow study.
59. The Agency conducted a flow assessment for fisheries, which resulted in a flow recommendation of 300 to 350 cfs downstream of the project. The study did not assess peaking flows and the associated impacts to aquatic habitat under the current base flow of 228 cfs or the recommended flows.<sup>12</sup>
60. The Applicant's proposal to maintain existing operations of the Project would continue to impact the water's ability to support aquatic habitat.

#### **H. Rare, Threatened, and Endangered Species**

61. There are known occurrences of rare plant species in the project area. They are tradescant's aster (*Symphotrichum tradescant*), river-ledge goldenrod (*Solidago racemose*), and hyssop-leaved fleabane (*Erigeron hyssopifolius*)
62. Prior Agency recommendations included spillage over the dam to protect these species present on the rock outcrop of the gorge.<sup>13</sup>
63. Additionally, the riverside outcrop on river right which is the portion of the Middlesex gorge that was not flooded by the construction of the dam is a listed as a significant natural community for its botanical diversity.

#### **I. Recreation**

64. The Project has features for canoe portage: including a takeout located upstream of the dam on river left, a portage trail that runs along Route 100B and the powerhouse access road, and a put-in located downstream of the project.
65. Additionally, upstream and downstream of the project there are informal recreational accesses off public roads and the powerhouse access road for recreationalists including fishing, boating, and sightseers interested in the unique gorge area of the river.

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<sup>12</sup>*Id.* At 122.

<sup>13</sup> *Id.* At 129.

66. There is parking for 3 cars near the powerhouse and a stone path that leads to the reach downstream of the project that is used by anglers, boaters, and sightseers.
67. The proposed drawdown of the impoundment as part of the dam repair and project operations may affect the ability of boaters to use the takeout upstream of the project.

**J. Aesthetics**

68. The proposed drawdown associated with the dam repair project will likely have a short-term impact on aesthetics in the impoundment.
69. Current operations of the Project do not support the aesthetic use of the bypassed reach of the river, nor the impoundment.
70. The Applicant's proposal to maintain current operations of the hydroelectric project would continue to result in the non-attainment of aesthetic use.

**K. Construction and Erosion**

71. During construction to repair the dam, various sediment and water control measures will be used. This includes the installation of a water control structure to dewater the area and divert flows, silt fencing around disturbed areas, sediment control blankets, and a sedimentation basin to filter sediment laden water before discharge to the river.
72. The Applicant proposes to drawdown the impoundment 12 to 18 inches below the dam crest to facilitate the installation of the water control structure. Sediment has accumulated in the impoundment since construction of the dam and the drawdown has the potential to mobilize sediment resulting in a discharge downstream of the Project.
73. The 142-foot water control structure will be installed on the upstream face of the dam. It will be constructed of vertical steel beams equally spaced with timbers in between. The area between the water control structure and the dam will be dewatered, if needed, to facilitate the resurfacing of the dam crest.
74. Erosion of the riverbanks from fluctuation of the impoundment has been identified as an issue that impacts water quality and aquatic habitat at the Project.
75. Fluctuation of water levels and generation flows from the Project when operating in a hydropeaking mode have been identified as a cause of erosion downstream of the project.
76. The Applicant's proposal to maintain current operations of the hydroelectric project will continue to impact erosion of the riverbanks, affecting aquatic habitat and water quality at the Project and downstream.

**L. Debris**

77. The depositing or emission of debris and other solids to state waters violates Vermont's water pollution control laws, solid waste laws and the Standards (Standards, § 29A-303(1) and § 29A-303(2)). Debris also impairs aesthetics and other recreational uses.

78. The Applicant has not provided information on the handling and disposal of construction related debris, nor debris from ongoing project operations (i.e. trashrack debris and other project-related debris).

### **III. Analysis**

79. A state's 401 certification determination shall include a statement from the state that "there is a reasonable assurance that the activity will be conducted in a manner which will not violate applicable water quality standards." 40 C.F.R. § 121.2(a)(3); Environmental Protection Rules, Chapter § 13.11(g). Accordingly, the Department may set forth limitations and other requirements necessary for it to find that there is reasonable assurance that the activity and project will be operated in a manner which will not violate the Vermont Water Quality Standards.
80. The Winooski River upstream and reach bypassed by the Middlesex hydroelectric project is listed as priority water on Vermont's List of Priority Surface Waters Outside the Scope of the Clean Water Act Section 303(d) Part F because it does not support all designated uses. Of particular concern is non-support of aquatic biota and wildlife, and aquatic habitat uses due to water level fluctuations and no conservation flow in the bypass reach (Finding 40). A goal of the Water Quality Standards and the Clean Water Act is to protect and maintain the biological integrity of waters such that aquatic biota and wildlife are sustained by high quality habitat.
81. The potential impacts associated with the proposed project can be grouped into two categories: (1) those associated with the proposed construction activities to repair the dam; (2) and those associated with the continued operations of the hydroelectric project.

#### **A. Water Chemistry**

82. The Applicant's proposed flow and water level management during the construction have the potential to affect water chemistry in the Winooski River. This certification is being conditioned to address potential impacts associated with erosion, sediment, and debris management during the construction project.
83. The continued operation of the hydroelectric project has the potential to degrade water chemistry in the Winooski River. Historic water quality data collected below the hydroelectric project have indicated that operations may reduce dissolved oxygen levels below water quality standards due to lack of a conservation flow in the bypass reach and adequate flow below the tailrace.
84. The Applicant states that the hydroelectric project is currently operated in a run-of-river mode but does not propose a conservation flow for the bypassed reach. This certification is being conditioned such that the project will operate true run-of-river<sup>14</sup> with a default

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<sup>14</sup> A true run-of-river project is one which does not operate out of storage and, therefore, does not artificially regulate streamflow below the project's tailrace. Outflow from the project is equal to inflow to the project's impoundment on an instantaneous basis. The flow regime below the project is essentially the

hydrologic bypass conservation flow of 0.5 cubic feet per square mile of watershed area (csm). This mode of operation and bypass flow will address issues related to water chemistry related to dissolved oxygen because of the volume of water required to be spilled at the dam is likely to reoxygenate the water.

85. However, the Applicant has the option to conduct a site-specific bypass flow study to determine a lower the conservation flow in the bypass reach. Depending on the results of the bypass flow study, a dissolved oxygen monitoring study may be needed to ensure that continue operation of the hydroelectric project does not violate water quality standards (Condition L).

**B. Aquatic Biota**

86. The continued operation of the hydroelectric project has the potential to result in entrainment and impingement of resident fish.
87. A trashrack configuration that meets the US Fish and Wildlife Service’s design criteria (without the conveyance component) will minimize impingement and entrainment of resident fish.
88. By Condition M of this certification, the Applicant shall be required to consult the Department of Fish and Wildlife when the trashracks are scheduled for replacement, and to obtain Department approval for the design.

**C. Aquatic Habitat**

*Hydrologic Conditions Necessary to Support Aquatic Habitat*

89. The Applicant’s proposed flow and water level management during the installation and removal of the water control structure will result in short-term impacts on aquatic habitat primarily in the impoundment. Once the water control structure is installed, the impoundment will be refilled and the project will operate in a run-of-river mode during the construction period. This certification is being conditioned (Condition B) to limit the potential impacts on aquatic habitat and aquatic biota associated with the proposed flow and water level management associated with the construction activities.
90. The continued operations of the hydroelectric project have the potential to impact aquatic habitat in the impoundment and downstream of the Project. While the Applicant indicates the Project is currently operated in a voluntary run-of-river mode there is no permit or certification regulating operations. This certification is being conditioned (Condition I) to require operation of the project in a true run-of-river mode.
91. The Applicant has not proposed a conservation flow in the bypass reach. Without a conservation bypass flow, continued operation of the hydroelectric project will prevent the

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river’s natural regime, except in special circumstances, such as following the reinstallation of flashboards and project shutdowns. Under those circumstances, a change in storage contents is necessary, and outflow is reduced below inflow for a period.

support of the aquatic habitat use in the bypassed reach of river. The Applicant has not conducted a site-specific flow study in the bypass reach to determine an acceptable conservation flow. Pursuant to the Standards, hydrologic standards consistent with an Agency of Natural Resources procedure may be used to ensure compliance with the streamflow protection criteria in the absence of a site-specific study (§ 29A-304(3)).

92. The *Agency Procedure for Determining Acceptable Minimum Streamflows* promulgated by the Agency of Natural Resources establishes that the Agency will accept a minimum stream flow of 0.5 csm year round unless superseded by spawning or incubation flow requirements. As described in finding 53 there is likely no spawning habitat within the bypass reach. Therefore, this certification is being conditioned (Condition I) to require a flow of 0.5 csm or 259.5 cfs be spilled into the bypass reach at the Project to support aquatic habitat. Additionally, the certification is being conditioned such that if the Applicant chooses to conduct a site-specific flow study pursuant to Standards (§ 29A304(c)), the conservation flow may be modified after Department approval.
93. In order to minimize the effects of downstream flows following the maintenance or emergency operations, including lowering of the impoundment to replace flashboards, Condition J of this certification requires that 90 percent of instantaneous inflow be released during impoundment refill. Additionally, Condition K of this certification requires the Applicant to create a flow management plan within 180 days of this certification.

**D. Rare, Threatened, and Endangered Species**

94. As described in finding 61 and 62, there are rare plant species that occur on the rock outcrop of the gorge area. Prior Agency recommendations include a portion of the bypass flow to be spilled over the dam to protect these species. Therefore, this certification is being conditioned to require spillage at the dam into the bypass reach.

**E. Recreation**

95. The Applicant maintains a canoe portage trail with a takeout in the impoundment and a put-in downstream of the tailrace. Additionally, the Applicant provides parking to the general public to access the river. Continued public access to these facilities will support recreational uses such as boating, fishing, and swimming. This certification is being conditioned (Condition P) to allow continued public access to the project lands and the river within reasonable safety limitations.

**F. Aesthetics**

96. The drawdown of the impoundment may have a short-term adverse impact to aesthetics. However, this certification is being conditioned to require the Project to be operated in a true run-of-river mode and to require a portion of the bypass flow to be spilled over the dam to support the aesthetic use.

**G. Construction and Erosion**

97. Construction activities have the potential to result in discharges of sediment, debris, or other materials to State waters. The Applicant proposes to employ various sediment and

water control measures, including the installation of a water control structure to dewater the area and divert flows, silt fencing around disturbed areas, sediment control blankets, and a sedimentation basin to filter sediment laden water before discharging to the river. This certification is being conditioned (Condition E) to require all sediment and erosion control measures are properly employed and maintained during the work.

98. The flow and water level management during the proposed drawdown of the impoundment to facilitate the installation of the coffer dam is being conditioned (Condition B and C) to minimize the potential to mobilize or discharge sediment.
99. Erosion of the riverbanks from fluctuation of the impoundment has been identified as an issue that has impacts on water quality and aquatic habitat at the Middlesex Project. By Condition I of this certification the Project will be required to operate in a true run-of-river mode eliminating potential water level fluctuations associated with generation.

#### **H. Debris**

100. The Applicant has not provided information on the handling of construction related materials or machinery. This certification is being conditioned (Conditions F and G) to ensure materials associated with construction will not cause a violation of state laws and regulations.
101. The Applicant has not provided information on the handling and disposal of project-related debris. It is anticipated there will be little debris at the intake site due to the self-cleaning intake screen located at the intake. This certification is being conditioned (Condition N) to ensure materials accumulated with continued operation of the hydroelectric project will not cause a violation of state laws and regulations.

#### **I. Antidegradation**

102. Pursuant to the Antidegradation Policy set forth in the Water Quality Standards, Section 29A-105 and the Agency's 2010 Interim Anti-Degradation Implementation Procedure (Procedure), the Secretary must determine whether a proposed discharge or activities are consistent with the Policy by applying the Procedure during the review of applications for any permit for a new discharge if, during the application review process, compliance with the Standards is evaluated pursuant to applicable state or federal law. (Procedure III(A)). This includes review of applications for water quality certifications required by Section 401 of the federal Clean Water Act for a federal license or permit for flow modifying activities. (Procedure III(B)(3)).
103. In making the determination that proposed activities are consistent with the Policy, the Secretary is required to use all credible and relevant information and the best professional judgment of Agency staff. (Procedure III(D)). Section VIII of the Procedure governs the Agency's review of Section 401 applications for flow modifying activities. (Procedure VIII(A)(1)). The Secretary may have to review a single waterbody under multiple tiers of review depending on whether a waterbody is impaired or high quality for different parameters.

104. Tier 3 review is required if the project will discharge to an Outstanding Resource Water. (Procedure VIII(D)). This project does not affect any Outstanding Resource Waters and therefore does not trigger a Tier 3 review under Section VIII of the Procedure.
105. This project affects waters classified as B(2) for all designated uses, which are assumed to be high quality waters for certain parameters that trigger a Tier 2 review under Section VIII of the Procedure. (Procedure VIII(E)(1)(c)). Under Tier 2, the Secretary must determine whether the proposed activity will result in a limited reduction in water quality in a high quality water by utilizing all credible and relevant information and the best professional judgment of Agency staff. (Procedure VIII(E)(2)(b)).
106. When conducting a Tier 2 review, the Secretary may consider, when appropriate, one or more of the following factors when determining if a proposed activity will result in a reduction in water quality: (i) the predicted change, if any, in ambient water quality criteria at the appropriate critical conditions; (ii) whether there is a change in total pollutant loadings; (iii) whether there is a reduction in available assimilative capacity; (iv) the nature, persistence and potential effects of the pollutant; (v) the ratio of stream flow to discharge flow (dilution ratio); (vi) the duration of discharge; (vii) whether there are impacts to aquatic biota or habitat that are capable of being detected in the applicable receiving water; (viii) the existing physical, chemical and biological data for the receiving water; (ix) degree of hydrologic or sediment regime modifications; and (x) any other flow modifications. (Procedure VIII(E)(2)(d)).
107. The Secretary considered the foregoing factors during the review of the project to determine if the project will result in a reduction of water quality. The principal impacts of the proposed project are drawdown associated with the construction project, and the impacts of the continued operation of the project resulting from the water level management in the impoundment and alteration of flow in the bypass reach. By condition of the certification, the construction activity and the change in operations of the Project will not result in a discharge of additional pollutants or reduce other ambient water quality criteria. As a result, factors (i), (ii), (iii), (iv), (v), and (vi) are not at issue. The project has impacts on aquatic habitat and aesthetics associated with water level management of the impoundment and inadequate bypass flow. Condition B and Condition C requires water level and flow management during the construction to facilitate installation of the bulkhead to minimize potential impacts. Additionally, Condition I requires the hydroelectric project to operate in a true run-of river mode with a bypass flow of 259.5 cfs. These conditions and operational changes will reduce the impacts on aquatic habitat and aesthetics at the facility.
108. This Certification does not authorize any activities that would result in a lowering of water quality for those parameters that are exceeding water quality standards.
109. For those parameters for which the Winooski River is not exceeding water quality standards, the Secretary must conduct a Tier 1 review to determine that the existing uses of the water and the level of water quality necessary to protect those uses shall be maintained and protected. (Procedure VIII(F)).
110. Under Tier 1 review, the Secretary may identify existing uses and determine the conditions necessary to protect and maintain these uses. (Procedure VIII(F)). In determining the

existing uses to be protected and maintained, the Secretary must consider the following factors: (a) aquatic biota and wildlife that utilize or are present in the waters; (b) habitat that supports existing aquatic biota, wildlife, or plant life; (c) the use of the waters for recreation or fishing; (d) the use of the water for water supply, or commercial activity that depends directly on the preservation of an existing high level of water quality; and (e) evidence of the uses' ecological significance in the functioning of the ecosystem or evidence of the uses' rarity. (Procedure VIII(F)(2)).

111. The Secretary considered all of the factors listed above and, based on information supplied by the Applicant and Agency staff field investigations, identified the following existing uses: aquatic biota and wildlife; aquatic habitat; aesthetics; and recreation.
112. The existing dam and impoundment have changed the natural condition of the river at the Middlesex Hydroelectric Project. Currently, aquatic biota and wildlife, aquatic habitat, aesthetics, and recreational uses are impacted in the bypass due to insufficient flow and in the impoundment and downstream due to potential water level and flow fluctuations associated with generation at the hydroelectric project. Current operations do not sustain existing uses due to insufficient flow in the bypass and the potential for water level and flow fluctuations associated with power generation. However, the modifications to project operations conditioned under this Certification will result in improvements to water quality and will protect and maintain existing uses by assuring adequate conservation flows are passed consistently and the water level of the impoundment and flow downstream are not fluctuated for purpose of generation. These modifications include instituting bypass flows and true run-of-river operations at the Middlesex Hydroelectric Project.
113. The Secretary finds that the construction activities and operation of the project as conditioned by this Certification will comply with the Vermont Water Quality Standards. Accordingly, the Secretary finds that the project, as conditioned, meets the requirements of the Antidegradation Policy and Procedure relating to the protection and maintenance of high quality waters.

### **Decision and Certification**

The Department has examined the project application and bases its decision in this Certification upon an evaluation of the information contained therein that is relevant to the Department's responsibilities under Section 401 of the federal Clean Water Act and has examined other pertinent information deemed relevant by the Department, sufficient to enable the Department to certify that there is reasonable assurance that maintenance and operation of the Middlesex Hydroelectric Project in accordance with the following conditions will not cause a violation of Vermont Water Quality Standards and will be in compliance with sections 301, 302, 303, 306, and 307 of the Federal Clean Water Act, 33 U.S.C. § 1251 et seq., as amended, and other appropriate requirements of state law.

- A. Compliance with Conditions.** The Applicant shall provide notice to the Department of any proposed change to the dam repair project or operations of the hydroelectric project that would have a significant or material effect on the findings, conclusions or conditions of this



Certification, including any changes to operation of the project. The Applicant shall not make any such change without approval of the Department.

*Construction for dam repair*

- B. Flow and Water Level Management during drawdown, refill, and construction.** During the drawdown of the impoundment, outflow shall not exceed 10 percent greater than inflow. The drawdown of the impoundment shall not exceed 18 inches below the dam crest. During construction, the hydroelectric project shall be operated in a run-of-river mode with outflow equal to inflow on a near instantaneous basis. Refill of the impoundment shall be completed by passing 90 percent of inflow downstream while remaining 10 percent is stored. Under no circumstance shall flow downstream of the project be interrupted.
- C. Drawdown and sediment mobilization.** The rate of drawdown of the impoundment when nearing the target level shall be conducted in such a manner to prevent sediment mobilization. The drawdown shall occur during daylight periods and shall include visual monitoring for sediment mobilization in the intake area and the tailrace area. If sediment is released, work shall be suspended, and the Department shall be notified.
- D. Timing of Instream Work.** All instream work shall be undertaken and completed between July 1 and October 1, unless the work area is isolated, or an extension is granted by the Department following a written request.
- E. Erosion and Sediment Control.** Erosion prevention and sediment control measures shall be employed as necessary to prevent any discharge to State waters that would violate Standards.
- F. Management of Construction Materials.** All concrete waste and other debris shall be removed from the river channel at the end of each work day. This material shall be disposed of in accordance with state law and regulations. Special care shall be taken to prevent wet concrete from coming in contact with state waters and to prevent contaminated water from being displaced from form work.
- G. Maintenance of Machinery.** The contractor's equipment shall be clean and well maintained, free of fuel, hydraulic and gear oil leaks. Concrete trucks and equipment shall not be washed in any area that would result in a discharge of wash water or concrete to state waters.
- H. Restoration.** All disturbed areas shall be properly graded, seeded, and mulched upon project completion. All temporary erosion and sediment control measures shall be removed when they are no longer needed.

*Operations of Hydroelectric Project*

- I. Flow and Water Level Management.** Project facilities shall be operated in accordance with the conservation flow and water level management prescriptions described below. Bypass conservation flows shall be released on a continuous basis and not interrupted; conservation flows are the values listed below, or instantaneous inflow, if less, unless otherwise noted. True run-of-river operations means no utilization of impoundment storage and that outflow

from the facility is equal to inflow to the impoundment on an instantaneous basis. When the facility is not operating, all flows shall be released at the dam, unless otherwise noted.

The development shall operate in a true run-of-river mode with outflows equaling inflows on an instantaneous basis. A conservation flow of 259.5 cfs, or inflow if less shall be continuously released into the bypass reach with a portion to be spilled over the dam. The Applicant may conduct a site-specific flow study in the bypass reach pursuant to Section 29A-304(c) of the Vermont water quality standards. The site-specific flow study shall be conducted in consultation with the Department. The conservation flow for the bypass may be modified to a site-specific flow subject to Department approval. A site-specific flow approved by the Department may be used by the Applicant to establish the conservation flow in the bypass.

- J. Flow Management During Impoundment Refill.** During refill of the project impoundment following a drawdown associated with maintenance or replacement of flashboards at least 90 percent of instantaneous inflow shall be released below the project.
- K. Flow Management and Monitoring Plan.** Within 180 days of the effective date of this Certification, the Applicant shall develop and file with the Department a flow management and monitoring plan detailing how the project will be operated to achieve compliance with the operational mode and conservation flows prescribed in **Condition I**. The plan shall include a detailed description of how stable impoundment levels, stable downstream flows, and consistent bypass flows will be maintained.

Additionally, the plan shall include information on methods for continuous monitoring of flow, water levels, and generation associated with project operation. The plan shall include procedures for reporting deviations from prescribed operating conditions to the Department, explaining the reasons for those deviations and indicating measures to be taken to avoid recurrences. The Applicant shall maintain records and provide such records upon request by the Department.

The plan shall be subject to Department review and approval. The Department reserves the right of review and approval of any material changes made to the plan.

- L. Dissolved Oxygen.** If the Applicant chooses to seek a site-specific bypass flow the Applicant shall conduct a study to determine if project operation is degrading downstream dissolved oxygen concentrations. The study shall be conducted following Department approval of the site-specific bypass flow at the project in accordance with a study plan. The study plan shall be developed in consultation with the Department and shall include a schedule. The study plan shall be subject to Department review and approval. If the study documents that dissolved oxygen concentrations are being degraded, the Applicant shall propose, subject to Department review and approval, changes in project design or operation to mitigate the impact. The Applicant shall implement any project design and operation changes approved by the Department within the timeframes specified by the Department. Failure to implement any required changes may result in a reopening of this Certification.
- M. Trashracks.** Prior to the next replacement of the trashracks at the Project, the Applicant shall consult with the Department of Fish and Wildlife with respect to the trashrack design

and placement, to determine the appropriate bar clearance spacing and location. The Applicant shall file the trashrack design information with the Department of Environmental Conservation for approval prior to replacement.

- N. Debris.** Debris associated with project operation shall be disposed of in accordance with state laws and regulations.

*General Conditions*

- O. Public Access.** The Applicant shall allow public access to the project lands for utilization of public resources, subject to reasonable safety and liability limitations, and provided that no changes to public access shall be required prior to completion of the limited dam repair activities covered under this Certification. Such access should be prominently and permanently posted so that its availability is visible to the public. The Applicant shall not limit access to State waters without receiving written approval by the Department. In instances that access limitations are necessary to prevent unreasonable risks to public safety the Applicant shall not require pre-approval. In cases where an immediate threat to public safety exists, access may be restricted without prior approval. In such instances, the Applicant shall so notify the Department and shall file a request for approval, if the restriction is to be permanent or long term, within 14 days of the restriction of access.
- P. Maintenance and Repair Work.** Any proposals for project maintenance or repair work, including a drawdown outside the normal operating level to facilitate repair or maintenance work, shall be filed with the Department for prior review and approval, if said work may have an adverse effect on water quality.
- Q. Compliance Inspection by Department.** The Applicant shall allow the Department to inspect the hydroelectric project at any time to monitor compliance with Certification conditions.
- R. Approval of Project Changes.** Any change to the project that would have a significant or material effect on the findings, conclusions, or conditions of this Certification, including project operation, must be submitted to the Department for prior review and written approval where appropriate and authorized by law and only as related to the change proposed.
- S. Continuing Jurisdiction.** By condition of this certification, the Department retains the continuing jurisdiction over the Project and may reopen this certification to assure compliance with the Standards and to respond to any changes in classification or management objectives for the waters affected by the Project.

**Effective Date and Expiration of Certification**

This certification shall become effective on the date of issuance, and the condition of any certification shall become conditions of the federal permit (33 U.S.C. § 1341(d)). If the federal authority denies a permit, the certification becomes null and void. Otherwise, the certification runs for the terms of the federal license or permit.

### **Enforcement**

Upon receipt of information that water quality standards are being violated as a consequence of the project's construction or operation or that one or more certification conditions has not been complied with, the Secretary, after consultation with the Applicant and notification of the appropriate federal permitting agency, may, after notice and opportunity for a public hearing, modify the Certification and provide a copy of such modification to the Applicant and the federal permitting agency.

Certification conditions are subject to enforcement mechanisms available to the federal agency issuing the license or permit and to the state of Vermont. Other mechanisms under Vermont state law may also be used to correct or prevent adverse water quality impacts from construction or operation of activities for which certification has been issued.

### **Appeals**

Pursuant to 10 V.S.A. Chapter 220, any appeal of this decision must be filed with the clerk of the Environmental Division of the Superior Court within 30 days of the date of the decision. The Notice of Appeal must specify the parties taking the appeal and the statutory provision under which each party claims party status; must designate the act or decision appealed from; must name the Environmental Division; and must be signed by the appellant or their attorney. In addition, the appeal must give the address or location and description of the property, project, or facility with which the appeal is concerned and the name of the Applicant or any permit involved in the appeal. The appellant must also serve a copy of the Notice of Appeal in accordance with Rule 5(b)(4)(B) of the Vermont Rules for Environmental Court Proceedings. For further information, see the Vermont Rules for Environmental Court Proceedings, available online at [www.vermontjudiciary.org](http://www.vermontjudiciary.org). The address for the Environmental Division is 32 Cherry Street, 2nd Floor, Suite 303; Burlington, VT 05401 (Tel. 802.951.1740).

Pursuant to 10 V.S.A. Chapter 220, an aggrieved person shall not appeal this decision unless the person submitted to the Secretary a written comment during the applicable public comment period or an oral comment at the public meeting conducted by the Secretary. Absent a determination of the Environmental judge to the contrary, an aggrieved person may only appeal issues related to the person's comments to the Secretary as prescribed by 10 V.S.A. § 8504(d)(2).

Dated at Montpelier, Vermont this  
XXth day of June, 2020

Peter Walke, Commissioner  
Department of Environmental Conservation

By

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Peter LaFlamme, Director  
Watershed Management Division  
Department of Environmental Conservation

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