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Alan Douglass
Regulatory Compliance Manager

October 31, 2022

Via Electronic Filing

Ms. Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
888 First Street, N.E.
Washington, DC 20426

Re: Turners Falls Hydroelectric Project (FERC No. 1889), FirstLight MA Hydro LLC, Northfield Mountain Pumped Storage Project (FERC No. 2485), Northfield Mountain LLC, Status Update

Dear Secretary Bose:

On August 9, 2022, FirstLight Power Services LLC (FirstLight), as agent for Northfield Mountain LLC, the current licensee for Northfield Mountain Pumped Storage Project, No. 2485-MA and FirstLight MA Hydro LLC, the current licensee for Turners Falls Hydroelectric Project, No. 1889-MA, sent the Federal Energy Regulatory Commission (FERC) an update on the status of settlement discussions relative to the Turners Falls Hydroelectric Project and the Northfield Mountain Pumped Storage Project. In that August 9, 2022, letter, FirstLight indicated it would file a status update on settlement negotiations by October 31, 2022, which is the purpose of this filing.

Since the last status update, FirstLight is pleased to report that settlement parties have achieved the following critical milestones.

- FirstLight, Massachusetts Division of Fisheries and Wildlife, National Marine Fisheries Service, United States Fish and Wildlife Service, and The Nature Conservancy (TNC) reached an Amended Agreement in Principle ("AIP") relative to Flows and Fish Passage for the Turners Falls and Northfield Mountain Pumped Storage Projects (see attached). The Amended AIP replaces the one filed with FERC on March 17, 2022. The major updates reflect agreement on fish passage performance goals and adaptive management measures. The Amended AIP also includes details on how the Turners Falls Hydroelectric Project will operate when the upstream hydroelectric projects operate in a peaking mode (considered "flex" operations). Agreement was also reached on establishing a fund for habitat improvement projects and/or alosine management activities to offset the potential loss of ichthyoplankton through entrainment at the Northfield Mountain Pumped Storage Project. FirstLight appreciates the time and effort the state and federal agencies and TNC put forth to reach this AIP.

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- FirstLight and the Nolumbeka Project, Elnu Abenaki and Chaubunagungamaug Band of Nipmuck Indians have reached a Memorandum of Understanding in Principle ("MOUIP") relative to cultural resources for the Turners Falls and Northfield Mountain Pumped Storage Projects. The MOUIP is currently being circulated for signature and will be filed with FERC. FirstLight also appreciates the time and effort the Tribal stakeholders put forth to achieve this MOUIP.

- The Amended AIP on Flows and Fish Passage, MOUIP on Cultural Resources, and the previously filed AIPs on Recreation and Whitewater Flows demonstrate extensive progress in reaching a Comprehensive Settlement Agreement ("CSA").

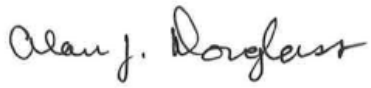
- Discussions on Turners Falls Impoundment shoreline erosion have begun and stakeholders have exchanged proposals. Meetings are slated in the coming weeks with the goal of reaching an AIP on this remaining issue to be included in the CSA.

- A drafting group comprised of counsel from FirstLight and several other settlement participants has made substantial progress on the general terms and conditions of the CSA. FirstLight has also begun the process of drafting proposed license articles and an explanatory statement for the CSA.

FirstLight continues to believe that a comprehensive settlement is the most expeditious way to get to a final license with terms acceptable to the majority of licensing stakeholders. As demonstrated above, Parties have made substantial progress towards reaching a CSA. Based on this progress, FirstLight continues to believe that a CSA is achievable and can be filed with FERC by December 31, 2022. See 18 CFR Section 5.29(g). We continue to thank FERC for its patience while FirstLight and the Parties work through the remaining issues to achieve a CSA.

Thank you for your consideration.

Respectfully,



Alan Douglass
Regulatory Compliance Manager

Attachment: Amended Flow and Fish Passage Agreement in Principle

TURNERS FALLS HYDROELECTRIC PROJECT
FERC PROJECT NO. 1889

NORTHFIELD MOUNTAIN PUMPED STORAGE PROJECT
FERC PROJECT NO. 2485

AMENDED AGREEMENT IN PRINCIPLE TO DEVELOP A RELICENSING SETTLEMENT AGREEMENT ON FLOWS AND FISH PASSAGE

October, 2022

WHEREAS, FirstLight MA Hydro LLC and Northfield Mountain LLC (collectively, FirstLight) are the Federal Energy Regulatory Commission (FERC) licensees for the Turners Falls Hydroelectric Project, FERC Project No. 1889 (Turners Falls Project) and Northfield Mountain Pumped Storage Project, FERC Project No. 2485 (Northfield Mountain Project), respectively. Both the license for the Turners Falls Project and the license for the Northfield Mountain Project expired April 30, 2018. The Projects have been operating on annual licenses pursuant to Section 15 of the Federal Power Act (FPA) since that time.

WHEREAS, in accordance with the requirements of the FPA and FERC's regulations, FirstLight filed a Final Application for New License (FLA) for the Turners Falls and Northfield Mountain Projects with FERC on April 29, 2016. Because certain environmental studies had not yet been completed as of the statutory deadline for filing of the FLA, FirstLight filed a separate Amended Final License Application for each Project on December 4, 2020 (AFLA), including FirstLight's proposed protection, mitigation and enhancement (PM&E) measures to be included in the new licenses and the scientific and evidentiary basis for those measures.

WHEREAS, since filing of the AFLAs, FirstLight has been engaged with federal and state resource agencies, local communities, environmental organizations, Native American Tribes, and other stakeholders to consider agency and stakeholder proposals for additional PM&E measures on a broad range of issues pertaining to fish passage, streamflows, recreation, and cultural resources, with the goal of developing a comprehensive settlement agreement.

WHEREAS, FirstLight has been engaged specifically with the Parties to this Agreement in Principle (AIP), including the Massachusetts Division of Fisheries and Wildlife (MDFW), Massachusetts Natural Heritage and Endangered Species Program (NHESP), National Marine Fisheries Service (NMFS), The Nature Conservancy (TNC), and the United States Fish and Wildlife Service (USFWS). The Parties have now achieved conceptual agreement on minimum bypass flows and operational restrictions to benefit downstream fish and wildlife habitat and project modifications, fish passage performance goals, and adaptive management provisions to improve upstream and downstream fish passage.

NOW, THEREFORE, the Parties agree in principle as follows:

PART I: OVERVIEW AND INTENT

A. The Parties agree to negotiate toward a Final Settlement Agreement based on the terms of this AIP, with the intention of reaching a Final Settlement Agreement, if one can be reached, no later than December 31, 2022.

B. All Parties enter into this AIP without any admission of law or fact. The Parties acknowledge that the Final Settlement Agreement must include other material terms that have not yet been agreed upon and is subject to agreement on language embracing all of the terms agreed to in principle as set forth in Part II herein.

C. The Parties recognize that the Final Settlement Agreement and any other related agreements negotiated pursuant to this AIP are subject to formal and final review and approval of the Parties' management, executives, boards of directors, and other leadership, as necessary and appropriate to comply with corporate, municipal and agency requirements. The signatories to this AIP are the principal negotiators for each Party, who represent by their signatures only that:

- They have informed their respective management or leadership of the terms of this AIP.
- They have been authorized to negotiate toward a Final Settlement Agreement based in substance on the terms of this AIP.

D. All Parties recognize and acknowledge that this AIP is not legally binding and does not give rise to any enforceable rights in contract.

E. Unless and until a Final Settlement Agreement is executed by the Parties, any Party may take any action before FERC or any other agency as that Party unilaterally determines necessary to protect its interests.

F. In the event that this AIP does not culminate in a Final Settlement Agreement, it shall be null and void. No Party shall use this AIP as evidence of any other Party's position on any issue addressed in this AIP or as evidence that any term should or should not be incorporated into the New Licenses for the Turners Falls and Northfield Mountain Projects.

G. Nothing in this Agreement shall be construed as a waiver of any state or federal agency authority to carry out its statutory and regulatory mandates, including the requirement for FERC to engage in consultation under Section 7 of the Endangered Species Act. All Parties understand that the terms conceptually agreed upon in this document do not circumscribe the authority of the agencies or their analyses under Section 7 of the Endangered Species Act.

PART II: PROTECTION, MITIGATION AND ENHANCEMENT MEASURES- OPERATIONS

1 OPERATIONS

1.1 Project Operations

1.1.1 Turners Falls Project Operations

(a) FirstLight shall operate the Turners Falls Hydroelectric Project in accordance with the following operational flow regime until the third (3rd) anniversary of the date of license issuance.

FirstLight has included two timing elements to address the new operational paradigm. From license issuance until the third (3rd) anniversary of the date of license issuance, FirstLight shall institute the minimum flows in the bypass and below Cabot Station and Cabot Station up/down ramping in paragraph (a) and (b), as a license condition, and also put processes in place with GRH and ISO-NE to assure success in meeting its obligations for Flow Stabilization restrictions described in paragraph (c). In addition, Station No. 1 upgrades (described later) will be completed during this period. FirstLight also will submit to FERC for approval no later than 1 year after license issuance a project operation, monitoring and reporting plan after consultation with the agencies. On the third (3rd) anniversary of the date of license issuance and upon FERC's approval of the project operation, monitoring and reporting plan, FirstLight shall institute the full suite of flow enhancements shown in paragraphs (a), (b) and (c) (i.e., minimum flows in bypass and below Cabot Station, Cabot Station up/down ramping and flow stabilization restrictions). Table 1.1.1-1 summarizes the operations from license issuance through the third (3rd) anniversary of the date of license issuance.

Table 1.1.1-1: Operating Conditions from License Issuance through the third (3rd) anniversary of the date of license issuance: Turners Falls Dam Minimum Flow, Station No. 1 Minimum Flow, below Cabot Station Minimum Flows, Cabot Station Ramping, and Flexible Operations

1. Date	2. Total Bypass Flow[2]	3. Turners Falls Dam	4. Station No. 1[4,5]	5. Below Cabot Station Minimum Flow	6. Cabot Station Ramping[8] to Protect Shortnose Sturgeon and Odonates	7. Allowable Deviations from Ramping
01/01-03/31	1,500 cfs or the Naturally Routed Flow (NRF), whichever is less	400 cfs[3]	1,100 cfs	3,800 cfs or NRF, whichever is less (1,500 cfs + 2,300 cfs)	N/A	
04/01-05/15	6,500 cfs or the NRF, whichever is less	4,290 cfs	2,210 cfs	8,800 cfs between midnight and 7 pm or NRF, whichever is less (6,500 cfs + 2,300 cfs)	Up/Down to 2,300 cfs/hour	0 hours of Flexible Operations
05/16-05/31	6,500 cfs or the NRF, whichever is less	4,290 cfs	2,210 cfs	8,800 cfs between midnight and 7 pm or NRF, whichever is less (6,500 cfs + 2,300 cfs)	Up/Down to 2,300 cfs/hour	0 hours of Flexible Operations
06/01-06/15[1]	4,500 cfs or the NRF, whichever is less[7]	2,990 cfs[7]	1,510 cfs[7]	6,800 cfs or NRF, whichever is less (4,500 cfs + 2,300 cfs)	Up/Down to 2,300 cfs/hour	0 hours of Flexible Operations
06/16-06/30[1]	3,500 cfs of the NRF, whichever is less	2,280 cfs	1,220 cfs	5,800 cfs or NRF, whichever is less (3,500 cfs + 2,300 cfs)	Up/Down to 2,300 cfs/hour	0 hours of Flexible Operations
07/01-07/15	1,800 cfs or 90 % of the NRF, whichever is less	250 cfs[6]	1,550 cfs	1,800 cfs or 90 % of the NRF, whichever is less	Up to 2,300 cfs/hour (8 am to 2 pm)	N/A
07/16-07/31	1,800 cfs or 90 % of the NRF, whichever is less	250 cfs[6]	1,550 cfs	1,800 cfs or 90 % of the NRF, whichever is less	Up to 2,300 cfs/hour (8 am to 2 pm)	
08/01-08/15	1,800 cfs or 90 % of the NRF, whichever is less	250 cfs[6]	1,550 cfs	1,800 cfs or 90 % of the NRF, whichever is less	Up to 2,300 cfs/hour (8 am to 2 pm)	N/A
08/16-08/31	1,800 cfs or 90 % of the NRF, whichever is less	250 cfs[6]	1,550 cfs	1,800 cfs or 90 % of the NRF, whichever is less	N/A	
09/01-09/15	1,500 cfs or 90 % of the NRF, whichever is less	250 cfs[6]	1,250 cfs	1,500 cfs or 90 % of the NRF, whichever is less	N/A	N/A
09/16-09/30	1,500 cfs or 90 % of the NRF, whichever is less	250 cfs[6]	1,250 cfs	1,500 cfs or 90 % of the NRF, whichever is less	N/A	
10/01-10/15	1,500 cfs or 90 % of the NRF, whichever is less	250 cfs[6]	1,250 cfs	1,500 cfs or 90 % of the NRF, whichever is less	N/A	N/A
10/16-10/31	1,500 cfs or 90 % of the NRF, whichever is less	250 cfs[6]	1,250 cfs	1,500 cfs or 90 % of the NRF, whichever is less	N/A	
11/01-11/15	1,500 cfs or 90 % of the NRF, whichever is less	250 cfs[6]	1,250 cfs	1,500 cfs or 90 % of the NRF, whichever is less	N/A	N/A
11/16-11/30	1,500 cfs or 90% of the NRF, whichever is less	400 cfs[3]	1,100 cfs	1,500 cfs or 90 % of the NRF, whichever is less	N/A	
12/01-12/31	1,500 cfs or the NRF, whichever is less	400 cfs[3]	1,100 cfs	3,800 cfs or NRF, whichever is less (1,500 cfs + 2,300 cfs)	N/A	N/A

[1]The flow split during these periods is approximately 67% from the Turners Falls Dam and 33% from Station No. 1. If FirstLight conducts further testing, in consultation with the National Marine Fisheries Service (NMFS), United States Fish and Wildlife Service (USFWS) and Massachusetts Division of Fish and Wildlife (MDFW) and determines that migratory fish are not delayed by passing a greater percentage of the bypass flow via Station No. 1, it may increase the percentage through Station No. 1 upon written concurrence of those agencies. If further testing shows that the flow split could potentially be modified, FirstLight shall consult with American Whitewater (AW), Appalachian Mountain Club (AMC), Zoar Outdoors, Crab Apple Whitewater, Inc and New England FLOW relative to any changes in the flow split and address those entities comments in any filing before FERC or the Massachusetts Department of Environmental Protection (MDEP).

[2]If the NRF is less than 6,500 cfs (04/01-05/31), 4,500 cfs (06/01-06/15) or 3,500 cfs (06/16-06/30) the flow split will still be set at approximately 67% of the NRF from the Turners Falls Dam and 33% of the NRF from Station No. 1 subject to footnote 1. If 90% of the NRF is less than 1,800 cfs (7/1-8/31) or 1,500 cfs (9/1-11/15), FirstLight shall maintain the Turners Falls Dam discharge at 250 cfs or a maximum of 400 cfs, subject to footnote 6. If the NRF is less than 1,500 cfs (11/16-3/31), FirstLight shall maintain the Turners Falls Discharge at 400 cfs subject to footnote 3.

[3]The design maximum capacity of the canal gate is 400 cfs. FirstLight commits to opening the attraction flow gate to its maximum opening and will implement ice mitigation measures to maintain the maximum opening, if necessary, and monitor gate operations to determine if supplemental measures, such as cable-heating the gate, are needed to maintain flows at or as close to 400 cfs as possible.

[4]To maintain the flow split, Station No. 1 must be automated, which will not occur until Year 3 of the license. FirstLight proposes to maintain the flow split such that the Turners Falls Dam discharge will be as shown above, or higher flows will be spilled, in cases where the additional flow cannot be passed through Station No. 1.

[5]The Turners Falls Hydro (TFH) project (FERC No. 2622) and Milton Hilton, LLC project (unlicensed) are located on the power canal and discharge into the bypass reach upstream of Station No. 1. The hydraulic capacities of the TFH project and Milton Hilton, LLC project are 289 and 113 cfs, respectively. If the TFH project is operating, FirstLight may reduce its Station No. 1 discharge by 289 cfs. If the Milton Hilton, LLC project is operating, FirstLight may reduce its Station No. 1 discharge by 113 cfs.

[6] The 250 cfs is subject to an inspection of rare plant species in the bypass under Turners Falls Dam spillage flows ranging from 250-400 cfs in the first 4 years after license issuance. The entity conducting the inspection of rare plants will be resolved by the Parties as part of the Comprehensive Settlement Agreement. Pending the results of the study, NHESP may authorize that the Turners Falls Dam discharge be increased up to a maximum of 400 cfs with the portion of the bypass flow coming from Station No. 1 reduced by the corresponding amount. The Parties agree to discuss this issue further as part of Comprehensive Settlement discussions due to competing interests from multi-day through paddlers and flatwater paddlers.

[7] One of the adaptive management measures, described in Section 3, is increasing the total bypass flow from June 1 to June 15 from 4,500 cfs to 6,500 cfs. If this adaptative management measure is enacted and after two years of effectiveness testing, it improves the fish passage efficiency and time-to-pass goals, this change may be implemented throughout the remainder of the license, subject to other adaptive management measures. However, even after this change, the 6,500 cfs will revert to 4,500 cfs when 90% of the American Shad run enter the Spillway Lift before or within the June 1 to 15 period. The indicator as to when the 90% of the American Shad run passes will be determined using a predictive model developed in consultation with FirstLight, MDFW, NMFS, and USFWS. The model will be developed within 6 months of license issuance and be updated and/or refined with data collected over intervening years.

[8]If the NRF exceeds the hydraulic capacity of Cabot Station (all units) plus the total bypass flow in effect at the time, the Cabot Station up-ramping rates will not apply.

The bypass flows and minimum flow below Cabot Station may be modified temporarily: (1) during and to the extent required by operating emergencies beyond the control of FirstLight; and (2) upon mutual agreement among FirstLight for Projects Nos. 1889 and 2485 and the USFWS, NMFS, MDEP, and MDFW.

(b) The NRF represents the inflow to the Turners Falls Dam. For the period December 1 through June 30 the NRF is defined as the sum of the Vernon Hydroelectric Project total discharge from 12 hours previous, Ashuelot River United States Geological Survey (USGS) gage flow from 12 hours previous, and Millers River USGS gage flow from 12 hours previous. For the period July 1 through November 30, the NRF is defined as the hourly sum of discharges averaged from 1 to 12 hours previous from the Vernon Hydroelectric Project, the Ashuelot River USGS gage, and the Millers River USGS gage. The flow average from 1 to 12 hours previous is needed to help dampen upstream hydroelectric project flexible operations.

(c) FirstLight shall operate the Turners Falls Project in accordance with the conditions in paragraph (a) and the following operational flow regime beginning on the third (3^{rd}) anniversary of the date of license issuance (see Table 1.1.1-2).

Table 1.1.1-2: Operating Conditions starting on the third (3rd) anniversary of the date of license issuance: Turners Falls Dam Minimum Flow, Station No. 1 Minimum Flow, below Cabot Station Minimum Flows, Flow Stabilization, Cabot Station Ramping and Flexible Operations

1. Date	2. Total Bypass Flow[2]	3. Turners Falls Dam	4. Station No. 1[4,5]	5. Below Cabot Station Minimum Flow	6. Flow Stabilization[8] to Protect Shad Spawning (4/1-5/31), Puritan and Cobblestone Tiger Beetles, and state listed mussel and plant species (5/16-11/30)	7. Cabot Station Ramping[9] to Protect Shortnose Sturgeon and Odonates	8. Allowable Deviations from Flow Stabilization
01/01-03/31	1,500 cfs or the Naturally Routed Flow (NRF), whichever is less	400 cfs[3]	1,100 cfs	3,800 cfs or NRF, whichever is less (1,500 cfs + 2,300 cfs)	N/A	N/A	N/A
04/01-05/15	6,500 cfs or the NRF, whichever is less	4,290 cfs	2,210 cfs	8,800 cfs between midnight and 7 pm or NRF, whichever is less (6,500 cfs + 2,300 cfs)	Provide NRF ±10% below Cabot Station from 7 PM to Midnight, with deviations up to +/-20% allowed for up to 22 hours.	Up/Down to 2,300 cfs/hour (ramping will take precedence over flow stabilization)	0 hours of Flexible Operations
05/16-05/31	6,500 cfs or the NRF, whichever is less	4,290 cfs	2,210 cfs	8,800 cfs between midnight and 7 pm or NRF, whichever is less (6,500 cfs + 2,300 cfs)	Provide NRF ±10% below Cabot Station from 7 pm to Midnight, with deviations up to +/-20% for up to 18 hours.	Up/Down to 2,300 cfs/hour (ramping will take precedence over flow stabilization)	0 hours of Flexible Operations
06/01-06/15[1]	4,500 cfs or the NRF, whichever is less[7]	2,990 cfs[7]	1,510 cfs[7]	6,800 cfs or NRF, whichever is less (4,500 cfs + 2,300 cfs)	Provide NRF ±10% below Cabot Station, with deviations up to +/-20% for up to 7 hours	Up/Down to 2,300 cfs/hour (ramping will take precedence over flow stabilization)	0 hours of Flexible Operations
06/16-06/30[1]	3,500 cfs of the NRF, whichever is less	2,280 cfs	1,220 cfs	5,800 cfs or NRF, whichever is less (3,500 cfs + 2,300 cfs)	Provide NRF ±10% below Cabot Station, with deviations up to +/-20% for up to 7 hours	Up/Down to 2,300 cfs/hour (ramping will take precedence over flow stabilization)	0 hours of Flexible Operations
07/01-07/15	1,800 cfs or 90 % of the NRF, whichever is less	250 cfs[6]	1,550 cfs	1,800 cfs or 90 % of the NRF, whichever is less	Provide NRF ±10% below Cabot Station, with deviations up to +/-20% for up to 55 hours	N/A	20 hours of Flexible Operations with no more than 7 flex events per month (Jul).
07/16-07/31	1,800 cfs or 90 % of the NRF, whichever is less	250 cfs[6]	1,550 cfs	1,800 cfs or 90 % of the NRF, whichever is less			
08/01-08/15	1,800 cfs or 90 % of the NRF, whichever is less	250 cfs[6]	1,550 cfs	1,800 cfs or 90 % of the NRF, whichever is less			26 hours of Flexible Operations with no more than 7 flex events per month (Aug).
08/16-08/31	1,800 cfs or 90 % of the NRF, whichever is less	250 cfs[6]	1,550 cfs	1,800 cfs or 90 % of the NRF, whichever is less	Provide NRF ±10% below Cabot Station, with deviations up to +/-20% for up to 27 hours	N/A	
09/01-09/15	1,500 cfs or 90 % of the NRF, whichever is less	250 cfs[6]	1,250 cfs	1,500 cfs or 90 % of the NRF, whichever is less	Provide NRF ±10% below Cabot Station, with deviations up to +/-20% for up to 44 hours	N/A	23 hours of Flexible Operations with no more than 7 flex events per month (Sep).
09/16-09/30	1,500 cfs or 90 % of the NRF, whichever is less	250 cfs[6]	1,250 cfs	1,500 cfs or 90 % of the NRF, whichever is less		N/A	
10/01-10/15	1,500 cfs or 90 % of the NRF, whichever is less	250 cfs[6]	1,250 cfs	1,500 cfs or 90 % of the NRF, whichever is less		N/A	20 hours of Flexible Operations with no more than 7 flex events per month (Oct).
10/16-10/31	1,500 cfs or 90 % of the NRF, whichever is less	250 cfs[6]	1,250 cfs	1,500 cfs or 90 % of the NRF, whichever is less		N/A	
11/01-11/15	1,500 cfs or 90 % of the NRF, whichever is less	250 cfs[6]	1,250 cfs	1,500 cfs or 90 % of the NRF, whichever is less	Provide NRF ±10% below Cabot Station, with deviations up to +/-20% for up to 11 hours	N/A	28 hours of Flexible Operations with no more than 7 flex events per month (Nov).
11/16-11/30	1,500 cfs or 90 % of the NRF, whichever is less	400 cfs[3]	1,100 cfs	1,500 cfs or 90 % of the NRF, whichever is less		N/A	
12/01-12/31	1,500 cfs or the NRF, whichever is less	400 cfs[3]	1,100 cfs	3,800 cfs or NRF, whichever is less (1,500 cfs + 2,300 cfs)	N/A	N/A	N/A

1. Date	2. Total Bypass Flow[2]	3. Turners Falls Dam	4. Station No. 1[4,5]	5. Below Cabot Station Minimum Flow	6. Flow Stabilization to Protect Shad Spawning (4/1-5/15) and Puritan Tiger Beetles (5/16-11/15)	7. Cabot Station Ramping to Protect Shortnose Sturgeon and Odonates	8. Allowable Deviations from Ramping and Flow Stabilization

[1]The flow split during these periods is approximately 67% from the Turners Falls Dam and 33% from Station No. 1. If FirstLight conducts further testing, in consultation with the NMFS, USFWS and MDFW and determines that migratory fish are not delayed by passing a greater percentage of the bypass flow via Station No. 1, it may increase the percentage through Station No. 1 upon written concurrence of those agencies. If further testing shows that the flow split could potentially be modified, FirstLight shall consult with American Whitewater (AW), Appalachian Mountain Club (AMC), Zoar Outdoors, Crab Apple Whitewater, Inc and New England FLOW relative to any changes in the flow split and address those entities comments in any filing before FERC or the Massachusetts Department of Environmental Protection (MDEP).

[2]If the NRF is less than 6,500 cfs (04/01-05/31), 4,500 cfs (06/01-06/15) or 3,500 cfs (06/16-06/30) the flow split will still be set at approximately 67% of the NRF from the Turners Falls Dam and 33% of the NRF from Station No. 1, subject to footnote 1. If 90% of the NRF is less than 1,800 cfs (7/1-8/31) or 1,500 cfs (9/1-11/15), FirstLight shall maintain the Turners Falls Dam discharge at 250 cfs or a maximum of 400 cfs, subject to footnote 6. If the NRF is less than 1,500 cfs (11/16-3/31), FirstLight shall maintain the Turners Falls Discharge at 400 cfs subject to footnote 3.

[3]The design maximum capacity of the canal gate is 400 cfs. FirstLight commits to opening the attraction flow gate to its maximum opening and will implement ice mitigation measures to maintain the maximum opening, if necessary, and monitor gate operations to determine if supplemental measures, such as cable heating the gate, are needed to maintain flows at or as close to 400 cfs as possible.

[4]To maintain the flow split, Station No. 1 must be automated, which will not occur until Year 3 of the license. FirstLight proposes to maintain the flow split such that the Turners Falls Dam discharge will be as shown above, or higher flows will be spilled, in cases where the additional flow cannot be passed through Station No. 1.

[5]The Turners Falls Hydro (TFH) project (FERC No. 2622) and Milton Hilton, LLC project (unlicensed) are located on the power canal and discharge into the bypass reach upstream of Station No. 1. The hydraulic capacities of the TFH project and Milton Hilton, LLC project are 289 and 113 cfs, respectively. If the TFH project is operating, FirstLight may reduce its Station No. 1 discharge by 289 cfs. If the Milton Hilton, LLC project is operating, FirstLight may reduce its Station No. 1 discharge by 113 cfs.

[6] The 250 cfs is subject to an inspection of rare plant species in the bypass under Turners Falls Dam spillage flows ranging from 250-400 cfs in the first 4 years after license issuance. The entity conducting the inspection of rare plants will be resolved by the Parties as part of the Comprehensive Settlement Agreement. Pending the results of the study, NHESP may authorize that the Turners Falls Dam discharge be increased up to a maximum of 400 cfs with the portion of the bypass flow coming from Station No. 1 reduced by the corresponding amount. The Parties agree to discuss this issue further as part of Comprehensive Settlement discussions due to competing interests from multi-day through paddlers and flatwater paddlers.

[7] One of the adaptive management measures, described in Section 3, is increasing the total bypass flow from June 1 to June 15 from 4,500 cfs to 6,500 cfs. If this adaptative management measure is enacted and after two years of effectiveness testing, it improves the fish passage efficiency and time-to-pass goals, this change may be implemented throughout the remainder of the license, subject to other adaptive management measures. However, even after this change, the 6,500 cfs will revert to 4,500 cfs when 90% of the American Shad run enter the Spillway Lift before or within the June 1 to 15 period. The indicator as to when the 90% of the American Shad run passes will be determined using a predictive model developed in consultation with FirstLight, MDFW, NMFS, and USFWS. The model will be developed within 6 months of license issuance and be updated and/or refined with data collected over intervening years..

[8]If the NRF exceeds the hydraulic capacity of the Turners Falls Power Canal plus the total bypass flow in effect at the time, the flow stabilization will not apply.

[9]If the NRF exceeds the hydraulic capacity of Cabot Station (all units) plus the total bypass flow in effect at the time, the Cabot Station up-ramping rates will not apply.

FirstLight agrees that as part of an off-license agreement, it will plan for and begin implementation of the proposed flow stabilization measures in Table 1.2.1-2 upon license issuance, recognizing that it will not be required to demonstrate to FERC or the Parties that it is meeting the flow stabilization requirements in Column 6 of Table 1.2.1-2 until the third (3rd) anniversary of the date of license issuance. FirstLight agrees to provide the Parties an annual report (by March 1 of the following year) for the first two years and quarterly reports for year 3 to demonstrate substantive progress towards implementing the flow stabilization requirements.

In addition, FirstLight will have restricted discretionary flexible operating capability to respond to elevated energy prices (as defined in paragraph (d) below) between July 1 and November 30, as well as unrestricted capability to respond to emergencies, ISO-NE transmission and power system requirements, and other regulatory requirements (as defined in paragraph (e) below).

(d) Flexible operations allow for deviation from the prescribed operating limits (defined as Flow Stabilization and Cabot Station Ramping which are shown in Columns 6 and 7 of Table 1.2.1-2 in paragraph (c)). Such flexible operations are limited to the July 1 to November 30 period and will occur at the discretion of FirstLight and will be limited by a maximum number of hours and events per period as shown in Column 8 of Table 1.2.1-2 in paragraph (c).

(e) If compliance with the prescribed operating limits (defined as Flow Stabilization and Cabot Station Ramping which are shown in Columns 6 and 7 of Table 1.2.1-2 in paragraph (c)) would cause FirstLight to violate or breach any law, any applicable license, permit, approval, consent, exemption or authorization from a federal, state, or local governmental authority, any agreement with a governmental entity, or any tariff, capacity rating requirement, ramping criterion, or other requirement of the ISO-NE or its successors (ISO-NE)[1], FirstLight may deviate from the prescribed operating limitations to the least degree necessary in order to avoid such violation or breach. In addition, FirstLight may deviate from the operating limits for the following reasons:

- To implement Flood Flow Operations as defined in paragraph (g) below.
- To perform demonstrations of the resources' operating capabilities under ISO-NE rules and procedures. FirstLight will use best efforts to be allowed by ISO-NE to perform these demonstrations at times that will not cause it to deviate from the operating limits, with recognition that the April 1 to June 30 period will be avoided to the maximum extent possible.
- To manage the Turners Falls Impoundment (TFI) to stay within license limits, with recognition that the April 1 to June 30 period will be avoided to the maximum extent possible.
- If compliance with the prescribed operating limitations would cause a public safety hazard or prevent timely rescue.

From license issuance until the third (3rd) anniversary of the date of license issuance, FirstLight shall document on an hourly basis for each day any allowable deviations from the Cabot Station Ramping restrictions and demonstrate progress towards meeting flow stabilization requirements. Beginning on the third (3rd) anniversary of the date of license issuance and continuing through to license expiration, FirstLight shall document on an hourly basis for each day any allowable deviations from the Cabot Station Ramping rate and Flow Stabilization restrictions. Each day, between April 1 and November 30, any

[1]ISO-NE requirements are conditions when ISO-NE requires FirstLight to be fully available and, if necessary, responsive. Some examples include ISO-NE reserve deficiencies (a.k.a. reserve constraint penalty factors) when reserves are depleted on the power grid, for fuel security emergencies or scarcity events, for ISO-NE system (or system) stability (e.g., VAR support), and system over supply (negative prices).

allowable deviations will be recorded in a spreadsheet showing the daily deviations, the reason for the deviation, the number of hours, and scope. FirstLight shall provide the total number of deviations to the USFWS, NMFS, MDFW, and MDEP on an annual basis no later than March 1 of the following year. Allowable deviations will be tracked as follows:

- Identify Allowable Deviations: FirstLight will record Cabot Station, Station No. 1, spill, NRF, and total Project discharge at the top of each hour. Allowable deviations in both the Cabot Station ramping requirements and the Flow Stabilization requirements will be recorded. At the top of each hour, FirstLight will record the change in Cabot Station discharge from the previous hour to determine if any deviation has occurred from the agreed upon Cabot Station ramping rate. In addition, the NRF (as detailed in paragraph (b) of the "Operational Regime" section) will be compared with the recorded total Project discharge in a given hour to identify if a Flow Stabilization deviation occurred over the past hour. Any deviation of either the Cabot Station ramping or total Project discharge within the hour will be counted in one-hour increments.

- Categorize Allowable Deviations: When an allowable deviation is identified it will be categorized as either Regulatory (as detailed in paragraph (e) of the "Turners Falls Project Operations" in Section 1.2.1 of this Proposal), NRF Allowance (as detailed in paragraph (d) of the "Turners Falls Impoundment Water Level Management" in Section 1.2.2 of this Proposal), or Discretionary (as detailed in paragraph (d) of the "Operational Regime" section of this Proposal).

(f) Cabot Emergency Gate Use. FirstLight shall use the Cabot Emergency Gates under the following conditions: a) in case of a Cabot load rejection[2], b) in the case of dam safety issues such as potential canal overtopping or partial breach, and c) to discharge approximately 500 cfs between April 1 and June 15 for debris management. FirstLight shall avoid discharging higher flows through the gates from April 1 to June 15 whenever possible; however, if necessary, FirstLight shall coordinate with NMFS to minimize potential impacts to Shortnose Sturgeon in the area below Cabot Station.

(g) Flood Flow Operations. FirstLight shall operate the Turners Falls Project in accordance with its existing agreement with the United States Army Corp of Engineers (USACE). This agreement, memorialized in the *Reservoir and River Flow Management Procedures* (1976), as it may be amended from time to time, governs how the Turners Falls Project shall operate during flood conditions[3] and coordinate its operations with the Licensee of the Northfield Mountain Project (FERC No. 2485).

1.1.2 Turners Falls Impoundment Water Level Management

(a) FirstLight shall operate the TFI, as measured at the Turners Falls Dam, between elevation 176.0 feet and 185.0 feet NGVD29.

(b) FirstLight shall limit the rate of rise of the TFI water level, as measured at the Turners Falls Dam, to be less than 0.9 feet/hour from May 15 to August 15 between the hours of 8:00 am and 2:00 pm for the protection of odonates. If the NRF exceeds the hydraulic capacity of the Turners Falls Power Canal plus the total bypass flow in effect at the time, the TFI rate of rise rates will not apply.

[2] A load rejection is when the Cabot Station units are suddenly shut off. If this were to occur, the canal could potentially be overtopped. To prevent overtopping, the Cabot Emergency Gates open so that incoming flow down the power canal can be discharged via the Cabot Emergency Gates. Load rejections could occur at any time.

[3] These procedures define a flood as the NRF in excess of 65,000 cfs. However, these procedures implement measures for flood control when the NRF reaches 30,000 cfs.

(c) The rate of rise of the TFI may be modified temporarily: (1) during and to the extent required by operating emergencies beyond the control of FirstLight; and (2) upon mutual agreement among the Licensees for Projects Nos. 1889 and 2485 and the USFWS, NMFS and MDFW.

(d) FirstLight is entitled to increase the allowable NRF deviation from ±10% to ±20% in order to better manage TFI water levels. The increased flow deviation would be limited by the number of hours shown in Column 6 of Table 1.2.1-2 in paragraph (c) of "Turners Falls Project" in Section 1.2.1 of this Proposal. The allowance for an increased flow deviation outlined in this paragraph is different from the exceptions outlined in paragraphs (d) and (e) of "Turners Falls Project" in Section 1.2.1 of this Proposal. As such, the increased flow deviations outlined in this paragraph shall not count against any time allotment for exceptions outlined in paragraphs (d) and (e) of "Turners Falls Project" in Section 1.2.1 of this Proposal, and similarly operations meeting the exception criteria outlined in paragraphs (d) and (e) of "Turners Falls Project" in Section 1.2.1 of this Proposal shall not count against any time allotment for deviations outlined in this paragraph. Additionally, flow deviations in excess of ±10% of NRF resulting from conflicting operational requirements shall not count against any time allotment for deviations outlined in this paragraph.

1.1.3 Northfield Mountain Pumped Storage Project Operations

(a) Flood Flow Operations. FirstLight shall operate the Northfield Mountain Project in accordance with its existing agreement with the USACE. This agreement, memorialized in the *Reservoir and River Flow Management Procedures* (1976), as it may be amended from time to time, governs how the Northfield Mountain Project shall operate during flood conditions and coordinate its operations with the Licensee of the Turners Falls Project (FERC No. 1889).

(b) Upper Reservoir Water Level Management: FirstLight shall operate the Northfield Mountain Project Upper Reservoir between elevation 1004.5 and 920.0 feet NGVD29.

1.1.4 Cobblestone Tiger Beetle Mitigation Fund

As part of Final Settlement FirstLight agrees to work with the Settlement Parties to develop a Cobblestone Tiger Beetle Mitigation Plan. This plan will not include any requirements that limit the capacity of Cabot Station.

1.1.5 Ichthyoplankton Mitigation Fund

FirstLight will provide funding for habitat improvement projects and/or alosine management activities to offset the potential loss of ichthyoplankton through entrainment at the Northfield Mountain Pumped Storage Project. FirstLight will make payments to the USFWS per the schedule below by February 1 of each identified year.

Year after License Issuance	Amount
1	$112,800
13	$35,000
15	$220,000
20	$90,000
25	$110,000
30	$294,000

Year after License Issuance	Amount
35	$125,000
40	$132,481
45	$177,000
Total	$1,293,281

PART II: PROTECTION, MITIGATION AND ENHANCEMENT MEASURES- FISH PASSAGE

2 FISH PASSAGE

2.1 Provisions to Provide Bypass Flows

2.1.1 Station No. 1- Improve Operating Range of Turbines

FirstLight will automate the Station No. 1 turbines to throttle the station over a range of flows within 3 years of license issuance.

2.2 Fish Passage Design and Consultation

The Parties agree that for any new fish passage facility described in this AIP, FirstLight will consult and obtain approval from the MDFW, NMFS, and USFWS on the facility design and on operation and maintenance procedures. FirstLight will consult with MDFW, NMFS, and USFWS at the 30%, 60%, 90%, and 100% design milestones. For any new fish passage facility, the Parties will attempt to meet agency design guidelines to the extent practicable for the purpose of achieving fish passage performance goals stated in Section 3.1.

2.3 Downstream Fish Passage

2.3.1 Intake Protection at the Northfield Mountain Pumped Storage Project Intake/Tailrace

FirstLight will install a barrier net based on the conceptual design proposed in the Amended Final License Application, as modified through agency design consultation, for the period June 1 to November 15 to protect out-migrating shad and silver eel, to be operational no later than June 1 of Year 7 after license issuance. The barrier net will be 3/8-inch on the top and 3/4-inch on the bottom. FirstLight will include the Northfield Mountain Project in the study design for effectiveness studies of upstream and downstream fish passage measures at the Turners Falls Project and will consult with the agencies on the effectiveness study plan and design to include appropriate receiver placement in the vicinity of the Northfield Mountain Project intake/tailrace.

2.3.2 Cabot Intake Protection and Downstream Passage Conveyance

Within 4 years[4] FirstLight will operate downstream passage and protection facilities by replacing the existing trashrack structure with a new full depth trashrack with 1-inch clear spacing. In terms of general design concepts, the Parties agree that the new trashracks will have multiple openings for fish passage and that those openings will include both the top and bottom of the water column. The Parties further agree that they will attempt to maximize the hydraulic capacity of these openings within the constraints of the conveyance mechanisms. The Parties have analyzed a number of alternatives and believe the following conceptual design has merit for future exploration of detailed design alternatives:

[4] Relative to the Cabot Intake Protection and Downstream Passage Conveyance and the Station No. 1 Bar Rack, the times cited are from license issuance based on the time needed to complete construction. The actual first year of operation and shakedown of these two facilities will depend on when the license is issued. If the License is issued in Q1 then facilities should be operational no later than April 1 of Year 4 after license issuance; if it is issued in Q2 then facilities should be operational no later than August 1 of Year 4 after license issuance; and if it is issued after Q2 then facilities should be operational no later than April 1 of Year 5 after license issuance.

The new trashrack will have multiple surface entrances including a.) between Units 2 and 3; b.) between Units 4 and 5; and c.) at the right wall of the intake (looking downstream) at Unit 6. These openings will be 3-feet-wide by 2-feet-tall and will connect to the existing trash trough located behind the racks. Each opening at the top of the trashrack will have an approximate hydraulic capacity of 24 cfs, and the existing trash trough will convey a total hydraulic capacity of approximately 72 cfs from these openings. The new trashrack will have an additional entrance near the bottom at the left wall of the intake (looking downstream) at Unit 1. This entrance will be approximately 3-feet-wide by 3-feet-tall and will connect to a vertical pipe to safely convey fish to the existing trash trough or log sluice. This entrance will be sized to provide a velocity that attracts fish to the bypass relative to the turbine intakes (approximately 5 feet-per-second).

In addition to the entrances integral to the new trashrack structure, fish will be conveyed via a new uniform acceleration weir (UAW) and log sluice. The log sluice will be resurfaced to limit turbulence and injury to migrants. A steel panel (or equivalent) will be provided below the UAW to exclude migrants from being delayed in the space below the UAW. Total flow from all downstream passage components at Cabot Station will be at least 5% (685 cfs) of maximum hydraulic station capacity (13,728 cfs). The conveyance at each bypass entrance will be determined during the design phase.

FirstLight will consult and obtain approval from the Agencies during the design process as described in Section 2.2.

2.3.3 Station No. 1 Bar Rack

FirstLight will construct a ¾-inch clear-spaced bar rack at the entrance to the Station No. 1 branch canal the same year (see footnote 4) the Cabot Intake Protection and Downstream Passage Conveyance is built, so as to minimize canal outage time.

2.3.4 Plunge Pool below Bascule Gate No. 1

FirstLight will construct a plunge pool downstream of Bascule Gate No. 1 as part of the construction of the Spillway Lift, to be operational no later than April 1 of Year 9 after license issuance.

2.4 Upstream Fish Passage

2.4.1 Anadromous Passage

2.4.1.1 Spillway Lift

FirstLight will construct a new Spillway Lift at the Turners Falls Dam to be operational no later than April 1 of Year 9 after license issuance irrespective of what quarter the license is issued.

2.4.1.2 Rehabilitate Gatehouse Trapping Facility

FirstLight will rehabilitate the Gatehouse Trapping facility (sampling facility) to be operational no later than April 1 of Year 9 after license issuance.

2.4.1.3 Retire Cabot Ladder and Portions of Gatehouse Ladder

FirstLight, at its sole discretion, will either remove or retain in place the Cabot ladder and the canal portions of the Gatehouse ladder but will, in any case, cease using these facilities for fish passage within 2 years after the new Spillway Lift is operational.

2.4.2 Eel Passage

2.4.2.1 Eel Passage Measures

FirstLight will implement the following measures:

- Install and operate interim upstream eel passage in the vicinity of the Spillway Ladder within 1 year of license issuance and continue operating until permanent upstream eel passage becomes operational. The location and design of interim eelway(s) will be determined in consultation with the agencies.
- Conduct up to 2 years of eel ramp siting studies, using a similar methodology to relicensing Study 3.3.4 (both years). Siting surveys will be initiated the year the new Spillway Lift becomes operational.
- Based on siting survey results, design, construct, operate, and maintain up to two permanent upstream eel passage facilities at the Turners Falls Project no later than 3 years after completing the final siting survey. The Parties agree that final eel ramp siting will take into account the ability to maintain the facilities in light of spillage conditions at the Project. In particular, the Parties agree not to site any ramps immediately at the foot of any active spillway structures.

3 FISH PASSAGE PERFORMANCE GOALS AND ADAPTIVE MANAGEMENT

3.1 Fish Passage Performance Goals

Fish passage performance goals for the Projects are summarized below.

Downstream Passage – Northfield Mountain Project

- 95% of juvenile American Shad arriving 500 meters upstream of the Northfield Mountain tailrace survive migration past the Northfield Mountain Project tailrace within 24 hours.
- 95% adult American Shad arriving 1 kilometer upstream of the Northfield Mountain tailrace survive migration past the Northfield Mountain Project tailrace within 24 hours.
- 95% of American Eel arriving 1 kilometer upstream of the Northfield Mountain tailrace survive migration past the Northfield Mountain Project tailrace within 48 hours of a flow event (magnitude and duration to be determined).

Downstream Passage – Turners Falls Project[5]

- 95% of juvenile American Shad arriving 500 meters upstream of the Turners Falls Dam survive migration past the Turners Falls Project within 24 hours.
- 95% of adult American Shad arriving 1 kilometer upstream of the Turners Falls Dam survive migration past the Turners Falls Project within 24 hours.
- 95% of American Eel arriving 1 kilometer upstream of the Turners Falls Dam survive migration past the Turners Falls Project within 48 hours of a flow event (magnitude and duration to be determined)

Upstream Passage – Turners Falls Project

- 75% of adult American Shad arriving 500 meters below Cabot Station successfully pass into the TFI within 48 hours. The 75% passage efficiency for American Shad will be based on the first 90% of the American Shad run.[6] FirstLight, MDFW, NMFS and USFWS will revisit whether the 75% passage efficiency goal is achievable or should be reduced, and whether the 48-hour time-to-pass goal is achievable or should be increased, after implementing the first and second round of adaptive management measures (AMMs) as described in Table 3.5-1.
- An internal passage efficiency of 95% within the permanent passage structure(s) for American Eel.[7]

3.2 Initial Fish Passage Construction Build-Out and Initial Effectiveness Testing

3.2.1 Initial Fish Passage Construction Schedule

The overall schedule for the initial upstream and downstream fish passage construction build-out and initial effectiveness testing is shown in Table 3.2-1.

[5] It should be noted that the downstream passage at the Turners Falls Project is project wide and includes all routes of passage (e.g. spill, fish bypass, and turbine passage).

[6] Note that the effectiveness testing will be conducted over the entire American Shad run; but the 75% passage efficiency goal will be based on the first 90% of the run, as determined by a posteriori analysis of the run counts.

[7] FirstLight agrees to the 95% internal efficiency so long as it is possible to successfully tag up migrating eels.

Table 3.2-1. Schedule for Initial Fish Passage Build-out and Effectiveness Testing

Facility	Operational/Shakedown Date	Effectiveness Study Years and Locations to be Tested
Cabot Rack and Downstream Conveyance	Year 4 after license issuance[8]	Years 6-7, the Cabot Downstream Fish Passage Structure and Station No. 1 Rack will be tested.
Station No. 1 Bar Rack	Year 4 after license issuance[8]	
Northfield Mountain Barrier Net	Year 7 (by June 1st) after license issuance	Years 10-11, the Northfield Mountain Barrier Net, Turners Falls Plunge Pool and Spillway Lift will be tested.
Turners Falls Dam Plunge Pool	Year 9 (by April 1st) after license issuance	
Spillway Lift	Year 9 (by April 1st) after license issuance	
Rehabilitate Gatehouse Trapping Facility (Sampling Facility)	Year 9 (by April 1st) after license issuance	Not Applicable
Retire Cabot Ladder and Portions of Gatehouse Ladder	No later than Year 11 after license issuance (tied to within 2 years after the Spillway Lift becomes operational)	Not Applicable
Permanent Eel Passage Structure(s)	Year 13 after license issuance	Year 14, the internal efficiency of the permanent eel passage structure(s) will be tested.

FirstLight will conduct a shakedown assessment of each fish passage facility during the first year of operation followed by two years of representative, quantitative effectiveness studies.

3.2.2 Initial Effectiveness Testing

Effectiveness Testing in Years 6-7

Downstream Passage

FirstLight will conduct survival testing in Years 6 and 7 at the Turners Falls Project to evaluate the downstream fish passage survival and time-to-pass. Data will be collected such that the overall project survival as well as the survival at individual components (e.g. Cabot Station and Station No. 1) can be determined and compared to the performance goals in Section 3.1.

Effectiveness Testing in Years 10-11

Downstream Passage

FirstLight will conduct survival testing in Years 10-11 at the Turners Falls Project to evaluate the downstream fish passage survival and time-to-pass of the newly constructed plunge pool as well as any enhancements made to the downstream passage/intake protection facility modifications made at Station No. 1 or Cabot Station as a result of the Year 6 and 7 studies. Data will be collected such that the overall project survival as well as the survival at individual components (e.g. Cabot Station, Station No. 1, and Plunge Pool) can be determined and compared to the performance goals listed in Section 3.1. FirstLight will also conduct survival testing in Years 10-11 at the Northfield Mountain Project to evaluate the

[8] Refer to Footnote 4 under section 2.3.2.

downstream fish passage survival and time-to-pass by the Northfield Mountain tailrace due to the Barrier Net.

Upstream Passage

FirstLight will conduct effectiveness testing in Years 10 and 11 to evaluate upstream fish passage efficiency and time-to-pass. Data will be collected to determine the nodal passage efficiency and time-to-pass at the Cabot Station tailrace, Rawson Island, Station No. 1 tailrace, and at the Spillway Lift through the Gatehouse Ladder exit, which will be compared to the performance goals in Section 3.1.

Effectiveness Testing in Year 14

FirstLight will conduct effectiveness testing in Year 14 to evaluate the internal efficiency of the permanent eel passage structures, which will be compared to the performance goals in Section 3.1.

3.3 Process of Implementing Adaptive Management Measures and Establishment of an Independent Peer Review Panel

3.3.1 Initial Downstream Effectiveness Testing in Years 6-7

After the Year 6-7 downstream survival testing at the Turners Falls Project, FirstLight will develop a draft report by February 1 of the following year for adult shad and by April 1 of the following year for juvenile shad and adult eel summarizing the survival study findings and provide it to MDFW, NMFS, and USFWS. FirstLight, MDFW, NMFS, and USFWS will then consult on the Year 6-7 testing results to determine what, if any, downstream AMMs (see Section 3.4) will be implemented at Cabot Station and/or Station No. 1 in advance of the Year 10-11 testing. Any AMMs will be targeted to those locations where study results document passage performance problems.

3.3.2 *Initial Upstream Effectiveness Testing in Years 10-11 and Effectiveness Testing of Any AMMs Implemented after the Downstream Year 6-7 testing*

After the Year 10-11 upstream initial effectiveness testing and after the effectiveness testing of any AMMs implemented for downstream passage after the Year 6-7 testing, FirstLight will develop a draft report by February 1 of the following year for adult shad and by April 1 of the following year for juvenile shad and adult eel summarizing the effectiveness study findings and provide it to MDFW, NMFS, and USFWS. FirstLight, MDFW, NMFS, and USFWS will then consult on the effectiveness testing results to determine what, if any, upstream and downstream AMMs will be implemented. Any AMMs will be targeted to those locations where the fish passage performance goals are not achieved and will be implemented per the schedule outlined in Table 3.4-1 or Table 3.5-1.

3.3.3 Additional Downstream Passage Adaptive Management Effectiveness Testing

In the case of downstream passage, if AMMs are implemented pursuant to Section 3.3.2, FirstLight will again develop a report by February 1 of the following year for adult shad and by April 1 of the following year for juvenile shad and adult eel, summarizing the effectiveness study results of the implemented AMMs and provide it to MDFW, NMFS, and USFWS. FirstLight, MDFW, NMFS, and USFWS will then consult on the AMM effectiveness testing results to determine what, if any, additional AMMs will be implemented. Identified AMMs will be implemented per the schedule outlined in Table 3.4-1.

3.3.4 Upstream Passage Adaptive Management Effectiveness Testing

In the case of upstream passage, after implementing each round[9] of upstream AMMs, FirstLight will again develop a report by February 1 of the following year summarizing the effectiveness study findings and

[9] There are two tiers of adaptive management measures as described in Section 3.5.

provide it to MDFW, NMFS, USFWS, and a 3-person Independent Peer Review Panel (IPRP) to independently evaluate the study results. After the IPRP's review of the effectiveness study findings, it will evaluate the ability to achieve the upstream fish passage performance goals (see Section 3.1) and provide a summary report of its findings to FirstLight, MDFW, NMFS, and USFWS within 3 months of receiving the effectiveness study report. FirstLight, MDFW, NMFS, and USFWS will then consult on the AMM effectiveness testing results to determine what, if any, additional AMMs will be implemented per the schedule outlined in Table 3.5-1. This same process will be repeated after each effectiveness testing of the AMMs.

The IPRP will be comprised of three independent experts. FirstLight and MDFW/ NMFS/USFWS will each independently select an expert and will jointly select the third member of the panel.

3.4 Downstream Fish Passage Adaptive Management Measures and Effectiveness Testing

The agreed upon list of AMMs at the Turners Falls Dam, Station No. 1 and Cabot Station is shown in Table 3.4-1. What, if any, AMMs to be implemented will be informed by the initial effectiveness testing results and consultation in Section 3.3. For example, if the fish passage performance goals are achieved at Station No. 1 but not at Cabot Station, then the AMMs will focus on Cabot Station.

No other AMMs, other than those listed in Table 3.4-1, will be implemented for the first 25 years of the license unless expressly agreed to by all the Parties. In addition, Cabot Station shutdowns and Northfield Mountain pumping restrictions will not be required over the life of the license unless expressly agreed to by all the Parties.

Downstream Passage at the Turners Falls Project

If the testing conducted in Years 10-11 shows that further improvements (beyond those implemented based on the Year 6-7 studies) from Table 3.4-1 are needed at the Turners Falls Dam, Station No. 1 or Cabot Station to meet overall project downstream passage goals then FirstLight will implement those enhancements based on consultations with MDFW, NMFS, and USFWS.

Downstream Passage at the Northfield Mountain Project

Survival for juvenile shad and adult eel will be tested as part of the Year 10-11 studies. If the survival and/or time to pass goals listed in Section 3.1 are not attained then FirstLight will consult and reach agreement with MDFW, NMFS, and USFWS relative to the implementation of AMM's from Table 3.4-1.

Table 3.4-1. Downstream Adaptive Management Measures

Adaptive Management Measure (if needed)	Timing
<u>Northfield Mountain</u> ● Alter the arrangement and size of the net panels (e.g. extend depth of the smaller panels). ● Improve maintenance measures for the net. <u>Turners Falls Dam</u> ● Modify the bascule gate setting(s) and resultant spill (rate, location). <u>Station No. 1</u> • Install a behavioral barrier.	Initial Effectiveness Testing at Cabot Station and Station No. 1: **Years 6-7** Initial Effectiveness Testing at Turners Falls Dam and Barrier Net and Round 1 Effectiveness Testing for any AMMs implemented at Cabot Station and/or Station No. 1 (if needed): **Year 10-11**. Round 2 AMM Effectiveness Testing at Cabot Station and/or

Adaptive Management Measure (if needed)	Timing
Cabot Station ● Modify the downstream passage conveyance design to reduce impact velocities and shear stresses (e.g., pump-back system; gradient reduction; piping, lining); ● Modify the downstream passage conveyance design to increase water depth; ● Modify the area of flow convergences of the trash trough, Uniform Acceleration Weir, eel pipe, and sluiceway; ● Modify the area of flow convergence of the sluiceway and the receiving waters in the Connecticut River (e.g., adjustable lip, velocity control, and plunge pool depth)	Station No. 1 (if needed) and Round 1 Effectiveness Testing at Turners Falls Dam and/or Barrier Net (if needed): **Years 14-15** Round 3 AMM Effectiveness Testing at Cabot Station and/or Station No. 1 (if needed) and Round 2 Effectiveness Testing at Turners Falls Dam and/or Barrier Net (if needed): **Years 18-19**

3.5 Upstream Fish Passage Adaptive Management Measures and Effectiveness Testing

As described in Section 3.2, FirstLight will conduct two years of effectiveness testing in Years 10-11 after constructing the Spillway Lift.

Relative to upstream passage at the Turners Falls Project, the results of the initial effectiveness testing will be compared against the upstream fish passage performance goals described in Section 3.1 to determine what, if any, AMMs will be implemented. Two tiers (Tier 1 and Tier 2) of AMMs are listed in Table 3.5-1. Based on the initial effectiveness study results, some or all of the Tier 1 AMMs may be implemented and tested.

Implementation of the Tier 1 AMMs will be informed by the initial effectiveness testing results. While there is an overall passage efficiency goal of 75% in 48 hours, there are four locations (or nodes) of interest, where FirstLight can provide enhancements as part of the AMM for upstream passage including Cabot Station, Rawson Island, Station No. 1, and the Spillway Lift. If the individual passage efficiency at all four locations is 90% or higher, or if overall passage efficiency goals are met, no Tier 1 AMMs will be implemented. Tier 1 enhancements will be targeted for any of the four locations with an individual passage efficiency of less than 90%. However, if FirstLight, MDFW, NFMS, and USFWS agree that improvements can be made at other nodes that would improve the overall passage efficiency a comparable amount as an enhancement to achieve an individual location/node to at least 90%, then that enhancement can be implemented.

As described in Section 3.3.3, the following process will be implemented after the Tier 1 AMMs are completed: a) FirstLight will conduct effectiveness testing, b) FirstLight will provide the effectiveness study results to the MDFW, NMFS, USFWS, and the IPRP, and c) the IPRP will evaluate the results relative to the fish passage performance goals and provide a summary report to FirstLight, MDFW, NMFS, and USFWS. If the 75% passage efficiency/48-hour time-to-pass performance goals are not met, FirstLight, MDFW, NMFS, and USFWS will consult to determine whether the 75% passage efficiency goal is achievable or should be reduced, and/or the 48-hour time-to-pass goal is achievable or should be increased. Any modifications to the 75% efficiency/48-hour metric must be agreed to by FirstLight, MDFW, NMFS, and USFWS. In addition, the same group will discuss, and reach agreement on, what, if any, AMMs will be implemented.

Pending this consultation, the remaining Tier 1 AMMs and/or Tier 2 AMMs may be implemented and a final round of AMM effectiveness testing will be conducted. In no case will other AMMs, other than those in Table 3.5-1, be implemented for the first 25 years of the license unless expressly agreed to by all the

Parties. In addition, Cabot Station shutdowns, construction of a Cabot Lift, and Northfield Mountain Pumping restrictions will not be included at any time over the life of the license.

Table 3.5-1. Upstream Adaptive Management Measures- Tier 1 and 2

Adaptive Management Measure (if needed)	Schedule
Tier 1 <u>Cabot Tailrace and Rawson Island Nodes</u>[10] ● Upon license issuance, the bypass flow from June 1 to June 15 is 4,500 cfs. This AMM includes increasing the bypass flow from June 1 to June 15 to 6,500 cfs until 90% of the American Shad run enter the Spillway Lift, upon which the bypass flow will revert to 4,500 cfs.[11] <u>Station No. 1 Node</u> ● Shift the distribution of the total bypass flow so that there is more spillage at the Turners Falls Dam and less generation at Station No. 1 from April 1 to June 30 until 90% of the American Shad run passes into the Spillway Lift, upon which it will revert back to flow requirements in Table 1.1.1-2. The total amount of bypass flow remains the same. <u>Spillway Lift Node</u> ● Adjust the new plunge pool release and/or bascule gate operation and/or, ● Adjust the new fish lift attraction water and entrance conditions and/or, ● Adjust the timing and frequency of lift operations and/or; ● Adjust the entrance gate.	Years of Initial Effectiveness Testing: **Years 10-11** Time Needed to Implement AMM(s): **Year 0** since all Tier 1 AMMs are operational Years of Post AMM Effectiveness Testing: **Years 13-14**
Tier 2 <u>Cabot Tailrace Node</u> ● Install a behavioral barrier near the Cabot Station tailrace to guide fish upstream for passage at the Turners Falls Dam. If this AMM is implemented, then the bypass flow will be reduced from 6,500 cfs to 4,500 cfs (Tier 1 AMM) during the period June 1 to June 15 for the period of testing the Tier 2 measures. At the end of Tier 2	Time Needed to Implement AMM(s): **Year 15-16 (particularly Rawson Island)**

[10] Rawson Island is located in the bypass reach.

[11] If this adaptative management measure is enacted and after two years of effectiveness testing, it improves the fish passage efficiency and time-to-pass goals, this change may be implemented throughout the remainder of the license, subject to other adaptive management measures. However, even after this change, the 6,500 cfs will revert to 4,500 cfs when 90% of the American Shad run enter the Spillway Lift before or within the June 1 to 15 period. The indicator as to when the 90% of the American Shad run passes will be determined using a predictive model developed in consultation with FirstLight, MDFW, NMFS and USFWS within 6 months of license issuance to be updated and/or refined with data collected over intervening years.

Adaptive Management Measure (if needed)	Schedule
testing (and provided that the 6,500 cfs extension is not needed to significantly improve passage efficiency or time-to-pass at Rawson Island) either the increased flow of 6,500 cfs (June 1 to June 15) will be implemented or the behavioral barrier but not both unless it is demonstrated that both are needed to make a substantial improvement in passage efficiency or time-to-pass. <u>Rawson Island Node</u> ● If it is determined that the river channel adjacent to Rawson Island is inhibiting upstream fish passage, then constructing a zone of passage is an AMM. FirstLight will consult with the recreational boating interests, Tribal interests, NHESP, MDFW, NMFS and the USFWS on the design of the zone of passage. If the zone of passage is constructed, then the bypass flow will be reduced from 6,500 cfs to 4,500 cfs (Tier 1 AMM) during the period June 1 to June 15 for the period of testing the Tier 2 measures. At the end of Tier 2 testing (and provided that the 6,500 cfs extension is not needed to significantly improve passage efficiency or time-to-pass at Rawson Island) the 6,500 cfs will be reduced back to 4,500 cfs. <u>Station No. 1 Node</u> ● A behavioral barrier will be installed near the Station No. 1 tailrace to guide fish upstream for passage at the Turners Falls Dam. If this AMM is implemented, then the Turners Falls Dam Spill/Station No. 1 Flow split will be maintained at the 67%/33%, respectively, for the period April 1 to June 30 (see Tier 1 relative to increased Turners Falls Dam Spill and less Station No. 1 generation). At the end of Tier 2 testing, either the increased spillage component of the flow split used in Tier 1 will be implemented or the behavioral barrier, but not both, unless it is demonstrated that both are needed to make a substantial improvement in passage efficiency or time to pass. <u>Turners Falls Dam/Fish Lift Node</u> ● Internal structural modifications to improve hydraulics for fish movement, as necessary.	Shakedown: **Year 17** Years of Post AMM Effectiveness Testing: **Years 18-19**

Tier 1 Effectiveness Testing

If the 75% passage efficiency/48-hour time-to-pass goals are not met, then FirstLight, MDFW, NMFS, and USFWS will consult to determine the efficacy of the goals based on the Tier 1 AMMs. Any modifications to the 75% efficiency 48-hour metric will need to be agreed to by the Parties.

Tier 2 Effectiveness Testing

After implementing the Tier 2 AMMs, if the overall passage efficiency is greater than 65% or a lesser number as agreed by the FirstLight, MDFW, NMFS, and USFWS based on IPRP input, and the overall time-to-pass is less than 60 hours or a higher number as agreed by the same group based on IPRP input, the MDFW, NMFS, and USFWS will not exercise any reserved authority to require additional upstream fish passage measures or operational changes. In no event will MDFW, NMFS, and USFWS, exercise any reserved authority or reopener relative to upstream passage for the first 25 years of the license.

3.6 Consultation

FirstLight, MDFW, NMFS, and USFWS will consult at various times as follows:

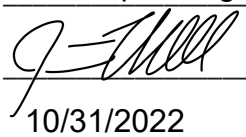
- For any new fish passage facility described in this AIP (including temporary eel passes), FirstLight will consult with, and obtain approval from, the MDFW, NMFS, and USFWS on the facility design and fish passage operation and maintenance procedures.
- All fish passage effectiveness study plans will be developed in consultation with, and require approval by MDFW, NMFS, and USFWS.
- After issuing effectiveness study reports, FirstLight, MDFW, NMFS, and USFWS will consult and reach agreement on what, if any, AMMs will be implemented.
- After implementing the Tier 1 and Tier 2 AMMs for upstream fish passage, FirstLight, MDFW, NMFS, and USFWS will consult on the efficacy of the performance goals as informed by the IPRP. Any modifications to the 75% efficiency and 48-hour time to pass metrics must be agreed to by FirstLight, MDFW, NMFS, and USFWS.
- After undertaking two years of upstream eel passage siting surveys, FirstLight, MDFW, NMFS, and USFWS will consult and reach agreement on the location of the permanent eel structures.

PART III SIGNATURES

Organization: FirstLight MA Hydro LLC and Northfield Mountain LLC (collectively, FirstLight)

By: Justin Trudell

Title: Chief Operating Officer

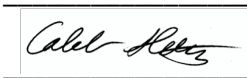
Signature: 

Date: 10/31/2022

Organization: Massachusetts Division of Fisheries and Wildlife

By: Caleb Slater

Title: Chief Of Hatcheries

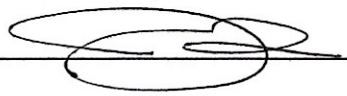
Signature:  (TL)

Date: 10/31/2022

Organization: Massachusetts Natural Heritage and Endangered Species Program

By: JESSE LEDDICK

Title: CHIEF OF REGULATORY REVIEW

Signature: 

Date: 10/30/2022

Organization: National Marine Fisheries Service

By: Christopher Boelke

Title: Chief, New England Branch

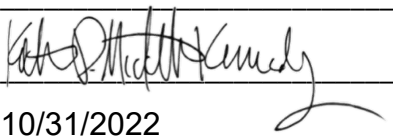
Signature: 

Date: 10/31/2022

Organization: The Nature Conservancy

By: Katie Kennedy

Title: Applied River Scientist

Signature: 

Date: 10/31/2022

Organization: United States Department of the Interior, United States Fish and Wildlife Service

By: Audrey Mayer

Title: Field Office Supervisor

Signature: AUDREY MAYER Digitally signed by AUDREY MAYER Date: 2022.10.31 08:52:34 -04'00'

Date: 10/31/2022