METHUEN FALLS HYDROELECTRIC PROJECT

Methuen MA

RECERTIFICATION APPLICATION TO THE LOW IMPACT HYDROPOWER INSTITUTE

FERC NO. 8093 and LIHI CERTIFICATE 111

August 2018, revised February 2019

Prepared by:
Olson Electric Development Co., Inc.
Methuen MA

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1.0 **INTRODUCTION**

The Methuen Falls Hydroelectric Project (Project) is located in Essex County, Methuen, MA on the Spicket River and is owned and operated by the Methuen Falls Hydroelectric Company (MFH). The Project was certified by the Low Impact Hydropower Institute (LIHI) as a low impact hydropower facility in August 2013. LIHI Certificate No. 000111 became effective on August 8, 2013, extended on August 6, 2018 and expires on December 31, 2018. MFH is submitting this recertification application to the LIHI as the Project continues to be a low impact hydropower facility.

There have been no material changes in the facility design, operations or regulatory requirements since the original certificate was issued. The Project remains in compliance with all FERC License order and Water Quality Certificate conditions and terms. The information and conclusions contained in the original reviewer's report (2013 report) remain valid.

The following 3 conditions were required as a result of the LIHI certification...

Condition #1: *Effective immediately upon receipt of this grant of certification, Olson shall increase the minimum bypass flow to 16 cfs, or instantaneous inflow if less.*

Condition satisfied in 2013.

Condition #2: *Within 90 days of LIHI's grant of certification, Olson shall develop a flow monitoring and record keeping plan in consultation with the United States Fish and Wildlife Service "USFWS") and the Massachusetts Division of Fisheries & Wildlife ("MassWildlife") and file the plan with LIHI. The plan shall include the information on the mechanism for maintaining the bypass minimum flow (noting that at least 3 cfs should be provided as full-crest spillage for consistency with the license). Before filing the plan with LIHI, Olson shall seek written approval from the agencies and include any written responses to LIHI at the same time the plan is filed.*

Minimum Flow Monitoring Plan attached. See Appendix C.

Condition #3: *Upon notification by the USFWS that a final determination has been made that fish passage is required for American eel at Methuen Falls dam, Olson shall immediately start work to establish a cooperative Agreement with USFWS and MassWildlife to implement*

and provide such eel passage, including both permanent and interim measures that are requested by these agencies. Olson shall notify LIHI within 30 days of this notification on the eel passage requirement, and the Agreement shall be in place within 90 days of such notification. The interim measures that are identified in the Agreement shall be put in place within 120 days of the notification, and permanent eel passage measures shall be in place no later than two years after notification of the requirement. Two weeks after the eel passage Agreement is in place, Olson shall provide a report to LIHI describing the planned passage and protection measures and the implementation schedule for design, installation, and operations, along with a copy of the Agreement. Progress and any monitoring data collected shall be reported to LIHI in Olson's annual compliance letter.

The project has not been notified that eel passage is required.

2.0 FACILITY DESCRIPTION

2.1 General Description

The Project is located in the City of Methuen, Essex County, Massachusetts on the Spicket River near Route 28, south of the junction of Routes 28 and 213.

The Spicket River (the River), a tributary of the Merrimack River, part of the Gulf of Maine watershed, is a 17.7-mile-long river located in both New Hampshire and Massachusetts. The Spicket begins at the outlet of Island Pond in Derry, New Hampshire, and flows south into Salem, New Hampshire, passing through the Arlington Mill Reservoir. The river continues through Salem, and enters the city of Methuen, Massachusetts, where it drops nearly 100 feet over a series of dams on its way to the Merrimack River in Lawrence. The drainage area is approximately 73.8 square miles. There are two USGS gauges on the river. USGS 01100561 SPICKET RIVER NEAR METHUEN is located 1½ miles upstream from the Project at the Hampshire Road Bridge on the Salem NH and Methuen MA border. USGS 01100505 SPICKET RIVER AT NORTH SALEM, NH is located 9 miles upstream from the Project on the border of Salem and Derry.

The Project utilizes the Methuen Falls Dam (ID #605921) (the Dam) to achieve it hydraulic head. Methuen Falls is the second of four existing dams on the river. The first and most immediate upstream is Wheeler Dam (ID #870816) located approximately 7 miles to the north at the outlet of Arlington Mill Reservoir in Salem, New Hampshire. The third, and most immediate downstream, is Harvey's Falls Dam located approximately ½ mile to the south. The Dam, which was originally constructed in 1880 to 1890, is a gravity dam made of cut granite built on a bedrock foundation. The fourth and last Dam on the river is Steven's Pond Dam located in Lawrence just south of the Methuen line. The downstream face is vertical dry stone masonry laid on a running bond pattern. Its maximum height above the river bed is twenty feet with three feet of plywood flashboards on the crest. The overflow spillway consists of three sections separated by two large masonry piers and has a total length of 130 feet. There are (2) 3 foot wide by 4 foot high fully automated flood gates located on the southern pier. The dam is classified as a "Low Hazard" dam.

The Project intake is located on the northern side of the dam. The intake structure consists of a formed concrete box protected by 16 foot wide by 10 foot deep galvanized trash racks. The intake is sealed by a 10 foot wide by 10 foot deep fully automated aluminum head gate. Water is

transported to the power house via a 150 foot long, 7 foot high by 10 foot wide granite topped brick channel that transitions into a 4 foot diameter steel penstock at a ninety degree angle. The penstock transfers water into a 7 foot high by 20 foot square concrete pressure case which houses Unit #1. A 3 foot long, 3 foot diameter steel penstock supplies water from the concrete pressure case to a 6 foot high by 6 foot square steel pressure case that houses Unit #2. Each pressure case passes water to the tailrace via conical draft tubes.

The powerhouse is located in the historically restored Methuen Company Spinning Mill #5. The c. 1840 structure contains 6000 square feet of finished interior space and sits 3½ stories above grade. The first floor houses the following major components.

Turbine #1: 405hp Vertical Leffel - Francis Unit
Generator #1: 285kw Vertical General Electric
Turbine #2: 120hp Vertical S. Morgan Smith - Francis Unit
Generator #2: 90kw Vertical Westinghouse
Switchgear, Excitation, HPU, & other Controls & Automation Equipment

2.2 Project Data

The key features and data for the Project in provided in the following Table B-1.

Table B-1. Facility Description Information for Methuen Falls Hydroelectric (LIHI #111).

Information Type	***Variable Description***	***Response(and reference to further details)***
Name of the Facility	Facility name (use FERC project name if possible)	Methuen Falls Hydroelectric (FERC No. 8093)
Location	River name (USGS proper name)	Spicket River
	River basin name	Merrimack
	Nearest town, county, and state	Methuen, Essex, MA
	River mile of dam above next major river	3
	Geographic latitude	42.72747 LAT
	Geographic longitude	-71.189561 LON
Facility Owner	Application contact names (IMPORTANT: you must also complete the Facilities Contact Form):	Kevin Olson (978) 204-9775
	- Facility owner (individual and company names)	Kevin Olson Methuen Falls Hydroelectric Co
	- Operating affiliate (if different from owner)	Olson Electric Development Co., Inc.
	- Representative in LIHI certification	Kevin Olson (978) 204-9775

Regulatory Status	FERC Project Number (e.g., P-xxxxx), issuance and expiration dates	P-8093 Issued: March 27, 1986 Expires: March 27, 2026
	FERC license type or special classification (e.g., "qualified conduit")	Minor
	Water Quality Certificate identifier and issuance date, plus source agency name	January 24, 1984 Commonwealth of MA
	Hyperlinks to key electronic records on FERC e-library website (e.g., most recent Commission Orders, WQC, ESA documents, etc.)	
Power Plant Character-istics	Date of initial operation (past or future for operational applications)	1987
	Total name-plate capacity (MW)	0.357
	Average annual generation (MWh)	1000
	Number, type, and size of turbines, including maximum and minimum hydraulic capacity of each unit	Unit #1 - 405hp vertical Francis unit with a 104 cfs maximum hydraulic capacity and 45 cfs minimum hydraulic capacity. Unit #2 - 120hp vertical Francis unitwith a 40 cfs maximum hydraulic capacity and 14 cfs minimum hydraulic capacity.
	Modes of operation (run-of-river, peaking, pulsing, seasonal storage, etc.)	Run-of-river
	Dates and types of major equipment upgrades	n/a
	Dates, purpose, and type of any recent operational changes	n/a
	Plans, authorization, and regulatory activities for any facility upgrades	n/a
Character-istics of Dam, Diversion, or Conduit	Date of construction	1890
	Dam height	20’
	Spillway elevation and hydraulic capacity	101.3’
	Tailwater elevation	68.2’
	Length and type of all penstocks and water conveyance structures between reservoir and powerhouse	125’ granite & brick enclosed canal which transitions into a 25’ steel penstock.
	Dates and types of major, generation-related infrastructure improvements	n/a
	Designated facility purposes (e.g., power, navigation, flood control, water suppy, etc.)	Power Generation
	Water source	Spicket River
	Water discharge location or facility	Spicket River
Characte-ristics of Reservoir	Gross volume and surface area at full pool	Gross volume of 68 acre-feet and surface area of 8.7 acres.
	Maximum water surface elevation (ft. MSL)	n/a

and Watershed	Maximum and minimum volume and water surface elevations for designated power pool, if available	n/a
	Upstream dam(s) by name, ownership, FERC number (if applicable), and river mile	Wheeler Dam, Town of Salem NH, n/a, river mile 3.8
	Downstream dam(s) by name, ownership, FERC number (if applicable), and river mile	Harvey's Falls Dam, Town of Methuen MA, n/a, river mile 13.5
	Operating agreements with upstream or downstream reservoirs that affect water availability, if any, and facility operation	n/a
	Area inside FERC project boundary, where appropriate	9 acres
Hydrologic Setting	Average annual flow at the dam	107.2
	Average monthly flows	JAN 115 cfs FEB 123 cfs MAR 231 cfs APR 174 cfs MAY 118 cfs JUN 86 cfs JUL 45 cfs AUG 23 cfs SEP 27 cfs OCT 129 cfs NOV 91 cfs DEC 122 cfs
	Location and name of relevant stream gauging stations above and below the facility	USGS 01100561 SPICKET RIVER NEAR METHUEN, MA Latitude 42°44'35", Longitude 71°12'32" NAD27 Rockingham County, New Hampshire, Hydrologic Unit 01070002 Datum of gage: 100.91 feet above NGVD29.
	Watershed area at the dam	Drainage area: 73.8 square miles
Designated Zones of Effect	Number of zones of effect	3
	Upstream and downstream locations by river miles	ZOE 1: Impoundment & Penstock RM 13.1 to 13.2 ZOE 2: Bypass Reach RM 13.1 to 13.2 ZOE 3: Downstream of Project RM 13.2 to 13.6
	Type of waterbody (river, impoundment, by-passed reach, etc.)	ZOE 1: 8.7-acre Impoundment & 150 ft Penstock ZOE 2: 150 ft Bypass Reach ZOE 3: River Downstream of Project from tailrace to Harvey's Falls Dam

Additional Contact Information	Delimiting structures	ZOE 1: Methuen Falls Dam to Powerplant ZOE 2: Methuen Falls Dam to Tailrace ZOE 3: Tailrace to Harvey's Falls Dam
	Designated uses by state water quality agency	
	Names, addresses, phone numbers, and email for local state and federal resource agencies	Refer to Appendix B
	Names, addresses, phone numbers, and email for local non-governmental stakeholders	Refer to Appendix B
Photographs and Maps	Photographs of key features of the facility and each of the designated zones of effect	Refer to Appendix A
	Maps, aerial photos, and/or plan view diagrams of facility area and river basin	Refer to Appendix A

3.0 STANDARD MATRICES

Facility Name: Methuen Falls Hydroelectric **Zone of Effect: Zone 1 - Impoundment & Penstock**

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

Facility Name: Methuen Falls Hydroelectric **Zone of Effect: Zone 2 - Bypass Reach**

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

Facility Name: Methuen Falls Hydroelectric **Zone of Effect: Zone 3 - Downstream of Project**

		Alternative Standards				
	Criterion	***1***	***2***	***3***	***4***	***Plus***
A	**Ecological Flow Regimes**	X				
B	**Water Quality**		X			
C	**Upstream Fish Passage**	X				
D	**Downstream Fish Passage**	X				

E	Watershed and Shoreline Protection	X				
F	Threatened and Endangered Species Protection		X			
G	Cultural and Historic Resources Protection		X			
H	Recreational Resources	X				

4.0 SUPPORTING DOCUMENTATION FOR STANDARDS

4.1 Ecological Flow Standards

All ZOEs EXCEPT ZOE-2 Criteria A-1 (Not Applicable/De Minimis Effect)

The Project operates in run-of-river mode and provides a minimum bypass flow release of 13cfs or inflow at all times. Please see Appendix C Minimum Flow Monitoring Plan.

ZOE-2 (Bypass Reach) Criteria A-4 (Site-Specific Studies)

A site-specific study of the project's bypass was provided in the original LIHI application.

4.2 Water Quality Standards

All ZOEs Criteria B-2 (Agency Recommendation)

The Spicket River is designated as a Class B warm water fishery in the state's water quality standards and that Class B waters are designated as a habitat for fish, other aquatic life, and wildlife, including for their reproduction, migration, growth and other critical functions, and for primary and secondary contact recreation.

The river is on the state draft 2016 list of impaired waters as requiring a TMDL. Specific impairments along the 5.8 mile stretch from the New Hampshire state line to the confluence with the Merrimack River include the following…

1. Debris/Floatables/Trash
2. Physical substrate habitat alterations (hydromodification & channelization)
3. Aquatic Macroinvertebrate Bioassessments
4. Copper
5. Escherichia coli
6. Other (Unspecified Nutrients).

http://www.mass.gov/eea/docs/dep/water/resources/07v5/16ilwplist.pdf

When asked to comment, on October 31, 2018 Robert Kubit, P.E. with MassDEP Division of Watershed Management offered the following…

"In regards water quality, there has been no change from our 2012 letter. We believe the 1999 Merrimack River Water Quality Assessment Report is representative of current conditions in the vicinity of the Methuen Falls dam. The Spicket River (MA84A-10) is heavily impacted by urbanization and is listed as a Category 5 water: "Waters requiring a TMDL". The Department believes that the Methuen Falls Hydroelectric Project and its operations neither cause nor contribute to the presence of pathogens, escherichia coli and fecal coliform both immediately up and downstream of or in the Project area."

Letter attached

4.3 Upstream Fish Passage Standards

All ZOEs Criteria C-1 (Not Applicable/De Minimis Effect)

As evidenced by sampling conducted by the Massachusetts Division of Fisheries and Wildlife, the Spicket River supports a primarily warmwater fish community. Documented fish species include American eel, bluegill, brown bullhead, common shiner, fallfish, largemouth bass, pumpkinseed, redbreast sunfish, redfin pickerel, tessellated darter, white sucker and yellow bullhead (Caleb Slater, MDFW, personal communication).

The facility does not impose a barrier to upstream fish passage in the designated zone as there are no fish passage technologies in place at any upstream dam locations.To date, no agency has requested installation of fish passage measures.

4.4 Downstream Fish Passage Standards

All ZOEs Criteria D-1 (Not Applicable/De Minimis Effect)

As evidenced by sampling conducted by the Massachusetts Division of Fisheries and Wildlife, the Spicket River supports a primarily warmwater fish community. Documented fish species include American eel, bluegill, brown bullhead, common shiner, fallfish, largemouth bass, pumpkinseed, redbreast sunfish, redfin pickerel, tessellated darter, white sucker and yellow bullhead (Caleb Slater, MDFW, personal communication).

The facility does not impose a barrier to downstream fish passage in the designated zone as there are no fish passage technologies in place at any upstream dam locations.To date, no agency has requested installation of fish passage measures. The ¾" trash rack spacing prevents

resident fish from impingement/entrainment.

4.5 Shoreline and Watershed Protection Standards

All ZOEs Criteria E-1 (Not Applicable/De Minimis Effect)

There are no lands with significant ecological value associated with the facility. The extent of the FERC project boundary is less than one acre, owned by the Methuen Falls Hydroelectric Company, zoned industrial and used strictly for the purpose of power generation (see Appendix A). There have been no Shoreline Management Plans or similar protection requirements for the facility.

4.6 Threatened and Endangered Species

All ZOEs Criteria F-2 (Finding or No Negative Effects)

The Commonwealth of Massachusetts list the Blue-spotted Salamander, Blanding's Turtle, Andrews' Bottle Gentian, Wood Turtle, Cobra Clubtail, Bald Eagle, Alternate-flowered Water-milfoil and Umber Shadowdragon as endangered, threatened or of special concern in Methuen. According to the Natural Heritage Atlas, 14th Edition, pursuant to the Massachusetts Endangered Species Act and Wetlands Protection Act, the above species, are not present in the immediate project area.

https://www.mass.gov/service-details/regulatory-maps-priority-estimated-habitats

US Fish & Wildlife lists the Piping Plover, Roseate tern, Red knot, Small whorled pogonia, Northern Long-Eared Bat, Hawksbill sea turtle, Leatherback sea turtle as either endangered or threatened in Essex County. The project doesn't have any habitat that would support any of the species listed above. All of the species except small whorled pogonia and the northern long eared bat are shore/marine animals and wouldn't be found at the project. Small whorled pogonia habitat is upland forest. Northern long eared bat might possibly be present but project operations don't and are not expected to impact the species.

4.7 Cultural Resources

All ZOEs Criteria G-2 (Approved Plan)

The project is inventoried with the State and the City of Methuen under the Spicket Falls Historic District; Methuen Multiple Resource Area; the Searles/Tenney/Nevins Historic District; and, the National Registry. The Methuen Company Spinning Mill #5, which houses the power plant, has been preserved and restored in accordance with Historic District guidelines. In 2002

aluminum clad wood windows with true divided lite, gray fibercement siding, white trim, and miscellaneous carpentry, were approved by the historic commision. In 2003, the project was awarded a Preservation Award from the Methuen Historical Society for the restoration and preservation work listed above.

No other changes to historic structures that might impact cultural or historic resources are planned at this time. In the event there is a plan in the future, in accordance with Article 20 of our FERC license and our 1985 Cultural Resources Management Plan, we would consult with the State Historic Preservation Office and the Historical Society in advance of any construction.

4.8 Recreational Resource Standards

All ZOEs Criteria H-1 (Not Applicable/De Minimis Effect)

With the exception of the recently constructed footbridge over the dam (which is accessible to the public), there are no recreational facilities within the FERC boundary or owned by the Project. There is no land on which to provide access. In addition, it would no be safe. However, there is other local recreational access to the river. Kayaks can put-in just north of the project boundary on the north side of the Lowell street bridge and navigate upstream to the north.

5.0 **SWORN STATEMENT AND WAIVER FORM**

SWORN STATEMENT

As an Authorized Representative of **Methuen Falls Hydroelectric Company**, the Undersigned attests that the material presented in the application is true and complete.

The Undersigned acknowledges that the primary goal of the Low Impact Hydropower Institute's Certification Program is public benefit, and that the LIHI Governing Board and its agents are not responsible for financial or other private consequences of its certification decisions.

The undersigned further acknowledges that if certification of the applying facility is issued, the LIHI Certification Mark License Agreement must be executed prior to marketing the electricity product as LIHI Certified.

The undersigned Applicant further agrees to hold the Low Impact Hydropower Institute, the Governing Board and its agents harmless for any decision rendered on this or other applications, from any consequences of disclosing or publishing any submitted certification application materials to the public, or on any other action pursuant to the Low Impact Hydropower Institute's Certification Program.

Company Name: **Methuen Falls Hydroelectric**

Authorize Representative Name: **Kevin Olson**

Title: **Principal**

Authorized Signature:

Date: **02.19.19**

APPENDIX A

BASIN MAPS AND PHOTOS

Photo A: Impoundment

Photo B: Project Boundaries

Photo C: Project Features

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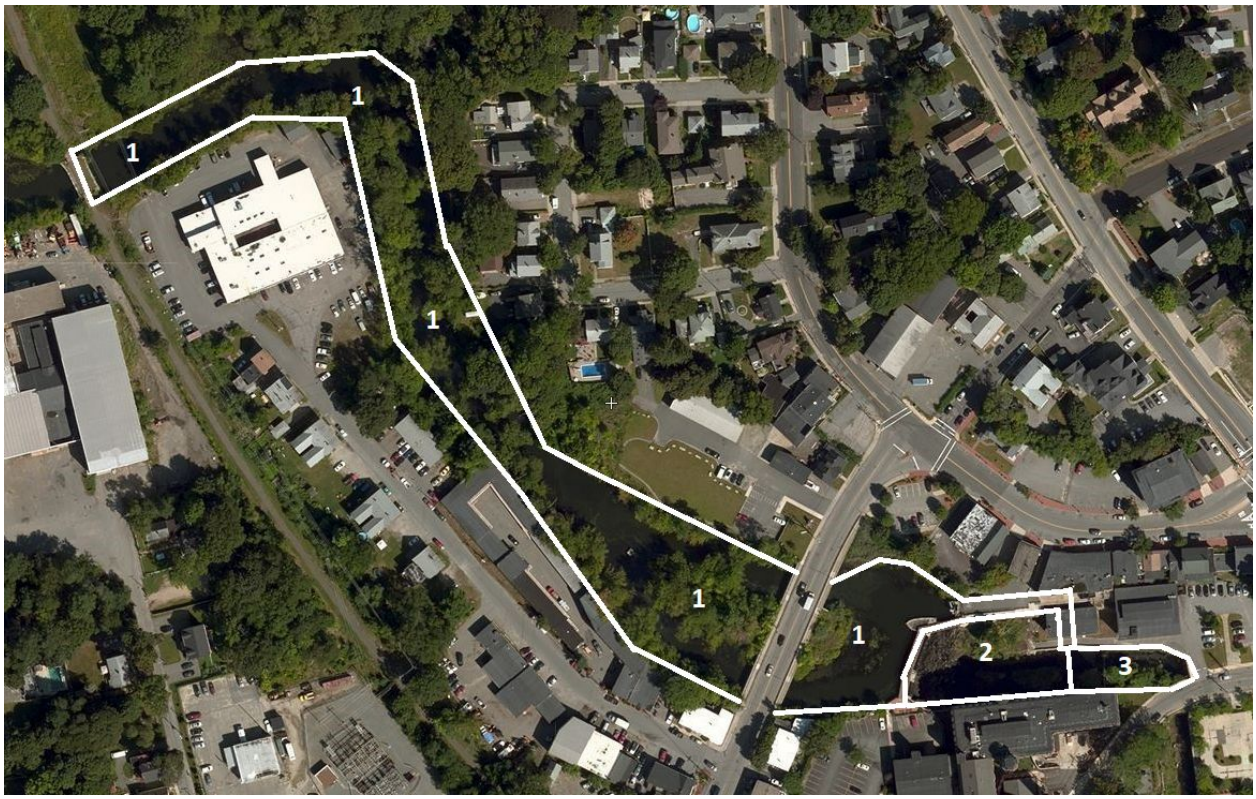
Photo D: Zones of Effect



APPENDIX B

FACILITY CONTACTS FORM

1. All applications for LIHI Certification must include complete contact information to be reviewed.

Project Owner:	
Name and Title	Kevin Olson
Company	Principal
Phone	(978) 204-9775
Email Address	kevin@olsonelectric.com
Mailing Address	30r Hampshire Street, Methuen MA 01844
Project Operator (if different from Owner):	
Name and Title	
Company	
Phone	
Email Address	
Mailing Address	
Consulting Firm / Agent for LIHI Program (if different from above):	
Name and Title	
Company	
Phone	
Email Address	
Mailing Address	
Compliance Contact (responsible for LIHI Program requirements):	
Name and Title	
Company	
Phone	
Email Address	
Mailing Address	
Party responsible for accounts payable:	
Name and Title	
Company	
Phone	

Email Address	
Mailing Address	

2. Applicant must identify the most current and relevant state, federal, provincial, and tribal resource agency contacts (copy and repeat the following table as needed).

Agency Contact (Check area of responsibility: Flows X, Water Quality X, Fish/Wildlife Resources __, Watersheds __, T/E Spp. __, Cultural/Historic Resources __, Recreation __):	
Agency Name	Massachusetts Department of Environmental Protection, Division of Watershed Management
Name and Title	Robert Kubit, P.E.
Phone	(508) 767-2854
Email address	robert.kubit@state.us.ma
Mailing Address	627 Main Street Worcester Massachusetts 01608

Agency Contact (Check area of responsibility: Flows__, Water Quality __, Fish/Wildlife Resources __, Watersheds __, T/E Spp. X, Cultural/Historic Resources __, Recreation __):	
Agency Name	Massachusetts Division of Fisheries and Wildlife
Name and Title	Thomas French - Assistant Director of DFW - for NHESP
Phone	
Email address	
Mailing Address	1 Rabbit Hill Road, Westborough, Massachusetts 01581

Agency Contact (Check area of responsibility: Flows X, Water Quality __, Fish/Wildlife Resources X, Watersheds X, T/E Spp. __, Cultural/Historic Resources __, Recreation __):	
Agency Name	Massachusetts Division of Fisheries and Wildlife
Name and Title	Caleb Slater, PhD, Anadromous Fish Project Leader
Phone	
Email address	
Mailing Address	1 Rabbit Hill Road, Westborough, Massachusetts 01581

Agency Contact (Check area of responsibility: Flows__, Water Quality __, Fish/Wildlife Resources __, Watersheds __, T/E Spp. __, Cultural/Historic Resources __, Recreation __):	
Agency Name	Methuen Historical Commision
Name and Title	Patricia Antoon,
Phone	(978) 983-8566
Email address	
Mailing Address	Searles Building, Room 217, 41 Pleasant St. Methuen, MA 01844

Agency Contact (Check area of responsibility: Flows X, Water Quality __, Fish/Wildlife Resources X, Watersheds X, T/E Spp. X, Cultural/Historic Resources __, Recreation __):	
Agency Name	United States Fish and Wildlife Service, New England Ecological Services Field Office
Name and Title	Melissa Grader
Phone	
Email address	melissa_grader@fws.gov
Mailing Address	70 Commercial Street, Suite 300 Concord, New Hampshire 03301-5094

Agency Contact (Check area of responsibility: Flows X, Water Quality __, Fish/Wildlife Resources X, Watersheds X, T/E Spp. X, Cultural/Historic Resources __, Recreation __):	
Agency Name	United States Fish and Wildlife Service, New England Ecological Services Field Office
Name and Title	julianne_rosset@fws
Phone	
Email address	julianne_rosset@fws.gov
Mailing Address	70 Commercial Street, Suite 300 Concord, New Hampshire 03301-5094

APPENDIX C

MINIMUM FLOW MONITORING PLAN

On December 11, 2013, The Methuen Falls Hydroelectric project was certified by the Low Impact Hydropower Institute (LIHI). As a condition of its certification, the project is required to develop a system for maintaining records sufficient to demonstrate compliance with the head pond elevation and flow management limitations set forth under the terms of the Federal Energy Regulatory Commission (FERC). The project is required to discharge from the project an instantaneous flow of 16 cfs or inflow to the project area, whichever is less. Within 90 days of the date of issuance of the certification, the owner shall provide a written flow management plan that outlines the systems in place to properly manage flows and head pond levels, and to produce compliance records. Prior to filing the plan, the owner shall consult with the USFWS, the N.H. Department of Fish and Game, and the N.H. Department of Environmental Services to address the method for releasing the bypass minimum flow and how records will be supplemented to enable demonstration of compliance with the bypass minimum flow.

The owner has prepared this Run-of-River and Minimum Flow monitoring Plan in response to the requirements of the certification by the Low Impact Hydropower Institute.

Project Description

The Project is located in the City of Methuen, Essex County, Massachusetts on the Spicket River near Route 28, south of the junction of Routes 28 and 213.

The Spicket River (the River), a tributary of the Merrimack River, part of the Gulf of Maine watershed, is a 17.7-mile-long river located in both New Hampshire and Massachusetts. The Spicket begins at the outlet of Island Pond in Derry, New Hampshire, and flows south into Salem, New Hampshire, passing through the Arlington Mill Reservoir. The river continues through Salem, and enters the city of Methuen, Massachusetts, where it drops nearly 100 feet over a series of dams on its way to the Merrimack River in Lawrence. The drainage area is approximately 73.8 square miles. There are two USGS gauges on the river. USGS 01100561

SPICKET RIVER NEAR METHUEN is located 1½ miles upstream from the Project at the Hampshire Road Bridge on the Salem NH and Methuen MA border. USGS 01100505 SPICKET RIVER AT NORTH SALEM, NH is located 9 miles upstream from the Project on the border of Salem and Derry.

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The Project intake is located on the northern side of the dam. The intake structure consists of a formed concrete box protected by 16 foot wide by 10 foot deep galvanized trash racks. The intake is sealed by a 10 foot wide by 10 foot deep fully automated aluminum head gate. Water is transported to the power house via a 150 foot long, 7 foot high by 10 foot wide granite topped brick channel that transitions into a 4 foot diameter steel penstock at a ninety degree angle. The penstock transfers water into a 7 foot high by 20 foot square concrete pressure case which houses Unit #1. A 3 foot long, 3 foot diameter steel penstock supplies water from the concrete pressure case to a 6 foot high by 6 foot square steel pressure case that houses Unit #2. Each pressure case passes water to the tailrace via conical draft tubes.

The powerhouse is located in the historically restored Methuen Company Spinning Mill #5. The c. 1840 structure contains 6000 square feet of finished interior space and sits 3½ stories above grade. The first floor houses the following major components.

Turbine #1: 405hp Vertical Leffel - Francis Unit
Generator #1: 285kw Vertical General Electric
Turbine #2: 120hp Vertical S. Morgan Smith - Francis Unit
Generator #2: 90kw Vertical Westinghouse
Switchgear, Excitation, HPU, & other Controls & Automation Equipment

Operating Requirements Under FERC License P-8093

The project owner shall operate the project in a run-of-river mode such that inflow to the project equals outflow from the project on an instantaneous basis and fluctuations of the

head pond water level are minimized. The operating regime may be temporarily modified by approved maintenance activities, by agreement between the owner and appropriate state and federal resource agencies, or by extreme hydrologic conditions or emergency electrical system conditions.

The license holder shall discharge from the project an instantaneous flow of at least 16 cfs (increased from 3 cfs by LIHI) or inflow to the project area, whichever is less. In addition, the license holder shall maintain at least 3 cfs of full-crest spillage. The water will be released down the bypass reach. The project can calculate the exact bypass flow using the known inflow to the head pond (via USGS flow gauge upstream) and subtracting our turbines known usage. Using the calculated bypass flow, the minimum head pond level (required to maintain minimum flow) is recorded and maintained (via computer program and pressure transducers in the head pond which are accurate to 0.01"). The computer program then takes control of the turbines inflow, making automatic adjustments as needed to maintain minimum flow. The head pond pressure transducer will detect a drop in water levels. When the sensor detects the pond level has fallen below our low-level limit (required to maintain minimum flow and a full head pond), the turbine wicket gates are adjusted by the PLC to account for reduction in flow.

Compliance Monitoring

Compliance monitoring and documentation will be performed by the control system and project's owner. Compliance monitoring will be manually recorded daily. The recorded data will include the following for compliance monitoring purposes:

Date and time
Headpond level
Total output of units (kW)
Pond discharge (cfs)

The control system records the pond level every 5 seconds. All logged data will be stored in the powerhouse office for compliance record-keeping purposes.

Compliance with run-of-river operating conditions will be confirmed by demonstrating that the headpond level is at or above the top of the flashboards at all times when any units are operating. When the units are off-line all inflow will be passed through and over the dam.

Agency Consultation

Pursuant to the consultant requirements of the LIHI certificate, the owner will submit the plan to the United States Fish and Wildlife Service and the Massachusetts Division of Fisheries & Wildlife.

APPENDIX D

Gmail by Google

Kevin Olson <kevin@olsonelectric.com>

RE: Methuen Falls Hydro - LIHI Re-certifcation

1 message

Kubit, Robert (DEP) <robert.kubit@state.ma.us> Wed, Oct 31, 2018 at 3:30 PM
To: Kevin Olson <kevin@olsonelectric.com>

Good afternoon Mr. Olsen,

In regards to the flow issue, the MA Department of Environmental Protection relies upon the recommendations from the MA Division of Fisheries & Wildlife for aquatic habitat needs. To date, I have not heard from them about this Project. We have no records to ascertain compliance with run of river flow requirements.

In regards water quality, there has been no change from our 2012 letter. We believe the 1999 Merrimack River Water Quality Assessment Report is representative of current conditions in the vicinity of the Methuen Falls dam. The Spicket River (MA84A-10) is heavily impacted by urbanization and is listed as a Category 5 water: "Waters requiring a TMDL". The Department believes that the Methuen Falls Hydroelectric Project and its operations neither cause nor contribute to the presence of pathogens, escherchia coli and fecal coliform both immediately up and downstream of or in the Project area.

If there are any questions, please let me know.

Robert Kubit, P.E.

MassDEP

Division of Watershed Management

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