

OPEN SQUARE HYDROELECTRIC PROJECT

REVIEW OF APPLICATION FOR RE-CERTIFICATION BY THE LOW IMPACT HYDROPOWER INSTITUTE

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I. BACKGROUND

The Open Square Hydroelectric Project (Open Square), owned and operated by Open Square Properties, LLC, is located on Holyoke Canal System in Holyoke, Massachusetts, which is associated with Holyoke Dam, the first dam on the mainstem of the Connecticut River upstream of Long Island Sound. The Project is physically located within the Holyoke Gas & Electric Department (HG&E, a municipal utility) Hydropower System, which consists of Holyoke Dam on the Connecticut River and the Holyoke Canal System. The canal system consists of three levels. The Project utilizes the 20 feet of head between the First Level Canal at elevation 97.5 feet msl and the Second Level Canal at elevation 77.5 feet msl. The Canal System begins at a gatehouse structure located directly upstream of Hadley Falls Station, which is operated by HG&E. A downstream fish passage louver facility operated by HG&E is located starting about 554 feet downstream of the canal gatehouse and is designed to prevent fish entry into the canal. The full-depth louver rack is angled downstream across the canal and ends at a bypass facility and pipe. The pipe transports migrating fish to the Hadley Falls Station tailrace.

The Open Square Project consists of two powerhouses each with single Leffel 33-inch ‘Z’ Vertical Francis Turbine units, referred to as the D-Wheel and the G-Wheel. The dam and canal system were constructed as one system starting in 1847-1848. The original purpose of the system was to harness the power of the Falls by diverting water from the Connecticut River to mills for mechanical power for manufacturing. As noted during LIHI’s first certification review, the Project is unlicensed and is not subject to any federal or state environmental permits or certifications relevant to the LIHI criteria.

Open Square (LIHI #86) was originally certified as “Low Impact” on December 5, 2011 with an expiration date of December 5, 2016, which was extended to December 31, 2017. The original reviewer’s report can be found at: <http://lowimpacthydro.org/wp-content/uploads/2012/05/OpenSquareCertificationFinalReportCorrected03May2012.pdf>

The original certification contained the following conditions:

- 1. Open Square Properties LLC shall consult with, and obtain approval from, the State Historic Preservation Office for activities that may have an adverse effect on cultural resources, including excavation, demolition, and structural alteration. Information on such activities shall be included in the annual reports filed with LIHI.*
- 2. Open Square Properties LLC shall continue to cooperate with the City of Holyoke in the planning and development of the Holyoke Canal Walk, including the grant of easements under reasonable terms. The status of negotiations and construction scheduling shall be provided in the annual reports to LIHI.*

Recognizing that there is a concurrent application by Holyoke Gas & Electric Department for its Hadley Falls Station and Canal stations, that this application remains pending at this time, and that the Open Square Hydroelectric Project is inextricably part of the entire generating system at the Holyoke Dam site, LIHI adds the following two special conditions:

- 1. If it determines that the project(s) owned and operated by the Holyoke Gas & Electric Department (Hadley Falls station on the Connecticut River and sixteen stations on the Holyoke Canal System) do not qualify for certification, LIHI reserves the right to revoke this certification.*
- 2. If within three months from the date of issuance of this certification the Holyoke Gas & Electric Department does not have in place an agency-approved downstream fish passage plan and implementation schedule, this certification shall be suspended effective three months from the date of issuance, and it shall remain suspended until LIHI notifies Open Square Properties LLC that such a plan and schedule have been approved by the agencies and that the suspension is lifted. During the*

period of suspension, Open Square Properties LLC shall not employ the certification in marketing the power produced.

LIHI reserves the right to suspend certification if the above steps are not completed, if no agreement is reached with the agencies, or if required measures to ensure downstream passage that is appropriately protective of the Atlantic salmon resource, are not made by April 1, 2013.

Regarding these conditions, this Stage II Recertification review found that:

- There were no project activities that require consultation with State Historic Preservation Office during the past five years.
- Recently, Town focus of the Canal Walk has been in areas other than the Open Square vicinity, although the applicant has regularly touched base with the Town Planning Department during the past five years.
- A decision was made on July 26, 2012, that the Holyoke Gas & Electric Department's (HG&E) Hadley Falls Station and Canal stations met the LIHI criteria for certification as "Low Impact", making the first special condition moot.
- Following extensive coordination with resource agencies over many years, an agreement for the downstream passage facilities were finally implemented in 2015. Effectiveness testing is now underway by HG&E. Based on LIHI file review, it does not appear that the certification of the Open Square Project was suspended by LIHI during this period.

The following photographs provide perspective of the Project.



Figure 1. D Wheel Head Raceway fed from Holyoke Canal System (seen beyond)



Figure 2. G Wheel Head Raceway fed from the Holyoke Canal System (seen beyond)

II. RECERTIFICATION PROCESS AND STANDARDS

This review for recertification was conducted using the new, 2nd Edition Handbook that was published in March 2016. A Stage-I / Intake Review was issued on May 25, 2017 based on the initial application submitted on April 26, 2017. As required, the Stage I review included a limited review of the initial LIHI application, and considered the following two questions:

- (1) Has there been a material change in the operation of the certified facility since the previous certificate term?
- (2) Has there been a change in LIHI criteria since the certificate was issued?

If the answer to either question is "Yes," the Application must proceed through Stage II, which consists of a more thorough review of the application using the LIHI criteria in effect at the time of the recertification application. Because the new Handbook involves new criteria and a new process, the answer to question two for all projects scheduled to renew in 2016 is an automatic 'YES.' Therefore, all certificates applying for renewal in 2016 are

required to proceed through both phase one and phase two of the recertification application reviews.

III. ADEQUACY OF APPLICATION

On June 6, 2017, the Owner provided supplemental information via an updated application based on the deficiencies identified during the Phase I Review. This application stated that there were no material changes in the facility design or operation since December 2011. In accordance with the Recertification Standards, "material changes" mean changes in operations, non-compliance and/or new or renewed issues of concern, or delays or lack of implementation of commitments that are relevant to LIHI's criteria. This Stage II assessment included review of the application package and review of annual compliance statements received by LIHI during the past term of certification. Absent a FERC license, review of FERC's eLibrary was not needed. In my opinion, the materials provided and referenced above are sufficient to make a recertification recommendation.

One comment letter, which is posted on LIHI website, was received as a result of application posting on LIHI's website and outreach. These comments are addressed under **Criterion D, Downstream Fish Passage**.

Outreach was made to the Town Planning Department for the City of Holyoke to discuss the coordination with Open Square on advancement of the Canal Walk. I did have a discussion on August 11, 2017 with Marcos A. Marrero, Director, of Planning and Economic Development for the City of Holyoke. Insight from that conversation is included under **Criterion H – Recreational Resources**. I did not feel that any other stakeholder contact was necessary, in part due to information available in simultaneous and parallel activities being done for LIHI on the Holyoke Hydroelectric Project. That data provided recent insight into agency positions regarding activities on the canal system that would similarly apply to Open Square.

IV. ZONES OF EFFECT AND SUMMARY OF COMPLINACE WITH LIHI CRITERIA

Only one Zone of Effect is applicable. As the project intake and discharge are located on two levels of a manmade canal system, its impacts are somewhat comparable to a conduit facility. Flows to the canal system, as well as maintenance of the canal are the responsibility of a separate entity, Holyoke Gas & Electric Department.



Figure 3. Holyoke Canal System with Open Square Project highlighted in green.

The following matrix summarizes the standards selected by the Applicant for the Project. I found that these standards are appropriate, sufficient supporting data was provided, and this data demonstrated compliance with the criteria and standard selected. Details of compliance with the criteria are presented below.

Criterion		Standards Selected				
		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				

- A. **Ecological Flows** – The Facility operates in a strict run-of-river mode. The Open Square Facility is located between the first and second levels of the Holyoke Canal system. Each power house is fed from an open head race branching off from the first level canal and discharging into the second level canal. All canal flows that feed the Open Square Facility are controlled by HG&E, from the Gate House at the Holyoke Dam. Water levels in the canals are maintained at constant elevations except for annual drawdowns for system maintenance. While the Holyoke Project operates under a modified ROR via their FERC license, flows to the Canal are unchanged from 2012. Open Square operations are governed by historic indentured water rights know as Mill Powers which permits primary operation Monday thru Saturday from 6am to 10pm. Open Square typically runs 24 hours a day when flows at the Connecticut River exceed approximately 15,000 cfs under a separate agreement with HG&E. Thus, the Project meets the requirements of Standard A1 - Not Applicable/De Minimis Effect.
- B. **Water Quality** – Water quality within the canal system is addressed by HGE through its FERC license and Water Quality Certification, not by Open Square Properties, LLC. HG&E monitors temperature, dissolved oxygen and fecal coliform bacteria at two locations in the canal. During the original certification review in 2011, the Massachusetts Department of Environmental Protection (MADEP) commented that the Project has no independent influence over water quality, which is sufficiently protected under the water quality certification and license for the Holyoke Canal System, FERC Project No. 2004. As no operational changes have occurred at Open Square, this lack of effect would still apply. The MADEP Massachusetts Year 2014 Integrated List of Waters (most recent version) pursuant to Clean Water Act Sections 305(b), 314 and 303(d) stated that the Connecticut River within the Holyoke Project boundaries is a Category 5 impaired water (i.e. requiring Total Maximum Daily Loads). TMDL pollutants identified in this report include: Escherichia Coli, PCB in Fish Tissues and Total Suspended Solids. An email sent by the MADEP to HG&E dated March 27, 2017, and contained in the final Open Square application, indicated that the operation of the Holyoke Project is not the cause of the impairments. The Open Square Project therefore meets the requirements of Standard B1 - Not Applicable/De Minimis Effect.
- C. **Upstream Fish Passage** – There is no requirement for upstream passage at Open Square. As noted in the original LIHI 2012 Open Square report, Caleb Slater, of Massachusetts Division of Fisheries & Wildlife, in a

letter dated January 13, 2012, commented, “The louver bypass on the Holyoke Canal is the current fish passage prescription and is working effectively. Because most migratory fish are excluded from the canal system there are no fish passage requirements of any kind at this project.” Upstream passage via a fish lift and upstream eel ramps exist at the Holyoke Dam to pass diadromous species upstream within the Connecticut River. The US Fish and Wildlife Service noted in their July 17, 2017 comment letter, that American eel are passing into the canal system in some fashion. Further discussion of this letter is included under **D - Downstream Fish Passage and Protection**. I believe that satisfaction of Standard C1-Not Applicable/De Minimis Effect has been demonstrated.

- D. Downstream Fish Passage and Protection** – A two-inch louver system managed by HG&E exists at the beginning of the canal to prevent passage of fish into the canal system, which has been reported as working effectively. There are no downstream fish passage facilities at the Facility, and none have ever been required. Based on past communications with state resource agencies, this is due to the fact that the canal system is entirely a manmade environment. In their comment letter, the USF&WS recommended that LIHI certification require that Open Square Properties LLC perform eel impingement, entrainment and turbine survival studies at this site, since they have identified a few past reports which have indicated that eels may enter the canals. It is my opinion that, at this time, the need for such studies at Open Square is premature. Similar data is being developed by HG&E for their canal facilities as part of their FERC re-licensing studies of the Holyoke Hydroelectric Project (FERC # P-2004). These studies will help determine if, and what impacts may be occurring, and if additional measures may be needed to minimize potential impacts to downstream movement of such species. Resolution of these questions would be addressed within a new license for the Holyoke project. I have recommended a condition to monitor the outcome of these studies to help determine if impacts to these species are greater than understood in the past. The approach of letting the relicensing process, which involves input from federal and state fisheries agencies, resolve these questions aligns with that recommended in the current LIHI recertification report developed for the Holyoke Hydropower Project. I believe that at this time, the Open Square Project meets the Standard D1 - Not Applicable/De Minimis Effect.
- E. Watershed and Shoreline Protection** – The only land under project control is an 8 ½ acre urban mill site on which the Open Square Facility is located, bordered by the manmade stone canals to the east and west and city streets to the north and south. The Owner appropriately selected and has met Standard E-1 – Not Applicable/De Minimis for this criterion.
- F. Threatened and Endangered Species Protection** – Based on studies conducted by HG&E, the only protected species that occur in the canals are the yellow lamp mussel and dwarf wedge mussel. HG&E’s Threatened and Endangered Species Plan, and their Comprehensive Canal Operations Plan (CCOP) include measures to protect and enhance the yellow lamp mussel and dwarf wedge mussel habitat in the canal by implementing agency approved protocols during maintenance drawdowns of the canal. Operation of the Open Square facility is not expected to affect these species. The Owner appropriately selected and met Standard F-1 – Not Applicable/De Minimis for this criterion.
- G. Cultural and Historic Resources Protection** – The Holyoke Canal System is listed as a Historic District in the National Register of Historic Places. Based on the 2012 LIHI report research, the Open Square site itself has not been included in the District, but the complex is on the Inventory of Historic and Archaeological Assets of the Commonwealth. The City of Holyoke has at various times investigated creating a Historic District incorporating the Holyoke Canal System, but has not pursued this designation. The current designation carries no restrictions on Open Square, although a Cultural Resources Management Plan has been developed by HG&E and is being implemented. The owner of Open Square reported they are aware of and would follow all requirements of the Massachusetts Environmental Policy Act (MEPA), the Massachusetts Historical Commission, and the Holyoke Historic Commission should modifications or repairs require such agency/commission review. Open Square is also active in sponsoring and promoting the cultural resources of Holyoke and Open Square by providing tours of the mill buildings, water turbines and hosting the performance

of local historical plays. The Owner appropriately selected and demonstrated satisfaction of Standard G1 – Not Applicable/De Minimis Effect.

- H. **Recreational Resources** – There are no regulatory requirements to develop recreational features at the Open Square Project. However, Open Square reported it 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 the Massachusetts Academy of Ballet. Open Square stated they are currently undertaking some enhancement activities on their property including new concrete sidewalks and providing other Canal Walk amenities such as pedestrian scale lighting, trees and bike lanes. Open Square has worked with the Town in the recent past on planning activities of the Canal Walk. In a discussion with the Director of Planning and Economic Development, he indicated he is hopeful that an agreement can be reached with Open Square to allow use of a small section of the Open Square property to simplify access to the new bridge under final design by the state Department of Transportation. Such access would also facilitate the implementation of streetscape design in this area in alignment with that planned for this section of the Canal Walk. This work is planned for completion with the next 12-18 months. I believe that with satisfaction of the recommended condition, the requirements of Standard H1 will be met for the Project.

V. GENERAL CONCLUSIONS AND REVIEWER RECOMMENDATION

In conclusion, I believe that at this time, the Open Square Facility has satisfied the requirements of the **Not Applicable or De Minimis Effect** standard for all criterion, and therefore should be considered a Very Low Impact facility. Such certification would be a ten-year term. However, because a potential exists that impacts to out-migrating eels may be occurring but does not yet seem to be confirmed, and the need for additional cooperation with the City for advancement of Canal Walk related activities, I am recommending that the certification include the following conditions:

1. *The Owner shall monitor the status of the studies being conducted evaluating impacts to American eel and other resident species living in the canal system for the re-licensing of the Holyoke Nos. 1, 2 and 3 Projects (FERC Projects P- 2386, 2387 and 2388, respectively). When a new license is issued to these facilities, the Owner shall notify LIHI of the issuance date(s). At that time, LIHI will re-assess whether or not impacts are likely occurring at Open Square, and if so, will consider actions that may be needed at Open Square to maintain its LIHI certification.*
2. *The Owner shall cooperate with the City of Holyoke in the planning and development of the Holyoke Canal Walk, including the grant of easements or other permissions under reasonable terms. This shall include agreement allowing use of a small section of the Open Square site for ease of access associated with the new bridge, as designated in current State Department of Transportation design documents. Such agreements shall accommodate the project's planned completion with 12-18 months. The status of negotiations for this Canal Walk related bridge project shall be provided to LIHI within 45 days of reaching such agreement. A summary of further coordination activities shall be provided in the annual reports to LIHI.*

LIHI reserves the right to suspend certification if the above steps are not completed.