REVIEW OF APPLICATION FOR CERTIFICATION BY THE LOW IMPACT HYDROPOWER INSTITUTE OF THE BROOKLYN DAM HYDROELECTRIC FACILITY

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Updated and revised by Maryalice Fischer, January 7, 2019

I. INTRODUCTION

This report reviews the updated application submitted by Ampersand Brooklyn Dam Hydro LLC (Ampersand or Applicant) dated June 2018, to the Low Impact Hydropower Institute (LIHI) for Low Impact Hydropower Certification for the Brooklyn Dam Hydroelectric Project (P-13809-NH) (Brooklyn Dam or Project). Review of a draft application resulted in a Stage I Report dated April 4, 2017. Follow-up questions were provided to the Applicant on two occasions and a revised application was submitted in June 2018. Additional follow-up questions were provided, and the Applicant responded with supplemental information on several occasions between August and January 2019. This certification review was conducted in compliance with LIHI's Handbook, 2nd Edition, dated March 7, 2016. The original reviewer completed the review in July 2018 and recommended that the Project not be certified at that time pending receipt of additional information. This updated report incorporates discussion of the additional information received since that time and recommends that the Project conditionally satisfies the LIHI criteria and can be certified at this time.

The Brooklyn Dam Project (Project) is located on the lower section of the Upper Ammonoosuc River in Northumberland, Coos County, NH. The Brooklyn dam was constructed in 1912 to provide hydro-mechanical power to local textile mills. In 1930, hydroelectric generation facilities were installed at the Project to provide power to the Groveton Paper Mill and it operated as a hydropower facility until 1969 when the turbines and generators were removed. It was purchased by Ampersand in 2013 for redevelopment and re-entered service in December 2015.

The Brooklyn Dam Project holds a FERC license Exemption issued on August 14, 2015 to 5540 Hydro Inc, a subsidiary of Ampersand, and a Water Quality Certification from the New Hampshire Department of Environmental Services (NHDES) issued August December 3, 2015. The Project's authorized capacity as licensed is 0.6 megawatts (MW) run-of-river facility with a reported annual generation between 2,500 to 2,800 MWh.

II. PROJECT'S GEOGRAPHIC LOCATION

The Project is located on the Upper Ammonoosuc River between the Red Dam, located about 0.8 miles upstream and the Weston Hydropower Project, located about 0.7 miles downstream. The Upper Ammonoosuc River is separate from the Ammonoosuc River of the White Mountains. The drainage area of the Upper Ammonoosuc River is 232 square miles. The Upper

Ammonoosuc River discharges to the upper Connecticut River approximately 3.2 miles downstream of Brooklyn Dam. There are numerous dams downstream on the Connecticut River. Not all have upstream passage for anadromous species. The upstream Red Dam originally was a second development of the FERC license that included the Brooklyn Dam Project. The Red Dam is no longer used for power production and is not part of the current FERC license exemption for the Project.

III. PROJECT AND IMMEDIATE SITE CHARACTERISTICS

The Brooklyn Dam Project uses an existing 120-foot-long, 14-foot-high timber crib dam. The entire 120-foot length of the dam functions as a spillway and has a crest elevation of 878.73 feet National Geodetic Vertical Datum of 1929 (NGVD1929). Adjacent to the dam is an existing 43-foot-long floodgate structure with four 6.9-foot-wide, 10-foot-high floodgates. With the existing 2.50-foot-high flashboards installed, the dam creates a 26-acre impoundment with a normal water surface elevation of 881.23 feet NGVD1929. The impoundment volume is 51.85 acre-ft (minimum) and 52.15 acre-ft (maximum). The Project includes an existing 100-foot-long, 45-foot-wide forebay, with three 15.2-foot-wide, 15.5-foot-high trash racks with 1-inch clear-bar spacing. There is an approximate 100-foot-long bypass from where water spills over the dam to where it merges with the tailrace.

When operating, water passes through the trashracks and forebay structure into an existing 45-foot-long, 48-foot-tall, 23-foot-high brick and concrete powerhouse containing two new 300-kW Kaplan turbine generating units. Each turbine has a minimum hydraulic capacity of 33 cubic feet per second (cfs) and a maximum hydraulic capacity of 315 cfs. At flows less than 33 cfs, the Project will not operate and all flow passes over the spillway or flashboards. At flows between 33 cfs and 630 cfs (the maximum operating capacity of the Project), the Project will operate and no flow will pass over the spillway. At flows greater than 630 cfs, the Project will operate at its maximum capacity with excess flows passing over the spillway.

Turbine discharge is to an existing 48-foot-long, 45-foot-wide tailrace. Power is transmitted through a new 100-foot-long, 480-volt underground transmission line connecting the powerhouse electrical panel to three new single-phased transformers. A new 300-foot-long, 35.4-kilovolt above-ground transmission line transmits power from the transformers to the regional distribution grid. There are no fish passage facilities. No operational changes have been made since the redeveloped Project started in 2015.

Appendix A includes three Figures showing the Project's general location, nearby dams and key Project features including the Zones of Effect. Photographs 1 through 4 show the various Project features.

IV. ZONES OF EFFECT

Two Zones of Effect (ZOEs) are being evaluated for this Project: ZOE #1 - the tailrace and bypass and ZOE #2 – the impoundment. Due to the short length (about 100 feet) of the bypass, it was

agreed that the bypass and tailrace could be assessed as one ZOE. Photograph 1 in the Appendix illustrates the relationship between the tailrace and bypass.

V. REGULATORY AND COMPLIANCE STATUS

FERC Licensing

An original Federal Energy Regulatory Commission (FERC) license for the Brooklyn Dam was held by James River Corporation who owned and operated the Groveton Paper Mill. The Brooklyn Dam and upstream Red Dam were used for mill operation. In 1996, the owner at that time, Odell Hydroelectric Company, had the license amended to remove the upstream Red Dam since it was no longer needed for power generation.

In 2015, 5440 Hydro Inc., (subsidiary of Ampersand) filed for a FERC license exemption which was granted on August 14, 2015. While most exemption articles are standard engineering and dam safety requirements, Article 20 requires filing of specified plans and reports, as well as notifications to FERC of operational modification, and Articles 25 and 26 both deal with protection of cultural resources. The United States Fish and Wildlife Service (USF&WS) issued a series of recommendations under 30(c) of the FPA, 16 U.S.C. § 823a(c), which became mandatory conditions, and thus were directly incorporated into the FERC exemption. Those related to LIHI criteria included:

- Required run-of-river operation,
- Development of a plan for operation and compliance monitoring within six months of exemption issuance;
- Performance of a habitat assessment in the bypass within three months of project start-up, to assess impacts during non-spill situations, and agreement to provide required minimum flows if they are found necessary to support aquatic habitat needs;
- Performance of three years of post-operation water quality sampling to be initiated the first low-flow season after project start-up;
- Installation of trash rakes, concurrent with project start-up, having clear spacing of 1-inch or less and an approach velocity of $\leq$ 2 foot per second;
- Specified impoundment refill rates for dam maintenance, flashboard replacement and emergency drawdowns; and
- Installation of upstream and downstream fish passage facilities when requested by the USF&WS or New Hampshire Fish and Game Department (NHF&G)

Brooklyn Dam's FERC exemption has not been amended since issuance.

Water Quality Certification

A Water Quality Certification (WQC) was issued by New Hampshire Department of Environmental Services (NHDES) on November 30, 2015, which was after issuance of the FERC exemption. The WQC included twenty conditions, most parallel in context and schedule

to the USF&WS recommendations adopted into the FERC exemption. Unique conditions related at least in part to LIHI criteria included:

- drawdown rates when the impoundment is lowered,
- 48-hour reporting of, and submission of annual reports on operations deviations,
- registration and reporting for water use,
- the need to consult with the NHDES Water Conservation Program to determine the need to file a Water Conservation Plan, and
- specific requirements for an Operation and Compliance Monitoring Plan (OCMP).

Exemption and WQC Compliance

A review of FERC's eLibrary found two letters from FERC, and one from NHDES to the Applicant identifying non-compliance concerns that occurred during Project redevelopment. The first was from NHDES which issued a Notice of Past Violation (NOV) on March 31, 2015, for use of an excavator on the dry riverbed and temporary installation of a cofferdam in the riverbed without securing the appropriate state permits. The second was from FERC dated June 15, 2015, in which FERC, in response to the NHDES Notice, notified the Applicant that they had inappropriately begun construction on the Project before a decision had been reached on issuance of the license exemption. The FERC exemption was subsequently issued on August 14, 2015. Although not directly related to LIHI criteria, on November 14, 2017 FERC reminded the Applicant that they were overdue by a year in updating the Project's Public Safety Plan and signage. However, the Applicant later confirmed with LIHI that the submittal had been made in a timely manner and also refiled it on the FERC elibrary on January 4, 2019.

As discussed under the applicable criteria sections below, the original reviewer found that the Project had not met the original schedule deadlines established by the WQC and FERC exemption for OCMP development, water quality testing, and OCMP deviation reporting. These items are discussed under applicable sections below.

VI. PUBLIC COMMENT RECEIVED OR SOLICITED BY LIHI

The deadline for submission of comments on the LIHI certification initial application was December 26, 2017. No comments were received. Due to the newness of the FERC exemption and WQC, and communications provided between the NHDES, USF&WS and the Applicant showing recent interaction on several of the outstanding compliance requirements, the original reviewer determined that no agency consultation was needed to complete this review. Supplemental information in the application and information provided subsequently by the Applicant also demonstrated ongoing consultation and communications with agencies on matters related to flows and water quality.

VII. SUMMARY OF COMPLIANCE WITH CRITERIA

The following matrices summarize the standards selected by the Applicant for the Project. The original reviewer found that these standards are appropriate although compliance with all criteria had not be demonstrated at the time of the original review. Details of all criteria compliance are presented in Section VIII.

ZOE #1 – Tailwater and Bypass Reach

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

ZOE #2– Impoundment

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

VIII. DETAILED CRITERIA REVIEW

A. ECOLOGICAL FLOW REGIMES

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

Standards: All river reaches where stream flows are altered by the facility shall be defined. In all locations, appropriate flow management should apply an ecosystem-based approach that supports fish and wildlife resources by considering base flows, seasonal variability, high flow pulses, short-term rates of change, and year-to-year variability. Compliance with one of the alternative standards identified in the Low Impact Hydropower Certification Handbook issued March 7, 2016 must also be demonstrated.

Assessment: The Applicant has selected **Standard A-2, Agency Recommendation** for both ZOEs.

- ***"STANDARD A-2. Agency Recommendation***: The flow regime at the Facility was developed in accord with a site specific, science-based agency recommendation."

Per the Handbook, Standard A-1 can be selected for all impoundments (ZOE#2). While the Project operates as run-of-river, there are drawdown and refill rate limits for the impoundment to minimize environmental impacts, and therefore the Applicant selected A-2. The requirements are:

- dewatering rates of six inches or less per day (required by the WQC for all reservoir drawdowns); and
- a re-fill rate limit that requires 90 percent of inflow to the Project be released below the Project, and the impoundment is refilled on the remaining 10 percent of inflow. This is required by both the license exemption and WQC, and both specifically note that they apply to all reservoir activities, including flashboard replacement, dam maintenance, or emergency drawdown, unless pre-approval is obtained from NHDES, USF&WS, and NHF&G for the specific event.

LIHI's Handbook, under Section 2.1.1, requires that to be eligible for certification, such changes in flow must "not worsen conditions for fish, wildlife, or water quality". According to the FERC exemption, flows that formerly were passed over the spillway into the 100-foot-long bypass reach prior to Project redevelopment, would no longer be spilled unless flows exceeded the Project's hydraulic capacity (630 cfs) or the Project was not generating. That concern resulted in a WQC and license exemption requirement to conduct water quality testing and a habitat assessment in the bypass reach.

The bypass reach currently does not have any minimum flow requirements, but that could change if water quality sampling results indicate that standards such as dissolved oxygen standards are not met during low flow periods (discussed further under Water Quality). Therefore, use of Standard A-2 is appropriate. Compliance with these mandates is to be measured and recorded in accordance with an approved Operation Compliance and Monitoring Plan (OCMP).

There is also a WQC requirement to evaluate the linear extent of habitat dewatered during periods of no spill. This was intended, along with water quality testing, to help support the position that the Biological and Aquatic Community Integrity of the river is being maintained (page 18 of the WQC). The Applicant provided documentation, including evidence of recent USF&WS approval, that this study would not be required since the bypass reach is backwatered by the impoundment of the Weston dam located one mile downstream. According to the OCMP, the toe of Brooklyn Dam always has 1 to 4 feet of water regardless of whether Weston dam lowers their water level below normal operations.

The FERC exemption and USF&WS Condition 5 required that the OCMP be submitted to USF&WS for approval within six months of exemption issuance, making the due date March 14, 2016. WQC Condition 16(a) also required the OCMP to be in-place, with NHDES approval, prior to Project operation. The Project began operation in December 2015, which is earlier than had been expected, and before the OCMP was submitted to, and received approval from agencies. On June 29, 2016 NHDES informed the Applicant that the agency had not received the OCMP for review. In response, the applicant submitted a draft OCMP on July 7, 2016, and a revised version was prepared in response to NHDES comments (which were not provided until March 14, 2018). The revised OCMP was submitted on May 18, 2018 to NHDES, and again on July 16, 2018 to NHDES and USF&WS with follow-up emails requesting agency review and approval on August 15, 2018, October 10, 2018, and December 5, 2018. The OCMP was sent to FERC's ecologist on October 22, 2018 and filed on the FERC elibrary on December 20, 2018. To date, the revised OCMP has not been formally approved by the agencies despite the repeated attempts by the Applicant to obtain such approval.

The FERC exemption, USF&WS terms and conditions, and WQC Condition 16(a) – (c) have several interrelated requirements. It was not clear to the original reviewer that the Applicant was consistently following all of them. Those requirements include:

- Run-of-river operations with allowance for modifications for emergencies or with pre-approval by NHDES, NHFG, and USF&WS, and 10-day reporting to FERC of such modifications.
- 90% release/10% impoundment refill rates after planned or unplanned drawdowns with case-by-case pre-approval by NHDES, NHFG, and USF&WS for changes in these rates, and 10-day reporting to FERC of any such changes.
- 48-hour reporting to NHDES of any OCMP deviations and filing with the agency an annual OCMP deviation summary report.

Based on information submitted to LIHI and to NHDES in December 2018 and January 2019, run-of-river operations had been followed except for a short period when the Project first started operating and monitoring systems were being calibrated. Impoundment refill rate restrictions had been followed for planned events. For unplanned events such as loss of flashboards during high water, refill rates are a function of total inflow which is typically beyond control of the Applicant who reported that the rates cannot be followed for short periods (2-3 hours) during which the very small impoundment refills while spill continues to occur.

The overlapping requirements of the WQC, and USF&WS Conditions incorporated into the FERC exemption are confusing since the WQC was issued after the FERC exemption. Resource agencies have not been responsive in a timely way to the Applicant's repeated efforts to gain approval of the OCMP. In addition, the Applicant was not aware of some requirements such as reporting to FERC, and in some cases, reporting to NHDES. However, once made aware of these requirements, the Applicant has begun to implement them, and committed to continue implementing them in the future. Therefore, this review recommends the following condition to confirm ongoing compliance with LIHI flows criterion:

- The facility Owner shall submit quarterly reports to LIHI by the end of the month following the calendar quarter (e.g., April 30, July 31, October 31, January 31), information sufficient to confirm run-of-river operations, adherence to impoundment refill rates, and related agency communications for the prior calendar quarter. Any requests made by the Owner for modifications to operations or refill rates, agency approvals of such modifications, copies of notifications to FERC and NHDES of any OCMP deviations, and copies of annual OCMP deviation reports to NHDES shall also be provided to LIHI with these reports.

This Project Conditionally Passes Criterion A – Ecological Flow Regimes

B. WATER QUALITY

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

Standards: Compliance with the appropriate state/provincial or federal water quality standards must be demonstrated with all waterbodies where water quality is directly affected by the facility, including those affected areas outside the facility boundary. In all cases, if any waterbody directly affected by the facility has been defined as being water quality limited (for example, on a list of waters with quality that does not fully support designated uses), it must be demonstrated that that the facility has not contributed to that substandard water quality. Compliance with one of the alternative standards identified in the Low Impact Hydropower Certification Handbook issued March 7, 2016 must also be demonstrated.

Assessment: The Applicant has selected **Standard B-2, Agency Recommendation** to pass the Water Quality criterion for all three ZOEs. This Standard requires:

> ***"STANDARD B-2. Agency Recommendation:*** The facility is in compliance with all water quality conditions contained in a science-based agency recommendation providing reasonable assurance that water quality standards will be met for all waterbodies that are directly affected by the facility (for example, a recent Water Quality Certification issued pursuant Section 401 of the Clean Water Act). Such recommendations, whether based on a generally applicable water quality standard or one that was developed on a site-specific basis, must include consideration of all water quality components necessary to preserve healthy fish and wildlife populations, human uses and recreation."

The WQC was issued on November 30, 2015 with 20 conditions, many in parallel with the license exemption requirements. The WQC identifies that the waters at the Project are on the 2014 Section 303(d) list for mercury. All New Hampshire rivers are considered impaired for mercury, with the primary source being atmospheric deposition. The WQC states that Project operation is not expected to significantly affect mercury levels in fish tissues.

Pre-operational water quality sampling conducted in 2013 upstream and downstream of the dam for temperature and dissolved oxygen found that water quality standards were being met before the Project features were redeveloped. Because less water would be passed over the spillway after redevelopment, and to ensure that water quality standards are maintained and aquatic habitat is supported once the Project began operating, three years of post-operational water quality sampling was to be initiated the first low-flow season after Project start-up per the USF&WS terms and conditions incorporated into the FERC exemption and referenced in the WQC (the WQC only required one season of sampling with the need for subsequent sampling dependent upon the initial results).

The sampling was due to start the summer of 2016 with the sampling plan having been submitted within 6 months of WQC issuance, making this due date May 2016. The Applicant had made a request with agencies on June 3, 2016 and again on July 25, 2016 to use the original 2013 pre-operational sampling plan for post-operational monitoring. However, despite repeated email communications with NHDES, the plan was not approved in time for the 2016 or 2017 sampling seasons. On March 14, 2018 after additional requests from the Applicant, NHDES provided comments and requested some changes to the original plan. USF&WS deferred to NHDES on April 18, 2018. The Applicant then submitted a revised sampling plan to NHDES on May 18, 2018 and again on July 16, 2018 to both NHDES and USF&WS, seeking approval of the plan prior to the 2018 low flow season. It was assumed that agency comments on the draft plan constituted de facto approval once the plan was revised, and sampling was conducted in 2018. Sampling was conducted and results were provided to the agencies on December 5, 2018.

The WQC also requires that if the post-operation sampling indicates standards are not being met in the bypass, then mitigation requirements, possibly minimum flow releases, would likely be required. Sampling results indicate that dissolved oxygen, temperature, pH, total phosphorus and Chlorophyll a were all within the state's water quality standards and criteria, although the report stated that continuous monitoring data in the impoundment and bypass reach were unusable, but that grab samples of dissolved oxygen in both locations on two of the lowest flow days were within state standards. Results were submitted to NHDES and agency review is pending at this time. While the WQC requires only one season of sampling with additional sampling dependent on results, the USF&WS terms and conditions (#4) require three years of post-operational water quality sampling. Since there is not a full data record for 2018 in the impoundment and bypass reach, additional sampling may be needed in 2019.

Since NHDES has not yet reviewed or approved the 2018 sampling results, the results are somewhat incomplete, and USF&WS requires three years of sampling, this review recommends the following condition to obtain confirmation of satisfactory 2018 results, and either conduct additional sampling in 2019 and 2020 or obtain written agreement from NHDES and USF&WS that additional sampling is not needed:

- The facility Owner shall submit to LIHI the NHDES review and comment on the 2018 water quality monitoring results within 60 days of receipt. The Owner shall consult with NHDES and USF&WS on the need for additional sampling in 2019 and 2020 and file with LIHI the results of that consultation by July 31, 2019. If additional sampling is not required by NHDES and USF&WS, the Owner should evaluate the need to file with FERC a request for amendment to the exemption to remove the requirement for additional years of sampling and, if applicable, provide a copy of the request and any subsequent FERC approval to LIHI when available. If minimum flows into the bypass reach are required, LIHI shall be provided with all relevant information and agency communications within 60 days of receipt.

This Project Conditionally Passes Criterion B – Water Quality

C. UPSTREAM FISH PASSAGE

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

Standards: The applicant shall list all migratory fish species (for example, anadromous, catadromous, and potamodromous species) that occur now or have occurred historically at the Facility. Maintenance of upstream passage sufficient to support sustainable populations of these migratory species must be demonstrated by compliance with one of the alternative standards identified in the Low Impact Hydropower Certification Handbook issued March 7, 2016.

Assessment: The Applicant has selected and demonstrated compliance with **Standard C-1, Not Applicable/De Minimis Effect** for both ZOEs. This standard requires:

> ***"STANDARD C-1. Not Applicable/De Minimis Effect:*** The facility does not create a barrier to upstream passage, or there are no migratory fish in the vicinity of the facility and the facility is not the cause of extirpation of such species if they had been present historically.

The Upper Ammonoosuc River provides habitat primarily for a warmwater fishery, including brown bullhead, common sucker, yellow perch, common shiner, chain pickerel, and blacknose dace. Brook, brown and rainbow trout are stocked at times by the NHF&G for a put-and-take fishery. Atlantic salmon historically were found in the Upper Ammonoosuc River, however, their migration upstream was blocked by dams on the Connecticut River starting in the late 19th century. Some dams still do not have upstream passage. In 2013, the USF&WS ended its program to restore Atlantic salmon to the Connecticut River basin.

The impoundment (ZOE #2) does not pose a barrier to upstream passage so standard C-1 is appropriate. Regarding ZOE #1, the tailrace and bypass reach, neither the WQC nor the FERC exemption require upstream passage for diadromous species as none exist in the area. Both the FERC exemption and WQC include a condition requiring the design, installation, operation and testing if upstream passage is deemed appropriate in the future.by USF&WS or NHF&G. The

FERC Environmental Assessment in 2015 reported that there are no current plans to restore diadromous species to the Upper Ammonoosuc River.

This Project Passes Criterion C – Upstream Fish Passage

D. DOWNSTREAM FISH PASSAGE AND PROTECTION

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

Standards: The applicant shall list all fish species (for example, riverine, anadromous, catadromous, and potamodromous) that occur now or have occurred historically in the area affected by the Facility. To pass the downstream fish passage and protection criterion, compliance with one of the alternative standards identified in the Low Impact Hydropower Certification Handbook issued March 7, 2016 must be demonstrated.

Assessment: The Applicant has selected and demonstrated compliance with **Standard D-1**, **Not Applicable/De Minimis Effect** for both ZOEs. This standard requires:

> ***"STANDARD D-1. Not Applicable/De Minimis Effect:*** The facility does not create a barrier to downstream passage, or there are no migratory fish in the vicinity of the facility; if migratory fish had been present historically, the Facility is not responsible for extirpation of such species; the Facility does not contribute adversely to the sustainability of riverine fish populations or to their access to habitat necessary for the completion of their life cycles."

As noted above, the Upper Ammonoosuc River is primarily a warm water fishery, and diadromous species do not currently occur in the River. Currently, there is no requirement for downstream diadromous fish passage facilities at the Project. Both the FERC exemption and WQC include a condition requiring the design, installation, operation and testing if downstream passage is deemed appropriate in the future by USF&WS or NHF&G.

The FERC exemption, as a recommendation from USF&WS, did require the installation of trash racks having 1-inch clear spacing and an approach velocity of $\leq$ 2 foot per second. The racks were installed and based on recent correspondence from USF&WS provided in the application, it appears that this installation satisfied this obligation.

The Project Passes Criterion D – Downstream Fish Passage and Protection

E. SHORELINE AND WATERSHED PROTECTION

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

Standards: To pass the watershed protection criterion for LIHI certification, the applicant shall demonstrate compliance with one of the alternative standards identified in the Low Impact Hydropower Certification Handbook issued March 7, 2016.

Assessment: The Applicant has selected and demonstrated compliance with **Standard E-1, Agency Recommendations** for both ZOEs, to pass the Shoreline and Watershed Protection criterion. This standard requires:

> ***"STANDARD E-1. Not Applicable/De Minimis Effect:*** There are no lands associated with the facility under ownership and control of the applicant that have significant ecological value for protecting water quality, aesthetics, or low-impact recreation, and there has been no Shoreline Management Plan (SMP) or similar protection required at the facility; or the facility has no direct or indirect project-related land ownership, excluding lands used for power generation and transmission, flowage rights and required developed recreational amenities."

Neither the FERC exemption nor WQC requires the protection of lands under the control of the Applicant via a Shoreline Management Plan or a buffer zone. Applicant ownership is limited to the land housing the powerhouse and ancillary facilities (transformer, etc.) None of these lands are considered to have any significant ecological value as all Project lands are developed. The area immediately surrounding the Project is also mostly developed, having a mix of industrial uses, vacant lands and some residential areas.

The Project Passes Criterion E – Shoreline and Watershed Protection

F. THREATENED AND ENDANGERED SPECIES PROTECTION

Goal: The Facility does not negatively impact listed species.

Standards: Facilities shall not have caused or contributed in a demonstrable way to the extirpation of a listed species. However, a facility that is making significant efforts to reintroduce an extirpated species may pass this criterion. To pass the Threatened and Endangered Species criterion compliance with at least one of the alternative standards identified in the Low Impact Hydropower Certification Handbook issued March 7, 2016 must be demonstrated.

Assessment: The Applicant has selected and demonstrated conditional compliance with **Standard F-2 Finding of No Negative Effect** for both ZOEs. This standard requires:

STANDARD F-2. Finding of No Negative Effect: There are <u>listed species</u> in the area, but the facility has been found by an appropriate resource management agency to have no negative effect on them, either recently or in the past."

The application, based on information included in the Project's FERC Environmental Assessment states that no federally protected species are specifically known to occur at the site and no known habitat for these species occurs in the Project area. However, the Canada lynx and Northern long-

eared bat, both federally threatened species, are known to occur in Coos County. Project operations are not expected to impact such species. Follow-up correspondence from the applicant indicated that based on data available from the NH Natural Heritage Bureau, no state protected species are recorded as being in the vicinity of the Project.

The Project Passes Criterion F – Threatened and Endangered Species Protection

G. CULTURAL AND HISTORIC RESOURCE PROTECTION

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

Standards: To pass the Cultural and Historic Resource criterion compliance with one or more of the alternative standards identified in the Low Impact Hydropower Certification Handbook issued March 7, 2016 must be demonstrated.

Assessment: The Applicant has selected **Standard G-2, Approved Plan** to pass the Cultural and Historic Protection criterion for both ZOEs. This standard requires:

> ***"STANDARD G-2. Approved Plan:*** The facility is in compliance with approved state, provincial, federal, and recognized tribal plans for protection, enhancement, or mitigation of impacts to cultural or historic resources affected by the facility."

The FERC exemption contains two articles regarding protection of cultural resources. In a letter dated January 31, 2014, the New Hampshire SHPO stated that there was no potential for Project redevelopment as planned to cause adverse effects on cultural or historic resources related to the dam. The FERC Environmental Assessment did denote the historical use of the area by the Abenaki Indians and the close presence of the Groveton historic covered bridge, which was constructed over the Upper Ammonoosuc in 1852. The Groveton Bridge is eligible for listing on the National Register of Historic Places. Thus, Standard G-2 is appropriate given these FERC exemption conditions to protect cultural resources that may exist, but have not yet been formally documented, and that compliance with those conditions demonstrates satisfaction of the LIHI Standard.

Article 26:

> *Prior to implementing any project modifications not specifically authorized by this exemption, including but not limited to maintenance activities, land-clearing or land-disturbing activities, or changes to project operation or facilities, the exemptee must consult with the New Hampshire Division of Historical Resources (New Hampshire SHPO) to determine the effects of the activities and the need for any cultural resource studies or measures. If no studies or measures are needed, the exemptee must file with the Commission documentation of its consultation with the New Hampshire SHPO.*

Article 27:

> *If the exemptee discovers previously unidentified cultural resources during the course of*

> *constructing, maintaining, or operating project works or other facilities at the project, the exemptee must stop all land-clearing and land-disturbing activities in the vicinity of the resource and consult with the New Hampshire Division of Historical Resources (New Hampshire SHPO) to determine the need for any cultural resource studies or measures. If no studies or measures are needed, the exemptee must file with the Commission documentation of its consultation with the New Hampshire SHPO.*

Under both Articles, if cultural studies are determined necessary by the SHPO or artifacts are found, then additional measures, including development and implementation of an Historic Properties Management Plan must be completed before the work can continue.

On July 31, 2018, the SHPO issued a letter to the Applicant stating that they had issued a letter on August 14, 2014 (not found in the FERC elibrary) indicating that no additional consultation was required. The 2018 letter reiterated that decision and noting that consultation and completion of a New Hampshire Inventory report would be required if future changes that could affect cultural or historic resources (specifically the dam) were planned at the Project.

The Project Passes Criterion G - Cultural and Historic Resource Protection

H. RECREATIONAL RESOURCES

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

Standards: To pass the recreation criterion, compliance with at least one of the alternative standards identified in the Low Impact Hydropower Certification Handbook issued March 7, 2016 must be demonstrated. In all cases, it must be demonstrated that flow-related recreational impacts are mitigated to a reasonable extent in all zones where there is flow-related recreation. Where there is recognized, flow-related recreational use, the facility shall provide the public with relevant and up-to-date information on reservoir levels and river flows, preferably real-time updates. It is understood that recreational activities must be consistent with the assurance of reasonable safety of employees and the public, and with critical infrastructure protection dictated by state or federal authorities.

Assessment: The Applicant has selected and demonstrated compliance with **Standard H-3, Assured Accessibility and Use** to pass the Recreational Resources criterion for all ZOEs. This standard requires:

- ***"STANDARD H-3. Assured Accessibility and Use:*** If agency recommendations and an enforceable recreation plan are not in effect, the facility demonstrates that it has been and will continue to be responsive to reasonable public interest group requests for adequate public access to land associated with the facility, to the reservoir and downstream reaches, and to appropriate recreational water flows and levels, without fees or charges."

Neither the FERC exemption nor the WQC includes any discussion or conditions regarding

recreational facilities. The Applicant stated that they maintain a canoe portage and allow free access to the Project impoundment for recreational fishing. They also committed to take into consideration any reasonable public interest group requests for recreational use of Project lands or water. Thus, it appears that Standard H-3 is appropriate and is being met.

The Project Passes Criterion H – Recreational Resources

IX. GENERAL CONCLUSIONS AND REVIEWER RECOMMENDATION

The original reviewer recommended that the Project not be certified in 2018 until issues related to the flows criterion and water quality were addressed. The original reviewer and LIHI staff had several conversations with the Applicant throughout 2018 about items of potential concern to certification. During that time the Applicant made significant progress to address those issues, to gain resource agency concurrence where needed, and to implement procedures to ensure ongoing compliance with flow related requirements. Therefore, it is now recommended by the subsequent reviewer that the Project be LIHI Certified® with the following two conditions:

- Condition 1: The facility Owner shall submit quarterly reports to LIHI by the end of the month following the calendar quarter (e.g., April 30, July 31, October 31, January 31), information sufficient to confirm run-of-river operations, adherence to impoundment refill rates, and related agency communications for the prior calendar quarter. Any requests made by the Owner for modifications to operations or refill rates, agency approvals of such modifications, copies of notifications to FERC and NHDES of any OCMP deviations, and copies of annual OCMP deviation reports to NHDES shall also be provided to LIHI with these reports.

- Condition 2: The facility Owner shall submit to LIHI the NHDES review and comment on the 2018 water quality monitoring results within 60 days of receipt. The Owner shall consult with NHDES and USF&WS on the need for additional sampling in 2019 and 2020 and file with LIHI the results of that consultation by July 31, 2019. If additional sampling is not required by NHDES and USF&WS, the Owner should evaluate the need to file with FERC a request for amendment to the exemption to remove the requirement for additional years of sampling and, if applicable, provide a copy of the request and any subsequent FERC approval to LIHI when available. If minimum flows into the bypass reach are required, LIHI shall be provided with all relevant information and agency communications within 60 days of receipt.

THE BROOKLYN DAM PROJECT CONDITIONALLY MEETS THE LIHI CRITERIA FOR CERTIFICATION

APPENDIX A

Figures and Photographs

Figure 1 – General Location of the Brooklyn Dam Project

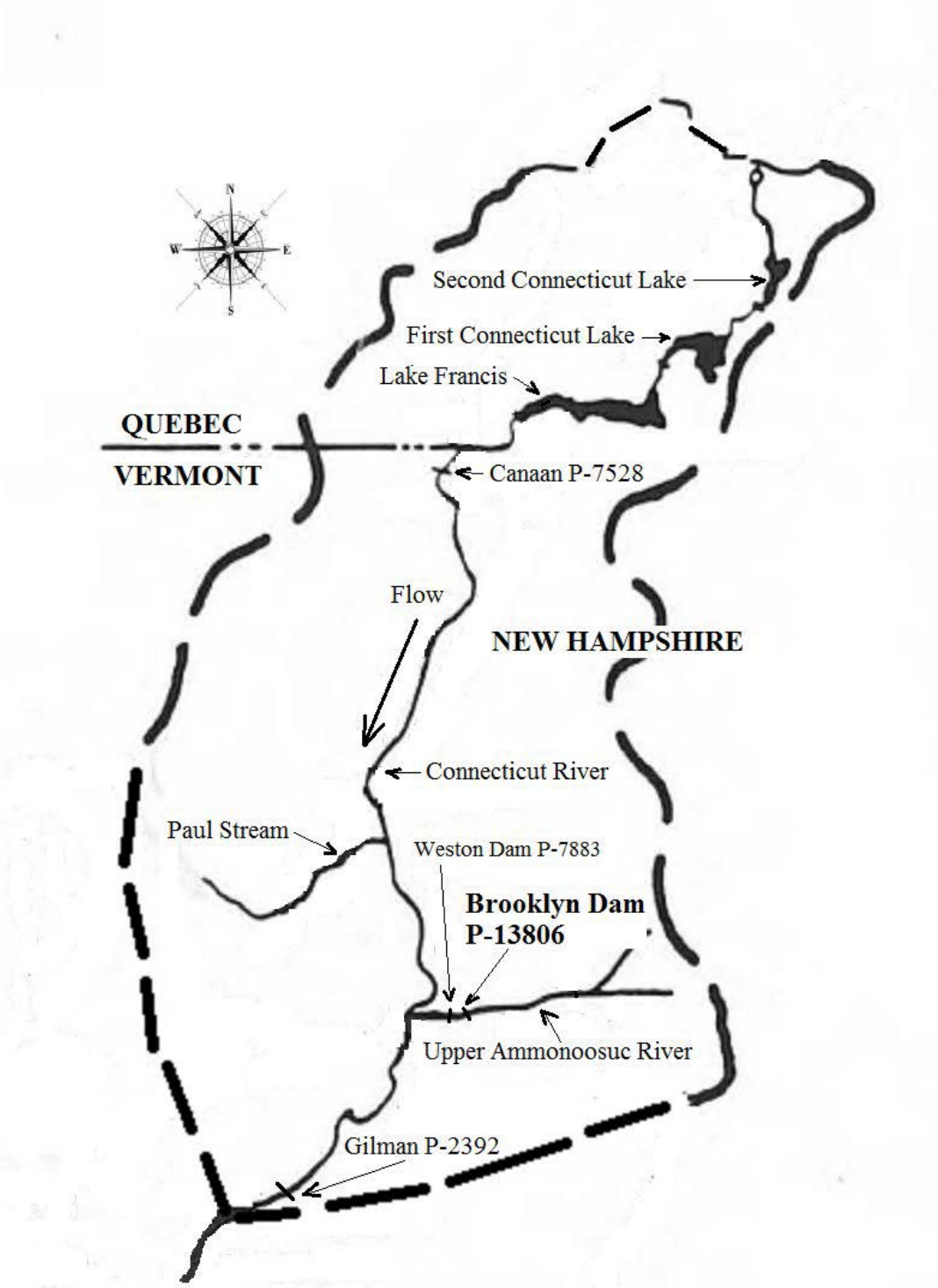


Figure 2 – Brooklyn Dam Project and Nearby Dams on the Upper Ammonoosuc River

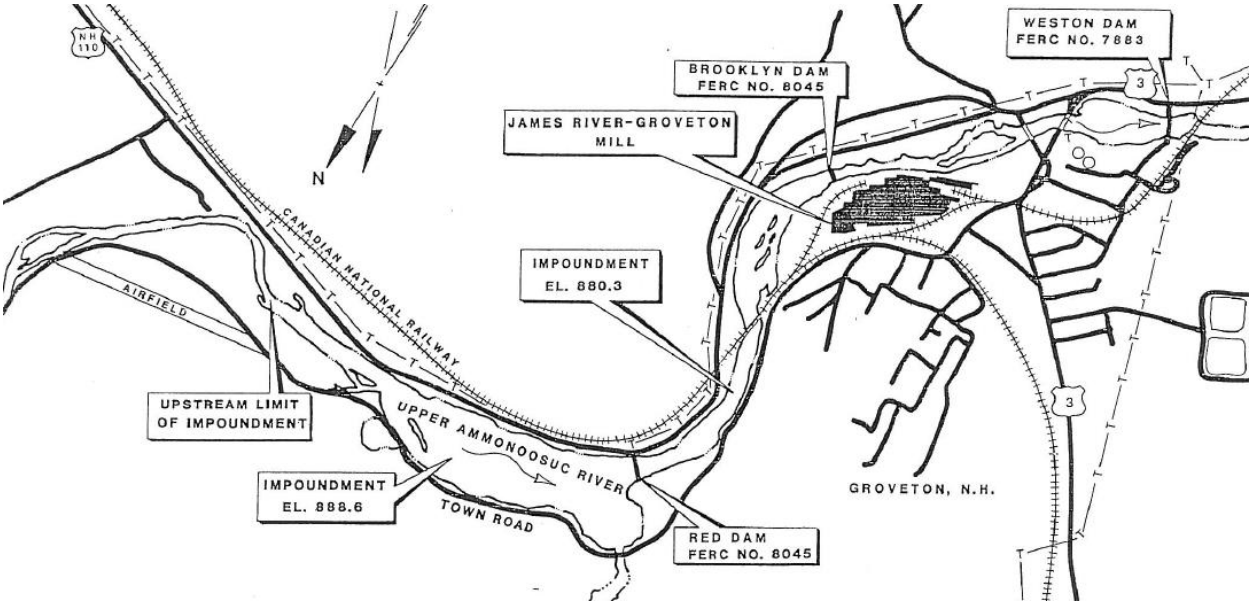
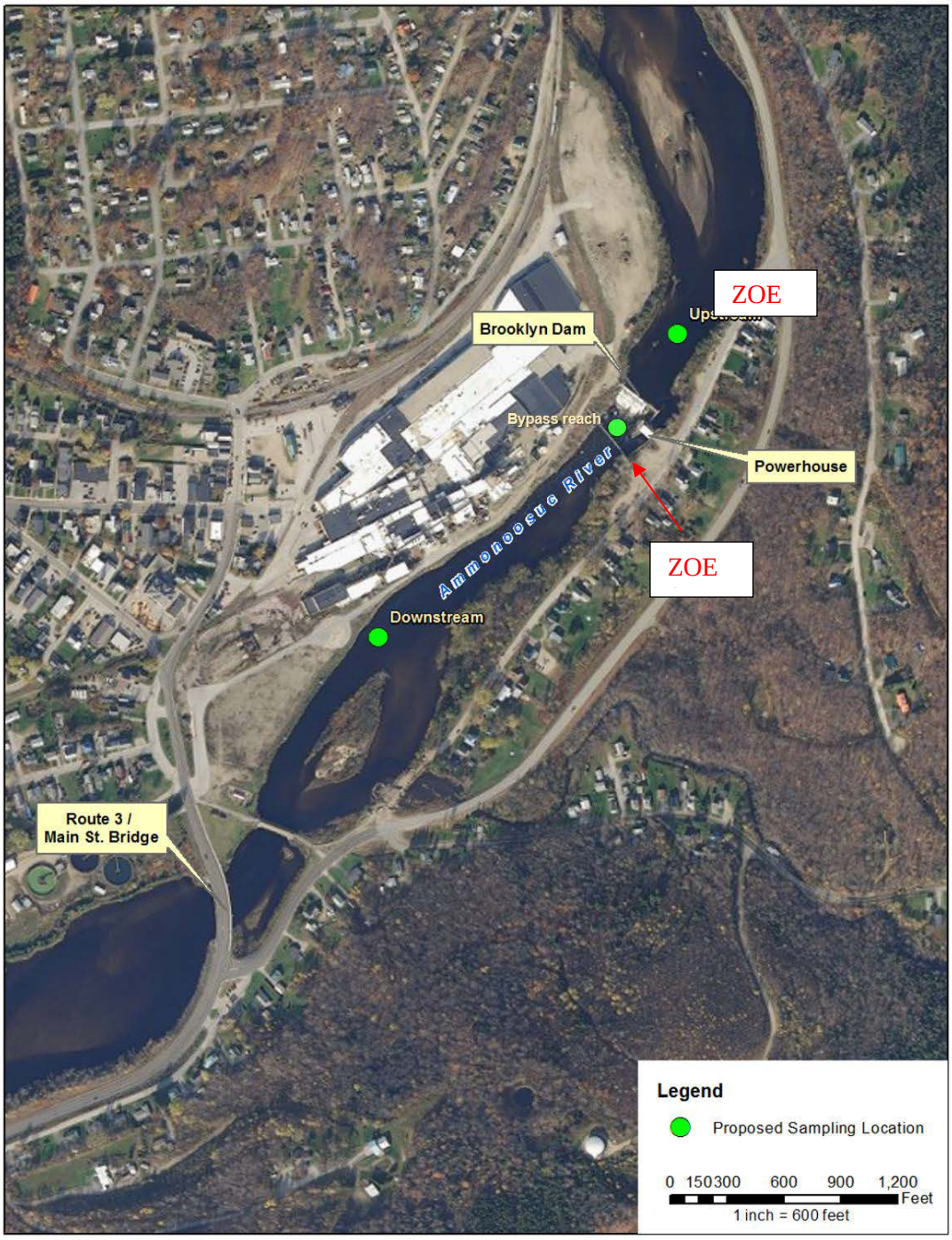
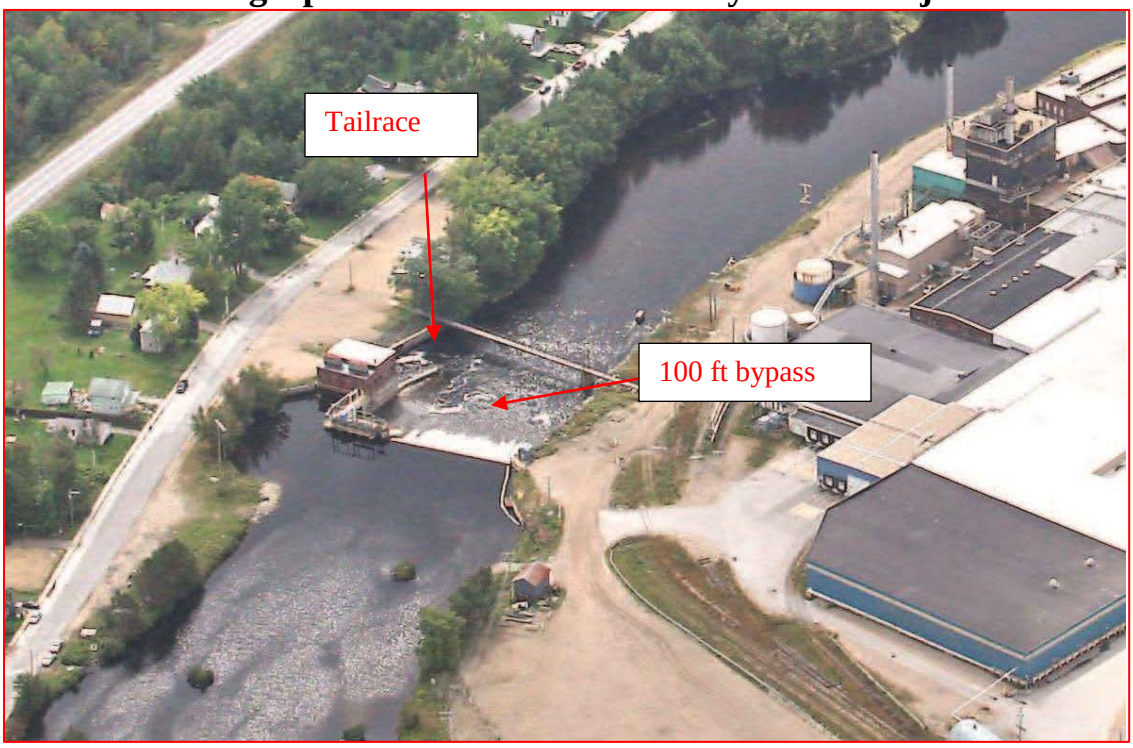


Figure 3 – Brooklyn Dam Project and Zones of Effect

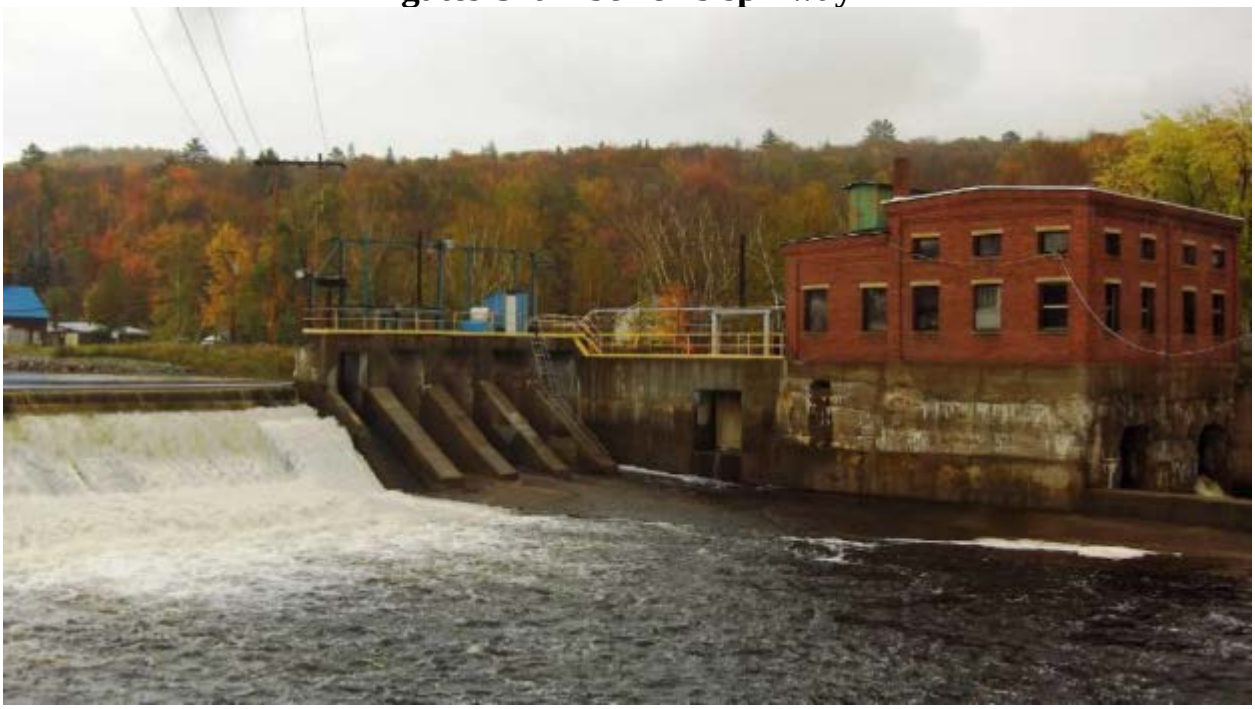
Green circles are proposed water quality sampling locations.



Photograph 1 – Aerial of the Brooklyn Dam Project



Photograph 2 – Brooklyn Dam, including powerhouse, spillway slab, flood gates & timber crib spillway



Photograph 3 - Side view of the dam's flood gates, spillway slab & timber crib spillway

Photograph 4 – Brooklyn Dam's forebay and powerhouse