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LOW IMPACT HYDROPOWER QUESTIONNAIRE

[Excerpted from Part VI, Section E of the Low Impact Hydropower Certification Program. Words in italics are defined in Part VI, Section C, and line-by-line instructions are available in Section D of the program, available on-line in PDF format at http://www.lowimpacthydro.org.

E. LOW IMPACT HYDROPOWER QUESTIONNAIRE

This Application for Low Impact Hydropower Certification includes two hydroelectric turbines identified as D-Wheel and G-Wheel, at Open Square, in Holyoke, Massachusetts. Open Square is a mixed-use development of seven historic mill buildings containing 685,000 square feet of floor area on an 8-½ acre city block located between the First and Second Level Canals of the Holyoke Gas & Electric Department (HG&E) Hydropower System. The HG&E Hydropower System includes the Connecticut River Holyoke Dam and Holyoke Canal System that feeds the Open Square Facility. The HG&E Hydropower System encompasses the Hadley Falls hydroelectric station on the Connecticut River and sixteen stations on the Canal System. The Canal System is a 4 mile man made structure that diverts water from the Connecticut River at the Holyoke Dam through three canal levels and back into the Connecticut River below the Holyoke Dam. Water flows within the Canal System vary based upon river flows and regulatory requirements, but water elevation in the canals is maintained at a constant elevation except for twice yearly draw downs for system maintenance. The system is controlled by HG&E from a Gate House located at the dam, which has been continually staffed 24 hours per day since the Canal System began operation in the 1840's.

Open Square has the deeded right to 13 Mill Powers equivalent to 494 cfs of water and currently utilizes approximately 436 cfs for it's two hydroelectric generating units. Open Square takes water from the Canal System through a short passage of open raceways and enclosed penstocks from the First Level Canal, through two powerhouses located within the historic mills and then discharges the water into the Second Level Canal. The HG&E Hydropower System including the dam and

canal system that feeds the Open Square Facility are covered under FERC license 2004 which also includes HG&E's Boatlock and Beebe-Holbrook stations directly north and south of the Open Square Facility on the First Level Canal. Regulatory and Resource Agency compliance for the Dam and Canal System are comprehensively addressed by HG&E through this license and on going requirements. Open Square's questionnaire addresses primarily the Open Square Facility and the Holyoke Canal System that feeds it. The information about the Holyoke Canal System is taken from direct sources of the HG&E Hydropower System including HG&E's initial questionnaire for the Low Impact Hydropower Institute submitted in April of 2010. HG&E's questionnaire includes pertinent information about the Holyoke Dam. A copy of this questionnaire is included for reference.

Ba	ckground Information	
1)	Name of the <i>Facility</i> .	Open Square
2)	Applicant's name, contact information and relationship to the Facility. If the Applicant is not the Facility owner/operator, also provide the name and contact information for the Facility owner and operator.	John P. Aubin, Managing Member Open Square Properties LLC 4 Open Square Way Holyoke, MA 01040 Phone (413) 537-8660
3)	Location of Facility by river and state.	Connecticut River and Holyoke Canal System, Massachusetts
4)	Installed capacity.	480 KW
5)	Average annual generation.	3,049,467 KWH Average annual generation 2005 - 2010
6)	Regulatory status.	Non-Licensed. Pre 1935 project.
7)	Reservoir volume and surface area measured at the high water mark in an average water year.	The Open Square Facility receives flow from the Holyoke Canal System at the First Level Canal through two open raceways on the Open Square site. The two open raceways have an approximate surface area of .23 acres and an estimated volume of 3.49 acre-feet of water.
8)	Area occupied by non-reservoir facilities (<i>e.g.</i> , dam, penstocks, powerhouse).	Total area occupied by non-reservoir facilities is 7,760 square feet. Covered and underground raceways and penstocks, both within and exterior to mill buildings occupy 6,404 square feet, while two powerhouses occupy 1,356 square feet.
9)	Number of acres inundated by the Facility.	The Open Square Facility is within the engineered Canal System, which is monitored and regulated at fixed water level. The inundated area is limited to the open raceways on the Open Square site.
10)	Number of acres contained in a 200-foot zone extending around entire impoundment.	Same as 9 above.
11)	Please attach a list of contacts in the relevant Resource Agencies and in non-governmental organizations that have	Open Square has contacted the following for recommendations regarding Open Square's LIHI application:

been involved in Recommending conditions for your Facility	
	Dr. Caleb Slater
	Anadromous Fish Team Leader
	Massachusetts Division of Fisheries and Wildlife
	Field Headquarters
	1 Dabbit Hill Dood
	Westhereugh MA 01591
	(508) 280 (221
	(508) 589-0551 Calab Share Catata and a
	Caleb.Slater@state.ma.us
	Mr. Robert Kubit
	NPDES
	Massachusetts Department of Environmental Protection
	627 Main Street
	Worcester MA 01608
	(508) 767-2854
	Robert Kubit@state maus
	KoonKuon.@suuo.inu.us
	Mr. John Warner
	Energy/Hydropower Coordinator
	U.S. Fish and Wildlife Service - New England Field Office
	70 Commercial Street, Suite 300
	Concord. NH 03301
	(603) 223-2541
	Iohn Warner@fws.gov
	voini_ (vainor@r.ws.go)
	Mr. Josh Knox
	Superintendent
	The Trustees of Reservations - Connecticut River Valley Management Unit
	(413) 532-1660
	jknox@ttor.org
12) Please attach a description of the Facility, its mode of operation	A description of the Facility is provided in Section 2 of this Application. Open
(<i>i.e.</i> , peaking/run of river) and a map of the Facility.	Square's hydroelectric turbines are operated in a run-of-river mode. Operation is
(, , , , , , , , , , , , , , , , , , ,	directed by deed and contract obligations with HG&E and the numerous flow
	requirements established under HG&E's Settlement Agreement and 2005 Amended
	License. Project operations are addressed in Section 3.
Questions for For "New" Facilities Only:	Not Applicable
· · · · · ·	
If the Facility you are applying for is "new" i.e., an existing	
dam that added or increased power generation capacity after	

August of 1998 please answer the following questions to determine eligibility for the program				
13) When was the dam associated with the Facility completed?	Not Ap	plicable		
electricity? If the added or increased generation is not yet	Not Ap	plicable		
operational, please answer question 18 as well.				
15) Did the added or increased power generation capacity require or include any new dam or other diversion structure?	Not Ap	plicable		
16) Did the added or increased capacity include or require a change	Not Ap	plicable		
fish, wildlife, or water quality. (for example, did operations				
change from run-of-river to peaking)?				
17 (a) Was the existing dam recommended for removal or	No reso	urce agency or of	her organization h	as recommended removal of the
decommissioning by resource agencies, or recommended for	Holyok	e Dam, or decom	nissioning of Ope	n Square's Facilities.
removal or decommissioning by a broad representation of				
community prior to the added or increased capacity?				
(b) If you answered "yes" to question 17(a), the Facility is not eligible for certification unless you can show that the added or				
increased capacity resulted in specific measures to improve				
fish, wildlife, or water quality protection at the existing dam. If				
such measures were a result, prease explain.				
18 (a) If the increased or added generation is not yet operational,	Not Ap	plicable		
has the increased or added generation received regulatory authorization (e.g. approval by the Federal Energy Regulatory				
Commission)? If not, the facility is not eligible for				
consideration; and (b) Are there any pending appeals or litigation regarding that				
authorization? If so, the facility is not eligible for				
consideration.				
	1			
A. Flows		PASS	FAIL	APPLICANT ANSWER

 Is the Facility in <i>Compliance</i> with <i>Resource Agency Recommendations</i> issued after December 31, 1986 regarding flow conditions for fish and wildlife protection, mitigation and enhancement (including in-stream flows, ramping and peaking rate conditions, and seasonal and episodic instream flow variations) for both the reach below the tailrace and all bypassed reaches? 	YES = Pass, Go to B N/A = Go to A2	NO = Fail	Yes. See flow requirements for the Holyoke Canal System owned by HG&E as outlined in Section 3.
2) If there is no flow condition recommended by any Resource Agency for the Facility, or if the recommendation was issued prior to January 1 1987, is the Facility in Compliance with a flow release schedule, both below the tailrace and in all bypassed reaches, that at a minimum meets Aquatic Base Flow standards or "good"_habitat flow standards calculated using the Montana-Tennant method?	YES = Pass, go to B NO = Go to A3		Not Applicable
3) If the Facility is unable to meet the flow standards in A.2., has the Applicant demonstrated, and obtained a letter from the relevant Resource Agency confirming that demonstration, that the flow conditions at the Facility are appropriately protective of fish, wildlife, and water quality?	YES = Pass, go to B	NO = Fail	Not Applicable
B Water Quality	PASS	FAII	
 Is the Facility either: In Compliance with all conditions issued pursuant to a Clean Water Act Section 401 meter available continued for the Facility of the 	YES = Go toB2	NO = Fail	Yes. See water quality description for the Holyoke Canal System owned by HG&E as outlined in Section 4.
 b) In Compliance with the quantitative water quality standards established by the state that support designated uses pursuant to the federal Clean Water Act in the Facility area and in the downstream reach? 			
 b) In Compliance with the quantitative water quality standards established by the state that support designated uses pursuant to the federal Clean Water Act in the Facility area and in the downstream reach? 2) Is the Facility area or the downstream reach currently identified by the state in the facility area and in the downstream reach? 			Na
 b) In Compliance with the quantitative water quality standards established by the state that support designated uses pursuant to the federal Clean Water Act in the Facility area and in the downstream reach? 2) Is the Facility area or the downstream reach currently identified by the state as not meeting water quality standards (including narrative and numeric criteria and designated uses) pursuant to Section 303(d) of the Clean Water Act? 	YES = Go to B3 NO = Pass		No

С.	Fish Passage and Protection	PASS	FAIL	
1)	Is the Facility in Compliance with <i>Mandatory Fish Passage</i> <i>Prescriptions</i> for upstream and downstream passage of anadromous and catadromous fish issued by Resource Agencies after December 31, 1986?	YES = Go to C5 N/A = Go to C2	NO = Fail	Yes. See fish passage requirements for the Holyoke Canal System owned by HG&E as outlined in Section 5.
2)	Are there historic records of anadromous and/or catadromous fish movement through the Facility area, but anadromous and/or catadromous fish do not presently move through the Facility area (<i>e.g.</i> , because passage is blocked at a downstream dam or the fish run is extinct)?	YES = Go to $C2a$ $NO = Go to$ $C3$		No.
	a) If the fish are extinct or extirpated from the Facility area or downstream reach, has the Applicant demonstrated that the extinction or extirpation was not due in whole or part to the Facility?	YES = Go to C2b N/A = Go to	NO = Fail	Not Applicable.
	b) If a Resource Agency Recommended adoption of upstream and/or downstream fish passage measures at a specific future date, or when a triggering event occurs (such as completion of passage through a downstream obstruction or the completion of a specified process), has the Facility owner/operator made a legally enforceable commitment to provide such passage?	YES = Go to $C2b$ $YES = Go to$ $C5$ $N/A = Go to$ $C3$	NO = Fail	Not Applicable.
3)	 If, since December 31, 1986: a) Resource Agencies have had the opportunity to issue, and considered issuing, a Mandatory Fish Passage Prescription for upstream and/or downstream passage of anadromous or catadromous fish (including delayed installation as described in C2a above), and 	NO = Go to C5 N/A = Go to C4	YES = Fail	No. See Section 5 of this application for a discussion of fish passage requirements and provisions related to the Holyoke Canal System owned by HG&E.
	b) The Resource Agencies declined to issue a Mandatory Fish Passage Prescription,			

	c) Was a reason for the Resource Agencies' declining to issue a Mandatory Fish Passage Prescription one of the following: (1) the technological infeasibility of passage, (2) the absence of habitat upstream of the Facility due at least in part to inundation by the Facility impoundment, or (3) the anadromous or catadromous fish are no longer present in the Facility area and/or downstream reach due in whole or part to the presence of the Facility?			
4) a)	If C3 was not applicable: Are upstream and downstream fish passage survival rates for anadromous and catadromous fish at the dam each documented at greater than 95% over 80% of the run using a generally accepted monitoring methodology? Or	YES = Go to C5	NO = Fail	Yes. See Section 5 of this application for a discussion of fish passage requirements and provisions related to the Holyoke Canal System owned by HG&E.
b)	If the Facility is unable to meet the fish passage standards in 4.a., has the Applicant demonstrated, and obtained a letter from the US Fish and Wildlife Service or National Marine Fisheries Service confirming that demonstration, that the upstream and downstream fish passage measures (if any) at the Facility are appropriately protective of the fishery resource?			
5)	Is the Facility in Compliance with Mandatory Fish Passage Prescriptions for upstream and/or downstream passage of <i>Riverine</i> fish?	YES = Go to C6 N/A = Go to C6	NO = Fail	Yes. See Section 5 of this application for a discussion of fish passage requirements and provisions related to the Holyoke Canal System owned by HG&E.
6)	Is the Facility in Compliance with Resource Agency Recommendations for Riverine, anadromous and catadromous fish entrainment protection, such as tailrace barriers?	YES = Pass, go to D N/A = Pass, go to D	NO = Fail	Yes. See Section 5 of this application for a discussion of fish passage requirements and provisions related to the Holyoke Canal System owned by HG&E.
<u> </u>				
D.	Watershed Protection	PASS	FAIL	
1) and ext 50	Is there a buffer zone dedicated for conservation purposes (to protect fish wildlife habitat, water quality, aesthetics and/or low-impact recreation) ending 200 feet from the high water mark in an average water year around - 100% of the impoundment, and for all of the undeveloped shoreline	YES = Pass, go to E and receive 3 extra	NO = go to D2	Not Applicable. The Open Square Hydro Power Facility is located within a historic mill complex on an urban site.

	years of certification		
2) Has the facility owner/operator established an approved watershed enhancement fund that: 1) could achieve within the project's watershed the ecological and recreational equivalent of land protection in D.1.,and 2) has the agreement of appropriate stakeholders and state and federal resource agencies?	YES = Pass, go to E and receive 3 extra years of certification	NO = go to D3	Not Applicable.
3) Has the facility owner/operator established through a settlement agreement with appropriate stakeholders and that has state and federal resource agencies agreement an appropriate shoreland buffer or equivalent watershed land protection plan for conservation purposes (to protect fish and wildlife habitat, water quality, aesthetics and/or low impact recreation)	YES = Pass, go to E	NO = go to D4	Not Applicable.
4) Is the facility in compliance with both state and federal resource agencies recommendations in a license approved shoreland management plan regarding protection, mitigation or enhancement of shorelands surrounding the project.	YES = Pass, go to E	No = Fail	Not Applicable.
E. Threatened and Endangered Species Protection	PASS	FAIL	
 Are threatened or endangered species listed under state or federal Endangered Species Acts present in the Facility area and/or downstream reach? 	YES = Go to E2 NO = Pass, go to F		Yes. See Section 6 of this application for a discussion of threatened and endangered species protection measures.
2) If a recovery plan has been adopted for the threatened or endangered species pursuant to Section 4(f) of the Endangered Species Act or similar state provision, is the Facility in Compliance with all recommendations in the plan relevant to the Facility?	YES = Go to E3 N/A = Go to E3	NO = Fail	No recovery plan has been developed. See Section 6 of this application for a discussion of threatened and endangered species protection measures.
3) If the Facility has received authority to incidentally <i>Take</i> a listed species through: (i) Having a relevant agency complete consultation pursuant to ESA Section 7 resulting in a biological opinion, a habitat recovery plan, and/or (if needed) an incidental Take statement; (ii) Obtaining an incidental Take permit pursuant to ESA Section 10; or (iii) For species listed by a state and not by the federal government, obtaining authority pursuant to similar state procedures; is the Facility in Compliance with conditions pursuant to that authority?	YES = Go to E4 N/A = Go to E5	NO = Fail	Yes. See Section 6 of this application for a discussion of threatened and endangered species protection measures.

4)	 If a biological opinion applicable to the Facility for the threatened or endangered species has been issued, can the Applicant demonstrate that: a) The biological opinion was accompanied by a FERC license or exemption or a habitat conservation plan? Or b) The biological opinion was issued pursuant to or consistent with a recovery plan for the endangered or threatened species? Or 	YES = Pass, go to F	NO = Fail	Yes. See Section 6 of this application for a discussion of threatened and endangered species protection measures.
	c) There is no recovery plan for the threatened or endangered species under active development by the relevant Resource Agency? Or			
	d) The recovery plan under active development will have no material effect on the Facility's operations?			
5)	If E.2. and E.3. are not applicable, has the Applicant demonstrated that the Facility and Facility operations do not negatively affect listed species?	YES = Pass, go to F	NO = Fail	Yes. See Section 6 of this application for a discussion of threatened and endangered species protection measures.
F.	Cultural Resource Protection	PASS	FAIL	
1)	If FERC-regulated, is the Facility in Compliance with all requirements regarding Cultural Resource protection, mitigation or enhancement included in the FERC license or exemption?	YES = Pass, go to G N/A = Go to F2	NO = Fail	Not applicable
2)	If not FERC-regulated, does the Facility owner/operator have in place (and is in Compliance with) a plan for the protection, mitigation or enhancement of impacts to Cultural Resources approved by the relevant state or federal agency or <i>Native American Tribe</i> , or a letter from a senior officer of the relevant agency or Tribe that no plan is needed because Cultural Resources are not negatively affected by the Facility?	YES = Pass, go to G	NO = Fail	Yes. See Section 7.
G.	Recreation	PASS	FAIL	
1)	If FERC-regulated, is the Facility in Compliance with the recreational access, accommodation (including recreational flow releases) and facilities conditions in its FERC license or exemption?	YES = Go to $G3$ $N/A = Go to$	NO = Fail	Not applicable

		G2		
2)	If not FERC-regulated, does the Facility provide recreational access, accommodation (including recreational flow releases) and facilities, as Recommended by Resource Agencies or other agencies responsible for recreation?	YES = Go to G3	NO = Fail	Yes. See Section 8.
3)	Does the Facility allow access to the reservoir and downstream reaches without fees or charges?	YES = Pass, go to H	NO = Fail	Not applicable
Н.	Facilities Recommended for Removal	PASS	FAIL	
1)	Is there a Resource Agency Recommendation for removal of the dam associated with the Facility?	NO = Pass, Facility is Low Impact	YES = Fail	No. No resource agency has recommended removal of the Hadley Falls dam or decommissioning of any of the developments addressed in this Application.

Section 2

Project Descriptions and Maps

This Application for Low Impact Hydropower Certification is for the Open Square D-Wheel and G-Wheel, which are located on an occupied historic urban mill site within the Holyoke Canal System. HG&E's Holyoke Project License (FERC No. 2004) includes the Holyoke Canal System, the Holyoke Dam and six generating stations including the Hadley Falls Station and five of the canal stations. Only one of the stations, Hadley Falls, has a dam and an impoundment. The remaining stations are located on the Holyoke canal system (Figure 2-1).

2.1 Holyoke Canal System Stations

The Holyoke Canal System is man-made and was constructed for the purpose of power generation. It consists of three levels, referred to as First, Second, and Third Level Canals (Figure 2-1). The system is tiered with the first canal at the highest elevation and each subsequent canal at a lower elevation. A series of subsurface sluiceways extend between each of the canals. Many of the sluiceways contain rotating turbines that generate power. The sluiceways and canals are not considered to be navigable waterways under the Clean Water Act.

There are a total of twenty hydroelectric generating stations currently in service on the Holyoke Canal System including two owned by Open Square and seventeen that are owned and operated by HG&E. The Canal system begins with the Canal gatehouse structure located between the Hadley Falls Station and the western shore. There is a downstream fish passage Louver facility, which begins 554 ft

downstream of the Canal gatehouse. The fish exclusion louver system is angled across the Canal and is 440 ft long. It ends at a bypass facility and pipe, which transports migrating fish to the Hadley Falls Station tailrace. The gatehouse discharges water into the First Level Canal, a subsystem about 6,500 ft long, running through the City of Holyoke. The No. 1 Overflow structure, which is located immediately downstream of the gatehouse, discharges water directly back to the Hadley Falls Station tailrace, or to the fish lift attraction water.

The First Level Canal discharges water into the Second Level Canal through eight generating stations located along its length; Open Square (also known as Aubin or Anitec) owns two of these stations and six of these stations are owned and operated by HG&E. The HG&E Projects (all operational) on the First Level Canal are: Boatlock, Beebe- Holbrook, Skinner; Holyoke 1, Holyoke 2 and Holyoke 4 Hydro.

The Second Level Canal includes nine in-service generating stations, the No. 2 Overflow structure that discharges into the Hadley Falls Station tailrace, the No. 3 Overflow, and a pipe that discharges to the Third Level Canal. The following stations on the Second Level Canal are located between the Second Level Canal and the Connecticut River about 3,500 ft north of the Boston & Maine Railroad bridge: Riverside, Station No. 5, Albion Mill D, Albion Mill A, Mt. Tom Mill, Nonotuck, Gillmill A, and Gillmill D. Crocker Mill A and B and Crocker Mill C, which are out of service and slated for decommissioning, are also located on the Second Level Canal The Holyoke 3 station is located between the Second and Third Level Canals.

The Third Level Canal is supplied with water from the Holyoke 3 station and the No. 3 Overflow. It is about 4,000 ft in length, and is located largely at the low-lying southern end of the Canal system in the City of Holyoke, mostly parallel to the bank of the Connecticut River. The Third Level Canal includes the No. 4 Overflow structure located between the Canal and the Connecticut River. The Chemical and Sonoco (not owned by HG&E) stations are located between the Third Level Canal and the Connecticut River about 3,400 ft south of the railroad bridge.

FIGURE 2-1 OPEN SQUARE HYDRO ELECTRIC FACILITY AND HG&E HYDROPOWER SYSTEM OVERVIEW



2.2 Open Square D-Wheel and G-Wheel Stations

The Open Square D-Wheel is fed from the Holyoke Canal System First Level Canal through an open raceway constructed of granite block walls and a cypress wood floor. A steel trash grate at the end of the open raceway leads to a steel penstock, which delivers water to the D-Wheel Powerhouse. The Powerhouse is located in the northeast corner of the lower level one floor of Mill #2 at Open Square. The D-Wheel hydroelectric station consists of a Leffel 33" 'Z' Vertical Francis Turbine in a pressure flume with an Electric Machine Company synchronous generator installed in 1933. The system generates an average of 230 kW utilizing a 20' head and discharges into the Second Level Canal through a tailrace underneath the mill building.

The Open Square G-Wheel is fed from the Holyoke Canal System First Level Canal through a second open raceway just south of the D-Wheel open raceway and is also constructed of granite block walls and a cypress wood floor. A steel trash grate at the end of the open raceway leads to a continuation of the raceway underneath a paved lot and into the lower level one of Mill #5. Once inside the building, the water flows through a short steel penstock to the G-Wheel Powerhouse. The Powerhouse is located in the northwest corner of the lower level one floor of Mill #5 at Open Square. The system consists of a Leffel 33" 'Z' Vertical Francis Turbine in a pressure flume with a General Electric synchronous generator installed in 1928. The system generates an average of 250 kiwi utilizing a 20' head and discharges into the Second Level Canal through a tailrace underneath the mill building.

FIGURE 2-2 OPEN SQUARE SITE PLAN AND HYDRO ELECTRIC FACILITY



Section 3 **Project Operations and Flows Related Provisions**

Open Square takes water for it's D-Wheel and G-Wheel stations from the Holyoke Canal System, which is part of the HG&E Hydroelectric System including the Connecticut River Holyoke Dam. The HG&E Hydroelectric System is operated in a Run-of-River (ROR) mode in compliance with numerous flow requirements established under the Settlement and Amended License for that System FERC 2004. In addition to ROR operations, the HG&E system is operated under specific flow prioritization requirements, and provides bypass reach flows, canal flows, and fish passage flows. In addition, there is a low flow contingency plan for system operations. Although these requirements are set forth in the license for the Holyoke Project, they each affect canal flows and operations, and the facilities located there. Specific requirements include:

■ Revised License Article (LA) 405 and 2001 Water Quality Certification (WQC) Condition 9 require the Project to operate in ROR mode, and provided for modifying where ROR operations are monitored to facilitate less fluctuations in the mid impoundment area.

■ Revised LA 406 and 2001 WQC Condition 11 require the release of certain seasonally adjusted flows in the Bypass Reach and Canal system, and required that plans be developed to provide measures to distribute the flows into the Bypass Reach, and to provide means for measuring, recording, and reporting flows in the Bypass Reach.

■ Revised LA 407 requires HG&E to implement the Comprehensive Operations and Flow Plan (COFP) as approved by the Commission on June 24, 2003 (103 FERC ¶ 62,178), with modifications as required under the Settlement Agreement. 2001 WQC Condition 12 prescribes the method and priority of releasing flows from the Project and require the development of plans describing how the required releases will be made during low-flow and normal operational years.

■ Revised LAs 406 and 408 and WQC Condition 13 required filing of a revised Comprehensive Canal Operations Plan (CCOP), which HG&E filed with FERC, after completing consultation with agencies, on June 20, 2005. The provisions of the CCOP are a subset of the flow and operations provisions contained in the revised COFP.

■ Revised LA 406 and LA 407 required HG&E to file modifications to the original COFP consistent with the Settlement Agreement. Pursuant to revised LA 407, HG&E is to follow a detailed consultation process, as set forth in revised LA 420, prior to submitting to FERC any modifications or revisions to the original COFP. Revised LA 420 (based onSection 3.3 of the Settlement Agreement) set forth the steps for consultation with resource agencies and certain stakeholders involved in the Settlement.

■ Revised LA 406 (and 2001 WQC Condition 11) requires minimum habitat flows and minimum zone-of-passage (ZOP) flows based on whether the fish lifts at the Project are operational. As specified in revised LA 406(a)(2) [and Section 4.5(b) of the Settlement], the fish lifts will be operational at the Project from April 1 through November 15 of each year, as refined by USFWS, NOAA Fisheries, MADEP on an annual basis, except that the fish lifts will not be operational during the period July 15 through September 15 each year until such time as: (i) NOAA Fisheries determines that upstream passage of shortnose sturgeon is appropriate, or (ii) MDFW and USFWS

determine that resident fish passage is necessary.

Operations under each of the above-listed revised LAs is described below. Tables 3–1, 3–3, and 3–3 below provide a summary of the entire HG&E Hydropower System operations over a range of flows for Habitat Flows and for Spring and Fall ZOP flows for fish passage seasons. Open Square operates its hydroelectric stations at the direction of HG&E and is included in these tables under "Canal Unit Dispatch" and listed as "Aubin". Information regarding Canal Flows, which directly supply the Open Square Facility, follows. Additional river specific details regarding the HG&E Hydropower System Run-of-River Operations, Low Flow Contingency Plan and Flow Prioritization, Bypass Flows, Bypass Zone-of Passage Flows, Spring Upstream Fish Passage Flows, Fall Upstream Fish Passage Flows, Bypass Habitat Flows, Fish Passage Attraction Flows, and Hadley Falls Station Flows are available in the attached HG&E LIHI questionnaire or upon request.

TABLE 3-1OPERATIONS PLAN, SPRING FISH PASSAGE FLOWS (U/S AND D/S)

							FLOW	S (cfs)							CANAL UNIT DISPAT							PAT	СН						
														1									2			3			
Total Project Q (cfs)	Percent of Time Flow is Exceeded	Pond Elevation (ft)	Bascule Gate w/ Weir ***	Attraction Water from Canal***	Canal Downstream Bypass Flows	Canal Flows ⁶	Hadley 1	Hadley 2	Rubber Dam 5 ¹	Rubber Dam 1 ²	Rubber Dam 3 ³	Rubber Dam 2 ⁴	Rubber Dam 4 ⁵	Flow into Canal	Flow into Bypass Reach	Holyoke 2	Parsons	Boatlock	Beebe-Holbrook	Skinner	Holyoke 1	No. 3 Overflow	Holyoke 4	Holyoke 3	Riverside	All Harris	Station No. 5	Chemical (1 unit)/ No.4 Overflow	Sonoco
550	99.5%	102.9			150	400								550	0	х								х	х			х	х
1,390	98.4%	102.9	600		150	400			240**					550	840**	х								х	х			х	х
2,090	97.4%	102.9	600	440	150	400			500**					990	1300**	х								х	х			х	х
2,970	95.3%	102.9	600	440	150	400	880		500**					990	1300**	х								х	х			х	х
3,390	94.1%	102.9	600	440	150	400	1,300	-	500**					990	1300**	х								х	х			х	х
5,390	86.7%	102.9	600	440	150	400	3,300	Ι	500**					990	1300**	х								х	х			х	х
5,390	86.8%	102.9	600	440	150	2,400	1,300		500**					2,990	1300**	х	х	х х						х	х	X	x	х	х
12,340	60.1%	102.9	600	440	150	2,400	4,500	3,750	500**					2,990	1300**	х	X	х х						х	х	X	x	х	х
15,940	50.0%	102.9	600	440	150	6,000	4,500	3,750	500**					6,590	1300**	х	X	х х	X	х	х	х	х	х	х	X	x	х	х
17,040	47.1%	103.5	700	440	150	6,000	4,500	3,750	900	0	200	200	200	6,590	2,400	х	х	х х	X	х	х	х	х	х	х	X	x	х	х
18,240	44.5%	103.5	700	440	150	6,000	4,500	3,750	900	1,200	200	200	200	6,590	3,600	х	X	х х	X	Х	х	х	х	х	х	X	x	х	х
28,640	26.1%	104.2	800	440	150	6,000	4,500	3,750	1,100	1,500	8,300	1,000	1,100	6,590	14,000	х	X	х х	X	х	х	х	х	х	х	X	x	х	х
31,740	22.8%	103.7	700	440	150	6,000	4,500	3,750	900	1,200	6,900	6,800	400	6,590	17,100	х	Х	х х	X	х	х	х	x	х	х	Х	x	х	х
36,740	18.2%	103.5	700	440	150	6,000	4,500	3,750	900	1,200	6,400	6,300	6,400	6,590	22,100	х	Х	х х	X	х	х	х	х	х	х	Х	x	х	х
40,700	15.1%	104.0	700	0	150	6,000	4,500	3,750	1,000	1,400	7,800	7,600	7,800	6,150	26,500	Х	Х	х х	X	X	х	х	Х	Х	х	Х	X	х	х

¹ 37 ft long Rubber Dam 5 deflated or partially deflated at all flows, except extreme low flow events

² 50 ft long Rubber Dam 1 auto deflation set at pond El 103.5

³ 278 ft long Rubber Dam 3 auto deflation set at pond El 104.2

⁴ 273 ft long Rubber Dam 2 auto deflation set at pond El 103.7

⁵ 278 ft long Rubber Dam 4 auto deflation set at pond El 103.5

⁶ Flows through the canal system will be distributed by generation and/or inter-canal leakage.

#,### Canal flows increase to a minimum of 2000 cfs by reducing Hadley Falls Unit #1 flows for compliance with the Water Quality Certificate. This operational limitation may change after full depth louver evaluations are complete.

* Harris units include Gill, Nonotuck, Mt. Tom, Albion, and Crocker

** Nominal values based on instream flow measurements. For compliance purposes, WSEL's from the IFIM study will be used and the cfs values may vary.

*** Maximum value shown

Shaded rubber dam values are with bags deflated

TABLE 3-2OPERATIONS PLAN, FALL FISH PASSAGE FLOWS (U/S AND D/S)

TABLE 3-3

3.1 Canal Flows

Revised LAs 406(c) and (d), revised LA 408 and 2001 WQC Condition 13 specify the requirements for operating the Canal system. HG&E filed its Comprehensive Canal Operation Plan (CCOP) on June 20, 2005, and supplemented it October 11, 2005. The Plan was approved by FERC on January 11, 2006.

The final CCOP has three components: 1) the canal operations plan; 2) a plan for protection and monitoring of aquatic resources in the canal system; and 3) the plan to exclude sturgeon and other fish from the fish-lift attraction water system. The CCOP describes HG&E's methods for releasing and circulating the required 400 cfs minimum flow through the canal system downstream of the louver bypass and achieving and maintaining the minimum canal flow and protective requirements for aquatic resources, including mussels, during canal maintenance draw downs. The plan for protection and monitoring of aquatic resources in the canal provides for enhancement of mussel habitat in the canal system by installing a weir at the beginning of the First Level Canal, providing minimum canal flows, and implementing a drawdown procedure, which ensures continual watered conditions in mussel habitat areas. The plan outlines two mitigation efforts to enhance mussel survival and habitat conditions in the canals and includes provision of minimum canal flow and shifting of annual maintenance drawdown from the summer to the fall. Finally, the plan for excluding sturgeon and other fish from the fish-lift attraction system consists of a fish exclusion device, which has been installed at the No. 1 Overflow, in consultation with the resource agencies per Water Quality Certificate Condition No.13.

Section 4 Water Quality

The Holyoke Canal that feeds the Open Square Facility is a Class B waterway. HG&E monitors Temperature, dissolved oxygen and fecal coliform bacteria at two locations in the canal.

Section 5 Fish Passage & Protection

The Holyoke Canal System, which feeds the Open Square Facility, is designed to exclude migratory fish through a louver and bypass system at the beginning of the canal system as described below.

5.1 Downstream Migratory Fish Passage Facilities at the Holyoke Canal System

5.1 Canal Louvers and Louver Bypass

The current primary downstream fish passage facilities at the Project are the Louver Bypass Facility (including the Full Depth Louvers and the Louver Bypass Discharge Pipe), and the Downstream Sampling Facility. The addition of the Full Depth Louver Bypass System (and Trash Rake) in October 2002 replaced an earlier Louver system(1993) that had been designed to guide and pass Atlantic salmon smolts, juvenile and adult American shad and blueback herring, all of which migrate close to the surface. In October 2002 modifications were made to guide bottom-oriented species to the bypass pipe and are described in further detail below. HG&E operates and maintains the Full Depth Louvers located in the Canal System. The purpose of the Full Depth Louvers is to create hydraulic conditions that guide approaching fish migrating downstream to the entrance of the bypass. The Downstream Fish Passage Louver facility begins 554 ft downstream of the Canal Gatehouse. The Louver extends across the First Level Canal at an angle and is 440 ft long. It diverts fish from the Canal into a pipe that bypasses the generating units and transports fish into the Hadley Station tailrace.

Section 6 Threatened and Endangered Species Protection

In accordance with License Article 416 HG&E filed its Threatened and Endangered Species Plan (T&E Plan) on July 15, 2002. The Plan was approved by FERC Order dated June 3, 2003. The T&E Plan includes provision related to the federally listed threatened bald eagle (Haliaeetus leucocephalus)⁴ and Puritan tiger beetle (Cicindela puritana), endangered shortnose sturgeon (Acipenser brevirostrum), and mussels including, but not necessarily limited to, the state listed endangered yellow lampmussel (Lampsilis cariosa) and dwarf wedge mussel (Alismidonta heterodon). Of the threatened and endangered species listed, only the yellow lamp mussel and dwarf wedge mussel are found in the Holyoke Canal System that feeds the Open Square Facility. HG&E's T&E plan for these two species is outlined below. Information regarding the other threatened and endangered species specific to the Connecticut River and Holyoke Dam are available in the attached HG&E LIHI questionnaire or upon request.

6.1 Yellow Lamp Mussel and Dwarf Wedge Mussels in the Holyoke Canal System

HG&E's T&E Plan, and the Comprehensive Canal Operations Plan (CCOP) (See discussion in Section 3 of this Application) include measures to protect and enhance the yellow lamp mussel and dwarf wedge mussel. HG&E has installed a concrete weir at the beginning of the first level canal to provide protection of mussel populations during canal maintenance draw downs; monitors habitat; provides minimum canal flows; and implements specific drawdown procedures to maintain watered conditions in mussel habitat areas. In addition, HG&E has also moved the annual maintenance drawdown to October, which minimizes drawdown effects on mussel

populations. HG&E surveys the canal system to document the populations and the location of drawdown pools supporting mussel populations. This survey has been conducted regularly since 2003 and will continue pursuant to the T&E Plan and CCOP until at least 2014. Yellow lamp mussels have been documented to occur in the canal. HG&E's operational measures, including drawdown procedures and minimum canal flows, were specifically developed to protect and enhance the habitat for this species.

Section 7 Cultural Resource Protection

Open Square is located on the Holyoke Canal System and within a densely developed commercial and light industrial area. Its hydroelectric facility is located within historic mill buildings and occupies a small percentage of space and land that is utilized for separate commercial development. Open Square is not required to develop a specific Cultural Resources Management Plan (CRMP) as part of it's facility operations, but is aware of and complies with all federal, state and local requirements concerning cultural resources including requirements of the Massachusetts Environmental Policy Act (MEPA), the Massachusetts Historical Commission and the Holyoke Historic Commission. Open Square is also active in sponsoring and promoting the cultural resources of Holyoke and Open Square through a number of activities. These include: providing tours of the mill buildings as well as active and inactive water turbines; sponsoring the development and hosting the performance of the historical play *Between the Canals* by the Enchanted Circle Theater (http://www.enchantedcircletheater.com/performances.php?show_id=1); hosting art exhibitions; donating space for local events and organizations; and sponsoring a weekly farmers' market at Open Square.

Section 8 Recreation

Open Square is not required to development a specific recreational access or recreation monitoring plan. However, Open Square actively integrates recreation as part of its mixed-use development model. This presently includes renting space to health, fitness and physical arts tenants such as Vega Yoga and the Massachusetts Academy of Ballet. Open Square is also working with the City of Holyoke on extending the Holyoke Canal Walk onto the Open Square site.