# Low-Impact Hydropower Power Institute

# **Certification Application**

# For

# Ware River Hydroelectric Project

(FERC No: P-3127-MA)



Prepared by:

Ware River Power Co., Inc. Barre, Massachusetts

December 4, 2019

## Low-Impact Hydropower Power Institute Certification Application

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### 1.0 FACILITY DESCRIPTION

Pioneer Hydro Electric (FERC No. P-3127-MA) (Project) is located on the Ware River in the Town of Ware, Hampton County, Massachusetts.

Pioneer Hydro Electric consists of two dams and a total of 5 turbines. The facility is managed and owned by Lucas Wright who has over 25 years' experience in hydropower. He resides 5.6 miles from the plant. Assistance is provided by the staff of Ware River Power, Inc. The plant consists of Ware Upper Dam and Ware Lower Dam. Ware Lower Dam houses turbine 3. Ware Upper Dam houses turbines 1, 2, 4, and 5.



Figure 1: Photo of Project / Identification of Project Parts





#### 1.1 Geographic Location

The Ware River is a 35.4-mile-long (57.0 km) river in central Massachusetts. It has two forks, the longer of which (the east branch) begins near Hubbardston, Massachusetts. The Ware River flows southwest through the middle of the state and joins the Quaboag River at Three Rivers, Massachusetts, to form the Chicopee River on its way to the Connecticut River. Massachusetts Water Resources Authority diverts water from the Ware River upstream of the project into the water supply system for Boston. Farther upstream, the US Army Corps of Engineers Barre Falls Dam controls flows into the Ware River.

The upper and lower hydro plants are located on the Ware River, Ware Massachusetts. Upstream of the Ware River project there are five dams. The closet one is located about 7 miles upstream of Pioneer Hydro Electric in the village of Wheelwright, Mass. It is a low hazard, low head, mill dam that is no longer producing power.

The next project is approximately 12 miles upstream of the Pioneer Hydro Electric project. It is the South Barre Dam in South Barre, MA and it is owned and operated by Ware River Power, Inc. It is currently under a FERC exemption. Its condition is good, and it is monitored daily. The dam is 20' in height.

Almost immediately upstream of the South Barre Dam is the Powder Mill Pond Dam which is also owned and operated by Ware River Power, Inc. It is a small mill dam with a FERC exemption and low hazard classification.

Half a mile above the Powder Mill Pond Dam is the Massachusetts MWRA diversion dam for the Quabbin Reservoir, and five miles above that is the US Army Corps flood control project at Barre Falls. Both projects have the ability to divert and store flood flows and contribute greatly to the safety of the watershed.

Below the Pioneer Hydro Electric Ware Project there are at least nine known existing hydro power projects on the Chicopee River Watershed that eventually runs into the Connecticut River. Two of those are about 7 miles downstream on the Ware River and they are both operating mill dams that are not FERC jurisdictional as they predate the Federal Powers Act.



Figure 3: Geographic Overview of Project Location

#### https://browse.startpage.com/do/show\_picture.pl?l=english&rais=1&oiu=https%3A%2F% 2Fwww.mobilemaplets.com%2Fthumbnails%2F16211\_thumbnail-1024.jpg&sp=fd80a4eeb4d89074f8c696c539f6ffa2&t=default



Ware River Watershed System

Figure 4: Facility Area River Basin

## 1.2 **Project Description**

Pioneer Hydro Electric consists of two dams and a total of 5 turbines with ¼ mile of each other on the Ware River located in Ware, Massachusetts. The facility consists of Ware Upper Dam which falls 34 feet and Ware Lower Dam which falls 16 feet. Ware Upper Dam houses turbines 1, 2, 4 and 5. Ware Lower Dam houses turbine 3. Turbines 4 and 5 are on the upper dam and turbine 3 on the lower dam are controlled automatically with direct pond leveling controls.

Since the initial LIHI certification and as a result of an agreement with Massachusetts Department of Fisheries and Wildlife, minimum stream flow at the facility has been voluntarily increased by Pioneer Hydro over and above the FERC required 20 cfs to 26.8 cfs. This represents a 34% increase and reflects Pioneer Hydro having been granted 33.88% Mass. Class 1 REC's by the DOR. The increased minimum stream flow was achieved through significant alterations to the upper dam and flashboard structure in October of 2010 which increased the bypass weir width from 11.4 feet to 15.3 feet (Please see December 2010 letters to FERC and LIHI below which reflect the agreement). Minimum stream flow is constantly and closely monitored by pond leveling sensors that control turbine actuation. In case of low pond level, an automatic dialer notifies operators via cell phone communications of a low pond level scenario. If a response is not delivered manually, the site trips offline before a violation of minimum stream flow occurs. The lower dam has no minimum stream flow, as its discharge is directly at the foot of the dam and it has no reach area. The lower dam is "run of river" at all times and has shutdown protection if water gets below dam crest.



Federal Energy Regulatory Commission Office of Energy Projects Division of Dam Safety and Inspections New York Regional Office 19 West 34<sup>th</sup> Street-Suite 400 New York, New York 10001

December 20, 2010

P-3127-MA, Ware Upper & Lower

Attn: Chung Yao Hsu, P.E.

Attached is a signed agreement that was executed by me and Caleb Slater of the Mass Division of Fisheries and Wildlife. This agreement, although not a formal resource agency recommendation, was executed as a result of negotiations between Caleb and I, as a result of our Low Impact Hydro Institute certification. This letter is intended to inform you of the increase in stream flow at the Ware upper project and also is intended to inform you of Pioneer's recent LIHI certification. Please see the attached agreement, and the LIHI website for further clarification. If you have any questions please feel free to contact me at the above number.

Sincerely. . WIND

Lucas Wright, Owner Pioneer Hydro Electric Co. Inc.



12/13/10

Caleb Slater, Ph.D. Anadromous Fish project Leader MA Division of Fisheries and Wildlife

Dear Caleb,

I am writing to finalize the agreement that you and I made as a result of Pioneer Hydro Electric Companies LIHI application. LIHI has made it mandatory that you and I sign an agreement and that I then copy it to FERC for notification purposes. The language below comes from LIHI's ruling:

"The flow agreement reached between the Applicant and the MDF&W is not a formal "resource agency recommendation" based on a proceeding. The agreement requires the Applicant to increase the cubic feet per second (cfs) in the bypass reach area, at a proportion directly relative to the percentage of capacity that qualifies for MA Class 1 REC's. For example, if the DOER finds that Pioneer qualifies for 20% class one REC's, then Pioneer will increase its minimum stream flow in the reach by 20%."

"The certification will be suspended if, no later than December 31, 2010 the Applicant has not filed documentation with the Low Impact Hydropower Institute demonstrating that they have filed with FERC a description of the flow agreement signed by the Applicant and the MDF&G".

As you probably know, we were granted 33.88% MA Class 1 REC's by the DOR. As our agreement refers to, and as you already are aware, we made significant alterations to our dam and flashboard structure in October to increase the minimum stream flow by this percentage. Our new weir is 15.3' wide and allows for a minimum stream flow of 26.8 CFS which, according to our calculations is a 34% increase over the old required minimum stream flow which was calculated as follows:

"As a result of FERC order issued March 3, 1995. Project No. 3127-014, the exemptee shall: (i) set the pond elevation to 0.76 foot (9.1 inches) above spillway crest, maintaining the width of the bypass weir at 11.4 feet....In order to insure instantaneous minimum flow of 20 CFS is being released in bypass reach...."

I am sending signed copies of this correspondence to act as the final agreement in this matter. Your signature below would indicate that Pioneer Hydro has completed the terms of this agreement and is currently in compliance to your satisfaction.

Signed on this day the  $\frac{6}{6}$  of December, 2010

Lucas Wright

Pioneer Hydro Company

sele 6

Caleb Slater, PHD

Anadromous Fish project Leader MA Division of Fisheries and Wildlife

## 1.3 Regulatory Status

The Pioneer Hydroelectric Project filed and received a FERC exemption on February 12, 1982 and is in good standing with FERC.

FERC Exemption Amendment 2017, construction is expected to be completed by December 2019 to replace the lower powerhouse turbine and installation of the second unit. When the project is complete, this will be considered a material change to the project.

ltem	Information Requested	Response (include references to further details)
Name of the Facility	Facility name (use FERC project name or another legal name)	Ware River Project (FERC #3127)
Location	River name (USGS proper name)	Ware River
	Watershed name	Ware River; HUC #: 01080204
	Nearest town(s), county(ies), and state(s) to dam	Town of Ware, Hampshire County, Massachusetts
	River mile of dam	Approximately at river mile 12 above the mouth
	Geographic latitude of dam	W72 14'
	Geographic longitude of dam	N42 15'-30"
Facility Owner	Application contact names (Complete the	Lucas Wright, Ware River Power
	Eacility owner company and authorized	Lucas W. Wright Owner Pioneer Hydro
	owner representative name.	Electric Co., Inc.
	FERC licensee company name (if different	
Regulatory	FERC Project Number (e.g., P-xxxxx),	P-3127-MA, Exemption Issued October 15,
Status	issuance and expiration dates, or date of exemption	1981 with amendment issued on August 18, 2017
	FERC license type (major, minor,	< 5MW Exemption
	exemption) or special classification (e.g.,	
	"qualified conduit", "non-jurisdictional")	No water avality contificate. Defer to ottoched
	issuance date, and issuing agency name.	letter from Robert Kubit, PE, MADEP
	Hyperlinks to key electronic records on	Exemption
	FERC e-library website or other publicly	https://elibrary.fer.gov/idmws/common/opennat.
	accessible data repositories	asp?fileID=13422861 2017 Amondmont
		https://elibrary.ferc.gov/idmws/common/openna
		t.asp?fileID=14662248
		July 13, 1994 Amendment to change turbine
		<u>Attps://elibrary.terc.gov/IDMWS/file_list.asp</u>
		sections below.
	Date of initial operation (past or future for	Under current ownership, 1995
Powerhouse	pre-operational applications)	
	Total installed capacity (MW)	1300 kWh
	For recertifications: Indicate if installed	
	certification	

 Table 1: Facility Description Information for Pioneer Hydroelectric Project (LIHI #00047)

Item	Information Requested	Response (include references to further details)
	Average annual generation (MWh) and period of record used For recertifications: Indicate if average annual generation has changed since last certification	5,000,000 kWh
	Mode of operation (run-of-river, peaking, pulsing, seasonal storage, diversion, etc.) For recertifications: Indicate if mode of operation has changed since last certification	Run-of-River
	Number, type, and size of turbines, including maximum and minimum hydraulic capacity of each unit	Unit 1: vertical James Leffel, Francis turbine with a hydraulic capacity of 134 cfs. Unit 2: vertical Rodney Hunt, Francis turbine with a hydraulic capacity of 189 cfs Unit 3: vertical James Leffel, Francis turbine with a hydraulic capacity of 110 cfs Unit 4: horizontal Rodney Hunt, Francis turbine with a hydraulic capacity of 225 cfs Unit 5: 30" diameter, 6-bladed, stainless steel Model X4 turbine with a hydraulic capacity of 103 cfs.
	Trashrack clear spacing (inches), for each trashrack	1-3/4"
	Dates and types of major equipment upgrades	2016 through 2020, upgrade of Unit #3 and install a new Unit located at Pioneer lower.
	Dates, purpose, and type of any recent operational changes	None.
	Plans, authorization, and regulatory activities for any facility upgrades or license or exemption amendments	Exemption <u>https://elibrary.fer.gov/idmws/common/opennat.</u> <u>asp?fileID=13422861</u> 2017 Amendment <u>https://elibrary.ferc.gov/idmws/common/openna</u> <u>t.asp?fileID=14662248</u> July 13, 1994 Amendment to change turbine capacity <u>https://elibrary.ferc.gov/IDMWS/file_list.asp</u>
	Date of original construction and description and dates of subsequent dam or diversion structure modifications	Upper dam construction in 1824.
Dam or Diversion	Dam or diversion structure height including separately, the height of any flashboards, inflatable dams, etc.	Upper Dam: 115 feet long and approximately 34 feet high with1 foot tall flashboards. Lower Dam: 116 feet long and 16-foot-high concrete capped cut granite dam.
	Spillway elevation and hydraulic capacity	Crest elevation of 463.8 feet MSL; ungated capacity of 7980 cfs
	Tailwater elevation (provide normal range if available)	Upper: 418.7 Lower: 418.2
	Length and type of all penstocks and water conveyance structures between the impoundment and powerhouse	I wo existing 6-ft diameter, 70-foot-long steel penstocks
	Dates and types of major infrastructure changes	None
	Designated facility purposes (e.g., power, navigation, flood control, water supply, etc.)	Power and flood control.

ltem	Information Requested	Response (include references to further details)
	Source water	Ware River
	Receiving water and location of discharge	Ware River, see figure 3
	Date of conduit construction and primary purpose of conduit	N/A, not a conduit project.
Conduit	Authorized maximum and minimum water surface elevations For recertifications: Indicate if these values have changed since last certification	N/A, not a conduit project.
Impoundment and Watershed	Normal operating elevations and normal fluctuation range For recertifications: Indicate if these values have changed since last certification	The existing impoundment has a surface area of 3 acres and a storage capacity of 27 acre-ft. This has not changed since the last certification.
	Gross storage volume and surface area at full pool For recertifications: Indicate if these	Maximum storage area 746-acre feet, Storage capacity of 320,000 square feet.
	certification	This is unchanged since the last application
	Usable storage volume and surface area	42 acres.
	values have changed since last certification	This is unchanged since the last application.
	Describe requirements related to impoundment inflow, outflow, up/down ramping and refill rate restrictions.	See sections 3.1-3.2 below.
	Upstream dams by name, ownership and river mile. If FERC licensed or exempt, please provide FERC Project number of these dams. Indicate which upstream dams have downstream fish passage.	Upstream: South Barre Dam, Owned by Ware River Power. FERC #P-4320, exempt. Power Mill Dam, Owned by Ware River Power. FERC #P-9728, exempt.
		MWRA diversion dam, non-hydro, river mile 29.1 US Army Corps Barre Falls Dam, non-hydro See figure 3 for locations.
	Downstream dams by name, ownership, river mile and FERC number if FERC licensed or exempt. Indicate which downstream dams have upstream fish passage	Thorndike Dam, approximately at river mile 3, may be FERC non-jurisdictional, not listed on exempt or licensed lists, owned by Thorndike Energy.
		Red Bridge Dam, Chicopee River FERC #P- 10676, Owned by Hull Street Energy. See figure 3 for locations.
	Operating agreements with upstream or downstream facilities that affect water availability and facility operation	No operating agreements are in effect with other surrounding facilities.
	Area of land (acres) and area of water (acres) inside FERC project boundary or under facility control.	48.48 acres

ltem	Information Requested	Response (include references to further details)
	Average annual flow at the dam, and period of record used	https://nwis.waterdata.usgs.gov/nwis/uv?cb_00 060=on&cb_00065=on&format=gif_stats&site no=01173500.=&begin_date=2018-09- 30&end_date=2019-10-31 Period is from 9/30 to 10/31/19
Hydrologic Setting	Average monthly flows and period of record used	https://nwis.waterdata.usgs.gov/nwis/uv?cb_00 060=on&cb_00065=on&format=gif_stats&site no=01173500.=&begin_date=2019-09- 01&end_date=2019-09-30 Period is from 9/1 to 9/30/19
	Location and name of closest stream gauging stations above and below the facility	Upstream: USGS 01173000 Ware River at intake works near Barre, MA Downstream: USGS 01173500 Ware River at Gibbs Crossing, MA
	Watershed area at the dam (in square miles). Identify if this value is prorated and provide the basis for proration.	166 sq. miles at the lower dam https://elibrary.ferc.gov/IDMWS/file_list.asp
	Number of zones of effect	There are 4 zones of effect: 1) Impoundment 2) Bypassed Reach 3) Lower Impoundment 4) De Minimis Bypass and Downstream Reach
Designated Zones of Effect	Upstream and downstream locations by river miles	<ol> <li>Impoundment, approximately ½ mile</li> <li>Bypassed reach approximately ¼ mile</li> <li>Lower impoundment approximately ¼ mile</li> <li>Downstream reach approximately 6/10 mile to confluence of Muddy Brook</li> </ol>
	Type of waterbody (river, impoundment, bypassed reach, etc.)	<ol> <li>Impoundment</li> <li>Riverine bypass</li> <li>Impoundment</li> <li>Riverine</li> </ol>
	Delimiting structures or features	<ol> <li>River upstream to upper dam</li> <li>Upper dam to upper powerhouse</li> <li>Upper powerhouse to lower dam</li> <li>Lower dam to downstream reach</li> </ol>
	Designated uses by state water quality agency	Class B, warm water, see Section 3.3 below.

#### 2.0 STANDARDS MATRICES

#### 2.1 Impoundment ZoE (Zone 1)

			Alterna	tive Sta	andard	s
	Criterion	1	2	3	4	Plus
Α	Ecological Flow Regimes	X				
В	Water Quality	X				
С	Upstream Fish Passage	X				
D	Downstream Fish Passage	X				
Ε	Watershed and Shoreline Protection	X				
F	Threatened and Endangered Species	X				
	Protection					
G	Cultural and Historic Resources Protection	X				
Η	Recreational Resources	X				

#### 2.2 Bypassed Reach ZoE (Zone 2)

			Alterna	tive Sta	andard	s
	Criterion	1	2	3	4	Plus
Α	Ecological Flow Regimes		X			
В	Water Quality	X				
С	Upstream Fish Passage	X				
D	Downstream Fish Passage	X				
Ε	Watershed and Shoreline Protection	X				
F	Threatened and Endangered Species		X			
	Protection					
G	Cultural and Historic Resources Protection	X				
Η	Recreational Resources	X				

## 2.3 Lower Impoundment ZoE (Zone 3)

			Alterna	tive Sta	andard	5
	Criterion	1	2	3	4	Plus
Α	Ecological Flow Regimes		X			
В	Water Quality	X				
С	Upstream Fish Passage	X				
D	Downstream Fish Passage	X				
Ε	Watershed and Shoreline Protection	X				
F	Threatened and Endangered Species		X			
	Protection					
G	Cultural and Historic Resources Protection	X				
Н	Recreational Resources	X				

## 2.4 De Minimis Bypass and Downstream Reach ZoE (Zone 4)

			Alterna	tive Sta	andards	5
	Criterion	1	2	3	4	Plus
Α	Ecological Flow Regimes		X			
В	Water Quality	X				
С	Upstream Fish Passage	X				
D	Downstream Fish Passage	X				
Ε	Watershed and Shoreline Protection	X				
F	Threatened and Endangered Species		X			
	Protection					
G	Cultural and Historic Resources Protection	X				
Η	Recreational Resources	X				

#### 3.0 SUPPORTING INFORMATION

A       1       Not Applicable / De Minimis Effect:         • Confirm the location of the powerhouse relative to dam/diversion structures and demonstrate that there are no bypassed reaches the facility.         • For run-of-river facilities, provide details on operations and	Criterion	Standard	Instructions
<ul> <li>Confirm the location of the powerhouse relative to dam/diversion structures and demonstrate that there are no bypassed reaches the facility.</li> <li>For run-of-river facilities, provide details on operations and</li> </ul>	Α	1	Not Applicable / De Minimis Effect:
<ul> <li>For run-of-river facilities, provide details on operations and</li> </ul>			• Confirm the location of the powerhouse relative to dam/diversion structures and demonstrate that there are no bypassed reaches at the facility.
<ul> <li>demonstrate that flows, water levels, and operation are monitore to ensure such an operational mode is maintained. If deviations from required flows have occurred, discuss them and the measures taken to minimize reoccurrence.</li> <li>In a conduit facility, identify the source waters, location of discharge points, and receiving waters for the conduit system within which the hydropower facility is located. This standard cannot be used for conduits that discharge to a natural waterbod</li> <li>For impoundment zones only, explain water management (e.g., fluctuations, ramping, refill rates) and how fish and wildlife habita within the zone is evaluated and managed. <i>NOTE:</i> this is require information, but it will not be used to determine whether the Ecological Flows criterion has been satisfied. All impoundment zones and the measures are party Criterion A.1 to page this criterion.</li> </ul>			<ul> <li>For run-of-river facilities, provide details on operations and demonstrate that flows, water levels, and operation are monitored to ensure such an operational mode is maintained. If deviations from required flows have occurred, discuss them and the measures taken to minimize reoccurrence.</li> <li>In a conduit facility, identify the source waters, location of discharge points, and receiving waters for the conduit system within which the hydropower facility is located. This standard cannot be used for conduits that discharge to a natural waterbody.</li> <li>For impoundment zones only, explain water management (e.g., fluctuations, ramping, refill rates) and how fish and wildlife habitat within the zone is evaluated and managed. <i>NOTE:</i> this is required information, but it will not be used to determine whether the Ecological Flows criterion has been satisfied. All impoundment zones this ariterion</li> </ul>

#### 3.1 Ecological Flows Standards: Impoundment Zone 1

The projects upper reservoir elevation at a minimum of 0.76 foot (9.1 inches) above the dam/main spillway crest, when the flashboards are in place, and elevation 0.17 foot (2 inches above the dam crest, when the flashboards are down).

Minimum stream flow is met at the upper dam by a 10'x 12" opening in the upper flashboards that is monitored by pond leveling sensors that control turbine actuation. In case of low pond level, an automatic dialer notifies operators via cell and pager communications of a low pond level scenario. If response is not delivered manually, the site trips offline before a violation of minimum stream flow occurs. Minimum stream flow in the upper project reach area is 20 cfs.

The project operates as an instantaneous run-of-river project, whereby the inflow to the project shall equal the outflow from the project. Water levels above the dam are not drawn down for purposes of generating power. Run-of-river operations may be modified temporarily if required by operating emergencies beyond the operators control or for short periods upon mutual agreement between the project and the US Fish and Wildlife Service as well as the Massachusetts Division of Fisheries and Wildlife.

# 3.2 Ecological Flows Standards: Bypassed Reach, Lower Impoundment, De Minimis Bypass and Downstream Reach

A	2	<ul> <li><u>Agency Recommendation (see Appendix A for definitions):</u></li> <li>Identify the proceeding and source, date, and specifics of the agency recommendation applied (NOTE: there may be more than one; identify and explain which is most environmentally protective).</li> <li>Explain the scientific or technical basis for the agency recommendation, including methods and data used. This is required regardless of whether the recommendation is or is not part of a Settlement Agreement.</li> </ul>
		<ul> <li>Explain how the recommendation relates to agency management goals and objectives for fish and wildlife.</li> <li>Explain how the recommendation provides fish and wildlife protection, mitigation and enhancement (including in-stream flows,</li> </ul>
		ramping and peaking rate conditions, and seasonal and episodic instream flow variations).

Ware Lower Dam is controlled automatically with direct pond leveling controls. The lower dam has no minimum stream flow, as its discharge is directly at the foot of the dam and it has no reach area. The lower dam is "run of river" at all times and has shutdown protection if water gets below dam crest.

# 3.3 Water Quality Standards: Impoundment, Bypassed Reach, Lower Impoundment, and De Minimis Bypass and Downstream Reach

Criterion	Standard	Instructions
В	1	Not Applicable / De Minimis Effect:
		<ul> <li>If facility is located on a <u>Water Quality Limited</u> river reach, provide a link to the state's most recent impaired waters list and indicate the page(s) therein that apply to facility waters. If possible, provide an agency letter stating that the facility is not a cause of such limitation.</li> <li>Explain the rationale for why the facility does not alter water quality characteristics below, around, and above the facility.</li> </ul>

The project, which is located on the Ware River is considered a Class B warm water stream. Class B designed waters are considered habitats for fish and other aquatic life as well as wildlife, including their reproduction, migration, growth and other critical functions. Class B waters are also suitable for irrigation and other agricultural uses and for compatible industrial cooling and process uses.

These waters shall have consistently good aesthetic value, with dissolved oxygen being  $\geq 5.0$  mg/l  $\geq 60\%$  saturation unless background conditions lower it. Temperature must be  $\leq 28.3^{\circ}$ C (83°F) and pH must be 6.0 to 8.3 S.U.

Massachusetts Department of Environmental Protection (MDEP) has indicated that project changes proposed in the 2017 FERC amendment order would not alter compliance with state water quality standards.

Please note that the Ware River is impaired for e coli in Segment MA36-05 and has been discovered between the Wheelwright Dam in New Braintree to the Ware Dam. A total of 11.5 miles. Segment MA36-06 is from Ware Dam to Thorndike Dam in Palmer. A total of 10.1 miles long.

https://www.mass.gov/files/documents/2017/08/zu/16ilwplist.pdf

Ware River	MA36-03	MDC intake, Barre to dam at South Barre Reservoir (NATID:	2.1	MILES	Mercury in Fish Tissue	
		MA00091), Barre (through former segments Powder Mill Pond			-	
		MA26126 and South Barre Reservoir MA26141)				
		MASSIZE and South Dane Reservoir MASSI41).				
Ware River	MA36-05	Wheelwright Pond Dam (NATID: MA00616), New	11.5	MILES	Escherichia coli	
		Braintree/Hardwick to Ware Impoundment dam (NATID: MA00594).				
		Ware				
		Wale.				
Ware River	MA36-06	Ware Impoundment dam (NATID: MA00594), Ware to Thorndike	10.1	MILES	Escherichia coli	
		Dam (NATID: MA00563) Palmer			Fecal Coliform	
					r oour oomonn	
Ware River	MA36-27	Confluence of East Branch Ware and West Branch Ware rivers,	4.9	MILES	Oxygen, Dissolved	
		Barre to MDC intake, Barre.			Temperature, water	

The project is run of river and has no impact on these impairments.

We will have a post upgrade water quality reporting and monitoring survey done for up to three years at the completion of the upgrade in accordance with USFWS condition 4 included in the 2017 FERC amendment. Upgrade should be complete by January 2020.

# 3.4 Upstream Fish Passage Standards: Impoundment, Bypassed Reach, Lower Impoundment and De Minimis Bypass and Downstream Reach

Criterion	Standard	Instructions
С	1	Not Applicable / De Minimis Effect:
		• Explain why the facility does not impose a barrier to upstream fish passage in the designated zone. Typically, impoundment zones will qualify for this standard since once above a dam and in an impoundment, there is no facility barrier to further upstream movement.
		• Document available fish distribution data and the lack of migratory fish species in the vicinity.
		<ul> <li>If migratory fish species have been extirpated from the area, explain why the facility is or was not the cause of this.</li> </ul>

The Ware Upper Dam is in the gently rolling hills of the Pioneer Valley. In the immediate project area, the banks of the river are covered with mixed hardwoods, including oaks, maples and ash, as well as a variety of grasses. There may be American eel present since they have been observed in the Chicopee River. However, no Chicopee River dams have upstream passage for eels. The Ware River project is required under the 2017 FERC amendment to implement fish passage if and when Massachusetts Department of Fish and Wildlife determines a need for passage.

# 3.5 Downstream Fish Passage Standards: Impoundment, Bypassed Reach, Lower Impoundment and De Minimis Bypass and Downstream Reach

Criterion	Standard	Instructions
D	1	Not Applicable / De Minimis Effect:
		<ul> <li>Explain why the facility does not impose a barrier to downstream fish passage in the designated zone, considering both physical obstruction and increased mortality relative to natural downstream movement (e.g., entrainment into hydropower turbines). Typically, tailwater/downstream zones will qualify for this standard since below a dam and powerhouse there is no facility barrier to further downstream movement. Bypassed reach zones must demonstrate that flows in the reach are adequate to support safe, effective and timely downstream migration.</li> <li>For riverine fish populations that are known to move downstream, explain why the facility does not contribute adversely to the sustainability of these populations or to their access to habitat necessary for successful completion of their life cycles.</li> <li>Document available fish distribution data and the lack of migratory fish species in the vicinity.</li> <li>If migratory fish species have been extirpated from the area, explain why the facility is or was not the cause of this.</li> </ul>

Fish species that are or may be present at the project include: stocked trout, fallfish, yellow perch, yellow bullhead, common shiner, golden shiner, spot-tailed shiner, bluegill, redbreast sunfish, pumpkinseed, longnose dace, black nose dace, tessellated darter, chain pickerel, rock bass, white sucker, eastern and largemouth bass.

(http://www.townofware.com/document\_center/Planning/OS&RPlan/2016%20osrp%20March%2 03,%202016%20-%20web.pdf)

There are no anadromous fish in this stretch of the river. The Chicopee River has no migratory fish or eel passage on any of the nine hydropower projects currently.

The Bypass Reach between the Zone 1 Impoundment and the Zone 3 Lower Impoundment consists of a series of small pools in rocky rapids. The banks are extremely steep with ledge outcroppings, retaining walls, and bridge abutments in many areas.

The trash rack spacing on the upper dam intake is 1-3/4".

The stretch between the upper and lower dams is divided into two parts: the top half falling through a series of small pools in the rocky rapids and the lower half running through the lower dam. There is no active fish management program in the project area.

The project, per the stipulation of the U.S. Fish and Wildlife Service and the Massachusetts Department of Fish and Game, maintains an instantaneous release of 20 cfs at the dam which provides enough flow for downstream passage. The Ware River project is required under the 2017 FERC amendment to implement fish passages if and when Massachusetts Department of Fish and Wildlife determines a need for passage.

#### 3.6 Watershed and Shoreline Protection Standards: Impoundment, Bypassed Reach, Lower Impoundment, Downstream of Lower plant

Criterion	Standard	Instructions
E	1	Not Applicable / De Minimis Effect:
		<ul> <li>If there are no lands with significant ecological value associated with the facility, document and justify this (e.g., describe the land use and land cover within the FERC project or facility boundary).</li> <li>Document that there have been no Shoreline Management Plans or similar protection requirements for the facility.</li> </ul>

The project does not include or own very much land. Our lower plant is located within a mill building and our upper plant is in a small metal building with little to no land surrounding it.

Refer to Figure 2 FERC Project Boundary Map on page 2 of this application.

Since the project is in the center of Town of Ware, terrestrial wildlife resources are limited. A site survey by the Massachusetts Energy Office reported no large mammals and some populations of small mammals consisting of rabbits, muskrats and mice. There are a variety of game and songbirds in the projects area. There are no lands of ecological significance in the project boundary.

#### 3.7 Threatened and Endangered Species Standards: Impoundment, Bypassed Reach, Lower Impoundment, and De Minimis Bypass Downstream Reach

Criterion	Standard	Instructions
F	2	Finding of No Negative Effects:
		<ul> <li>Identify all federal and state listed species in the facility area</li> </ul>
		based on current data from the appropriate state and federal natural resource management agencies.
		• Provide documentation that there is no demonstrable negative effect of the facility on any listed species in the area from an appropriate natural resource management agency or provide documentation that habitat for the species does not exist within the ZoE or is not impacted by facility operations.

The project vicinity is shown in the document below in core habitat #1589 and #1583. Both mapped areas are core habitat for the state endangered Brook Floater mussel. Downstream of the project, there are two species of special concern, the Creeper and the Triangle Floater.

http://maps.massgis.state.ma.us/dfg/biomap/pdf/town\_core/Ware.pdf

http://maps.massgis.state.ma.us/dfg/biomap2.htm

The FERC amendment notes that there are no impacts to state species from replacing the lower dam's turbine.

https://elibrary.ferc.gov/idmws/common/opennat.asp?fileID=14213624

The Northern Long Eared bat is listed as a federal endangered species. However, the project is in an urban area and it is unlikely that the project would impact bats.

https://ecos.fws.gov/ipac/location/index

Any drawdowns at the project will include a plan to consult with the Massachusetts DFW to perform mussel salvage and relocation in accordance with the 2017 FERC amendment.

# 3.8 Cultural and Historic Resources Standards: Impoundment, Bypassed Reach, Lower

Impoundment and De Minimis Bypass and Downstream Reach

Criterion	Standard	Instructions
G	1	Not Applicable / De Minimis Effect:
		• Document that there are no cultural or historic resources located on facility lands that can be affected by construction or operations of the facility.
		<ul> <li>Document that the facility construction and operation have not in the past, nor currently adversely affect any cultural or historic resources that are present on facility lands.</li> </ul>

There are no archeological sites of historic value in the area of the hydro plants, according to the Massachusetts Historical Commission (MHC). Additionally, there is not an adverse effect on the mill that is part of the Ware Historical Mill Yard, listed on the National Register of Historic Places in 1986. The 2017 FERC amendment notes that the MHC concurred with the finding of no negative effect to historic resources for the proposed turbine changes.

https://www.sec.state.ma.us/mhc/mhcpdf/townreports/CT-Valley/war.pdf

# 3.9 Recreational Resources Standards: Impoundment, Bypassed Reach, Lower Impoundment, and De Minimis Bypass and Downstream Reach

Criterion	Standard	Instructions
Н	1	Not Applicable / De Minimis Effect:
		<ul> <li>Document that the facility does not occupy lands or waters to</li> </ul>
		which public access can be granted and that the facility does not
		otherwise impact recreational opportunities in the facility area.

The project area has limited recreational value. The stretch of the river immediately below the upper dam is too shallow, with a steep and rocky embankment to be used for boating or canoeing. The pond in the Ware Industrial Mill Yard is not accessible as it's within the town limits and is adjacent to industrial buildings and shops. Other parts of the project are restricted due to public safety.

Per the Federal Energy Regulatory Commission, we are required to install a boat barrier no later than May 20<sup>th</sup> of each year at the impoundment.

The Greenville Park above the impoundment provides recreation and has a boat ramp to the impoundment. This park also provides residents, including handicap residents with access to fishing piers, scenic trails, picnic areas, ball field, basketball court and playgrounds.

Veterans Memorial Field located on Monroe Street is downstream of the lower impoundment and provides residents with access to a ballfield.

### 4.0 CONTACTS FORM

## 4.1 Applicant-related contacts

Facility Owner:		
Name and Title	Lucas W. Wright, President	
Company	Pioneer Hydro Electric Co. Inc.	
Phone	978-355-4575	
Email Address	lwright@wareriverpower.com	
Mailing Address	PO Box 512; Barre MA 01005	
Facility Operato	r (if different from Owner):	
Name and Title	Same as above	
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 Cor	ntact (responsible for LIHI Program requirements):	
Name and Title	Nancy Brown, Office Administrator / Bookkeeper	
Company	Ware River Power Co. Inc.	
Phone	978-355-4575 or cell 978-939-3205	
Email Address	nbrown@wareriverpower.com	
Mailing Address	PO Box 512; Barre MA 01005	
Party responsible for accounts payable:		
Name and Title	Nancy Brown, Office Administrator / Bookkeeper	
Company	Ware River Power Co. Inc.	
Phone	978-355-4575 or cell 978-939-3205	
Email Address	nbrown@wareriverpower.com	
Mailing Address	PO Box 512; Barre MA 01005	

# 4.2 Current and relevant state, federal, and tribal resource agency contacts with knowledge of the facility

Agency Contact (Check areas of responsibility: Flows, Water Quality X, Fish/Wildlife			
Resources, Watersheds, T/E Spp, Cultural/Historic Resources, Recreation):			
Agency Name	Commonwealth of Massachusetts; Executive Office of Energy and		
	Environmental Affairs; Department of Environmental Protection		
Name and Title	Robert Kubit, PE		
Phone	508-767-2854		
Email address	Robert.kubit@state.ma.us		
Mailing Address	1 Winter Street; Boston MA 02108		
Agency Contact	(Check areas of responsibility: Flows, Water Quality, Fish/Wildlife		
Resources X, Wa	tersheds, T/E Spp, Cultural/Historic Resources, Recreation):		
Agency Name	Massachusetts Division of Fisheries and Wildlife, Field Headquarters		
Name and Title	Caleb Slater		
Phone	508-389-6300		
Email address	Caleb.slater@state.ma.us		
Mailing Address			
Agency Contact	(Check areas of responsibility: Flows_, Water Quality _, Fish/Wildlife		
Resources, W	atersheds, T/E Spp, Cultural/Historic Resources, Recreation X):		
Agency Name	Town of Ware, MA; Conservation Commission; Parks and Recreation		
	Department		
Name and Title	Conservation Commission		
Phone	413-967-9649		
Email address			
Mailing Address	126 Main Street; Ware, MA 01082		
Agency Contact	(Check areas of responsibility: Flows , Water Quality , Fish/Wildlife		
Resources, W	atersheds, T/E Spp, Cultural/Historic Resources, Recreation):		
Agency Name	Federal Energy Regulatory Commission; Office of Energy Projects; Division		
	of Dam Safety and Inspections		
Name and Title			
Phone	212-273-5911		
Email address			
Mailing Address	New York regional Office; 19 West 34 <sup>th</sup> Street; Suite 400; New York NY		
-	10001-3006		
Agency Contact (Check areas of responsibility: Flows , Water Quality , Fish/Wildlife			
Resources X, Wa	tersheds, T/E Spp, Cultural/Historic Resources, Recreation):		
Agency Name	US Fish and Wildlife Service		
Name and Title	Melissa Grader		
Phone	413-548-8002 X8124		
Email address	Melissa grader@fws.gov		
Mailing Address			

### Sworn Statement and Waiver Form

All applications for LIHI Certification must include the following sworn statement before they can be reviewed by LIHI:

### SWORN STATEMENT

As an Authorized Representative of <u>Pioneer Hydro Electric / Ware River Project</u>, 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 LIHI Certification of the applying facility is granted, the LIHI Certification Mark License Agreement must be executed prior to marketing the electricity product as LIHI Certified®.

The Undersigned 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.

### PLEASE INSERT FOR PRE-OPERATIONAL CERTIFICATIONS (see <u>Section 4.5.3</u>):

The Undersigned acknowledges that LIHI may suspend or revoke the LIHI Certification should the impacts of the facility, once operational, fail to comply with the LIHI program requirements.

Company Name: Pioneer Hydro Electric Co., Inc / Ware River Project

