STATE OF MAINE
DEPARTMENT OF AGRICULTURE, CONSERVATION & FORESTRY
LAND USE PLANNING COMMISSION
932 U.S. ROUTE 2 EAST
WILTON, MAINE 04294

JANET T. MILLS
GOVERNOR

AMANDA E. BEAL
COMMISSIONER

NICHOLAS D. LIVESAY
EXECUTIVE DIRECTOR

PERMIT

COMMISSION DECISION

IN THE MATTER OF

BROOKFIELD WHITE PINE HYDRO, LLC
HYDROPOWER PERMIT HP 30
MAINE WATERWAY DEVELOPMENT CONSERVATION ACT
WATER QUALITY CERTIFICATION

The Maine Land Use Planning Commission (Commission), after reviewing the application and supporting documents submitted by Brookfield White Pine Hydro, LLC (Brookfield) associated with Hydropower Permit (HP) 30, hearing testimony, public comments, and the related record materials, finds the following facts.

1. APPLICATION SUMMARY

a. Applicant: Brookfield White Pine Hydro, LLC
Attn: Kyle Murphy
150 Main Street
Lewiston, ME 04240

b. Agent: TRC Engineers, LLC
Attn: Mark Christopher
14 Gabriel Drive
Augusta, Maine 04330

c. Date of Completed Application: August 9, 2018, revised February 12, 2019

d. Project Description: Middle Dam Renewal Project

e. Project Location: Township C, Oxford County, Maine

f. Zoning: General Management Subdistrict (M-GN)
Residential Development Subdistrict (D-RS)
Shoreland Protection Subdistrict (P-SL)
Wetland Protection Subdistrict (P-WL)

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g. Water Bodies:

1. Lower Richardson Lake – The Commission has identified Lower Richardson Lake as a class 1A, a lake of statewide significance, relatively accessible and developed, with outstanding fisheries and shore character and significant wildlife and scenic resources. Lower Richardson Lake is a Class GPA water body pursuant to Standards for *classification of lakes and ponds*, 38 M.R.S. § 465-A.

2. Rapid River – The Rapid River, at the site of the proposed project, is a Class A water body pursuant to *Classification of major river basins*, 38 M.R.S. § 467(C).

2. BACKGROUND AND PROJECT DESCRIPTION

a. Upper Dam and Middle Dam are components of a hydropower project located on Richardson Lake and licensed the Federal Energy Regulatory Commission (FERC) (FERC P-11834-ME) as the Upper and Middle Dam Storage Project. Middle Dam is located at the southwest portion of Lower Richardson Lake. Together, Middle Dam and Upper Dam support water levels in Mooselookmeguntic Lake and Upper and Lower Richardson Lakes. The dam tailrace at the outlet of Lower Richardson Lake at Middle Dam marks the beginning of the Rapid River, which flows southwesterly into Pond in the River and Umbagog Lake. The Upper and Middle Dam Storage Project supports water levels and flows released from the 7,470-acre Richardson Lake and maintains a full pond water surface elevation of 1,450 feet. A series of gates are managed at each dam to control flow releases downstream.

Historically, the Upper and Middle Dam Storage Project served to provide a consistent water level for the Androscoggin River system in Maine and New Hampshire during the log drives of the 19th and 20th centuries. The lakes impounded by the Upper and Middle Dam Storage Project eventually became important components in the development of the sporting tourist industry in Maine in the late 19th century. As the paper industry and the population grew, the concurrent increase in demand for manufacturing capacity along the Androscoggin River in Maine resulted in the use of the reliable power available from the river system to fuel industrial growth. Upper and Middle Dams became important components of the river management system to ensure the availability of that power source. Middle Dam, which was originally built in the 1850s, has gone through numerous construction efforts and upgrades, but today does not meet the current FERC safety requirements. To ensure the continued safety to individuals, municipalities, businesses and recreational and environmental resources the Dam provides, the proposed reconstruction needs to satisfy FERC mandated safety requirements. This includes meeting the Potential Failure Mode Analysis (PFMA).

b. Middle Dam, as it exists at the time Brookfield submitted its permit application to the Commission, is a 244-foot long dam structure equipped with a gatehouse containing three 15-foot wide by 12-foot deep sluice gates; five 7-foot wide by 14.7-foot deep shoal gates; and six 9-foot wide by 12.3-foot deep spillway gates. Adjacent to the dam is an existing generator shed measuring 30 feet by 20 feet on a similarly-sized concrete foundation. The dam is flanked by two earthen dykes that assist in creating the impoundment. The northernmost dyke extends 560 feet north and 200 feet south of the gatehouse. The southernmost dyke, known as Blackcat Dyke, is located 2,000 feet to the southeast of the dam. Brookfield's anticipated

construction schedule is detailed in Table 1-2 of their permit application and included as **Attachment A** of this permit.

3. PROPOSAL

a. Reconstruction of existing dam structure. Brookfield is required to meet certain dam safety criteria mandated by the FERC license for the Middle and Upper Dam Storage Project. In order to meet the applicable FERC license requirements, the applicant has determined that a complete reconstruction of Middle Dam is the most structurally sound and feasible long-term option. The applicant proposes a five-year construction schedule to accomplish the reconstruction and upgrades to the associated infrastructure.

b. Construction of laydown yards. Brookfield proposes to create two laydown yards to support construction. The first, known as the upper laydown yard, is located approximately 0.5 miles north of Middle Dam adjacent to Middle Dam Road on property owned by Six Rivers Limited Partnership, and managed by Seven Islands Land Company. The purpose of the proposed laydown yard is to create a space for the storage of construction equipment, construction materials and fuel, and would also serve as the location of a temporary concrete batch plant. The upper laydown yard would be located approximately 1,000 feet west of Lower Richardson Lake and approximately 1,200 feet northwest of the nearest camps. The upper laydown area is proposed to be 300 feet by 600 feet, approximately 4.1 acres. The yard will be setback 75 feet from Middle Dam Road, accessed by two driveways, and will maintain a forested buffer within the setback to Middle Dam Road. The site is currently forested and will be cleared, grubbed, graded, and topsoil will be removed and stored onsite. Bank run shale or crushed rock will be placed over the entire site for stability, drainage, and to reduce erosion. A chain-linked security fence with fabric screening will surround the yard. Post-construction, the rock base will be removed and replaced with the topsoil, graded and vegetated. The site will not be restored to its original preconstruction topography. The chain-link fencing will be removed upon completion of construction.

c. Lower laydown yard. The second proposed laydown yard, known as the lower laydown yard, would be located north of the existing dam tender's house within an area of maintained lawn that is approximately 100 feet by 400 feet (approximately 0.92 acres), and would be set back 60 feet from the normal high-water mark (NHWM) of Richardson Lake. The waterside of the proposed yard is demarcated by a gravel driveway that leads to the former gate tender's house. The purpose of the lower laydown yard would be for storage of construction materials that will be of immediate need. The perimeter of the yard would be surrounded by a chain-link security fence with fabric screening. The yard will be graded and will contain three seepage trenches to improve drainage. A layer of geotextile fabric will be placed on top of the subgrade then covered by a layer of crushed stone. Post-construction, the gravel and filter fabric will be removed, topsoil replaced, graded to pre-construction contours, and vegetated. The chain-link fencing will be removed upon completion of construction.

d. Dyke reinforcement (Gatehouse Dyke). Brookfield proposes to raise and strengthen the Gatehouse Dyke, one of two earthen dykes involved in maintaining water levels in Richardson Lake. The Gatehouse Dyke extends 560 feet north and 200 feet south of the existing gatehouse. The north embankment needs structural reinforcement on both the lakeside and streamside banks. On the lakeside, a portion of the existing riprap on the lower slope will remain. On the upper slope, riprap will be removed and replaced with a riprap of

increased structural capabilities. For the streamside, a portion of the existing boulder and cobble substrate will be removed and replaced with a re-compacted glacial till and overlain with a 12-inch-thick layer of riprap. An 18-inch-thick layer of crushed gravel will be placed on top of the embankment to bring the final grade to 1,455.6 feet. For additional reinforcement, new sheet pile will be placed below grade to reduce seepage from Richardson Lake into the downstream portion of the embankment. The south embankment needs structural reinforcement on both the lakeside and streamside. The angle and the composition of the side slopes will be modified using a mixture of techniques and materials. For the lakeside, the lower slope of the embankment will be removed and a portion of it will be replaced with filter soil and a 36-inch layer of riprap. This work will not result in the placement of fill in Richardson Lake. A portion of the streamside embankment underlain with boulders and cobble will be removed and replaced with re-compacted glacial till and filter soil with a 12-inch-thick overlay of riprap. A portion of the streamside slope will be reinforced with filter soil and riprap and extend into the existing swale. An 18-inch-thick layer of crushed gravel will be placed on top of the embankment to meet the new side slopes and create a wave barrier at a final elevation of 1,455.6 feet.

e. Dyke reinforcement (Black Cat Dyke). Black Cat Dyke is located 2,000 feet southeast of the existing dam and is 180 feet long. By design, the dyke allows seepage through its earthen materials, the resulting drainage filters through a series of wetlands ultimately draining into the Pond in the River. Brookfield proposes to remove approximately 12-24 inches of soil from the dyke, replacing it with 36-48 inches of common borrow to reinforce the dyke and raise it to an elevation of 1,454 feet. Riprap will be placed on the lakeside of the dyke for reinforcement and to support the increased height. This additional fill will not extend below the NHWL of the lake.

f. Barge shore access*:* Brookfield proposes to construct a barge landing to transport materials to and from the site. To provide safe access from the lake, a small portion of an existing beach will be expanded by placing angular granitic-crushed rock over a geotextile underlayment which will be installed on the existing ground surface. The improved beach area will be 25-30 feet into the lake for a depth of two to three feet. An access trail of bank run shale or gravel will be created from the beach area to the lower laydown area. A temporary gravel pad approximately 50 feet by 50 feet will be created adjacent to the expanded beach to allow a crane to be set in place. A temporary road will be built from the gravel pad to the lower laydown yard for the use of extracting materials and equipment from the barge and to convey them to the laydown area and trucks. All stone and fabric will be removed post construction.

g. Reconstruction of storage and maintenance shed. Brookfield proposes to reconstruct and expand an existing maintenance shed and generator building. The dimensions of the existing shed and generator building are 30 feet by 20 feet. The expansion would take advantage of an adjacent 29-foot by 23-foot concrete foundation. The dimensions of the proposed expanded shed and generator building are 60 feet long by 23 feet wide by 24 feet in height. The existing maintenance shed is located north of the dam and is currently 38.5 feet from the NHWM of Richardson Lake. The proposed reconstructed maintenance shed would remain at 38.5 feet from the NHWM of the lake and will increase its existing footprint by 98 square feet. The shed would not have pressurized water or plumbing. The structure would house a generator and would be installed with secondary containment to contain any possible fuel leakage.

h. Temporary and permanent impacts. During the anticipated 5-year construction project, Brookfield proposed a number of temporary and permanent environmental impacts. These are identified in Table 1-3 of Brookfield's permit application, which is included as **Attachment B** of this permit. With regard to wetland impacts, Brookfield proposes 65,689 square feet of permanent wetland impacts and 26,600 square feet of temporary wetland impacts within the Wetland Protection (P-WL) subdistrict. Specifically, the applicant proposes:

1) Dredging within the upstream intake and tailrace area within cofferdams (temporary wetland impacts) in P-WL1 wetland: 23,350 square feet
2) Beach expansion (temporary wetland impacts) in P-WL1 wetland: 3,250 square feet
3) Dredging (permanent wetland impacts) in P-WL1 wetlands: 55,700 square feet
4) Proposed access trail (permanent wetland impacts) in P-WL1 wetlands: 1,350 square feet
5) Embankment reinforcement below the normal high water mark (permanent wetland impacts) in P-WL1 wetlands: 8,639 square feet

i. Mitigation. Brookfield proposes to mitigate environmental impacts as follows.

1) Angler access
   a) Construction of a permanent access trail from the intersection of Fish Pond Road and Middle Dam Road, leading to the north side of the Rapid River
   b) Construction of a permanent access trail located the south side of the dam leading to the south shoreline and extending into the south shoreline with a permanent wading access path
   c) Permanent angler platform affixed to the dam structure
   d) Relocation of Brookfield's seasonal dock to near the dam tenders house
   e) Temporary access path during construction, from Brookfield's seasonal dock to the permanent access trail

2) Remove the piers and concrete tailrace components
   a) Create 3,500 square feet of new aquatic habitat through removal of existing piers and concrete tailrace components
   b) Increase angler opportunities

3) Create the auxiliary gate
   a) Create 2,500 square feet of new aquatic habitat below spillway

4) Remove the upstream piers on the lake
   a) Restore 2,240 square feet of lake, aquatic benthic habitat

5) Habitat restoration and enhancement
   a) Create 8,240 square feet of suitable fish habitat in the area beneath the existing piers
   b) Create and re-create various micro habitats, including pool and riffle complexes
   c) Install large boulders at various locations to allow for complex tailwater habitat features to be created that mimic existing or natural conditions to the extent possible

6) Minimize substrate movement during high flow conditions

7) Continue Middle Dam Fisheries Working Group (FWG) (see paragraph 3.j. below)

8) Restrict in-stream work to June 1 through October 31 of each year

9) Invasive species monitoring and eradication program

10) Employ a contract monitor throughout construction (see paragraph 3.k. below)

11) Engineering design improvements through consultation with resource agencies
    a) Improved bass containment design
    b) Improved stormwater management system for the lower laydown yard
    c) Improved location for sediment catch basin
    d) Permanent pedestrian access paths to both north and south shores of the Rapid River

j. Middle Dam Fisheries Working Group (FWG). Brookfield formed the FWG to obtain stakeholder input on access and fisheries habitat issues. The working group is comprised of representatives from Brookfield, Maine Department of Inland Fisheries and Wildlife (MDIFW), Rangeley Lakes Heritage Trust (RLHT), Rangeley Guides Sportsman Association, Friends of Richardson, US Fish and Wildlife Service (USFWS) and Trout Unlimited (TU). With regard to habitat restoration, Brookfield has stated that it has a goal "[t]o provide suitable habitat to the tailrace areas that will be temporarily disturbed from the re-construction of Middle Dam." (Middle Dam – Downstream Habitat and Angling Restoration Memo, March 5, 2019.) Brookfield identified three design elements to meet this goal: 1) restore to resemble pre-construction/improve tailwater channel habitat to provide "resting pools or holding areas" for brook trout; 2) locate a network of holding areas within reasonable casting range of fly fishermen and under a range of flow scenarios; and 3) improve angler access to the resting pools via casting platform attached to the dam, and an improved trail and wading area location on the south shoreline. Brookfield has identified a number of criteria related to these design elements and solicited input on the criteria from the FWG. Brookfield has stated that it is committed to a restoration plan and intends the plan to be consistent with the design elements and related criteria. Overall, the objective is that the restoration is functionally equivalent to what is in place currently. How this restoration can best be accomplished will depend on the information gathered during the construction process. As a result, the conceptual Middle Dam tailrace habitat restoration figure is representative of Brookfield's intent, but is not a final plan.

In comments submitted April 5, 2019, Brookfield indicated it will attempt to convene the FWH within 60 days of permit approval to further develop the conceptual plan. Brookfield stated its intent to utilize existing bathymetry data and drone footage of the location of the cofferdam for reconstruction efforts. The data will be used by the FWG in consultation with Kleinschmidt Associates' Fluvial Geomorphologist and Senior Fisheries Biologist in the determination habitat features within the tailrace area. During Phase 2, Brookfield's intent is that the FWG will conduct a site visit while the tailrace area is dewatered and before excavation of the existing substrate begins. In addition to members of the group, Brookfield dam safety engineers and biologists and Kleinschmidt Associates Senior Fisheries Scientist

and Fluvial Geomorphologist will evaluate the dewatered area and collect data required to further develop and finalize the Conceptual Habitat Restoration Plan. Brookfield anticipates collecting the following data in the pre-construction survey:

- Substrate size range - perform a Wolman pebble count to determine the D10, D50, and D85 for the area immediately below the existing spillway
- Particle embeddedness – qualitative assessment of the percent of dominant particles protruding from the stream bed
- Channel cross sections – to document existing grades and substrate elevations. Minimum of two cross sections perpendicular to flow in the restored area
- Photographs of the dewatered area and of any high-quality pools

One-year post-construction, Brookfield stated a willingness to collect data to assesses restoration success. Brookfield stated it would provide a report summarizing monitoring results and evaluate the need for further monitoring at that time. Brookfield stated the data collected during the post-construction survey would include:

- Tailwater bathymetry – to document post-construction grades for year-over-year comparison. Likely to include bathymetry for the restored area, including a comparison to prior-year's data with the Year 0 survey as the baseline.
- Pool dimensions for created pool habitat – determined from the bathymetry and anticipated to include maximum depth, width, and length for created habitat features.
- Depth and velocity measurements - collected on monument cross-sections to establish that the targeted habitat-based hydraulics are achieved at fishable flows (approximately 400-1,800 cfs),
- Photographs of the restored area and each boulder cluster/habitat feature

k. Contract monitor (CM). Brookfield will have a field Contract Monitor onsite for the entire duration of the construction efforts. The primary role of the CM is to ensure the safety and all environmental aspects of the project are adhered to as planned. They will also be qualified to oversee other aspects related to the technical and construction activities. The CM staff will have extensive experience with safety, dam construction, contractor monitoring, environmental compliance, quality control, public relations, and communications. The CM will have the responsibility to oversee the day to day operations and serve to coordinate public concerns with the contractor and Brookfield. Detailed work plans will be developed daily to ensure design and permit requirements are followed and these plans will be approved by either the CM or project manager. The CM will act in coordination with Brookfield and will serve as the project manager's eyes and ears onsite. The CM will inspect and oversee repairs and any deficiencies to the erosion control measures. The CM will have the authority to stop work based on safety, environmental and quality control concerns. It will be the responsibility of CM to inspect and enforce all permit requirements and conditions.

4. ADMINISTRATIVE HISTORY

a. On July 11, 2001, the Maine Department of Environmental Protection (MDEP) issued a water quality certification (# L-20204-32-B-N / #L-20205-32-B-N) for the Upper and Middle Dam Storage Project. A corrected order was issued on July 24, 2001.

b. On December 19, 2002, FERC licensed the Upper and Middle Dam Storage Project as project No. 11834-000 (FERC P-11834-ME).

c. On August 9, 2018, the Commission accepted as complete for processing from Brookfield hydropower permit application HP 30. Commission staff provided a copy of the hydropower permit application for HP 30 to various state and federal agencies and other persons expressing interest in this matter, to solicit comments for consideration in this permitting and water quality certification decision.

d. On October 10, 2018, the Commission voted to hold a public hearing for the HP 30 application. The Commission designated the Commission Chair, Everett Worcester, as the Presiding Officer.

e. On February 12, 2019, Brookfield submitted a revised application following negotiations with state and federal resource agencies, the FWG, interveners and concerned citizens regarding certain aspects of the project.

f. On March 19, 2019, the Commission held a public hearing on Brookfield's application in accordance with the Maine Administrative Procedures Act and the Commission's Chapter 5 rules that govern public hearings. The hearing was located at the Rumford High School in Rumford, Maine. The post-hearing comment period remained open until March 29, 2019. Rebuttal comments could be filed until April 5, 2019. The close of record was April 5, 2019.

g. On May 8, 2019, the Commission deliberated and then took final action on the application.

5. REVIEW CRITERIA

The Commission administers the permit process under the Maine Waterway Development and Conservation Act ("MWDCA"), 38 M.R.S. §§ 630–638, for a hydropower project that is located wholly within the State's unorganized and deorganized areas and that does not use tidal or wave action as a source of electrical or mechanical power. 38 M.R.S. § 634-A(2) and *Administrative Regulations for Hydropower Projects*, 01-672 C.M.R. 11(2)(B). Additionally, the issuance of a water quality certificate is mandatory in every case where the Commission approves an application for a permit under the MWDCA. 38 M.R.S. § 635-B and 01-672 C.M.R. 11(6)(B). The Commission will approve a project when it finds that the approval criteria for reconstruction of a hydropower project, specified at 38 M.R.S. § 636 and incorporated into Chapter 11, have been met.

a. Financial and technical capability. The applicant has the financial capability and technical ability to undertake the project.

b. Safety. The applicant has made adequate provisions for protection of public safety.

c. Public benefits. The project will result in significant economic benefits to the public, including, but not limited to, creation of employment opportunities in Maine.

d. Traffic movement. The applicant has made adequate provision for traffic movement of all types project area.

e. Maine Land Use Planning Commission. Within the jurisdiction of the Commission, the project is an allowed use within the subdistricts in which it is proposed.

f. Environmental mitigation. The applicant has made reasonable provisions to realize the environmental benefits of the project, if any, and to mitigate its adverse environmental impacts.

g. Environmental and energy considerations. The advantages of the project are greater than the direct and cumulative adverse impacts over the life of the project based upon the considerations below:

1) whether the project will result in significant benefit or harm to soil stability, coastal and inland wetlands, or the natural environment of any surface waters and their shorelands;

2) whether the project will result in significant benefit or harm to fish and wildlife resources;

3) whether the project will result in significant benefit or harm to historic and archaeological resources;

4) whether the project will result in significant benefit or harm to the public rights of access to and use of the surface waters of the State for navigation, fishing, fowling, recreation and other lawful public uses;

5) whether the project will result in significant flood control benefits or flood hazards; and

6) whether the project will result in significant hydroelectric energy benefits, including the increase in generating capacity and annual energy output resulting from the project, and the amount of nonrenewable fuels it would replace.

h. Water Quality. There is reasonable assurance that the project will not violate applicable state water quality standards, including the provisions of 38 M.R.S. § 464(4)(F). *Standards for classification of fresh surface waters*, 38 M.R.S. § 465, establishes four classes of fresh surface waters, Class AA, A, B, and C. *Standards for classification of lakes and ponds*, 38 M.R.S. § 465-A, establishes one classification for lakes and ponds, Class GPA. The State's water quality standards establish water quality objectives for all State waters by: (1) designating uses and related characteristics of those uses for each class of water, and (2) prescribing water quality criteria necessary to protect those uses and related characteristics. 38 M.R.S. §§ 465, 465-A, 465-B. In addition, the State's antidegradation policy protects and maintains certain existing uses.

1) Designated uses. Class GPA, Class AA, Class A, Class B, and Class C waters must be of such quality that they are suitable for the designated uses of drinking water (after disinfection for Classes GPA, AA, and A, and after treatment for Classes B and C); recreation in and on the water; fishing; industrial process and cooling water supply; hydroelectric power generation; navigation; and as habitat for fish and other aquatic

life. The proposed project is part of a hydropower generation project and is a designed use of both Class GPA and Class A waters.

2) Water quality criteria. The water quality criteria protect and support the designated uses. The criteria prescribe numeric bacteria levels to protect human health and support the designated use of recreation in and on the water. In addition to specific numeric dissolved oxygen levels, the criteria describe narrative water quality conditions that must exist to support aquatic life. The proposed project is not anticipated to result in measurable changes in the bacteria or dissolved oxygen content of the affected water bodies or in the ability of these waters to support aquatic life.

3) Antidegradation policy. State waters are protected by the State's antidegradation policy, which provides that certain existing in-stream water uses and the level of water quality necessary to protect those existing uses must be maintained and protected. 38 M.R.S.§ 464(4)(F). The Commission may only issue a water quality certification when it finds that:

   i. Existing in-stream water uses and the level of water quality necessary to protect those existing uses must be maintained and protected; and,

   ii. When the existing in-stream use involves use of the water body by a population of plant life, wildlife, or aquatic, estuarine or marine life, or as aquatic, estuarine, marine, wildlife, or plant habitat, the applicant has demonstrated that the proposed activity would not have a significant impact on the existing use, 38 M.R.S. § 464(4)(F)(1); or

   iii. When the existing in-stream use involves use of the water body for recreation in or on the water, fishing, water supply or commercial enterprises that depend directly on the preservation of an existing level of water quality, the applicant has demonstrated that the proposed activity would not result in significant degradation of the existing use, 38 M.R.S. § 464(4)(F)(1-A);

   iv. Where high quality waters of the State constitute an outstanding national resource, that water quality must be maintained and protected. Outstanding national resources are those water bodies in national and state parks and wildlife refuges; public reserved lands; and those water bodies classified as Class AA and SA, 38 M.R.S. § 464(4)(F)(2);

   v. The standards of classification of the water body are met. The Commission may approve a water quality certification for a project affecting a water body in which the standards of classification are not met if the project does not cause or contribute to the failure of the water body to meet the standards of classification, 38 M.R.S. § 464(4)(F)(3); and

   vi. When the actual quality of any classified water exceeds the minimum standards of the next highest classification, that higher water quality must be maintained and protected, 38 M.R.S. § 464(4)(F)(4).

i. Additional Information Requirements. The Commission may require applicants for hydropower projects to submit additional information as deemed necessary to demonstrate that the Chapter 11 approval criteria have been met.

6. AGENCY REVIEW COMMENTS AND APPLICANT RESPONSES

a. The State Soil Scientist reviewed the application and provided the following comments.

1) The location of the of the proposed dewatering area adjacent to the proposed bypass spillway should be relocated to an area containing soils that provide adequate drainage.

In response, Brookfield moved the dewatering area to an area of improved drainage.

2) The proposed lower laydown yard will require additional measures to ensure the yard can contain and treat runoff sediment within its bounds, due to its poorly drained low permeable soils and its proximity to Lower Richardson Lake. In addition, the State Soil Scientists recommends routine tire cleaning for the vehicles entering the constructed laydown yard.

In response, Brookfield proposes to excavate three seepage trenches along the contours within the proposed yard to divert a portion of the runoff to the west side of yard where soils will have better permeability and greater distance from Lower Richardson Lake to treat runoff before entering the lake. In addition, the laydown yard will be covered by a layer of filter fabric placed under approximately six inches of crushed stone. A vegetative swale between the laydown yard and the lake will be constructed to treat any exiting drainage from the laydown yard. The applicant will practice routine tire cleaning as part of its maintenance plan for the lower laydown yard.

3) The proposed footpath starting from the terminus of Middle Dam Road leading to the Rapid River should not be constructed using culverts every 50 feet as originally proposed but rather should be constructed using the “rock sandwich” method.

In response, Brookfield agreed to construct the access path using the “rock sandwich” method to allow for water to freely seep through the path.

b. The Maine Department of Inland Fisheries and Wildlife (MDIFW) reviewed the application and provided the following comments.

1) MDIFW recommends an independent third-party inspector be utilized for the duration of the project.

In response, Brookfield proposes to hire a construction monitor to be on the job site at all times during construction. The monitor will provide daily management, inspections of best management practices, safety services and compliance to all plans and permits for the project. The construction monitor will be onsite

whenever work is being conducted and will act in an independent and authoritative capacity with the responsibility to oversee erosion and sedimentation controls, public relations, safety, permit compliance and construction. The contract monitor will have the authority to shut down construction if needed to remedy or to avoid potential failure to meet a condition or requirement of the permit. It will be the responsibility of the construction monitor to inspect and enforce all permit requirements and conditions. Monthly summary reports will be provided to the Commission for each month construction activities occur.

2) The construction sequence for cofferdams described in the original July 31, 2018, application describes the sequence as installing earthen materials followed by the installation of sheet piles. MDIFW recommended cofferdam construction sequence start with the installation of turbidity curtains then followed by the installation sheet piles and then finally the installation of earthen materials. Deconstruction should follow the reverse order. Furthermore, cofferdams should be flushed and pumped prior to release into the river.

   In response, Brookfield provided a table showing the revised cofferdam sequence as requested by MDIFW. The cofferdam construction sequence starts with the installation of turbidity curtains then followed by the installation sheet piles and then finally the installation of earthen materials. The area will be flushed and pumped prior to release into the river. The pipes used to drain the cofferdams area will be equipped with a 3/32-inch mesh screen[1].

3) MDIFW recommends introduced invasive plant populations shall be eradicated. The construction site should be monitored for introduced invasive species annually for two-years post-construction. Earthen materials should be sourced from clean gravel pits. Equipment shall be pressure washed prior before arriving on-site to minimize the potential of importing invasive species.

   In response, Brookfield proposes to control invasive species if introduced using the most effective practices including but not limited to selective herbicide applications. Brookfield will monitor and control invasive species within the property that it owns and are within the construction footprint and those areas of active construction that are outside of its ownership. Areas within Brookfield ownership and work areas associated with the project include the Middle Dam footprint, embankments, lower laydown area, and Black Cat Dike. Areas outside its ownership that will be monitored and where control practices applied as needed, include Middle Dam Road from the lower laydown area up to and including the upper laydown area. All other areas of ingress and egress will not be monitored. Brookfield will complete a qualitative baseline assessment of the areas mentioned above to determine if and document any invasive species that are present and to document preconstruction conditions. Brookfield will survey the area using a qualified biologist to identify species as listed on MNAP November 29, 2018, invasive species list, which is included as **Attachment C** of this permit. The applicant proposes to monitor the site for invasive species two years post-

[1] Brookfield may request written approval from Commission staff to change the size of the cofferdam drain pipe mesh screen if, in practice, the 3/32-inch screen is deemed too fine to effectively drain the cofferdam area.

construction. Brookfield proposes to pressure wash and inspect all equipment prior to arriving on site to minimize the spread of invasive species.

4) MDIFW recommends using washed riprap before installation.

   In response, Brookfield agreed to require contractors to provide clean materials for installation.

5) MDIFW requests periodic communication with resource agencies and the public.

   In response, Brookfield proposes to provide the public and resource agencies with three separate periodic lines of communication. The first monthly communication will be with interested members of the public. The purpose of this communication is to keep the public informed of upcoming activities and to communicate temporary disruptions or changes to access or other pertinent information. A second monthly communication will be provided to the Commission staff and MDIFW, and any other interested agencies. The purpose of this report will be to communicate minor changes to the construction schedule, upcoming construction activities, next steps, and any other pertinent information. Lastly, Brookfield will provide a monthly report from the construction monitor to any interested resource agencies to include the Commission and MDIFW. The purpose of the monthly report shall be to describe in a narrative with photographs of what actions have been taken to ensure erosion and sediment control practices are functional, and to demonstrate compliance with terms and conditions of the permit. If a failure to adhere to any condition or requirement of the permit has occurred, the construction monitor will provide a report to interested resource agencies within 48 hours of the failure. The report would detail in photographs and in narrative identifying the failure, how the situation was remedied and what measures will be put in place to ensure future success.

6) MDIFW requested the use of geotextile underlayment prior to the placement of the gravel in the beach expansion area. Post-construction the gravel can be removed then the underlayment to minimize disturbance to the beach substrate.

   In response, Brookfield revised its application to include placing geotextile fabric under the placed gravel and will remove all gravel set in place post-construction.

7) MDIFW requested the dam design to allow for a minimum 15 feet per second outflow velocity or to have a six-foot vertical barrier under all flow conditions, to ensure bass migration through the dam cannot occur.

   In response, Brookfield redesigned the dam structure to exclude the ramp gate and replace with a straight drop out of the gate to meet the requested threshold. As a consequence of the design change, articulated concrete block (ACB) will be installed in the tailrace area to dissipate the increased erosion potential.

8) MDIFW recommends that all in-stream work will be conducted between June 1 and September 30 of each year.

In response, Brookfield changed its original proposal for in-stream work from May 1 and November 30, to June 1 and September 30.

c. The Maine Historic Preservation Commission reviewed the proposal and stated that they have no comments on the proposal.

d. The Maine Department of Environmental Protection (MDEP) reviewed the proposal and provided the following comments.

1) MDEP recommends an alternatives analysis to wetland avoidance and minimization.

In response the applicant expanded its analysis of wetland avoidance and minimization in its February 12, 2019 revised application.

2) MDEP recommends the restoration of the lower laydown yard include the removal of the temporary crane pad.

In response the applicant agreed to remove the temporary crane (gravel pad) adjacent to the lower laydown yard.

7. INTERVENOR TESTIMONY AND PUBLIC COMMENTS

a. Intervener Carmen Durso and Rosanne Zuffante stated they are not against a permit being issued which meets all the legal criteria, and which respects the rights of all interested parties. Key topics they identified through written and public hearing testimony include:

1) The loss of public access to the Rapid River is not in compliance with the 1998 FERC settlement agreement in terms of providing traditional public access.

2) A proposal to place piers in the Rapid River downstream of the dam for the purpose of increasing fishing access both during and post-construction, to mitigate the loss of traditional fishing access during and post-construction.

b. Intervener Friends of Richardson (FOR) stated they are opposed to the current design of the project and do not support the issuance of a permit. The following are key topics provided through both written comments and public hearing testimony.

1) Expressed a need to have an enforcement and compliance mechanism administered by the Commission to ensure the tailrace restoration concept plan set forth by the FWG is successful.

2) Expressed a desire to consider scenic values and preserving the character of the middle dam area. Specifically, FOR requests the use of articulated concrete block as much as possible instead of rip rap for slope stabilization.

c. Intervener Trout Unlimited stated that they are neither for nor against the issuance of a permit for the reconstruction of the Middle Dam. The following are key topics provided through both written comments and public testimony.

1) Timing of construction in relation to trout phenology

2) Prior mitigation efforts required by the 1998 FERC settlement agreement should not be considered as mitigation to offset impacts to the current proposal.

3) The Commission should include permit conditions related to fisheries habitat mitigation, to ensure compliance with the objectives of the FWG.

d. Intervener South Arm Campground stated they are not opposed to the project as the reconstruction is mandated by FERC. Key topics provided through both written comments and public hearing testimony include:

1) Angler lake access to the Rapid River from the location Brookfield's relocated dock, near the existing dam tenders house is unsafe and will not provide safe access to the Rapid River.

e. The Commission received over 100 public comments and 7 public hearing testimony comments, which were generally not opposed to issuing a permit but several collective concerns were expressed and are summarized below.

1) Loss of angler access to the Rapid River post-construction due to the loss of the existing fishing piers and the relocation of the Brookfield's seasonal dock.

2) Concerns regarding aesthetics of the proposed dam, due to exposed concrete and the increase use of riprap proposed for bank stabilization.

3) Requests to require a performance bond to be utilized for compensatory mitigation, if habitat restoration of the tailrace area fails to meet the objective.

8. ANALYSIS AND CONCLUSIONS

a. Financial capability. Brookfield, the owner and licensee for the Upper and Middle Dam Storage Project, annually allocates in excess of $8.8M for capital expenditures associated with the Middle and Upper Dam Storage Project. The Middle Dam Renewal Project will be managed by Brookfield and is an indirect subsidiary of Brookfield Renewable Partners, which operates one of the world's largest publicly-traded renewable power platforms. Its portfolio consists of over 16,300 MW of capacity and 843 generating facilities in North America, South America, Europe and Asia, including 217 hydroelectric facilities. It is also an experienced owner, operator and investor of global wind, solar, distributed generation, and storage facilities. The Commission concludes that Brookfield has the financial capability and technical ability to undertake the project.

b. Safety. The Middle Dam currently does not meet FERC Dam Safety stability standards. As such, Brookfield has developed a design proposal that involves replacement of the structure that is intended to address these stability concerns. The proposed project will result in lowering the flood hazard for the predicted 100-year life span of the dam. Raising the elevation of the embankments and adding reinforcement reduces the possibility of an overtopping of the embankment or structural failure. Reconstructing the spillway and installing concrete aprons improves structural stability and reduces the potential for dam

failure. Replacing the existing gatehouse eliminates the existing fire hazard. Strengthening the dam and its associated dykes by raising its height, arming its slopes and creating filter barriers will provide additional assurance that the structure and its dikes will not fail during a probable maximum flood event. Brookfield has also proposed several safety measures, which include providing a kiosk at the end of Middle Dam Road equipped with radios for the public to summon Brookfield representatives for safe passage assistance through or around the construction site. Permanent and temporary access trails will provide the public safe access ways from the adjacent camps, the public dock, and the parking area at the terminus of Middle Dam Road. The project contractor will develop an emergency action plan. The Commission concludes that Brookfield has made adequate provisions for protection of public safety.

c. Public benefits. The Middle Dam Renewal Project is Brookfield's preferred option to provide the long-term and continued operation of the dam. The five-year proposed construction project will create some short-term economic benefit via employment and the procurement and delivery of material. The reconstructed dam will provide approximately 100 years of safe infrastructure to support the regions recreational opportunities and resource values associated with the dam. Furthermore, the reconstructed dam will continue to support the generation of electric power downstream. Eighteen hydroelectric generating projects with a combined capacity of about 250 MW are located downstream of the Upper and Middle Dam Storage Project on the Androscoggin River in New Hampshire and Maine. These projects generate an average of about 900,000,000 kilowatt-hours of electricity annually[2]. The Commission concludes that the project will result in significant economic benefits to the public.

d. Traffic movement. Brookfield proposes to construct and maintain temporary and permanent access routes for use by members of the public recreating at and around the Middle Dam facility. A permanent public access trail to the Rapid River is proposed to be located from the kiosk adjacent to the terminus of Middle Dam Road. A second permanent trail will start on the south side of the river starting from the Middle Dam Road and end on the shoreline with an area of wadable access for anglers. Brookfield proposes to maintain a temporary access trail located along the west side of the lower laydown yard which will circumvent the lower laydown yard, allowing foot traffic from the public dock, located near the existing dam keepers house and adjacent camps to the Rapid River. Temporary trails will lead to the kiosk and the proposed river access trailhead located at the intersection of Fish Pond and Middle Dam Roads. Throughout construction the dam will be constructed with temporary bridging to allow for vehicular passage at all times, with the exception of infrequent and temporary delays due to certain construction activities. A contract monitor will be available to the public to assist in safe passage around or through active construction areas. Access to the Rapid River will be allowed outside of all active construction areas during construction. Brookfield and its contractors will be required to adhere to the motor vehicle safety requirements that are detailed in Brookfield SOP-8110, motor vehicle operation procedures. Emergency vehicles will have vehicular access to the site at all times. The Commission concludes that Brookfield has made adequate provision for traffic movement of all types out of and into the project area.

e. Maine Land Use Planning Commission. The Commission concludes that the Middle Dam Renewal Project, which is considered a water impoundment for purposes of the Commission's zoning, is an allowed use within the Great Pond Protection (P-GP), Wetland Protection (P-

[2] July 24, 2001 water quality certification at ¶12.a.

WL), and Shoreland Protection (P-SL) subdistricts, in which it is located. (*Land Use Districts and Standards*, Chapter 10, sections 10.23,E, 10.23,L, and 10.23,N.)

f. Environmental mitigation. Brookfield's proposed mitigation efforts are summarized in sections 3.i. and 3.j. above. They also have agreed to improved mitigation measures through the course of the permitting process and, for example, committed to changes to the storm water plan for the lower laydown yard which reduces the chances of sediment runoff, relocation of the sediment catch basin to an area of improved drainage, development of a fish rescue plan, development of an improved bass exclusion engineering plan, a prohibition on in-stream work between October 1 and May 31 of each year. Brookfield also proposes and an invasive species monitoring and eradication program, with monitoring for plant populations two years post-construction. The proposed habitat restoration of the tailrace area will result in a net gain of 8,240 square feet of aquatic habitat within the dam tailrace. The habitat restoration plan, however, has not been finalized. Brookfield and the intervenors agreed that finalization of the plan at this point was premature and that valuable additional information would be obtained during the reconstruction process, for example, after installation of the coffer dams. This plan and its successful implementation are an important component of Brookfield's mitigation. Continued collaboration with the FWG will be an important part of plan development and has been committed to by Brookfield. Additionally, to ensure compliance with all terms and conditions of the permit, the applicant proposes to hire a construction monitor. The construction monitor will be on the jobsite at all times during construction to assist and ensure compliance with permit conditions and requirements, and best management practices. The construction monitor will report monthly to the Commission and to MDIFW, and within 48 hours of any failure to adhere to a permit condition or requirement.

   Provided Brookfield complies with Conditions #1 through #4, the Commission concludes Brookfield has made reasonable provisions to mitigate adverse environmental impacts associated with the proposed project.

g. Environmental and energy considerations. The Upper and Middle Dams Storage Project is operated primarily to benefit downstream hydroelectric generators on the main stem of the Androscoggin River; the Project itself does not generate electricity. The Project is operated to provide uniform, reliable flows during the entire year which benefits downstream hydropower facilities; industrial and municipal users, who use the river for water supply and waste assimilation; recreational users; and communities which benefit from flood protection. These benefits result from storing water during high inflow periods and augmenting flows during low inflow periods. At total of 23 downstream hydro facilities and multiple municipalities benefit from the Upper and Middle Dam Storage Project. The Commission concludes that advantages of the project are greater than the direct and cumulative adverse impacts over the life of the project.

h. Water quality. The Commission concludes that there is reasonable assurance that the project will not violate applicable state water quality standards, including the provisions of the State's antidegradation policy, 38 M.R.S. § 464(4)(F). Specifically:

   1) The designated use of fishing will be maintained and protected during and following construction of the project. Brookfield will provide for the safe access of anglers to the Rapid River and Richardson Lake at all times during and following the project.

Specific mitigation efforts regarding fishing are discussed in paragraph 3.i. of this permit.

2) The designated use of habitat for fish and other aquatic life will be maintained and protected during and following construction of the project. MDIFW reviewed the application and advised Brookfield regarding specific fisheries issues related to the site both during and following construction. Brookfield made several modifications to its proposal in response to MDIFW's review comments, and MDIFW will continue to provide guidance to the FWG throughout the construction and post-construction habitat restoration phases of the project.

3) Through the control of sediment discharges and lack of changes to flows in the river below the dam, the high-quality waters of the Rapid River be maintained and protected.

4) The proposal does not include a discharge of pollutants, changes in lake water levels or changes in controlled outflow to the Rapid River that will result in lowering the existing water quality of any water body or in the ability of these waters to support aquatic life.

The Commission concludes that, for the foregoing reasons, the approval criteria for reconstruction of a hydropower project, specified at 38 M.R.S. § 636, and in corresponding Commission rule Chapter 11, section 5, have been met.

Therefore, the Commission approves the application of Brookfield White Pine Hydro, LLC, subject to the following conditions:

1. Middle Dam Fisheries Working Group. Prior to dewatering of the tailrace, Brookfield must submit a FWG work plan for Commission review and approval. The group shall consist of representatives of the organizations listed in paragraph 3.j. or, if an organization is unwilling to participate, a substitute organization with similar experience and interests, if such a comparable, substitute organization exists and is interested in participating. The work plan must:

    a. Identify the members of the FWG and reflect each member's willingness to participate in the group;
    b. Identify the habitat restoration goals for the tailrace area;
    c. Specify the steps that will be taken to achieve these goals leading up to finalization of a habitat restoration plan, and the timeline for completing these steps;
    d. Set the date by which the final habitat restoration plan will be submitted to the Commission;
    e. Discuss the method for evaluating success of the habitat restoration plan for the five-year period after completion of the restoration project; and
    f. Identify alternative mitigation options if the habitat restoration is unsuccessful in meeting the specified goals, along with potential mechanisms to ensure the owner of the dam has the financial capacity to complete any required alternative mitigation.

If the work plan submitted by Brookfield pursuant to this condition does not reflect the consensus of the FWG, Brookfield shall submit with the work plan any written dissenting statements prepared by individual group members.

2. Tailrace Restoration Plan. By the date set in the approved work plan required by Condition #1, Brookfield shall submit a final tailrace restoration plan for Commission review and approval. The final tailrace restoration plan shall be consistent with the framework of the work plan approved by the Commission. If the tailrace restoration plan does not reflect the consensus of the FWG, Brookfield shall submit with the restoration plan any written dissenting statements prepared by individual group members.

3. Tailrace Restoration Plan Implementation. Brookfield shall implement the mitigation measures identified in the approved tailrace restoration plan.

4. Third Party Monitoring. Brookfield shall have a field Contract Monitor (CM) onsite for the entire duration of the construction efforts. The primary role of the CM shall be to ensure the safety and all environmental aspects of the project are adhered to as planned. The CM must have extensive experience with safety, dam construction, contractor monitoring, environmental compliance, quality control, public relations, and communications. The CM shall have the responsibility to oversee the day to day operations and serve to coordinate public concerns with the contractor and Brookfield. The CM shall have the authority to stop work based on safety, environmental and quality control concerns. The CM shall have authority to inspect all areas of the construction site necessary to determine compliance with this permit. The CM shall provide copies of all monthly reports directly to the Commission and the Maine Department of Inland Fisheries and Wildlife at the same time the reports are provided to Brookfield.

5. This permit does not alter, modify or in any way change the conditions of approval stipulated in Water Quality Certification, #L-20204-32-B-N / #L-20205-32-B-N, issued by the Maine Department of Environmental Protection on July 11, 2001 (corrected July 24, 2001).

6. This approval is limited to and includes the proposals and plans contained in the application and supporting documents submitted and affirmed to by Brookfield. All variances from the plans and proposals contained in said documents are subject to the review and approval of the Commission prior to implementation.

7. Brookfield must secure and comply with all applicable federal, state and local licenses, permits, authorizations, conditions, agreements, and orders prior to or during construction and operation.

8. Authorized representatives of the Commission will be granted access to the premises of the Brookfield at any reasonable time for the purpose of inspecting the construction or operation of the Project and assuring compliance by the Permittee with the conditions of this approval.

9. If construction is not commenced within 3 years and completed within 7 years from the date of issuance of this permit, this approval lapses, unless a request for an extension of these deadlines has been approved by the Commission.

10. This approval expires upon the assignment or transfer of the property covered by this approval, unless written consent to transfer this approval is obtained from the Commission.

11. Should the project be found, at any time, not to be in noncompliance with any of the conditions of approval, or should the permittee construct or operate the project in any way other than as specified in the application or supporting documents, as modified by the conditions of approval, then the terms of approval will be considered to have been violated.

12. Brookfield will take all necessary measures to ensure that its activities or those of its contractors do not result in measurable erosion of soils on the site during construction.

13. Notification of a failure to meet a condition or requirement of the permit must be provided to the Commission and the MDIFW within 48 hours of becoming aware of such excursion.

14. Prior to the start of construction, Brookfield must submit a final construction schedule, cofferdam construction/deconstruction sequence, dust control plan and an emergency action plan to the Commission for review and comment.

15. Brookfield must provide a copy of this permit to all contractors responsible for work performed for this project.

16. Brookfield must operate the portable concrete batch plant in compliance with the terms and conditions of Air Quality Permit # A-1035-71-A-N and its Spill Prevention Control and Countermeasures (SPCC) Plan.

17. All concrete must be cured at least one week before being exposed to natural water bodies. No washing of tools, forms, etc. may occur in or adjacent to a water body or wetland. Wash down of concrete trucks and equipment used in the pouring of concrete shall occur in the portion of the lay down area designated as a wash down area.

18. The water levels in Richardson Lake must be maintained as required under the existing Federal Energy Regulation Commission (FERC) license # FERC P-11834-ME.

19. With the exception of emergency activities and planned extended duration concrete placements, allowable work hours are 6:00 a.m. through 7:00 p.m., Monday through Saturday. No work is planned on Sundays, however, during critical tasks and to maintain the overall construction schedule limited Sunday work are allowed. Unless approved in writing by the Commission for good cause, construction activities will commence in the spring no earlier than May 1 and no later than December 31 for each calendar year throughout the duration of the project. Work will cease for three-day breaks during Memorial Day, Independence Day and Labor Day weekends.

20. In-stream work, is limited to June 1 to September 30, of each year. In-stream work shall be performed within dewatered cofferdams. Work below the normal high water mark within dewatered cofferdams is not subject to this timing restriction.

21. Brookfield must notify the Commission and MDIFW immediately if either the bass velocity barrier of 15 fps or the 6-foot physical barrier are not upheld during construction.

22. Brookfield must notify the Commission and MDIFW at least 2 weeks prior to the onset of all fish evacuation procedures. The evacuations must be implemented under the direct supervision of a qualified fisheries biologist.

23. All bulk fuel must be stored within the upper laydown yard in either a double-walled fuel tank or with secondary containment. All equipment containing fuels, oils or fluids must have secondary containment when not in use.

24. At the time of installation, riprap must be clean and free of caked on soil particles or rock dust/fragments that would result in releasing sediment into an adjacent water body. Contractors must undertake necessary means to provide clean materials prior to installation including washing or stockpiling.

25. Construction activities must be implemented to prevent the importation and spread of invasive plants. Earthen materials should be sourced from clean local gravel pits. Equipment must be washed prior to transportation to the project site.

26. Construction debris materials must be disposed of in accordance with all applicable federal, state, and local waste disposal regulations.

27. All areas of exposed soil must be contained with functional erosion and sediment controls and must remain in place maintained in good working order until such time that exposed soil is stabilized with vegetation.

A petition for review of this Commission decision may be filed in the Superior Court in accordance with Title 5, chapter 375, subchapter 7. The petition for review shall be filed within 30 days after receipt of notice if taken by a party to the proceeding of which review is sought. Any other person aggrieved shall have 40 days from the date the decision was rendered to petition for review.

DONE AND DATED AT BREWER, MAINE, THIS 8TH DAY OF MAY 2019.

Nicholas D. Livesay, Executive Director

ATTACHMENT A

Table 1-2. Proposed construction schedule.

Task	Start Date	End Date
Phase 1 Construction - 2019		
Access Road maintenance and laydown areas	6/1/19	6/30/19
Mobilize to site	6/15/19	7/31/19
Install BMPs, security fence, signage, screening	5/13/19	5/31/19
Construction of cofferdams for auxiliary gate	6/1/19	8/30/19
Excavate auxiliary spillway and grade and reinforce areas adjacent to auxiliary gate. Temporary access will be over the upstream coffer dam	9/3/19	11/29/19
Demobilize & complete temporary restoration (cofferdam remain in place through the winter)	12/2/19	12/13/19
Phase 2 Construction- 2020		
Complete auxiliary spillway and gate, stabilize disturbed areas, evaluate constructed as designed, open auxiliary spillway and gate. Remove coffer dam	6/1/20	9/11/20
Construct cellular upstream coffer dam. Install temporary upstream public access and temporary construction access (downstream)	6/1/20	8/30/20
Construct earthen downstream coffer dam	6/1/20	8/30/20
Demobilize for 2020 and complete temporary restoration	12/4/20	12/31/20
Phase 3 Construction – 2021		
Dewater dam footprint	5/1/21	5/28/21
Demolition of existing spillways, gate house, and all other structures	5/31/21	6/25/21
Foundation preparation	6/28/21	8/27/21
New sheetpile cutoff and embankment work	8/30/21	11/12/21
Black Cat Dike – Install BMPs, Install upstream reinforcements, Earthwork to raise dike, removal of BMPs and restoration	7/26/21	9/24/21
Construct new storage and generator building	11/15/21	12/10/21
Demobilize for 2021 and complete temporary restoration	12/10/21	12/31/21
Phase 4 Construction – 2022		
Construct new spillways, piers and side walls	5/1/22	7/29/22
Upstream reinforcements and substrate removal, Stabilize all construction, Evaluate as built	5/1/22	7/29/22
Remove coffer dams and open gates	8/1/22	8/31/22
Demobilize for 2022 and complete temporary restoration	12/19/22	12/31/22
Phase 5 Construction - Final Remediation - 2023		
Construct new gate house, gates, bridges	5/1/23	7/15/23
Finish upstream intake and downstream tailrace	5/1/23	7/15/23
Remove coffer dams	7/15/23	9/30/23
Final demobilization	10/15/23	11/15/23

Final restoration including final road work, loam, seed, removal of BMPs	11/15/23	12/31/23

ATTACHMENT B

Table 1-3. Summary of Temporary and Permanent Impacts.

Location	Description	Purpose	Surface area square feet (wetland impact)
Embankments: North, South, and Black Cat Dike. Middle Dam footprint. Above NHWL	Permanent above NHWL on existing embankments and adjacent disturbed areas	Reinforce side slopes and raise top	116,444
Wetlands	Permanent fill in existing previously undisturbed area	Fill for access trail, auxiliary embankment, & downstream south embankment	(9,360)
Upland near tailrace	Temporary impact on disturbed ground	Sediment basin for dewatering dam footprint	18,500
Upstream intake and tailrace	Permanent dredging and contouring on previously disturbed benthic areas (below NHWL)	Lower intake and tailrace to create positive flow	55,700
Upstream intake and tailrace	Temporary placement of cofferdams below NHWL; areas to be restored	Cofferdams are used to temporarily block flow to allow construction "in the dry"	23,350
Upper laydown area	Vegetation clearing, grading and stabilizing; area will be partially restored	Area is needed for staging construction materials and creating a temporary cement plant	198,230
Lower laydown area, crane pad, and access from the lake	Temporary grading and stabilizing; areas will be restored	Area is needed for staging construction materials and setting up a crane to off load materials	52,500
Beach expansion at old dam keeper's house	Temporary fill below the NHWL; area will be restored	Needed to facilitate access to barge to off load materials	3,250
Black cat dike (wetland fill)	Permanent above NHWL on existing embankments and adjacent disturbed areas	Reinforce side slopes and raise top	7,500 (629)
Upstream piers	Removal & restoration of benthic habitat	Re-contouring for inflow drainage	2,240
Sluice spillway aquatic habitat creation	Removal of materials, creation of aquatic habitat	Reduction in size of the spillway	3,500
Auxiliary spillway aquatic habitat creation	Removal of upland soil & boulders	Addition of auxiliary gate	2,500
Total aquatic/benthic habitat created			8,240
Total wetland impact			(9,989)

ATTACHMENT C

	A	B
1	**Common Name**	**Species Name**
2	Amur maple	*Acer ginnala*
3	Norway maple	*Acer platanoides*
4	Hardy kiwi	*Actinidia arguta*
5	Goutweed	*Aegopodium podagraria*
6	Tree of heaven	*Ailanthus altissima*
7	Chocolate vine; five-leaf akebia	*Akebia quinata*
8	Garlic mustard	*Alliaria petiolata*
9	European Alder	*Alnus glutinosa*
10	False indigo	*Amorpha fruticosa*
11	Porcelainberry	*Ampelopsis brevipedunculata*
12	Japanese barberry	*Berberis thunbergii*
13	Common barberry	*Berberis vulgaris*
14	Narrowleaf bittercress	*Cardamine impatiens*
15	Oriental bittersweet	*Celastrus orbiculatus*
16	Canada thistle	*Cirsium arvense*
17	Yam-leaved virgin's bower	*Clematis terniflora*
18	Black swallowwort	*Cynanchum louiseae*
19	Pale swallowwort	*Cynanchum rossicum*
20	Chinese yam	*Dioscorea polystachya*
21	Autumn olive	*Elaeagnus umbellata*
22	Hairy willow-herb	*Epilobium hirsutum*
23	Winged euonymous	*Euonymus alatus*
24	Wintercreeper	*Euonymus fortunei*
25	Leafy spurge	*Euphorbia esula*
26	Japanese knotweed	*Fallopia japonica*
27	Giant knotweed	*Fallopia sachalinensis*
28	Bohemian knotweed	*Fallopia x bohemica*
29	Lesser celandine	*Ficaria verna*
30	Glossy buckthorn	*Frangula alnus*
31	English water grass	*Glyceria maxima*
32	Giant hogweed	*Heracleum mantegazzianum*
33	Dame's rocket	*Hesperis matronalis*

	A	B
1	**Common Name**	**Species Name**
34	Japanese hops	*Humulus japonicus*
35	Ornamental jewelweed	*Impatiens glandulifera*
36	Yellow iris	*Iris pseudacorus*
37	Tall pepperwort	*Lepidium latifolium*
38	Border privet	*Ligustrum obtusifolium*
39	California privet	*Ligustrum ovalifolium*
40	Privet	*Ligustrum vulgare*
41	Japanese honeysuckle	*Lonicera japonica*
42	Amur honeysuckle	*Lonicera maackii*
43	Morrow's honeysuckle	*Lonicera morrowii*
44	Tartarian honeysuckle	*Lonicera tatarica*
45	Bella honeysuckle	*Lonicera x bella*
46	Purple loosestrife	*Lythrum salicaria*
47	Japanese stilt grass	*Microstegium vimineum*
48	Wall lettuce	*Mycelis muralis*
49	Water forget-me-not	*Myosotis scorpioides*
50	Wavyleaf basketgrass	*Oplismenus hirtellus ssp. undulatifolius*
51	Wild parsnip	*Pastinaca sativa*
52	Mile-a-minute vine	*Persicaria perfoliata*
53	Japanese fuki	*Petasites japonicus*
54	Reed Canary Grass	*Phalaris arundinacea*
55	Amur cork tree	*Phellodendron amurense*
56	Oriental photinia	*Photinia villosa*
57	Common reed	*Phragmites australis*
58	White cottonwood	*Populus alba*
59	Kudzu	*Pueraria lobata*
60	Callery ("Bradford") pear	*Pyrus calleryana*
61	Creeping buttercup	*Ranunculus repens*
62	Common buckthorn	*Rhamnus cathartica*
63	Black jetbead	*Rhodotypos scandens*
64	Black locust	*Robinia pseudoacacia*
65	Multiflora rose	*Rosa multiflora*

	A	B
1	**Common Name**	**Species Name**
66	Rugosa rose	*Rosa rugosa*
67	European blackberry	*Rubus fruticosus*
68	Wineberry	*Rubus phoenicolasias*
69	Linden arrowwood	*Viburnum dilatatum*