Draft License Application Volume I of II

Lawrence Hydroelectric Project

(FERC No. 2800)

July 6, 2026

Prepared by:

Prepared for:

Essex Company, LLC,

a subsidiary of Patriot Hydro, LLC

This page is intentionally left blank

Table of Contents

List of Figures

List of Tables

List of Acronyms

ºC	degrees Celsius
CEII	Critical Energy Infrastructure Information
CFD	Computational Fluid Dynamics
CFPP	Comprehensive Fish Passage Plan
CFR	Code of Federal Regulations
cfs	cubic feet per second
CMR	Code of Massachusetts Regulations
CWA	Clean Water Act
DHAC	Division of Hydropower Administration & Compliance
DLA	Draft License Application
DSSMP	Dam Safety Surveillance and Monitoring Plan
EA	Environmental Assessment
EAP	Emergency Action Plan
Essex	Essex Company, LLC (or Licensee, or Applicant)
FERC	Federal Energy Regulatory Commission (FERC or Commission)
FLA	Final License Application
FOMP	Fishways Operation and Maintenance Plan
FPA	Federal Power Act
GIS	Geographic Information System
HP	horsepower
HYDROGP	Massachusetts Hydroelectric Generating Facilities General Permit
Hz	hertz
ILP	Integrated Licensing Process
kV	kilovolt
kVA	kilovolt-amperes
LHA	Lawrence Hydroelectric Associates
M.G.L.	Massachusetts General Law
MA DFW	Massachusetts Division of Fisheries and Wildlife
MA DMF	Massachusetts Division of Marine Fisheries
MassDEP	Massachusetts Department of Environmental Protection
MassWildlife	Massachusetts Division of Fisheries and Wildlife
MOA	Memorandum of Agreement
MRTC	Merrimack River Technical Committee
MRWC	Merrimack River Watershed Council
MW	megawatt
MWh	megawatt hours
NEPA	National Environmental Policy Act of 1969
NGO	non-governmental organization
NHFG	New Hampshire Fish and Game
NMFS	National Marine Fisheries Service
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
PAD	Pre-Application Document
PM&E	protection, mitigation and enhancement
Project	Lawrence Hydroelectric Project

PSP	Proposed Study Plan
RM	river miles
ROR	run-of-river
RPM	revolutions per minute
RSP	Revised Study Plan
SD1	Scoping Document 1
SD2	Scoping Document 2
SHPO	State Historic Preservation Office
SPD	Study Plan Determination
USACE	U.S. Army Corps of Engineers
USC	United States Code
USEPA	U.S. Environmental Protection Agency
USGS	U.S. Geological Survey
WQC	Water Quality Certification

Executive Summary

ES.1 Introduction and Background

Essex Company, LLC (Essex), a subsidiary of Patriot Hydro, LLC, is the Licensee, owner, and operator of the Lawrence Hydroelectric Project (FERC No. 2800) (Project or Lawrence Project). The Lawrence Project is located on the Merrimack River in the City of Lawrence in Essex County, Massachusetts. Essex operates and maintains the Project under a license (P-2800) from the Federal Energy Regulatory Commission (FERC or Commission), under the authority granted to FERC by Congress through the Federal Power Act (FPA), 16 United States Code (USC) §791(a), et seq., to license and oversee the operation of non-federal hydroelectric projects on jurisdictional waters and/or federal land. The license for the Lawrence Project was issued on December 4, 1978 (with an effective date of December 1, 1978), and the license expires on November 30, 2028.

Essex is pursuing a new FERC license for the Project using the Commission's Integrated Licensing Process (ILP), as defined in 18 Code of Federal Regulations (CFR) Part 5. Essex initiated the ILP by filing the Pre-Application Document (PAD) and Notice of Intent (NOI) on June 16, 2023. Pursuant to the ILP and applicable regulations at 18 CFR §5.17(a), Essex must file the Final Application for a New License (Final License Application or FLA) with the Commission no later than November 30, 2026.

As currently licensed, the Project works consist of (1) the 35-foot-high by 900-foot-long gravity Essex Dam of stone masonry construction (also known as the Great Stone Dam), with a five-foot-high pneumatic crest gate system mounted on the spillway crest; (2) a 9.8-mile-long impoundment having a surface area of 655 acres[1] at a normal water elevation of 44.2 feet National Geodetic Vertical Datum of 1929 (NGVD29)[2] at the top of the crest gates, and gross storage capacity of approximately 19,900 acre-feet; (3) a powerhouse located at the end of a small forebay adjacent to the south abutment of the Essex Dam, containing two 8.4 megawatt (MW) generating units, and a tailrace channel extending into the Merrimack River channel; (4) fish passage facilities integral with the powerhouse, including a fish elevator and downstream fish bypass, and an eel ladder at the right abutment of the dam; (5) the North Canal, approximately 5,300 feet long by 95 feet wide by 15 feet deep, originating at the north abutment of the dam and paralleling the Merrimack River downstream of the Essex Dam; (6) the South Canal, approximately 2,750 feet long by 35 feet wide by 10 feet deep, originating at the south abutment of the Essex Dam and generally paralleling the Merrimack River downstream of the Essex Dam; (7) a single-circuit, underground/underwater 23.0-kilovolt (kV) transmission line; and (8) appurtenant facilities.

Under the new FERC license, Essex is proposing to remove the North and South Canals from the Lawrence Project boundary as they do not serve any Project purpose. It is questionable whether the canals ever served any Project purpose, because they were only used to convey flow to

[1] As discussed in Exhibit G, Essex is proposing a Project impoundment surface area of 732 acres.

[2] Unless otherwise noted, all elevations in this license application reference the National Geodetic Vertical Datum of 1929 (NGVD29).

hydroelectric facilities operated under separate licenses held by others[3], but never conveyed flow to any hydroelectric unit authorized under the Lawrence Project's license. As a result, Essex is proposing to remove the North and South canals from the Lawrence Project boundary under the new FERC license. This proposed action will not change the Project's installed capacity, overall mode of operation, or any of the Project's environmental resource values. The gatehouses associated with each canal will remain in the license as water retaining structures, and because the North Canal Gatehouse and associated Gatekeeper's House and Carriage House are included in the Project's current Recreation Plan. Details of Essex's proposal are provided within this Draft License Application (DLA).

ES.2 Agency Consultation and the Relicensing Process

Prior to the initiation of the Lawrence Project's relicensing proceeding, on May 16, 2019, FERC conducted a site visit to the Project to evaluate whether the Project was being operated in compliance with the license requirements and determine if any changes to the Project facilities or operations were warranted. Following its review, the Commission determined that the Project was in compliance with its license requirements. However, FERC questioned whether the North and South canals served a Project purpose under the license, and requested that Essex provide information demonstrating whether these facilities should remain part of the licensed Project and, if not, to file an application to amend the license to remove the canals from the Project boundary. [4]

After review, Essex concluded that the North Canal and the South Canal do not serve any Project purpose. Essex also questioned whether the canals had ever served any Project purpose under the FERC license because they have only been used to convey flow to hydroelectric facilities operated under separate licenses held by others, but have never conveyed flow to any hydroelectric unit authorized under the Lawrence Project's license. Accordingly, Essex filed an Application for Non-Capacity Amendment of License to remove the canals from the Lawrence Project on August 31, 2020[5]. In advance of this filing, Essex engaged in consultation with state and federal resource agencies, and interested stakeholders regarding the proposed amendment. Essex performed extensive consultation with the various agencies and stakeholders in support of the amendment process, including the development of the preliminary draft Memorandum of Agreement (MOA), which was filed with the Commission on March 22, 2022[6]. On July 13, 2022, FERC issued an order dismissing the application to amend the Project boundary[7]. The Commission found that it would be premature to make a determination regarding the request ahead of the upcoming relicensing.

On June 16, 2023, Essex, as the Licensee, filed a PAD and NOI to initiate the relicensing process for the Project. The PAD provided a description of the Project and summarized existing, relevant, and reasonably available information to assist resource agencies, federally recognized Indian tribes,

[3] The North Canal was historically used to convey water for power generation at several mills located between the canal and the Merrimack River, including the non-Project North Canal Waterworks Project (FERC No. P-5906) until that license was surrendered by order dated September 19, 1995. The South Canal was also historically used to convey water for power generation at several former mills, including at the former non-Project Aquamac Project (FERC No. P-2927) and Merrimac Project (FERC No. P-2928). The Commission terminated both of these licenses by order dated July 26, 2012.

[4] Accession Number: 20190808-3037
[5] Accession Number: 20200831-5299
[6] Accession Number: 20220322-5194
[7] Accession Number: 20220713-3003

non-governmental organizations (NGOs), and other interested parties (collectively, "stakeholders") in identifying issues, determining information needs, and preparing study requests.

The National Environmental Policy Act of 1969 (NEPA), the Commission's regulations, and other applicable statutes require the Commission to independently evaluate the environmental effects of issuing a new license for the Project, and to consider reasonable alternatives to relicensing. At this time, the Commission has expressed its intent to prepare an Environmental Assessment (EA) that describes and evaluates the site-specific and cumulative potential effects (if any) of issuing the new license, as well as potential alternatives to relicensing. The EA is being supported by a scoping process to identify issues, concerns, and opportunities for resource enhancement associated with the proposed action. Accordingly, the Commission issued Scoping Document 1 (SD1) for the Project on August 15, 2023. SD1 advises resource agencies, Indian tribes, NGOs, and other stakeholders as to the proposed scope of the EA and to seek additional information pertinent to the Commission's analysis. As provided in 18 CFR §5.8(a) and §5.18(b), the Commission issued a notice of commencement of the relicensing proceeding concomitant with SD1.

On September 13 and 14, 2023, the Commission held public scoping meetings in Lawrence, Massachusetts. During these meetings, FERC staff presented information regarding the ILP and details regarding the study scoping process and how to request a relicensing study, including the Commission's study criteria. In addition, FERC staff solicited comments regarding the scope of issues and analyses for the EA. Pursuant to 18 CFR §5.8(d), a public site visit of the Project was conducted on September 13, 2023. Resource agencies, Indian tribes, and other interested parties were afforded a 60-day period to request studies and provide comments on the PAD and SD1. The comment period was initiated with the Commission's August 15, 2023, notice and concluded on October 14, 2023. FERC received nineteen comment letters on SD1, including comments from resource agencies.

FERC issued Scoping Document 2 (SD2) on November 28, 2023, to provide information on the proposed action and alternatives, the environmental analysis process FERC staff will follow to prepare the EA based on stakeholder comments and study requests filed in response to SD1.

In accordance with 18 CFR §5.11, Essex developed a Proposed Study Plan (PSP) that was filed with the Commission and made available to stakeholders on November 28, 2023. The PSP described Essex's proposed approaches for conducting the studies requested by the agencies and stakeholders. A PSP meeting was held on January 4 and 5, 2024, to describe the intent and contents of the PSP, initial information gathering needs, and address outstanding issues associated with the proposed studies. Resource agencies and stakeholders were afforded 90 days from the date of the PSP filing (i.e., until March 11, 2024) to provide comments on the PSP or to request additional studies. In response to comments from stakeholders, Essex filed the Revised Study Plan (RSP) on April 10, 2024. The Commission issued its Study Plan Determination (SPD) with modifications to the RSP on May 10, 2024. In the SPD, FERC directed Essex to conduct seventeen studies:

1. Upstream Anadromous Fish Passage Assessment
2. Upstream American Eel Passage Assessment
3. American Eel Upstream Passage Siting Study
4. Desktop Entrainment, Impingement, and Turbine Passage Survival Study
5. Sturgeon Distribution and Project Interaction Study

6. Diadromous Fish Behavior, Movement, and Project Interaction Study
7. Project Operations and Fish Stranding Study
8. Freshwater Mussel Habitat Assessment and Survey
9. Water Quality Study
10. Three-Dimensional Computational Fluid Dynamics (CFD) Modeling
11. Recreation Facilities Use and Aesthetics Study
12. Historically Significant Waterpower Equipment Study
13. Condition Assessment of Historic Properties and Associated Canal System
14. Downstream Juvenile Alosine Passage Assessment
15. Sturgeon Habitat Mapping and Assessment Study
16. Fish Assemblage Assessment
17. Invasive Plants Survey

On May 28, 2024, the National Marine Fisheries Service (NMFS) filed a Notice of Formal Study Dispute to initiate FERC's formal study dispute resolution process. The dispute involved two study requests that were not adopted by FERC in the SPD, which consisted of a sturgeon habitat mapping assessment in the Project's impoundment and the Climate-Related Impacts on Shortnose Sturgeon Habitat Study. A technical conference was held on June 28, 2024, with FERC, Essex, NMFS, the U.S. Fish and Wildlife Service (USFWS), the Massachusetts Division of Fisheries and Wildlife (MassWildlife), the Massachusetts Department of Environmental Protection (MassDEP), the State of New Hampshire Fish and Game (NHFG), and the Merrimack River Watershed Council (MRWC). The technical conference focused primarily on determining whether the study requests would inform a license condition or guide fishery management decisions. The Study Dispute Panel issued its findings on July 19, 2024, affirming the SPD. Subsequently, FERC issued its Study Dispute Determination on August 6, 2024, requiring no modifications to the SPD.

In accordance with 18 CFR §5.15, Essex initiated studies in 2024 and 2025 as provided in the study plan and schedule approved by the Commission. On April 28, 2025, Essex filed the ISR for the studies noted above. The ISR contained study reports for five studies, updated study plans for three studies, information for consultation for one study, and status reports for the remaining studies. In addition, Essex filed a study report for the Condition Assessment of Historic Properties and Associated Canal System on May 6, 2025. Essex held an ISR meeting on May 7 and May 8, 2025, to discuss the status of studies and results for completed studies, and on May 27, 2025, filed the ISR Meeting Summary. Stakeholders were provided a 30-day period to provide comments on the ISR Meeting Summary, recommend study modifications, and/or to propose new studies. Data collection and analysis for the remaining studies occured or will occur during the 2025 and 2026 study seasons. Comments on the ISR were filed by FERC and the MassDEP on June 24, 2025. The NMFS, MassWildlife, NFGD, and Massachusetts Division of Marine Fisheries (MA DMF) filed comments on June 25, 2025, and Groundwork Lawrence filed comments on June 26, 2025. Essex filed a response to comments on July 25, 2025. FERC issued its Determination on Requests for Study Modifications on August 25, 2025, in which it approved modifications to three studies, denied the requested modifications to six studies, and denied the request for a new study.

On April 27, 2026, Essex filed its Updated Study Report (USR) and held USR Meetings on May 6 and 7, 2026. The USR Meeting Summary was filed on May 22, 2026. Stakeholders had until June 25, 2026 to file comments or disagreements with the USR.

In accordance with 18 CFR §5.16(a), Essex is filing this DLA with the Commission and making the DLA available to stakeholders. FERC and stakeholders will have 90 days to provide comments on the DLA (i.e., until October 5, 2026). Essex will file an FLA for the Project no later than November 30, 2026.

ES.3 Summary of Proposed Protection, Mitigation and Enhancement Measures

The Project is currently operated in run-of-river (ROR) mode, and Essex proposes to continue to operate in ROR mode under the future license. The comprehensive studies, consultation, and evaluation of the Project during the original licensing of the Project resulted in the development and implementation of multiple comprehensive protection, mitigation, and enhancement measures (PM&E); therefore, Essex is proposing operations and certain PM&E measures consistent with the measures required by the Project's existing license, as described in this DLA. However, Essex notes that studies required by the Commission are ongoing, and after completion of the study activities, Essex anticipates additional consultation with stakeholders regarding the potential PM&E measures to be proposed by Essex in the FLA.

In its Proposed Study Plan (PSP) filed on November 28, 2023, Essex proposed to develop a narrow-spaced trashrack design to replace the existing trashrack system, in lieu of performing most of the requested studies related to downstream passage impacts. Essex may consider alternative methods for providing downstream passage and protection at the intake for outmigrating fish, such as replacing the existing turbine runners with new "fish friendly" designed runners. Any proposed downstream passage and protection measures will be developed in consultation with the Merrimack River Technical Committee (MRTC).[8]

Essex also proposes to continue adhering to the following existing plans, described further within this DLA:

Crest Gate System Operation Plan: Under normal operations the Project's turbines are operated in automatic pond level control mode, with the control setpoint established at the top of the crest gates (± 44.2 feet). When river flows are within the hydraulic capacity of the turbines (8,000 cfs or less), the pond level control system adjusts the turbines' output to maintain the impoundment level at the control setpoint, thereby matching inflow and maintaining ROR operation. As inflow rises above the available capacity of the Project's turbines, the crest gate control system automatically lowers the gates to maintain the impoundment level until they are fully lowered at a flow of approximately 52,000 cfs.

Comprehensive Fish Passage Plan (CFPP): Filed pursuant to Article 31 of the Project's existing license and approved by FERC in July 2000. The CFPP includes details of operational measures

[8] The MRTC oversees and guides the diadromous fishery restoration efforts throughout the Merrimack River basin. It consists of representatives from the U.S. Fish and Wildlife Service (USFWS); the National Marine Fisheries Service (NMFS); the New Hampshire Fish and Game Department (NHFG); the Massachusetts Division of Marine Fisheries (MA DMF); and the Massachusetts Division of Fisheries and Wildlife (MDFW).

undertaken by Essex to protect upstream and downstream migrating anadromous fish. Upstream and downstream fish passage facilities at the Project include a fish lift, downstream fish bypass, eel ladder and eel lift.

Recreation Plan: A Recreation Plan was filed with FERC on June 30, 1977, and supplemented on November 15, 1977, and January 27, 1978, which was subsequently approved in the license order issued December 4, 1978. Under the Recreation Plan, Essex provides a handicap-accessible parking area, tours, and interpretive displays at the North Canal Carriage House.

ES.4 Draft License Application Roadmap

This DLA is composed of two volumes.

VOLUME I OF II (Public)

- Executive Summary
- Initial Statement and Additional Information Required by 18 CFR §5.18(a)
- Exhibit A – Project Location and Facilities [18 CFR §4.51(b)]
- Exhibit B – Project Operation and Resource Utilization [18 CFR §4.51(c)]
- Exhibit C – Construction of Existing Facilities [18 CFR §4.51(d)]
- Exhibit D – Original Cost of Existing Unlicensed Facilities [18 CFR §4.51(e)]
- Exhibit F – General Design Drawings of the Principal Project Works [18 CFR §4.41(g)] - Public
- Exhibit G – Project Maps [18 CFR §4.41(h)]
- Exhibit H – Ability to Operate [18 CFR §5.18(c)]

VOLUME II OF II (Public)

- Exhibit E – Environmental Report [18 CFR §4.51(f)]

This page is intentionally left blank

Initial Statement (18 CFR §4.51(a))

BEFORE THE

UNITED STATES OF AMERICA

FEDERAL ENERGY REGULATORY COMMISSION

APPLICATION FOR A NEW LICENSE FOR A MAJOR WATERPOWER PROJECT – EXISTING DAM

LAWRENCE HYDROELECTRIC PROJECT

FERC PROJECT NO. 2800

(1) Essex Company, LLC (Essex), a subsidiary of Patriot Hydro, LLC, applies to the Federal Energy Regulatory Commission (FERC or Commission) for a new license for the Lawrence Hydroelectric Project (Lawrence Project or Project), FERC No. 2800, as described in the attached Exhibits.

(2) The location of the Project is:

State or Territory:	Massachusetts
County:	Essex County
Township or nearby town:	City of Lawrence
Stream or other body of water:	Merrimack River

(3) The exact name, address, and telephone number of the applicant are:

Essex Hydropower, LLC
670 N Commercial Street, Suite 204
Manchester, NH 03101
(978) 623-8222

The exact name, address, and telephone number of each person authorized to act as agent for the applicant in this application are:

Kevin Webb
Hydro Licensing Manager
670 N Commercial Street, Suite 204
Manchester, NH 03101
(978) 935-6039
Kwebb@patriothydro.com

Jonathan DiCesare
Regulatory Affairs Manager
670 N Commercial Street, Suite 204
Manchester, NH 03101
(518) 657-9012
jdicesare@patriothydro.com

(4) The applicant is a domestic corporation and is not claiming preference under Section 7(a) of the Federal Power Act.

(5)(i) The statutory or regulatory requirements of the Commonwealth of Massachusetts that affect the Project as proposed, with respect to bed and banks and to the appropriation, diversion, and use of water for power purposes, and with respect to the right to engage in the business of developing and transmitting power and in any other business necessary to accomplish the purpose of the license under the Federal Power Act are:

a. Essex is a limited liability company organized under the laws of the Commonwealth of Massachusetts and registered to do business in Massachusetts, and, as such, can engage in the activities set forth in its organizational documents, which includes the ownership and operation of the hydroelectric project and related activities.

b. Section 401 of the Federal Clean Water Act (CWA), 33 USC §1341 (Section 401) requires that any applicant for a federal license or permit to conduct an activity that will or may discharge into waters of the United States (as defined in the CWA) must present the federal authority with a Water Quality Certification (WQC). Pursuant to Massachusetts General Law (M.G.L.) Chapter 27(3), the Massachusetts Department of Environmental Protection (MassDEP) is the state agency designated to carry out the certification requirements prescribed in Section 401 of the CWA for waters of the Commonwealth of Massachusetts. The Massachusetts CWA (M.G.L. Chapter 21 §§26-53) directs the MassDEP to take all action necessary or appropriate to secure to the Commonwealth the benefits of the CWA, 33 USC §1251 *et seq*. Regulations promulgated thereunder at 314 Code of Massachusetts Regulations (CMR) 9.00, establish procedures and criteria for the administration of Section 401 of the Federal CWA within the Commonwealth.

c. Regulations promulgated under the Massachusetts CWA, at 314 CMR 2.00 *et seq*. provide permitting procedures for the MassDEP's administration of the National Pollutant Discharge Elimination System (NPDES) permit program under delegated authority from the U.S. Environmental Protection Agency (USEPA).

d. M.G.L. Chapter 91 (Chapter 91) (Waterways Act) and regulations promulgated thereunder at 310 CMR 9.00 *et seq*., protects the public's interest in and access to waterways of the Commonwealth, and is intended to ensure that public rights to fish, fowl, and navigate are not unreasonably restricted and that unsafe or hazardous structures are repaired or removed. Chapter 91 requires a license from the MassDEP for certain structures in tidelands, Great Ponds, and rivers and streams, as defined in 310 CMR 9.00 *et seq*.

e. M.G.L. Chapter 21G (Massachusetts Water Management Act) and regulations promulgated thereunder at 310 CMR 36.00 *et seq*. establish a comprehensive program for managing water withdrawals within the Commonwealth. The Water Management Act requires that any person or entity making water withdrawals above the regulatory threshold obtain either a registration or permit from MassDEP, as set forth in 310 CMR 36.00 *et seq.*

(5)(ii) The steps that Applicant has taken, or plans to take, to comply with each of the laws cited above, are:

a. The Applicant has complied with the requirements of the laws of the Commonwealth of Massachusetts with respect to the right to engage in the business of developing and generating power.

b. The Applicant has all approvals, licenses, permits, and exemptions that are necessary to continue operating the existing waterpower facility. A request for §401 WQC will be submitted to the MassDEP following the Commission's Notice of Application Ready For Environmental Analysis. Since this is an application for relicensing of an existing waterpower project and the Applicant does not propose any new construction or significant change in operation of the existing waterpower facility, the Applicant expects to continue to operate the facility pursuant to approvals, licenses, permits, and exemptions already in effect. The Applicant proposes to remove the North and South Canals from the Project's new FERC license. Further details of Essex's proposal are provided in this license application.

c. Pursuant to the federal CWA and the Massachusetts CWA, the Lawrence Project has one NPDES permit issued under the Massachusetts Hydroelectric Generating Facilities General Permit (HYDROGP) No. MAG360023.

d. The Applicant currently holds three waterways licenses issued pursuant to M.G.L. Chapter 91 (Chapter 91) (Waterways Act). These include: License No. 556, which allows the Licensee to construct and maintain the powerhouse, inlet and tailrace, and other primary Project works; License No. 2472, which allows Essex to construct and maintain a sheet pile and gravel spur adjacent to the Essex Dam on river right; and License No. 2737, which allows Essex to construct and maintain the downstream fish bypass facility.

e. Pursuant to Title 310, Chapter 36 of the CMR, the Lawrence Project has two permits issued under the Massachusetts Watershed Management Program. These permits include: General Permit No. 21003959 for non-contact cooling water and General Permit No. X251283 for Surface Water Discharge NOI.

(6) Essex owns and operates the Lawrence Project and there are no federal facilities or land associated with the Project.

Additional Information Required by 18 CFR §5.17(e)

PURPA Benefits

Essex reserves its rights to seek benefits under Section 210 of the Public Utilities Regulatory Policies Act (PURPA) of 1978 in association with relicensing of the Project.

Additional Information Required by 18 CFR §5.18(a)

(1) *Identify every person, citizen, association of citizens, domestic corporation, municipality, or state that has or intends to obtain and will maintain any proprietary right necessary to construct, operate, or maintain the project:*

Essex presently holds, and will continue to hold, the proprietary rights necessary to operate and maintain the Project works.

(2) *Identify (providing names and mailing addresses):*

(i) *Every county in which any part of the project and any Federal facilities that would be used by the project would be located:*

County Name:	Essex County
Address:	1 Union St #402 Lawrence, MA 01840

There are no Federal lands or facilities used by the Project.

(ii) *Every city, town, or similar local subdivision:*

(A) *In which any part of the project, and any Federal facilities that would be used by the project, would be located:*

Brian De Peña, Mayor
City of Lawrence
200 Common Street
3rd Floor Room 309
Lawrence, MA 01840

Andrew Flanagan, Town Manager
Town of Andover, MA
36 Bartlet Street
Andover, MA 01810

Ann Vandal, Town Manager
Town of Dracut, MA
62 Arlington Street
Dracut, MA 01826

Neil Perry, Mayor
City of Methuen, MA
41 Pleasant Street
Methuen, MA 01844

Richard Montuori, Town Manager
Town of Tewksbury, MA
1009 Main Street 2nd Floor
Tewksbury, MA 01876

Sokhary Chau, Mayor
City of Lowell, MA
375 Merrimack Street 2nd Floor, Room 50
Lowell, MA 01852

(B) *That has a population of 5,000 or more people and is located within 15 miles of the project dam:*

Kassandra Gove, Mayor
City of Amesbury, MA
62 Friend Street
2nd floor
Amesbury, MA 01913

Melinda E. Barrett, Mayor
City of Haverhill, MA
4 Summer Street
Haverhill, MA 01830

Brian De Peña, Mayor
City of Lawrence, MA
200 Common Street
3rd Floor Room 309
Lawrence, MA 01840

Sokhary Chau, Mayor
City of Lowell, MA
375 Merrimack Street
2nd Floor, Room 50
Lowell, MA 01852

Neil Perry, Mayor
City of Methuen, MA
41 Pleasant Street
Methuen, MA 01844

Jim Donchess, Mayor
City of Nashua, NH
229 Main Street
PO Box 2019
Nashua, NH 03061

Sean Reardon, Mayor
City of Newburyport, MA
60 Pleasant Street
Newburyport, MA 01950

Scott Galvin, Mayor
City of Woburn, MA
10 Common Street
Woburn, MA 01801

Andrew Flanagan, Town Manager
Town of Andover, MA
36 Bartlet Street
Andover, MA 01810

John Apple, Town Administrator
Town of Atkinson, NH
19 Academy Avenue
Atkinson, NH 03811

John Curran, Town Manager
Town of Billerica, MA
365 Boston Road
Office 207
Billerica, MA 01821

Matthew Coogan, Town Administrator
Town of Boxford, MA
7A Spofford Road
Boxford, MA 01921

Paul Sagarino, Jr., Town Administrator
Town of Burlington, MA
29 Center Street
Burlington, MA 01803

John Danizio, Town Administrator
Town of Burlington, MA
29 Center Street
Burlington, MA 01803

Steve Bartha, Town Manager
Town of Danvers, MA
1 Sylvan Street
Danvers, MA 01923

Lisa Hultgren, Town Moderator
Town of Derry, NH
14 Manning Street
Derry, NH 03038

Ann Vandal, Town Manager
Town of Dracut, MA
62 Arlington Street
Dracut, MA 01826

Orlando Pacheco, Town Administrator
Town of Georgetown, MA
1 Library Street
Georgetown, MA 01833

Rebecca Oldham, Town Administrator
Town of Groveland, MA
183 Main Street
Groveland, MA 01834

Neil Reardon, Town Moderator
Town of Hampstead, NH
11 Main Street
Hampstead, NH 03841

Steve Malizia, Administrator
Town of Hudson, NH
12 School Street
Hudson, NH 03051

Michael Malaguti, Town Manager
Town of Londonderry,NH
268B Mammoth Road
Londonderry, NH 03053

Robert Dolan, Town Administrator
Town of Lynnfield, MA
55 Summer Street
Lynnfield, MA 01940

Benjamin Beaulieu, Chairman
Town of Merrimac, MA
4 School Street
Merrimac, MA 01860

Andrew Sheehan, Town Administrator
Town of Middleton, MA
48 South Main Street
Middleton, MA 01949

Melissa Rodrigues, Town Manager
Town of North Andover, MA
120 Main Street North
Andover, MA 01845

Michael Gilleberto, Town Administrator
Town of North Reading, MA
235 North Street North
Reading, MA 01864

Joseph Roark, Town Administrator
Town of Pelham, NH
6 Village Green
Pelham, NH 03076

Greg Colby, Town Manager
Town of Plaistow, NH
145 Main Street
Plaistow, NH 03865

Fidel Maltez, Town Manager
Town of Reading, MA
16 Lowell Street
Reading, MA 01867

Deborah Eagan, Town Administrator
Town of Rowley, MA
139 Main Street
PO Box 275
Rowley, MA 01969

Christopher Dillon, Town Manager
Town of Salem, NH
33 Geremonty Drive
Salem, NH 03079

Dennis Sheehan, Town Administrator
Town of Stoneham, MA
35 Central Street
2nd Floor
Stoneham, MA 02180

Richard Montuori, Town Manager
Town of Tewksbury, MA
1009 Main Street
2nd Floor
Tewksbury, MA 01876

Kevin Harutunian, Town Administrator
Town of Topsfield, MA
8 West Common Street
Topsfield, MA 01983

Colin Loiselle, Town Manager
Town of Tyngsborough, MA
25 Bryants Lane
Tyngsborough, MA 01879

Stephen Maio, Town Administrator
Town of Wakefield, MA
1 LaFayette Street
Wakefield, MA 01880

Steve Poulos, Town Administrator
Town of Wenham, MA
138 Main Street
Wenham, MA 01984

Jeffrey Hull, Town Manager
Town of Wilmington, MA
121 Glen Road
Room 11
Wilmington, MA 01887

Brian McCarthy, Town Administrator
Town of Windham, NH
4 North Lowell Road
Windham, NH 03087

(iii) *Every irrigation district, drainage district, or similar special purpose political subdivision:*

(A) *In which any part of the project, and any Federal facilities that would be used by the project, would be located:*

Cheri Cousens
Greater Lawrence Sanitary District
Executive Director
240 Charles Street
North Andover, MA 01845

(B) *That owns, operates, maintains, or uses any project facilities or any Federal facilities that would be used by the project:*

There are no irrigation districts, drainage districts, or similar special purpose political subdivisions that own, operate, maintain, or use any Project facilities. The Project does not use any federal facilities.

(iv) *Every other political subdivision in the general area of the project that there is reason to believe would likely be interested in, or affected by, the application:*

There are no political subdivisions in the general area of the Project that there is reason to believe would likely be interested in, or affected by, the application.

(v) *All Indian tribes that may be affected by the project:*

Indian Tribes listed in the 2023 NOI and receiving copies of this application include the following Indian tribes:

Brian Weeden
Mashpee Wampanoag Tribe
Tribal Historic Preservation Officer
483 Great Neck Road South
Mashpee, MA 02649

Shannon Holsey
Stockbridge Munsee
Community President
N8476 MohHeConNuck Road
Bowler, WI 54416

Jeffery C. Bendremer
Stockbridge Munsee Community
Tribal Historic Preservation Officer 86
Spring Street
Williamstown, MA 01267

Bettina Washington
Wampanoag Tribe of Gay Head
Tribal Historic Preservation Officer
20 Black Brook Road
Aquinnah, MA 02535

(3) For a license (other than a license under section 15 of the Federal Power Act) state that the applicant has made, either at the time of or before filing the application, a good faith effort to give notification by certified mail of the filing of the application.

This section is not relevant because Essex is applying for a new license under Section 15 of the Federal Power Act.

Verification Statement

This application is executed in the

State of :

County of :

By :

The undersigned being duly sworn, deposes and says that the contents of this application are true to the best of his or her knowledge or belief. The undersigned applicant has signed this application this ____ day of November 2026.

_____
[insert name]

Subscribed and sworn to before me, a Notary Public of the State of Massachusetts, this ___ day of November 2026.

_____
Notary Public

Exhibit A. Project Description (18 CFR §4.51(b))

The Lawrence Hydroelectric Project (FERC No. 2800) (Project or Lawrence Project) is located on the Merrimack River in the City of Lawrence in Essex County, Massachusetts. Essex operates and maintains the Project under a license (P-2800) from the Federal Energy Regulatory Commission (FERC or Commission). The Project is the first dam on the Merrimack River, approximately 29 river miles (RM) from the Atlantic Ocean, and is located approximately 11 RM downstream of the non-Project Lowell Hydroelectric Project (FERC No. 2790). Figure A-1 presents the proposed Project boundary and Figure A-2 presents the existing Project facilities.

Pursuant to FERC regulations 18 CFR §4.51(b), this Exhibit describes the physical composition, dimensions, and generation configuration of the Lawrence Project. Exhibit A contained herein reflects the Licensee's proposal to remove the North and South canals from the Project boundary under the new FERC license. The proposed FERC Project boundary is depicted in Exhibit G.

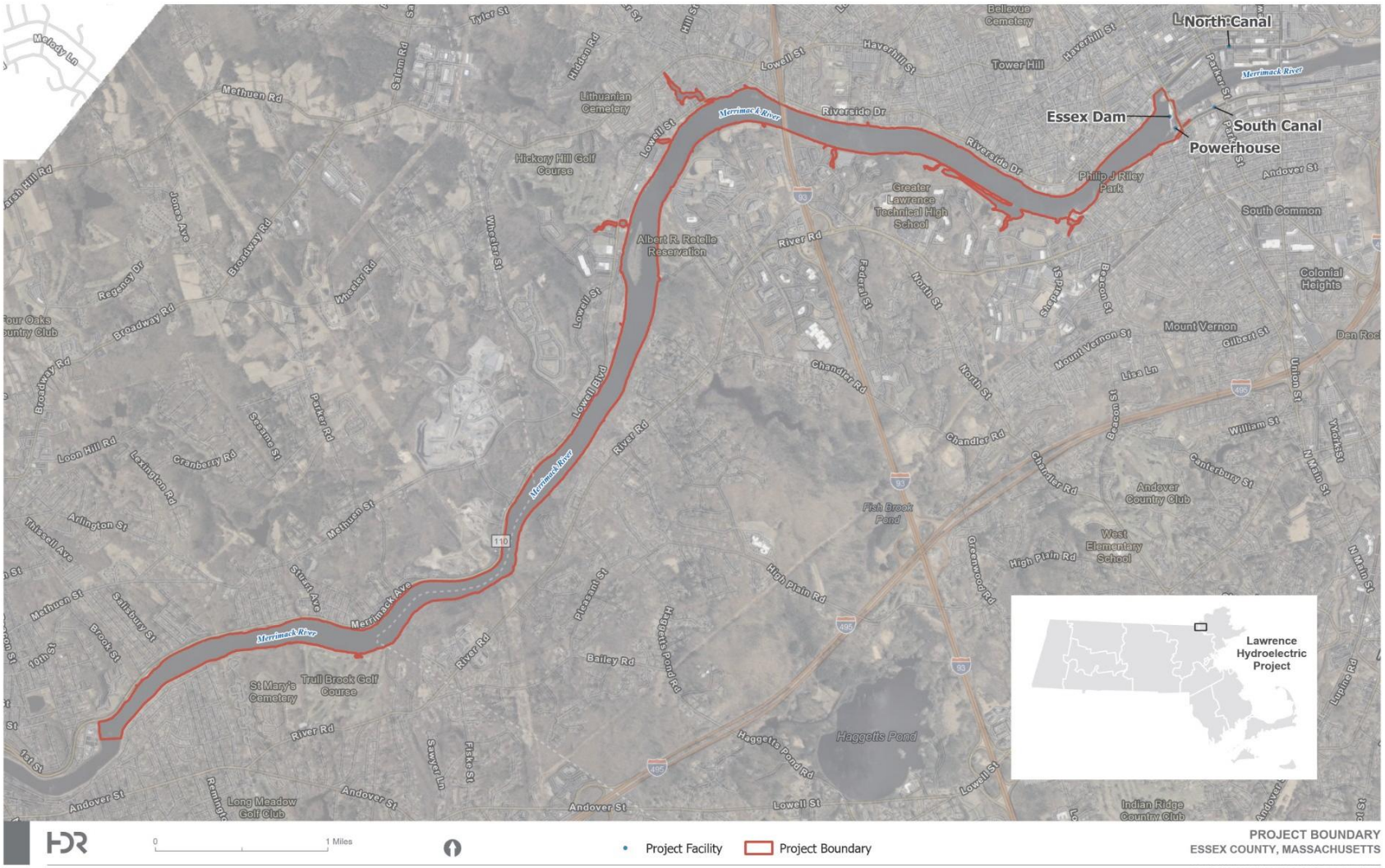


Figure A-1. Lawrence Hydroelectric Project Location Map and Proposed Project Boundary

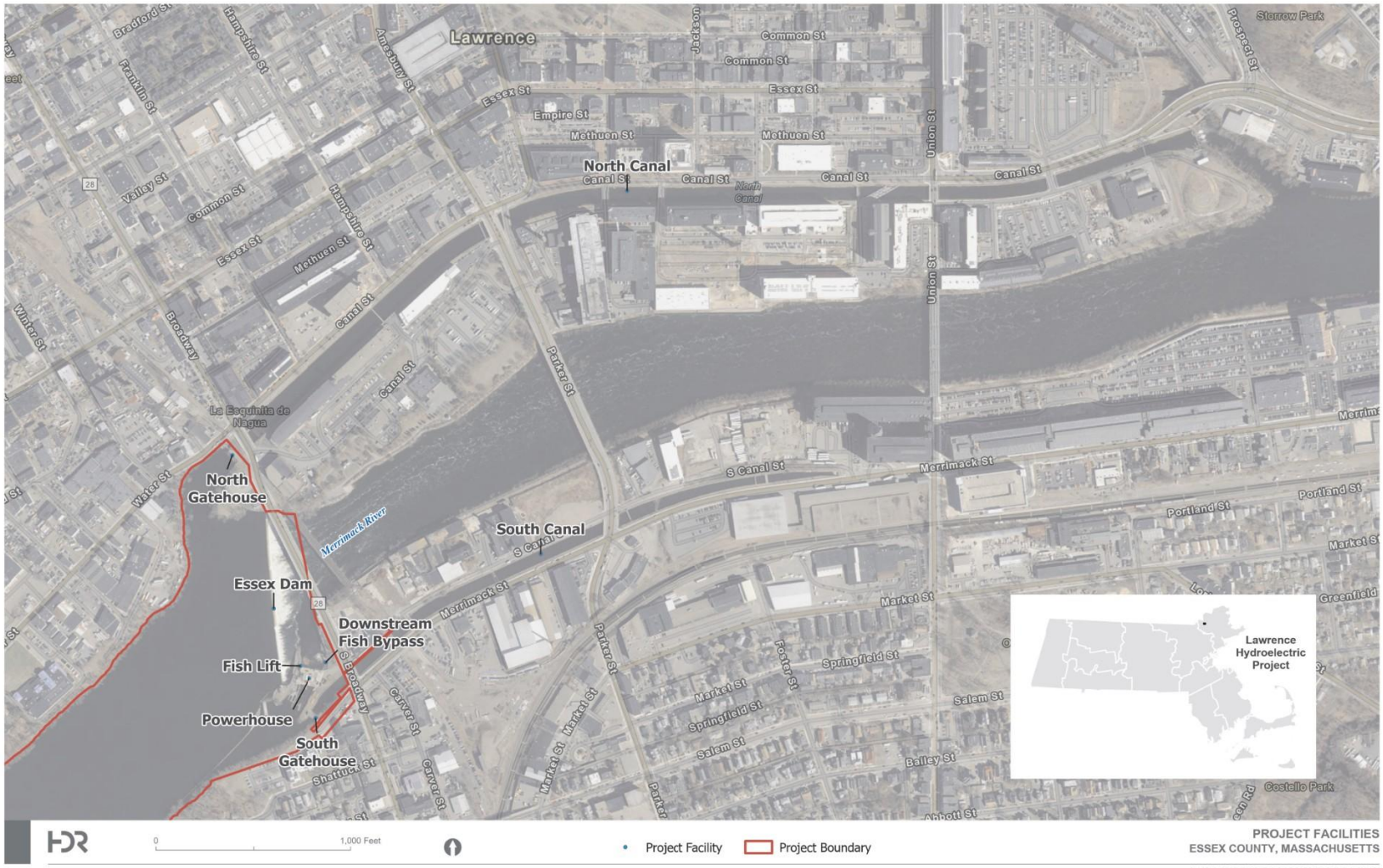


Figure A-2. Lawrence Hydroelectric Project Facilities Map and Proposed Project Boundary

A.1 Physical Composition, Dimensions, and General Configuration (18 CFR §4.51(b)(1))

As proposed, the Lawrence Project works consist of: (1) the 35-foot-high by 900-foot-long gravity Essex Dam of stone masonry construction (also known as the Great Stone Dam), with a five-foot-high pneumatic crest gate system mounted on the spillway crest; (2) a 9.8-mile-long impoundment having a surface area of 732 acres at a normal water elevation of 44.2 feet National Geodetic Vertical Datum of 1929 (NGVD29) at the top of the crest gates, and gross storage capacity of approximately 19,900 acre-feet; (3) a powerhouse located at the end of a small forebay adjacent to the south abutment of the Essex Dam, containing two 8.4 megawatt (MW) generating units, and a tailrace channel extending into the Merrimack River channel; (4) fish passage facilities integral with the powerhouse, including a fish elevator and downstream fish bypass, and an eel ladder at the right abutment of the dam; (5) the North Canal Gatehouse and South Canal Gatehouse; (6) a single-circuit, 700-foot-long underground/underwater 23.0-kilovolt (kV) transmission line; and (7) appurtenant facilities.

A summary of these Project features is provided in Table A-1. The physical descriptions, dimensions, and general configuration of the existing Project works are described in Sections A.1.1 through A.1.67 below.

Table A-1. Lawrence Project Features List

Description	Number or Fact
Project Total Capacity	16.8 MW
Project River Mile	29
Impoundment	
Normal Surface Area	732 acres
Normal Surface Elevation	44.2 feet NGVD29
Useable Storage Capacity	0 acre-feet
Gross Storage Capacity	19,900 acre-feet at El. 44.2
Essex Dam	
Spillway Length	900 feet
Spillway Crest Elevation	39.2 feet NGVD29
Non-overflow Length	0 feet
Intake Forebay	
Intake Forebay	170 feet long
Trashracks	6-inch clear-spacing
Powerhouse	
Construction Type	Concrete
Dimensions	72 feet wide by 128 feet long
Turbines	
Number	2
Type	Horizontal Kaplan bulb units
Rating	8.4 MW (each)

Description	Number or Fact
Maximum Hydraulic Capacity	4,000 cfs (each)
Minimum Hydraulic Capacity	600 cfs (each)
Gross Head	26.5 feet
Transmission Line	
Transmission Line	700-foot-long, single circuit underwater/underground 23-kV transmission line

A.1.1 The Essex Dam

The Essex Dam, also known as the Great Stone Dam, is a 900-foot-long gravity structure constructed of stone masonry. The dam is 35 feet in height from the crest elevation of 39.2 ft to the downstream foundation bedrock. The spillway crest is topped by a 5-foot-high Obermeyer pneumatic crest gate system with three independently controllable zones, with a crest elevation of 44.2 ft when fully elevated. Each 300-foot-long zone consists of fifteen 20-foot-long, hinged, steel panel sections supported by a tubular rubber air bladder. Restraining straps attached to each gate panel prevent the panels from being raised above the approved five-foot effective height above dam crest (Lawrence Hydroelectric Associates [LHA] 2008). The crest gate system is operated by air compressors and associated control system located within an approximately 18 ft by 25 ft masonry building adjacent to the dam's right abutment. Air lines lead from the compressor building to each of the three crest gate zones within a pipe trench embedded in the dam crest upstream of the crest gates.

A.1.2 Intake Forebay

River flows are directed to the powerhouse via a short intake forebay located adjacent to the south abutment of the dam. The forebay is approximately 170 feet long by 80 feet wide. The exit channel for the Project's fish lift system is located on the river left side of the forebay.

A.1.3 Powerhouse

The Project powerhouse is a 72-foot-wide by 128-foot-long building constructed of concrete and contains the Project's two generating units. The structure is approximately 90 feet high. The intake for the turbines is integral with the powerhouse and includes trashracks with 6-inch clear spacing. The powerhouse contains two horizontal, double-regulated Kaplan bulb turbines. Each turbine is rated at 11,260 horsepower (HP), operating at a speed of 128.6 revolutions per minute (RPM) at a rated head of 26.5 feet. Each unit's bulb contains a horizontal shaft, air-cooled, synchronous generator directly connected to the turbine shaft. Each generator is rated at 8,842 kilovolt-amperes (kVA), 0.95 power factor, 4,160 volts, 3-phase, 60 hertz (Hz), 80 degrees Celsius (ºC) temperature rise (LHA 1983). The generating units are each rated at 8.4 MW with a minimum and maximum hydraulic capacity of approximately 600 cubic feet per second (cfs) and 4,000 cfs, respectively (Essex 2020). The Project has a total installed authorized capacity of 16.8 MW.

A.1.4 Tailrace Channel

Flows from the Project's powerhouse discharge to the Merrimack River via an approximately 130-foot-long by 100-foot-wide tailrace channel. The tailrace channel is bordered on the river side by bedrock and the concrete remains of a former fish ladder, and on the land side by bedrock and undeveloped lands leading to the south abutment of the Route 28 (Broadway) bridge.

A.1.5 North Canal and South Canal Gatehouses

The North Canal Gatehouse (also referred to as the Gatehouse at the Great Stone Dam and a contributing resource to the North Canal Historic District), constructed in 1848, is positioned at the head of the North Canal and acts as a water retaining structure which controls flows into the North Canal. The North Canal Gatehouse is 80 feet long, 20 feet wide, and constructed mainly of wood. The gatehouse contains six sluiceways, each 9 feet wide by 12 feet high and separated by 3-foot-thick, cut-stone piers. The leaf gates are of timber construction consisting of gate panels with braced stems. Combined with their stems, from upstream to downstream, the individual gates panels are 24 feet, 10 inches; 21 feet, 5 inches; 18 feet, 5 inches; and 15 feet, 5 inches in height. In 1961, the hoisting mechanisms were augmented with electric motors joined to the lifting gears with rubber belts. In 2012, metal stoplogs were installed across four of the sluiceways; the center two sluiceways have no stoplogs emplaced.

The South Canal Gatehouse, completed in 1868, is virtually identical in design to the North Canal Gatehouse, but constructed on a smaller scale. Similar to the northern structure, the South Canal Gatehouse is positioned at the head of the South Canal and acts as a water retaining structure which controls flows into the South Canal. The South Canal Gatehouse is 16 feet wide by 56.5 feet long, constructed primarily of a wooden frame with 8" by 8" and larger timbers mortised and tenoned with cast iron columns in the substructure. The gatehouse contains four sluiceways constructed of dressed granite with mortared joints, founded on bedrock. Timber leaf gates control water flow into the canal. Each gate panel is 3 feet, 3 inches in height; 9 feet, 9 inches in width; and 9 inches thick. Combined with their stems, from downstream to upstream, the gate panels with their stems are 24 feet, 5 inches; 21 feet, 5 inches; 18 feet, 5 inches; and 15 feet, 5 inches in height, respectively. In 1961, the lifting mechanisms were augmented with electric motors joined to the lifting gears with rubber belts. Between 2010-2012, metal stoplogs were installed across all four of the sluiceways.

A.1.6 Fish Passage Facilities

Upstream passage is provided by the fish lift hopper system, with two entrances located at the downstream (north) side of the powerhouse. The fish lift system has a designed total operational flow (both entrances) of 200 cfs with 50 cfs supplied through a pipe into the lower fishway and the remaining 150 cfs supplied through a floor diffuser in the lower fishway attraction channel. The collection gallery has two entrances located in the tailrace. The "river side" entrance, located on the northwest side of the powerhouse, or river-left of the tailrace, is the fishway's primary entrance. The "street side" entrance, located on river-right in the tailrace, was closed following an evaluation of internal efficiency in 1996 and recommissioned again in 2023, at the request of the Merrimack River Technical Committee MRTC. With the river side entrance (primary) open, the attraction flow is up to 120 cfs, which attracts fish into the crowding channel. A pair of pneumatically operated "V" gates are

closed to trap and then move upstream to crowd the fish into the lift bay, which then lifts the fish into the upstream exit channel. Per the terms of the CFPP (at Section I.A.3. “Fishery Statistics”), monitoring of fish passage and maintaining passage counts has been performed by the fishery agencies, primarily MDMF. In recent years Essex as assumed responsibility for maintaining fish counts, consisting of visual estimates of fish in each lift supplemented by video recording at the exit flume counting window (Essex 2019a). The fish lift is typically operated from late April through mid-July. The final operation schedule is determined in consultation with resource agencies throughout each season. Upstream fish passage lifts generally occur hourly between 8:00 a.m. to 4:00 p.m. daily during operational periods and maintain operations from river flows of 500 cfs to 25,000 cfs (LHA 1999). In early 2022, a trapping facility was installed within the upper lift fishway to facilitate the trapping, sorting, and trucking of migratory species to upper portions of the Merrimack River watershed by the MRTC. Through routine consultation and evaluation of the fishway, periodic modification(s) to the original fishway design have been implemented in consultation with the MRTC.

The downstream fish bypass facility is a concrete bypass chute that is typically operated annually from April 1 through July 15 and from September 1 through November 15, on a 24-hour basis; the final schedule is determined each year in consultation with the MRTC. The bypass gate is mechanically driven and operates to provide surface spill from the forebay, providing 2 percent of turbine flow up to a maximum of 160 cfs (Essex 2019).

The upstream eel passage system consists of an eel ramp located adjacent to the powerhouse at the toe of Essex Dam, and an eel elevator located at the left (north) abutment of the dam. The eel ramp consists of a concrete ramp and a 120-gallon, flow-through, plastic collection box at its upstream end. The ramp includes four switch-backed, concrete ramp sections of various lengths that total approximately 40 feet and a slope that does not exceed 40 degrees. Ramp sections are fitted with 18-inch, Milieu plastic elver substrate (1-inch stud spacing) on all ramp surfaces. The ramp is supplied with water by a 300-gallon-per-minute, submersible pump located in the headpond. A distribution valve system allows flow balancing between the tank and ramp attraction water. An enclosed attraction flow pipe is available if high flows damage the ramp or regular flow pipe (Essex 2019). The eel elevator is installed at the left (north) abutment of Essex Dam, which supplements the eel ramp. The eel elevator consists of a collection/transport hopper connected to an integral ramp at the dam toe. Eel ramp and elevator operations occur annually between May 1 and September 30; the final schedule is determined each year in consultation with the MRTC.

A.1.7 FERC-Approved Recreation Facilities

A Recreation Plan was filed June 30, 1977, and supplemented on November 15, 1977, and January 27, 1978, which was subsequently approved in the license order issued December 4, 1978.[9]

Under the Recreation Plan, Essex provides a handicap-accessible parking area, tours, and interpretive displays at the North Canal Carriage House, from about May 15-October 15 annually. Tours cover the following topics: 1) how electricity is generated from waterpower; 2) the purpose and operation of the fish passage facilities; and 3) the role of The Essex Company, the Great Stone Dam, North Canal and North Canal Gatehouse (recognized on the National Register of Historic

[9] An amendment to Exhibit R was proposed in a letter dated March 5, 1992, and was supplemented on August 31, 1992. The revised Exhibit R was approved in an order issued August 1, 1995. On August 10, 1995, a clarification was made to the revised Exhibit R. This revision was approved in an order dated September 8, 1995.

Places) and the South Canal plus South Canal Gatehouse (eligible for National Register listing) in the development of the City, and early industrialization using hydromechanical power. The interpretive displays explain different aspects of the Project's operation.

A.2 Impoundment Characteristics (18 CFR §4.51(b)(2))

The Project operates in ROR mode and has no usable storage capacity. In this DLA, Essex is proposing to modify the Project Boundary around the impoundment to follow the impoundment's shoreline at the normal water surface elevation of 44.2 feet NGVD29. This proposed boundary around the impoundment shoreline was determined using LiDAR (light detection and ranging) data downloaded from NOAA National Centers for Environmental Information (OCM Partners 2026) and Pictometry Aerial Imagery (EagleView 2026), as well as aerial imagery of the Merrimack River.

Additionally, Essex reviewed the existing Exhibit K drawings (equivalent to Exhibit G under current FERC regulations) which show the current Project boundary drawn to the boundary of Essex's "Flowage Rights" at the 50-foot NGVD29 contour. However, Essex believes the appropriate Project boundary is shown on Exhibit K as "Normal Water Level" because the full extent of the flowage rights acquired by Essex prior to the construction of the Essex Dam was never exercised, i.e., the dam was constructed lower than its original intent so as not to impact upstream water power development in Lowell.

Accordingly, Essex is proposing to remove those lands from the Project boundary and impoundment as they are not needed for Project purposes. This proposed Project impoundment extends approximately 9.8 miles upstream and is generally shown above in Figure A.1-1. The 9.8-mile-long impoundment is bordered by urban development and forested shoreline. The surface area of the proposed Project impoundment is approximately 732 acres (estimated by Geographic Information Systems [GIS]) and the gross storage capacity is approximately 19,900 acre-feet. See Exhibit G for the most accurate depiction of the proposed Project boundary and impoundment.

A.3 Generating Equipment (18 CFR §4.51(b)(3))

The powerhouse contains two horizontal, double-regulated Kaplan bulb turbines. Each turbine is rated at 11,260 HP, operating at a speed of 128.6 RPM at a rated head of 26.5 feet. Each unit's bulb contains a horizontal shaft, air-cooled, synchronous generator directly connected to the turbine shaft. Each generator is rated at 8,842 kVA, 0.95 power factor, 4,160 volts, 3-phase, 60 Hz, 80 ºC temperature rise (LHA 1983). The generating units are each rated at 8.4 MW with a minimum and maximum hydraulic capacity of approximately 600 cfs and 4,000 cfs, respectively (Essex 2020). The Project has a total installed authorized capacity of 16.8 MW.

A.4 Transmission Facilities (18 CFR §4.51(b)(4))

Power from each generator is fed into an individual 4.16 kV / 23 kV step-up transformer located within the powerhouse. From the two transformers, energy produced by the Lawrence Project travels approximately 700 feet via a 23 kV, underground/underwater power line to the interconnection point at a 23 kV circuit break switch served from the North Lawrence No. 6 and South Broadway No. 45 substation. The circuit break switch is located adjacent to the South Canal at the upstream end of South Canal Street. The single-line diagram for the Project is included in Appendix A.

A.5 Ancillary Equipment (18 CFR §4.51(b)(5))

Ancillary equipment at the Project includes two sets of arched steel bulkheads which are installed in front of the trashracks, and in the tailrace, to isolate the turbines for inspection and maintenance. Other ancillary equipment at the Project includes trucks, lifting and hoisting equipment, tractors and material handling devices, landscape equipment, portable generators and pumps.

A.6 United States Lands within Project Boundary (18 CFR §4.51(b)(6))

No lands of the United States are enclosed within the Project boundary.

Exhibit B. Project Operation and Resource Utilization (18 CFR §4.51(c))

B.1 Description of Plant Operations (18 CFR §4.51(c)(1))

B.1.1 General Project Description and Overview

The Lawrence Project is located at RM 29 of the Merrimack River in Lawrence, Massachusetts. The Merrimack River is formed by the confluence of the Pemigewasset and Winnipesaukee rivers in Franklin, New Hampshire, from which it flows 115 miles to the Atlantic Ocean. The Merrimack River watershed has a total drainage area of approximately 5,010 square miles within the states of New Hampshire and Massachusetts (MEOEEA 2001). The Lawrence Project has a gross drainage area of 4,672 square miles and a net drainage area of 4,460 square miles after accounting for the 214 square-mile watershed attributed to the Boston and Worcester water supply (U.S. Geological Survey [USGS] 2023a).

There are a total of five hydroelectric developments comprising three separate Projects on the Merrimack River that are licensed by FERC. In New Hampshire, there are four U.S. Army Corps of Engineers (USACE) flood storage dams within the Merrimack River Basin; Essex and the other licensees on the Merrimack pay FERC Headwater Benefits annual charges to offset the operational costs of the USACE flood storage facilities. Table B-1 presents information on the five hydroelectric developments on the Merrimack River. All the hydroelectric facilities on the Merrimack River operate in ROR mode.

Table B-1. FERC-regulated Developments on the Merrimack River

Facility	FERC Project #	Licensee	River Mile	Generation Capacity (MW)
Garvins Falls (Merrimack River Project)	1893	CRP NH Amoskeag, LLC	87	12.3
Hooksett (Merrimack River Project)	1893	CRP NH Amoskeag, LLC	81	1.6
Amoskeag (Merrimack River Project)	1893	CRP NH Amoskeag, LLC	73	16
Lowell	2790	Boott Hydropower, LLC	40	20.2
Lawrence	2800	Essex Company, LLC	29	16.8

B.1.2 Current License Requirements and Compliance History

B.1.2.1 Current License Requirements

FERC issued the current Project license to LHA on December 4, 1978 (Appendix B). The current license is effective for a term of 50 years, with an effective date of December 1, 1978, and expiring on November 30, 2028. The license was amended on December 3, 1981, to add a new "standard" Article 43 and to delete Article 35 to give the Licensee authority to grant permission for certain uses of Project lands and waters and to convey certain interests in Project lands, without prior Commission approval. Additionally, the license was amended on June 19, 2007, to replace the original wooden flashboards with the existing pneumatic crest gate system.

The licensed Project is subject to the terms and conditions set forth in Form L-2 (October 1975), "Terms and Conditions of License for Unconstructed Major Project Affecting Navigable Waters of the United States". Project operations are also subject to specific license articles stated in the 1978 license order and associated amendments. The Project is additionally subject to a Water Quality Certification (WQC) that was issued by the Commonwealth of Massachusetts Water Resources Commission on July 5, 1978.

Essex has assumed responsibility for complying with the requirements of the original license, as well as subsequent orders, amendments, and WQC pursuant to Section 401 of the Clean Water Act (CWA) issued to-date, which are contained in Appendix B. In accordance with the Project's FERC license, Essex implements measures to protect and enhance the natural and recreational values of the Project to mitigate Project-related impacts. A summary of the most applicable of these articles related to Project operations and environmental measures is provided below. A complete set of the articles of the license is presented in Appendix B.

- **Article 17 (Ordered December 4, 1978):** requires the licensee to construct, maintain, and operate or arrange for recreational facilities.
- **Article 29 (Ordered December 4, 1978:** Approved May 16, 1979): requires the licensee to cooperate with the Massachusetts State Historic Preservation Office (SHPO) in order to avoid any adverse impact on identified historic structures at the Project.
- **Article 30 (Ordered December 4, 1978:** Approved October 26, 1992): requires the Licensee to file a revised Exhibit S to include functional design drawings of the fish lift and passage facilities at the Project.
- **Article 31 (Ordered December 4, 1978:** Approved July 20, 2000, June 28, 2001, June 29, 2001): requires the Licensee to conduct an operational study to determine the effectiveness of the fish passage facilities in assisting the migration of anadromous fish.
- **Article 32 (Ordered December 4, 1978):** requires the Licensee to maintain a continuous minimum flow of 951 cfs unless and until the reservoir water surface elevation is reduced below the crest of the dam; thereupon, the minimum flow shall equal the inflow to the reservoir.
- **Article 33 (Ordered December 4, 1978):** requires the Licensee to monitor or arrange for the monitoring of the fish lift and passage facilities to determine the presence of threatened or endangered fish species and, if any are found, implement measures to protect and conserve any such species.

B.1.2.2 Operations Compliance History

Essex has operated the Project in accordance with the FERC license with no violations. In accordance with the license, under Article 32, the Project operates in ROR mode and fulfills the minimum flow requirement.

On June 7, 2017, the City of Lawrence, Conservation Law Foundation, Groundwork Lawrence, Inc., Lawrence Community Works, Inc., 60 Island Street LLC, Everett Mills Real Estate LLC, GES Realty LLC, and Pacific Mills Acquisition LLC (Complainants) filed a complaint against the Licensee alleging multiple violations of its FERC license.[10] On May 16, 2019, FERC's Division of Hydropower Administration & Compliance (DHAC) conducted a site visit. Subsequently, DHAC issued a response to the complaint on August 8, 2019, finding no violation of the license.[11] On September 9, 2019, Complainants filed a Request for Rehearing,[12] which was subsequently denied on March 19, 2020.[13]

Following a Regional Engineer's inspection of the Project on August 4, 1998, FERC requested operational data from June 1 through August 31, 1998. In response, LHA provided the operational data in a letter dated October 13, 1998. On December 7, 1998, FERC concluded the Project was operated in a manner consistent with the minimum flow requirements of Article 32.

B.1.3 Project Operations

The Lawrence Project operates in ROR mode using automatic pond level control of the generating units. The crest gate control system works in concert with the powerhouse pond level control system to maintain the impoundment water level (Essex 2020). Essex is proposing to continue to operate the Project in the same ROR manner as it is currently operated.

In accordance with the existing license Article 32, Essex is required to maintain a continuous downstream minimum flow of 951 cfs, unless the reservoir surface elevation is reduced below the crest of the dam; thereupon, the minimum flow equals inflow to the reservoir (FERC 1978). By operating the Project in ROR mode, the Licensee always meets or exceeds the requirements of Article 32, by continuously maintaining outflow equal to inflow and by maintaining the impoundment level at or above the top of the crest gates. Essex is proposing to continue to operate the Project in ROR mode, consistent with current operations.

B.1.3.1 Pneumatic Crest Gate Operations

The crest gate control system works in concert with the powerhouse pond level control system to maintain the impoundment water level (Essex 2020). Under normal operations the Project's turbines are operated in automatic pond level control mode, with the control setpoint established at the top of the crest gates (± 44.2 feet). When river flows are within the hydraulic capacity of the turbines (between 600 and 8,000 cfs), the pond level control system adjusts the turbines' output to maintain the impoundment level at the control setpoint, thereby matching inflow and maintaining ROR

[10] Accession Number 20170607-5160
[11] Accession Number 20190808-3032
[12] Accession Number 20190909-5134
[13] Accession Number 20200319-3043

operation. Separately, the crest gate system also has an automatic pond level control system that regulates the elevation of each of the system's three zones to control the upstream impoundment water level. If inflow increases and the turbines are operating at their maximum available capacity, the water level at the dam will begin to rise above the normal pond level. The crest gate control system will sense the initial rise in the pond level and respond by incrementally lowering the crest gate panels to maintain at the normal pond level. If inflow then begins to decrease, the crest gate control system will sense the resulting drop in water level and will start to raise the crest gate panels. Thus, these two control systems work together to minimize impoundment level fluctuations so that inflows into the Project's impoundment approximate outflows. The Project's crest gate system operational scheme contained within the Crest Gate System Operation Plan (LHA 2008) is summarized below in Table B-2.

Table B-2. Pneumatic Crest Gate System Operational Scheme

Approximate River Flow (cfs)	Crest Gate Status	Target Pond Level (ft NGVD)	Unit Operation
0 – 8,000	Full elevation	44.2 (Normal pond)	Pond level control of the turbines
8,001 – 52,000	Crest gate lowers as flow over the spillway increases, maintaining water level at normal pond	± 44.2 ft	Full available output
>52,000	Fully lowered	Rises above 44.2 ft as flows over spillway increase	Full available output

B.1.3.2 Operations During Low Water and Adverse Conditions

Under low inflow conditions, Project operations are adjusted to ensure that fish passage flow requirements are maintained. The Project's turbines can only be operated when there is sufficient inflow to operate one of the turbines at its minimum hydraulic capacity of approximately 600 cfs.

During periods when inflow exceeds the maximum hydraulic capacity of the Project's main turbines (8,000 cfs combined), the Project normally operates at maximum capacity, and excess flows are discharged over the spillway. Under extreme flood conditions, the crest gate system is fully lowered using manual or automatic control to pass river flows in excess of the turbines' available capacity and is adjusted up to restore normal pond height after any high-flow or flood event has receded.

B.1.3.3 Fish Passage Operations

The MRTC oversees the management of the Lawrence Project for the restoration of diadromous fish to the Merrimack River as directed by the Project's Comprehensive Fish Passage Plan (CFPP), which was filed pursuant to Article 31 of the Project's existing license and approved by FERC in July 2000. Since that time, Essex and the MRTC have developed and maintained the Fishways Operation and Maintenance Plan (FOMP) to support implementation of the Project's CFPP and optimize fishway operations for target species. The FOMP serves as a living, adaptive management document that has been periodically updated and shared through the parties' ongoing cooperative efforts. The CFPP and subsequent FOMP includes details of operational measures undertaken by

Essex to protect upstream and downstream migrating anadromous fish. Upstream and downstream fish passage facilities at the Project consist of a fish lift, downstream fish bypass, an upstream eel ladder, and an upstream eel elevator. The Project's fish lift and downstream fish bypass were originally designed in consultation with the USFWS. Current fish passage operations of the structures are guided by both state and federal fishery agencies (i.e., the MRTC) per the CFPP and FOMP. Essex provides annual post-season updates to the MRTC. The Project's upstream eel ladder and elevator were designed in consultation with the MRTC and are subject to the same guidance and annual reporting.

In accordance with the FOMP, the fish lift is typically operated annually from late April through mid-July, however the start of the season varies slightly and is also based on downstream fish movement activity and thus, the seasonal operation schedule is determined in consultation with the MRTC. Operation of the upstream fish passage lift generally occurs hourly between 8:00 a.m. and 4:00 p.m. daily during operational periods and during river flows of 500 cfs to 25,000 cfs (LHA 1999). The downstream fish bypass facility is a concrete bypass chute that is typically operated annually from April 1 through July 15 and from September 1 through November 15, on a 24-hour basis. Upstream eel passage operations occur annually between May 1 and September 30 (Essex 2014). Upstream passage is provided by a combination of the Project's upstream eel ladder, which is located adjacent to the powerhouse at the toe of Essex Dam, and the Project's eel elevator (or "eel lift"), which is located at the left (north) abutment of Essex Dam. The elevator consists of a collection/transport hopper connected to an integral ramp at the toe of Essex Dam.

Essex collects information regarding the abundance of diadromous fishes using the fishways annually. This activity is a monitoring effort to inform the Technical Committee that manages these fishery resources. Essex staff records diadromous fish counts at the fish lift throughout the upstream migration season and provides a summary of these counts as part of its annual fishway operations report to the MRTC.

B.2 Estimated Energy Production and Dependable Capacity (18 CFR §4.51(c)(2))

B.2.1 Estimated Average Annual Energy Production

Annual and monthly average energy generation for the period of 2012-2025 is provided in Table B-3. The average annual gross generation is 72,736 Megawatt hours (MWh) over that time frame.

Table B-3. Lawrence Annual and Average Monthly Generation 2012-2025 (MWh)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Total
2012	9,331	7,934	9,706	6,278	9,101	7,848	2,578	3,614	2,750	5,357	6,638	6,998	78,133
2013	7,733	7,070	9,230	8,237	7,070	7,661	8,006	5,141	4,291	3,226	4,133	6,048	77,846
2014	6,324	5,557	8,322	5,871	7,752	5,486	6,019	3,960	2,419	4,863	6,357	7,011	69,941
2015	7,546	5,823	7,185	7,733	5,695	5,976	4,630	2,404	1,897	4,162	4,867	6,797	64,715
2016	7,891	7,718	9,134	8,716	6,932	3,340	1,814	1,181	436	1,854	3,586	6,163	58,765
2017	8,438	6,107	8,012	7,330	8,726	7,918	6,616	2,871	3,061	2,174	7,488	7,328	76,069
2018	7,961	6,065	9,560	6,736	9,896	3,986	2,546	3,440	3,015	4,196	6,920	9,324	73,645
2019	9,303	7,313	8,489	8,028	7,666	7,301	5,620	2,740	2,290	3,650	4,168	5,726	72,294
2020	6,933	7,640	7,769	7,093	7,566	2,761	3,306	1,152	736	2,676	3,756	4,770	56,158
2021	8,388	6,037	8,228	8,959	7,313	4,099	8,235	7,931	6,544	4,713	7,995	9,638	88,080
2022	8,477	7,529	8,209	9,393	8,354	4,376	1,719	1,142	1,941	2,940	3,230	8,525	65,835
2023	9,087	8,058	9,808	9,007	8,068	6,151	8,566	4,676	7,876	7,807	7,732	7,375	94,210
2024	7,466	8,881	7,543	8,028	9,154	4,979	1,943	3,889	1,786	2,109	2,929	6,422	65,128
2025	5,450	3,637	8,373	8,730	8,338	7,994	3,033	1,575	1,311	2,163	4,171	4,094	58,869
Average	7,334	6,859	8,575	8,588	8,520	6,375	4,514	3,380	3,658	4,026	4,944	5,964	72,736

B.2.2 Estimated Dependable Capacity

Dependable capacity is generally defined as the amount of load a hydroelectric plant can carry under adverse hydrologic conditions during a period of peak demand; for example, during the hot, dry conditions typical of August in the Project area. The estimated dependable capacity is also determined by any minimum flow or fish passage flow requirements included in the existing license. Under the Project's current license, the dependable capacity is estimated to be 4.2 MW during peak summer season, corresponding to the August median flow of approximately 2,100 cfs at the Project.

B.2.3 Plant Factor

Based on the average annual gross energy produced during calendar years 2012-2025, the Project's authorized capacity of 16.8 MW, and the average annual output of 72,736 MWh, the estimated annual plant factor for the Project is 49%.

B.2.4 Project Flows

The Lawrence Project is in the Merrimack River Basin, which extends from the White Mountain region of northern New Hampshire to northeastern Massachusetts. The Merrimack River Basin has a total drainage area of approximately 5,010 square miles and is the fourth largest river basin in New England (MEOEEA 2001). The majority of the watershed lies within New Hampshire (3,800 square miles) (MEOEEA 2001). The Lawrence Project has a gross drainage area of 4,674 square miles and a net drainage area of 4,460 square miles after accounting for the 214 square mile watershed attributed to the Boston and Worcester water supply.

River flows for the Lawrence Project were determined by a proration of flows of USGS Gage 01100000 Merrimack River below Concord River at Lowell, MA (located 9.4 miles upstream of the Project dam) by the ratio of drainage areas between the USGS Gage and Lawrence Project. The drainage area of the USGS Gage is 4,635 square miles; however, 214 square miles are attributed to the cities of Boston and Worcester water supply and, therefore, the USGS Gage has an effective drainage area of 4,421 square miles. The Lawrence Project has a gross drainage area of 4,674 square miles and a net drainage area of 4,460 square miles after accounting for the 214 square miles watershed attributed to the cities of Boston and Worcester water supply.

Prorated flow data from October 1923 to September 2021 were used to calculate the mean, maximum, minimum, and exceedances. Monthly average flows range from 3,143 cfs to 19,416 cfs (Table B-4). The highest daily average flow recorded during the period of record was 162,420 cfs and the lowest daily average flow was 216 cfs. Inflow data for the Merrimack River is provided in Table B-4. Annual and monthly flow duration curves have been developed using the upstream USGS gage (USGS Gage No. 01100000) for the period of record of 1923 to 2021. The flow duration curves are provided in Appendix C.

Table B-4. Summary of Annual and Monthly Flows from Oct 1923 through Sept 2021

Month	Minimum (cfs)	90% Exceedance (cfs)	Average (cfs)	10% Exceedance (cfs)	Maximum (cfs)
January	367	2,852	7,624	13,518	47,314
February	636	3,176	7,646	13,518	47,112
March	1,422	5,206	12,953	23,606	162,420
April	2,512	8,603	19,416	32,484	83,530
May	672	4,822	11,746	20,176	92,105
June	407	2,240	6,698	12,721	60,025
July	251	1,352	3,879	7,397	34,401
August	235	1,079	3,143	6,073	31,778
September	221	1,019	3,203	5,751	119,041
October	216	1,311	4,666	9,606	52,660
November	322	2,119	7,147	14,325	66,784
December	381	2,862	8,356	16,545	45,901
Annual	216	1,705	8,031	17,755	162,420

Source: USGS 2023b.

B.2.5 Area-Capacity and Rule Curves

The Project operates in ROR mode and has no useable storage capacity. Given the Project's current and proposed ROR operations, the minimal fluctuations in the reservoir level cause very little change in the surface area of the impoundment. Consequently, a site-specific area-capacity curve and impoundment rule curve for the powerhouse have not been developed, nor are they necessary to the current and future operation of the Project.

B.2.6 Hydraulic Capacity of Powerhouse

The generating units are each rated at 8.4 MW with a minimum and maximum hydraulic capacity of approximately 600 cfs and 4,000 cfs, respectively (Essex 2020) (Table B-5).

Table B-5. Lawrence Hydroelectric Project Hydraulic Capacity

Description	Number or Fact
Number of Turbines	2
Type	Horizontal Kaplan bulb units
Rating	8.4 MW (each)
Maximum Hydraulic Capacity	4,000 cfs (each)
Minimum Hydraulic Capacity	600 cfs (each)

B.2.7 Tailwater Rating Curve

The tailwater rating curve for the Lawrence powerhouse will be provided with the FLA to be filed by November 30, 2026.

B.2.8 Powerplant Capacity versus Head

This information will be provided in the FLA to be filed by November 30, 2026.

B.3 Statement of Power Utilization (18 CFR §4.51(c)(3))

Power generated at the Project is sold to meet the demands of the regional grid.

B.4 Future Development (18 CFR §4.51(c)(4))

At this time, Essex is not proposing to construct any new Project facilities or implement any modifications to the Project's existing facilities or operations. However, as economic conditions continue to change, Essex periodically performs evaluations of Project facilities for potential upgrades and will continue to do so into the future.

Exhibit C. Construction History (18 CFR §4.51(d))

The Essex (“Great Stone”) Dam was completed by 1848 at the location of Bodwell’s Falls on the mainstem Merrimack River, with construction of the North Canal following shortly thereafter. The South Canal was constructed later, in about 1865.

Following the issuance of the original Project license in 1978, the present powerhouse and fish passage facilities of the Project were constructed in the period 1980-81, and commenced operation in July, 1981. Installation of the Project’s pneumatic crest gate system on the Essex Dam occurred over several years, and was completed by 2010.

Essex is not proposing any increase in capacity or any changes to the Lawrence Project operations as part of this relicensing. Planned activities are limited to the continuation of the life-extension program to maintain, repair, modify, or replace the civil, mechanical, or electrical components of the Project on an as-needed basis. Essex reserves the right to re-evaluate potential unit upgrades or capacity additions in the future.

Essex is proposing certain PM&E measures consistent with the PM&E measures required by the existing license and, therefore, no new construction is necessary for the continuation of the PM&E measures required by the existing license.

Exhibit D. Costs and Financing (18 CFR §4.51(e))

D.1 Original Cost of Existing Unlicensed Facilities

This section is only applicable to initial license applications and not applicable to this current relicensing application of the Lawrence Hydroelectric Project.

D.2 Project Takeover Cost Pursuant to Section 14 of the FPA

Under Section 14(a) of the Federal Power Act (FPA), the Federal government may take over any project licensed by the Commission upon the expiration of the original license. The Commission may also issue a new license in accordance with Section 15(a) of the FPA. If such a takeover were to occur upon expiration of the current license, the Licensee would have to be reimbursed for the net investment, not to exceed fair value, of the property taken, plus severance damages. To date, no agency or interested party has recommended a federal takeover of the Project pursuant to Section 14 of the FPA.

D.2.1 Fair Market Value

Fair market value is not defined in the FPA or its implementing regulations. The fair value of the Project depends on prevailing power values and license conditions, both of which are currently subject to change. The best approximation of fair value is likely to be the cost to construct and operate a comparable power generating facility. Because of the high capital costs involved with constructing new facilities and the increase in fuel costs associated with operating such new facilities (assuming a fossil-fueled replacement), the fair value would be considerably higher than the net investment amount. If a takeover were to be proposed, the Licensee would calculate fair value based on then-current conditions.

Essex will provide the fair market value of the Project in the FLA to be filed with the Commission by November 30, 2026.

D.2.2 Net Investment

The FPA defines “net investment” as the original cost, plus additions, minus the sum of the following items (to the extent that such items have been accumulated during the period of the license from earnings in excess of a fair return on such investment): (a) unappropriated surplus; (b) aggregate credit balances of current depreciated accounts; and (c) aggregate appropriations of surplus or income held in amortization, sinking fund, or similar reserves.

Essex will provide the net investment of the Project in the FLA to be filed with the Commission by November 30, 2026.

D.2.3 Severance Damages

Severance damages are determined either by the cost of replacing (retiring) equipment that is "dependent for its usefulness upon the continuance of the License" (Section 14, FPA), or the cost of obtaining an amount of power equivalent to that generated by the Project from the least expensive alternative source, plus the capital cost of constructing any facilities that would be needed to transmit the power to the grid, minus the cost savings that would be realized by not operating the Project. These values would need to be calculated based on power values and license conditions at the time of Project takeover.

D.3 Estimated Cost of New Development

D.3.1 Land and Water Rights

The Licensee currently holds all land and water rights necessary to construct, operate and maintain the Project, and is not proposing expansion of its land or water rights as a consequence of this license application.

D.3.2 Cost of New Developments

The Licensee is not proposing any capacity-related developments at the Project. Essex is proposing a continuation of certain PM&E measures required by the existing license.

D.4 Estimated Average Annual Cost of the Project

This section describes the annual costs of the Project as proposed. The estimated average cost of the total Project will be provided in the FLA to be filed with the Commission on November 30, 2026. This estimate will include costs associated with existing and projected Project operations and maintenance, as well as local property and real estate taxes, but excludes income taxes, depreciation, and costs of financing.

D.4.1 Current Average Annual Cost

The estimated annual costs for the Project are presented in Table D-1.

Table D-1. Lawrence Project Current Average Annual Cost

Description	Cost
Cost of capital (equity and debt)	To be provided in the FLA
Local, state, and federal taxes	
Depreciation and amortization	
Operation and maintenance expenses, including interim replacements, insurance, administrative and general expenses, and contingencies	
Total	

D.4.1 Estimated Future Average Annual Costs

Essex will provide proposed PM&E measures and the associated estimated future average annual costs for the Project (Table D-2) in the FLA to be filed with the Commission by November 30, 2026.

Table D-2. Lawrence Project Estimated Future Average Annual Costs

Description	Cost
Total estimated current average annual cost	To be provided in the FLA

D.5 Estimated Annual Value of Project Power

The Licensee sells all the electricity generated at the Project into the regional grid under a power purchase agreement. The average annual gross energy projection for the Project, and an approximation of the value of Project power, will be provided in the FLA to be filed with the Commission by November 30, 2026.

D.6 Sources and Extent of Financing

Essex is likely to finance any major Project enhancements through a combination of internal funds and third-party loans.

D.7 Cost to Develop the License Application

The cost to develop the license application for the Project, including studies, consultants, and internal management and administrative costs will be provided in the FLA to be filed with the Commission by November 30, 2026.

D.8 On-Peak and Off-Peak Values of Project Power

The Project operates in ROR mode. As per 18 CFR §4.51(e)(8), this section is not applicable to hydroelectric projects operating in ROR mode.

D.9 Estimated Average Annual Increase or Decrease in Generation

Essex proposes a continuation of the current operations and PM&E measures required by the existing license; therefore, there would be no change in generation of Project power from the existing operation and measures under the new license.

Exhibit F. Project Description (18 CFR §4.51(g))

F.1 Design Drawings

The general design drawings showing overall plan views, elevations, and sections of the principal works for the Project will be provided in the FLA to be filed with FERC by November 30, 2026. In accordance with FERC's regulations and guidelines,[14] Essex is requesting that the General Design Drawings for the Project be treated as containing CEII. This request for privileged treatment is being made to the Commission in accordance with the Final Rule (Order No. 630-A) issued by the Commission on July 23, 2003 (revised August 8, 2003).

F.2 Supporting Design Report

Pursuant to 18 CFR §4.41(g)(3), an applicant for a new license is required to file with the Commission two copies of a Supporting Design Report (SDR) when the applicant files a license application. An SDR summarizes the studies that have been performed to date and the assumptions that have been made related to the development of the existing Project. The information contained within the SDR demonstrates that the existing structures are safe and adequate to fulfill their stated functions. The SDR will be filed as a separate cover Volume III (CEII) of the FLA by November 30, 2026.

[14] "Designation of Incoming Dam Safety Documents" https://www.ferc.gov/enforcement-legal/ceii/designation-incoming-dam-safety-documents

Exhibit G. Project Maps (18 CFR §4.51(h))

G.1 Project Boundary Maps

The proposed Project boundary maps for the Lawrence Hydroelectric Project were prepared in accordance with the requirements of 18 CFR §§4.39 and 4.51(h) and show the Project vicinity, location, and boundary to provide a full understanding of the Project. The updated Exhibit G drawings for the Project are listed below in Table G-1 and provided at the end of this Exhibit.

In this DLA, Essex is proposing to modify the Project Boundary to more accurately follow the impoundment's normal maximum elevation of 44.2 feet NGVD29. This proposed boundary around the impoundment shoreline was determined using LiDAR (light detection and ranging) data downloaded from NOAA National Centers for Environmental Information (OCM Partners 2026) and Pictometry Aerial Imagery (EagleView 2026), as well as aerial imagery of the Merrimack River. In addition, several minor modifications to the Project boundary result from incorporating the Project Boundary into modern GIS. The Exhibit G drawings incorporate these proposed Project boundary modifications and minor corrections.

Essex reviewed the existing Exhibit K drawings (aka Exhibit G) which show the Project boundary drawn to the boundary of "Flowage Rights" at the 50-foot NGVD29 contour. However, Essex believes the appropriate Project boundary is shown as "Normal Water Level" because the full extent of the flowage rights acquired by Essex prior to the construction of the Essex Dam was never exercised, i.e., the dam was constructed lower than its original intent so as not to impact upstream waterpower development in Lowell.

As stated elsewhere in this license application, Essex also proposes to remove the North and South canals and associated canal infrastructure from the new FERC license. This will also modify the Project boundary. Accordingly, the Project boundary depicted in the Exhibit G drawings herein has been revised. Table G-12 provides a summary and acreage of proposed changes to the existing FERC Project boundary. Essex possesses property or easement rights to all areas within the defined Project boundary.

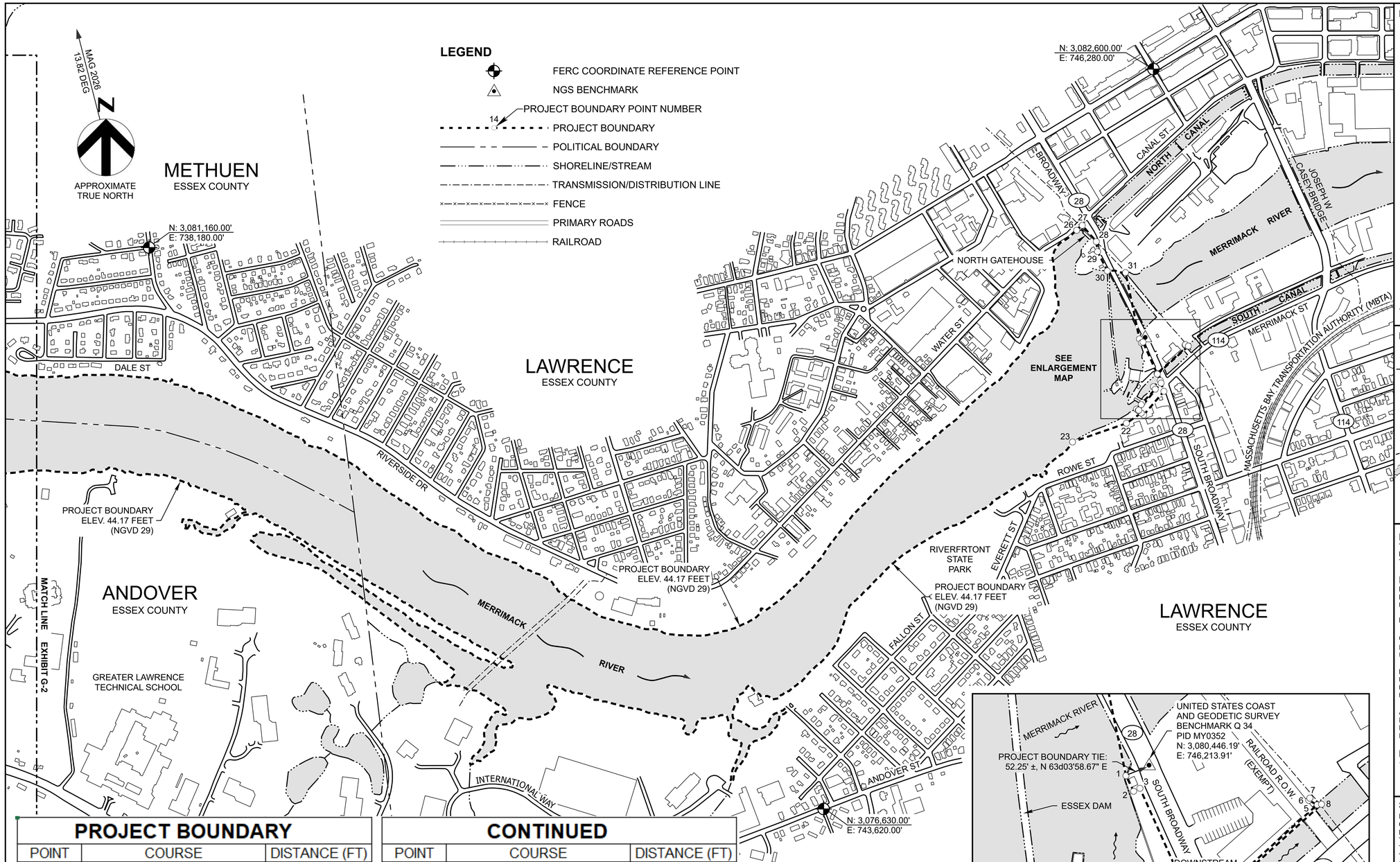
Table G-1. Lawrence Hydroelectric Project Exhibit G Project Boundary Drawings

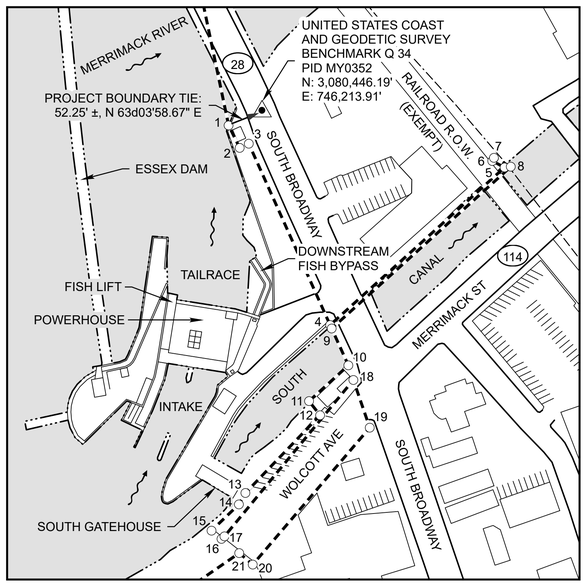
Exhibit No.	FERC Drawing No.	Title
G-1	P-2800-xxx	Project Boundary Map
G-2	P-2800-xxx	Project Boundary Map
G-3	P-2800-xxx	Project Boundary Map
G-4	P-2800-xxx	Project Boundary Map

Table G-2. Summary of Proposed Changes to Project Boundary and Estimated Acreage

Summary of Modification	Estimated Acreage
Removal of the North Canal	To be provided in FLA
Removal of the South Canal	To be provided in FLA

Summary of Modification	Estimated Acreage
Removal of Lands between “Flowage Rights” and removal of lands to more accurately follow the impoundment’s normal maximum elevation of 44.2 feet NGVD29	To be provided in FLA
Removal of a 4,371 square foot parcel adjacent to the South Canal, previously outconveyed for a local diner. See accession numbers 20160120-5062 and 20160307-3035.	0.10





POWERHOUSE AREA ENLARGEMENT MAP

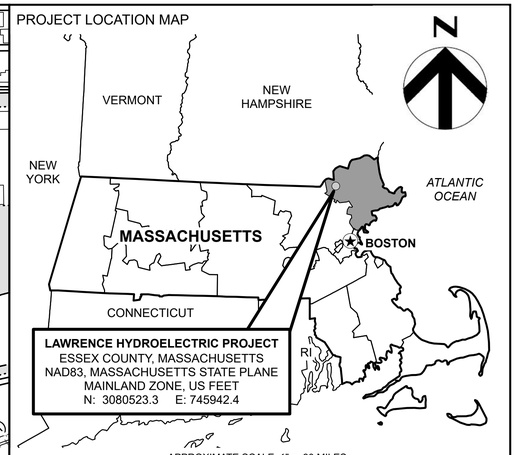
SCALE 1" = 100'

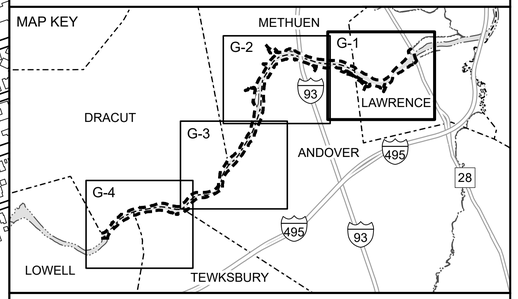
PROJECT BOUNDARY

POINT	COURSE	DISTANCE (FT)
1-2	S 26d19'07.02" E	35.00
2-3	N 65d18'38.06" E	14.00
3-4	S 24d09'02.55" E	277.85
4-5	N 47d53'47.66"E	328.56
5-6	N 62d16'48.32"W	19.42
6-7	N 27d43'07.01"E	5.00
7-8	S 62d16'49.67"E	26.59
8-9	S 47d53'47.83"W	337.35
9-10	S 24d20'38.05" E	56.52
10-11	S 47d41'02.54" W	74.23
11-12	S 37d54'13.34" E	25.11
12-13	S 43d51'51.53" W	150.66
13-14	S 29d39'24.23" W	18.37
14-15	S 46d11'47.34" W	53.00
15-16	S 50d29'42.66" E	18.07

CONTINUED

POINT	COURSE	DISTANCE (FT)
16-17	N 49d32'34.10" E	5.41
17-18	N 39d30'19.48" E	283.24
18-19	S 18d56'20.83" E	70.42
19-20	S 40d30'39.50" W	251.70
20-21	N 49d41'09.49" W	24.77
21-22	S 55d24'51.74" W	145.70
22-23	S 70d52'34.65" W	460.00
23-24	ALONG 44.17' CONTOUR	59,052.72
25-26	ALONG 44.17' CONTOUR	57,488.73
26-27	N 48d19'49.07" E	59.96
27-28	S 40d56'08.64" E	173.25
28-29	S 07d03'27.89" E	81.31
29-30	S 26d43'01.58" E	174.82
30-31	ALONG SHORELINE	150.95
31-1	S 11d49'43.45" E	547.00





PROJECT BOUNDARY TIE DATA

THE PROJECT BOUNDARY IS TIED TO ESSEX COUNTY NATIONAL GEODETIC SURVEY BENCHMARK Q 34, 1965, PID MY0352: N: 3,080,446.19' E: 746,213.91'
TIE POINT 1: 52.25' ±, N 63d03'58.67" E

REFERENCE COORDINATE METADATA

PROJECTION - MASSACHUSETTS STATE PLANE
DATUM - NAD83, MAINLAND ZONE
UNITS - U.S. SURVEY FEET

ELEVATIONS ARE REFERENCED TO NORTH AMERICAN VERTICAL DATUM OF 1929, NGVD29.

GEOREFERENCE SOURCE DATA

DIGITIZED DATA: PICTOMETRY HIGH ACCURACY ORTHOIMAGERY
URL HTTPS://WWW.EAGLEVIEW.COM REPORTED ACCURACY EXCEEDING NMAS (12.3FT) 1:4800.

LIDAR ELEVATION DATA:
UNITED STATES GEOLOGIC SURVEY (USGS) LIDAR POINT CLOUD (LPC),
URL: HTTPS://APPS.NATIONALMAP.GOV 2021 CENTRAL EASTERN MA LIDAR. EXPECTED TO MEET USGS 3DEP, QL2 OR BETTER QUALITY LIDAR DATA WITH USGS BASE SPEC V1.2 PRODUCTS.

ADDITIONAL DATA:
MASSGIS (BUREAU OF GEOGRAPHIC INFORMATION).
BOUNDARY DATA: FERC EXHIBIT K, LAWRENCE HYDROELECTRIC PROJECT DETAIL MAP OF PROJECT AREA, JUNE 28, 1977.

NOTES

1. THE LICENSEE EITHER OWNS IN SIMPLE FEE OR POSSESSES FLOWAGE EASEMENTS OVER ALL LANDS WITHIN THE PROJECT BOUNDARY REQUIRED TO OPERATE THE FACILITY.

SURVEYORS STATEMENT

I HEREBY CERTIFY TO THE FEDERAL ENERGY REGULATORY COMMISSION (FERC) THAT THIS PLAN MEETS THE CONDITIONS SET FORTH BY FERC FOR ITS EXPRESSED PURPOSE. THE PURPOSE OF THIS MAP IS TO PROVIDE A GEOREFERENCED VISUAL DEPICTION OF THE LOCATION OF PROJECT FEATURES AND BOUNDARIES BASED ON THE BEST AVAILABLE HISTORICAL DRAWINGS AND DIGITAL REFERENCE SOURCES INCORPORATED INTO THE GEOGRAPHIC INFORMATION SYSTEM (GIS). LOCATIONS HAVE NOT BEEN VERIFIED BY PHYSICAL FIELD SURVEYS AND THIS DRAWING SHOULD NOT BE USED FOR PURPOSES OF DEVELOPING PROPERTY BOUNDARY DESCRIPTIONS.

RESERVED FOR SURVEYORS STAMP

EXHIBIT G-1 **SHEET 1 OF 4**

LAWRENCE HYDROELECTRIC PROJECT MASSACHUSETTS PROJECT BOUNDARY MAP

400 0 400 800 1,200 1,600

ESSEX COMPANY, LLC **FERC No. 2800**

DATE: JUNE 2025 | SCALE: 1" = 400' | APPROVED: PENDING

DRAFT

FERC NO. P-2800 - XXXX

MAG 2026
13.82 DEG

N

APPROXIMATE
TRUE NORTH

N: 3,082,220.00'
E: 735,730.00'

METHUEN
ESSEX COUNTY

MATCH LINE EXHIBIT G-1

NORTH LOWELL ST

MILL
POND

110

LOWELL ST

RIVERSIDE DR

93

PROJECT BOUNDARY
ELEV. 44.17 FEET
(NGVD 29)

RIVERSIDE DR

METHUEN
ESSEX COUNTY

110

LOWELL ST

MERRIMACK
RIVER

MINUTEMAN RD

PROJECT BOUNDARY
ELEV. 44.17 FEET
(NGVD 29)

NEW ENGLAND BUSINESS CENTER DR

OLD RIVER RD

93

CAMPANELLI DR

RIVER RD

GRIFFIN
BROOK
POND

MINUTEMAN RD

RETELLE
RESERVATION

1776 DR

RIVER RD

N: 3,076,270.00'
E: 733,410.00'

BRUNDRETT AVE

PINE
ISLAND

ANDOVER
ESSEX COUNTY

MATCH LINE EXHIBIT G-1

FISH BROOK

METHUEN
ESSEX COUNTY

110

LOWELL BLVD

PROJECT BOUNDARY
ELEV. 44.17 FEET
(NGVD 29)

RIVER RD

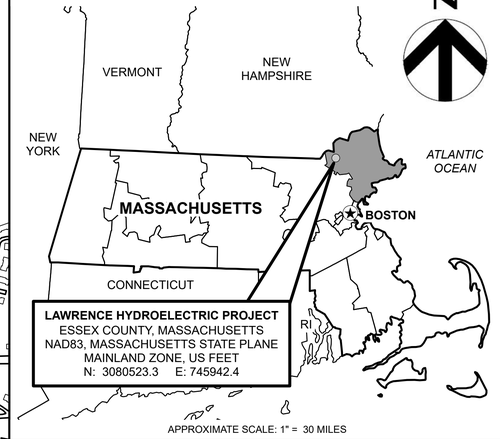
N: 3,074,130.00'
E: 726,860.00'

MATCH LINE EXHIBIT G-3

LEGEND

- FERC COORDINATE REFERENCE POINT
- NGS BENCHMARK
- 14 PROJECT BOUNDARY POINT NUMBER
- PROJECT BOUNDARY
- POLITICAL BOUNDARY
- SHORELINE/STREAM
- TRANSMISSION/DISTRIBUTION LINE
- FENCE
- PRIMARY ROADS
- RAILROAD

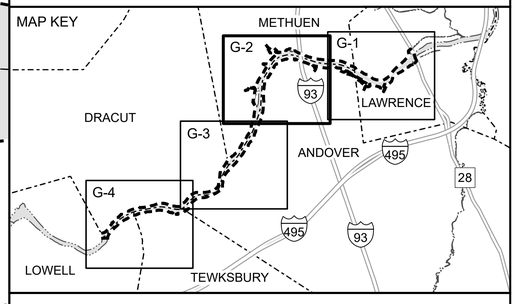
PROJECT LOCATION MAP



LAWRENCE HYDROELECTRIC PROJECT
ESSEX COUNTY, MASSACHUSETTS
NAD83, MASSACHUSETTS STATE PLANE
MAINLAND ZONE, US FEET
N: 3080523.3 E: 745942.4

APPROXIMATE SCALE: 1" = 30 MILES

MAP KEY



PROJECT BOUNDARY TIE DATA

THE PROJECT BOUNDARY IS TIED TO ESSEX COUNTY NATIONAL GEODETIC SURVEY
BENCHMARK Q 34, 1965, PID MY0352: N: 3,080,446.19' E: 746,213.91'
TIE POINT 1: 52.25' ±, N 63d03'58.67" E

REFERENCE COORDINATE METADATA

PROJECTION - MASSACHUSETTS STATE PLANE
DATUM - NAD83, MAINLAND ZONE
UNITS - U.S. SURVEY FEET

ELEVATIONS ARE REFERENCED TO NORTH AMERICAN VERTICAL DATUM OF 1929, NGVD29.

GEOREFERENCE SOURCE DATA

DIGITIZED DATA: PICTOMETRY HIGH ACCURACY ORTHOIMAGERY
URL HTTPS://WWW.EAGLEVIEW.COM REPORTED ACCURACY EXCEEDING NMAS (12.3FT) 1:4800.

LIDAR ELEVATION DATA:
UNITED STATES GEOLOGIC SURVEY (USGS) LIDAR POINT CLOUD (LPC).
URL: HTTPS://APPS.NATIONALMAP.GOV 2021 CENTRAL EASTERN MA LIDAR. EXPECTED TO MEET USGS 3DEP, QL2 OR BETTER QUALITY LIDAR DATA WITH USGS BASE SPEC V1.2 PRODUCTS.

ADDITIONAL DATA:
MASSGIS (BUREAU OF GEOGRAPHIC INFORMATION).
BOUNDARY DATA: FERC EXHIBIT K, LAWRENCE HYDROELECTRIC PROJECT DETAIL MAP OF PROJECT AREA, JUNE 28, 1977.

NOTES

1. THE LICENSEE EITHER OWNS IN SIMPLE FEE OR POSSESSES FLOWAGE EASEMENTS OVER ALL LANDS WITHIN THE PROJECT BOUNDARY REQUIRED TO OPERATE THE FACILITY.

SURVEYORS STATEMENT

I HEREBY CERTIFY TO THE FEDERAL ENERGY REGULATORY COMMISSION (FERC) THAT THIS PLAN MEETS THE CONDITIONS SET FORTH BY FERC FOR ITS EXPRESSED PURPOSE. THE PURPOSE OF THIS MAP IS TO PROVIDE A GEOREFERENCED VISUAL DEPICTION OF THE LOCATION OF PROJECT FEATURES AND BOUNDARIES BASED ON THE BEST AVAILABLE HISTORICAL DRAWINGS AND DIGITAL REFERENCE SOURCES INCORPORATED INTO THE GEOGRAPHIC INFORMATION SYSTEM (GIS). LOCATIONS HAVE NOT BEEN VERIFIED BY PHYSICAL FIELD SURVEYS AND THIS DRAWING SHOULD NOT BE USED FOR PURPOSES OF DEVELOPING PROPERTY BOUNDARY DESCRIPTIONS.

RESERVED FOR SURVEYORS STAMP

EXHIBIT G-2 **SHEET 2 OF 4**

LAWRENCE HYDROELECTRIC PROJECT
MASSACHUSETTS
PROJECT BOUNDARY MAP

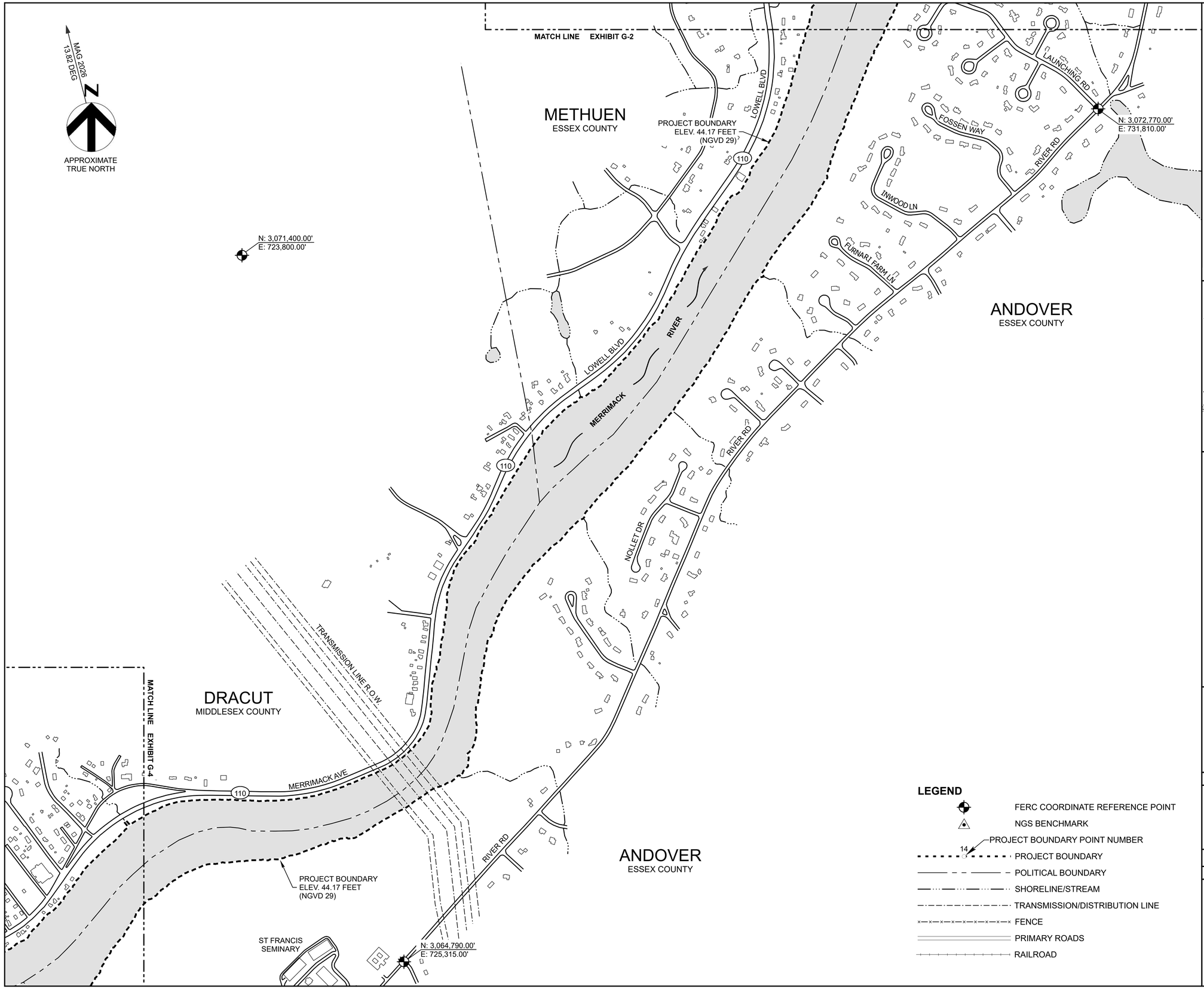
400 0 400 800 1,200 1,600

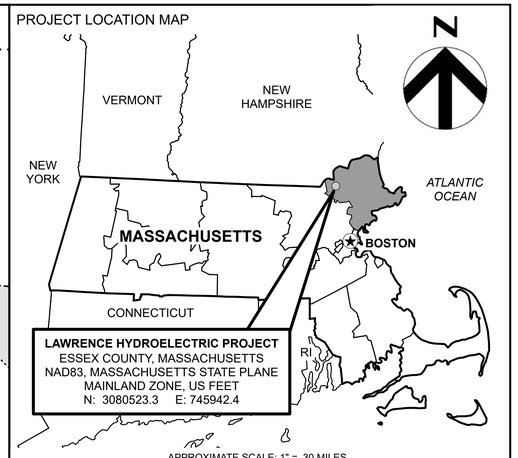
ESSEX COMPANY, LLC **FERC No. 2800**

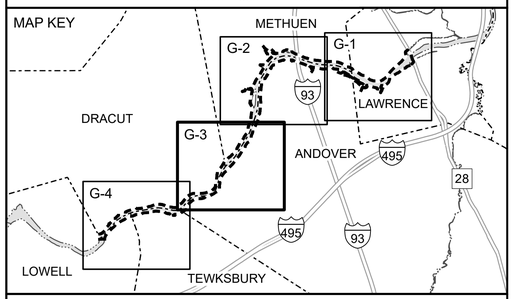
DATE: JUNE 2025	SCALE: 1" = 400'	APPROVED: PENDING

DRAFT

FERC NO. P-2800 - XXXX







PROJECT BOUNDARY TIE DATA

THE PROJECT BOUNDARY IS TIED TO ESSEX COUNTY NATIONAL GEODETIC SURVEY
BENCHMARK Q 34, 1965, PID MY0352: N: 3,080,446.19' E: 746,213.91'
TIE POINT 1: 52.25' ±, N 63d03'58.67" E

REFERENCE COORDINATE METADATA

PROJECTION - MASSACHUSETTS STATE PLANE
DATUM - NAD83, MAINLAND ZONE
UNITS - U.S. SURVEY FEET

ELEVATIONS ARE REFERENCED TO NORTH AMERICAN VERTICAL DATUM OF 1929, NGVD29.

GEOREFERENCE SOURCE DATA

DIGITIZED DATA: PICTOMETRY HIGH ACCURACY ORTHOIMAGERY
URL HTTPS://WWW.EAGLEVIEW.COM REPORTED ACCURACY EXCEEDING NMAS (12.3FT) 1:4800.

LIDAR ELEVATION DATA:
UNITED STATES GEOLOGIC SURVEY (USGS) LIDAR POINT CLOUD (LPC).
URL: HTTPS://APPS.NATIONALMAP.GOV 2021 CENTRAL EASTERN MA LIDAR. EXPECTED TO MEET USGS 3DEP, QL2 OR BETTER QUALITY LIDAR DATA WITH USGS BASE SPEC V1.2 PRODUCTS.

ADDITIONAL DATA:
MASSGIS (BUREAU OF GEOGRAPHIC INFORMATION).
BOUNDARY DATA: FERC EXHIBIT K, LAWRENCE HYDROELECTRIC PROJECT DETAIL MAP OF PROJECT AREA, JUNE 28, 1977.

NOTES

1. THE LICENSEE EITHER OWNS IN SIMPLE FEE OR POSSESSES FLOWAGE EASEMENTS OVER ALL LANDS WITHIN THE PROJECT BOUNDARY REQUIRED TO OPERATE THE FACILITY.

SURVEYORS STATEMENT

I HEREBY CERTIFY TO THE FEDERAL ENERGY REGULATORY COMMISSION (FERC) THAT THIS PLAN MEETS THE CONDITIONS SET FORTH BY FERC FOR ITS EXPRESSED PURPOSE. THE PURPOSE OF THIS MAP IS TO PROVIDE A GEOREFERENCED VISUAL DEPICTION OF THE LOCATION OF PROJECT FEATURES AND BOUNDARIES BASED ON THE BEST AVAILABLE HISTORICAL DRAWINGS AND DIGITAL REFERENCE SOURCES INCORPORATED INTO THE GEOGRAPHIC INFORMATION SYSTEM (GIS). LOCATIONS HAVE NOT BEEN VERIFIED BY PHYSICAL FIELD SURVEYS AND THIS DRAWING SHOULD NOT BE USED FOR PURPOSES OF DEVELOPING PROPERTY BOUNDARY DESCRIPTIONS.

RESERVED FOR SURVEYORS STAMP

LEGEND

- FERC COORDINATE REFERENCE POINT
- NGS BENCHMARK
- 14 PROJECT BOUNDARY POINT NUMBER
- PROJECT BOUNDARY
- POLITICAL BOUNDARY
- SHORELINE/STREAM
- TRANSMISSION/DISTRIBUTION LINE
- FENCE
- PRIMARY ROADS
- RAILROAD

EXHIBIT G-3 **SHEET 3 OF 4**

LAWRENCE HYDROELECTRIC PROJECT
MASSACHUSETTS
PROJECT BOUNDARY MAP

400 0 400 800 1,200 1,600

ESSEX COMPANY, LLC **FERC No. 2800**

DATE: JUNE 2025	SCALE: 1" = 400'	APPROVED: PENDING

DRAFT

FERC NO. P-2800 - XXXX

MAG 2026
13.82 DEG

N

APPROXIMATE
TRUE NORTH

N: 3,065,820.00'
E: 716,560.00'

DRACUT
MIDDLESEX COUNTY

PROJECT BOUNDARY
ELEV. 44.17 FEET
(NGVD 29)

MERRIMACK AVE

110

MERRIMACK RIVER

MATCH LINE EXHIBIT G-3

PROJECT BOUNDARY
ELEV. 44.17 FEET
(NGVD 29)

MERRIMAC DR

TRULL BROOK
GOLF COURSE

TRULL BROOK

N: 3,062,280.00'
E: 722,280.00'

RIVER RD

LOWELL
MIDDLESEX COUNTY

MERRIMACK AVE

RIVER RD

MERRIMACK MEADOWS LN

BURNHAM RD

ST MARY'S
CEMETERY

LOWELL CITY WASTE
WATER DEPARTMENT

25

24

HERITAGE DR

VETERANS OF FOREIGN WARS HWY

EAST MERRIMACK ST

RAVEN RD

ANDOVER ST

133

N: 3,059,290.00'
E: 712,430.00'

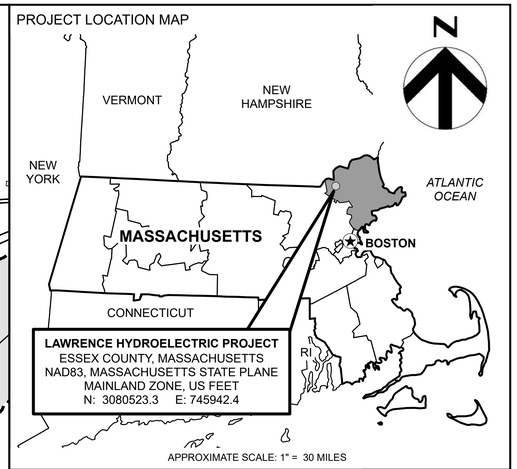
TEWKSBURY
MIDDLESEX COUNTY

PROJECT BOUNDARY		
POINT	COURSE	DISTANCE (FT)
23-24	ALONG 44.17' CONTOUR	59,052.72
24-25	S 86d46'38.06" W	618.76
25-26	ALONG 44.17' CONTOUR	57,488.73

LEGEND

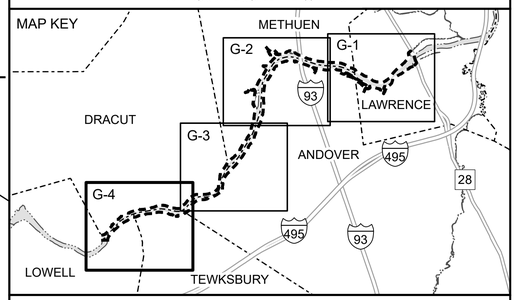
- FERC COORDINATE REFERENCE POINT
- NGS BENCHMARK
- PROJECT BOUNDARY POINT NUMBER (14)
- PROJECT BOUNDARY
- POLITICAL BOUNDARY
- SHORELINE/STREAM
- TRANSMISSION/DISTRIBUTION LINE
- FENCE
- PRIMARY ROADS
- RAILROAD

PROJECT LOCATION MAP



APPROXIMATE SCALE: 1" = 30 MILES

MAP KEY



PROJECT BOUNDARY TIE DATA

THE PROJECT BOUNDARY IS TIED TO ESSEX COUNTY NATIONAL GEODETIC SURVEY
BENCHMARK Q 34, 1965, PID MY0352: N: 3,080,446.19' E: 746,213.91'
TIE POINT 1: 52.25' ±, N 63d03'58.67" E

REFERENCE COORDINATE METADATA

PROJECTION - MASSACHUSETTS STATE PLANE
DATUM - NAD83, MAINLAND ZONE
UNITS - U.S. SURVEY FEET

ELEVATIONS ARE REFERENCED TO NORTH AMERICAN VERTICAL DATUM OF 1929, NGVD29.

GEOREFERENCE SOURCE DATA

DIGITIZED DATA: PICTOMETRY HIGH ACCURACY ORTHOIMAGERY
URL HTTPS://WWW.EAGLEVIEW.COM REPORTED ACCURACY EXCEEDING NMAS (12.3FT) 1:4800.

LIDAR ELEVATION DATA:
UNITED STATES GEOLOGIC SURVEY (USGS) LIDAR POINT CLOUD (LPC),
URL: HTTPS://APPS.NATIONALMAP.GOV 2021 CENTRAL EASTERN MA LIDAR. EXPECTED TO MEET USGS 3DEP, QL2 OR BETTER QUALITY LIDAR DATA WITH USGS BASE SPEC V1.2 PRODUCTS.

ADDITIONAL DATA:
MASSGIS (BUREAU OF GEOGRAPHIC INFORMATION).
BOUNDARY DATA: FERC EXHIBIT K, LAWRENCE HYDROELECTRIC PROJECT DETAIL MAP OF PROJECT AREA, JUNE 28, 1977.

NOTES

1. THE LICENSEE EITHER OWNS IN SIMPLE FEE OR POSSESSES FLOWAGE EASEMENTS OVER ALL LANDS WITHIN THE PROJECT BOUNDARY REQUIRED TO OPERATE THE FACILITY.

SURVEYORS STATEMENT

I HEREBY CERTIFY TO THE FEDERAL ENERGY REGULATORY COMMISSION (FERC) THAT THIS PLAN MEETS THE CONDITIONS SET FORTH BY FERC FOR ITS EXPRESSED PURPOSE. THE PURPOSE OF THIS MAP IS TO PROVIDE A GEOREFERENCED VISUAL DEPICTION OF THE LOCATION OF PROJECT FEATURES AND BOUNDARIES BASED ON THE BEST AVAILABLE HISTORICAL DRAWINGS AND DIGITAL REFERENCE SOURCES INCORPORATED INTO THE GEOGRAPHIC INFORMATION SYSTEM (GIS). LOCATIONS HAVE NOT BEEN VERIFIED BY PHYSICAL FIELD SURVEYS AND THIS DRAWING SHOULD NOT BE USED FOR PURPOSES OF DEVELOPING PROPERTY BOUNDARY DESCRIPTIONS.

RESERVED FOR SURVEYORS STAMP

EXHIBIT G-4 **SHEET 4 OF 4**

LAWRENCE HYDROELECTRIC PROJECT
MASSACHUSETTS
PROJECT BOUNDARY MAP

400 0 400 800 1,200 1,600

ESSEX COMPANY, LLC **FERC No. 2800**

DATE: JUNE 2025	SCALE: 1" = 400'	APPROVED: PENDING

DRAFT

FERC NO. P-2800 - XXXX

Exhibit H. Ability to Operate (18 CFR §5.18(c))

This exhibit is still under development and will be included in its entirety in the Final License Application (FLA) to be filed with the Commission by November 30, 2026.

H.1 Licensee's Ability to Provide Reliable Electric Service (18 CFR §5.18(c)(1)(i)(A))

H.1.1 Increase in Capacity or Generation

Essex currently has no plans to increase the capacity or generation of the Project as part of this relicensing.

H.1.2 Coordination of Operation with Upstream and Downstream Projects

Essex does not coordinate the operation of the Project with other projects located upstream.

H.1.3 Coordination of Operation with Electrical Systems to Minimize Cost of Production

Essex does not coordinate the operation of the Project with other projects or electric systems.

H.2 Need for Project Power (18 CFR §5.18(c)(1)(i)(B))

H.2.1 Cost and Availability of Alternative Sources of Power

The Project generates emissions-free, renewable power and the electric output from the Project is sold wholesale into the New England Independent Systems Operator (NEISO) administered market. The replacement of energy and capacity provided by the Project would be met through other sources, likely to be fossil-fired generating units, whose fuel and other variable costs would be significantly higher than those of the Project.

H.2.2 Increase in Fuel, Capital, and Other Costs to Purchase or Generate Replacement Power

If the Licensee is not granted a license, this Project would cease to provide affordable, clean electricity to the NEISO. The NEISO and its wholesale customers would need to obtain the annual equivalent capacity and energy from other sources capable for meeting peak demands, and the cost and availability of alternative sources of power would be determined by suppliers available to

NEISO. An un-quantified increase in costs would likely occur to the electric consumer in the region if a license for continued operation of the Project was not granted.

H.2.3 Effect of Alternative Power Sources on Licensee's Customers, Operating and Load Characteristics, and Communities Served

This section is not applicable to the Licensee since the Licensee sells its electricity into NEISO.

H.3 Reasonable Cost and Availability of Alternative Sources of Power (18 CFR §5.18(c)(1)(i)(C))

H.3.1 Average Annual Cost of Power

The estimated annual costs for the Lawrence Project are presented in Table H-1.

Table H-1. Lawrence Project Current Average Annual Cost

Description	Cost
Cost of capital (equity and debt)	To be provided in the FLA
Local, state, and federal taxes	
Depreciation and amortization	
Operation and maintenance expenses, including interim replacements, insurance, administrative and general expenses, and contingencies	
Total	

H.3.2 Projected Resources to Meet Licensee's Capacity and Energy Requirements over the Short and Long Term

To be provided in the FLA.

H.4 Use of Power for Applicant-owned Industrial Facility (18 CFR §5.18(c)(1)(i)(D))

Essex does not own any industrial facilities; therefore, this section is not applicable.

H.5 Native American Tribe as Applicant (CFR §5.18(c)(1)(i)(E))

Essex is not a Native American tribe; therefore, this section is not applicable.

H.6 Impacts of Receiving or not Receiving a License on Licensee's Operations of the Transmission Facility (18§5.18(c)(1)(i)(F))

Because the Licensee is an independent power producer and does not own the local transmission system, this section is not applicable to the Licensee.

H.7 Modifications to Project Facilities (18 CFR §5.18(c)(1)(i)(G)

The Licensee is not proposing any capacity changes or modifications to the Project facilities. Relicensing and continued operation of the Project will continue to be compatible with the comprehensive development and utilization of the waterway and conform to the various comprehensive natural resource plans developed by resource management agencies, as discussed below.

H.8 Consistency with Comprehensive Plans (18 CFR §5.18(c)(1)(i)(H))

Section 10(a)(1) and (2) of the FPA requires the Commission to consider the extent to which a project is consistent with federal or state comprehensive plans for improving, developing, or conserving a waterway or waterways affected by a project. The Commission's Scoping Document 2 (SD2) identified nineteen comprehensive plans that are potentially relevant to the Project. The Licensee has reviewed the Commission's list of comprehensive plans, which are listed below. Essex will further consider the Project's consistency with these plans during the development of the FLA.

1. Atlantic States Marine Fisheries Commission. 1995. Interstate fishery management plan for Atlantic striped bass. (Report No. 24). March 1995.
2. Atlantic States Marine Fisheries Commission. 1998. Amendment 1 to the Interstate Fishery Management Plan for Atlantic sturgeon (Acipenser oxyrhynchus oxyrhynchus). (Report No. 31). July 1998.
3. Atlantic States Marine Fisheries Commission. 1998. Interstate fishery management plan for Atlantic striped bass. (Report No. 34). January 1998.
4. Atlantic States Marine Fisheries Commission. 1999. Amendment 1 to the Interstate Fishery Management Plan for shad and river herring. (Report No. 35). April 1999.
5. Atlantic States Marine Fisheries Commission. 2000. Interstate Fishery Management Plan for American eel (Anguilla rostrata). (Report No. 36). April 2000.
6. Atlantic States Marine Fisheries Commission. 2000. Technical Addendum 1 to Amendment 1 of the Interstate Fishery Management Plan for shad and river herring. February 9, 2000.
7. Atlantic States Marine Fisheries Commission. 2008. Amendment 2 to the Interstate Fishery Management Plan for American eel. Arlington, Virginia. October 2008.

8. Atlantic States Marine Fisheries Commission. 2009. Amendment 2 to the Interstate Fishery Management Plan for shad and river herring, Arlington, Virginia. May 2009.
9. Atlantic States Marine Fisheries Commission. 2010. Amendment 3 to the Interstate Fishery Management Plan for shad and river herring, Arlington, Virginia. February 2010.
10. Atlantic States Marine Fisheries Commission. 2013. Amendment 3 to the Interstate Fishery Management Plan for American eel. Arlington, Virginia. August 2013.
11. Atlantic States Marine Fisheries Commission. 2014. Amendment 4 to the Interstate Fishery Management Plan for American eel. Arlington, Virginia. October 2014.
12. Massachusetts Department of Environmental Management. n.d. Commonwealth connections: A greenway vision for Massachusetts. Boston, Massachusetts.
13. Massachusetts Division of Fisheries and Wildlife. 2015. Massachusetts State Wildlife Action Plan 2015. Westborough, Massachusetts. October 2015.
14. National Marine Fisheries Service. 1998. Final Amendment #11 to the Northeast Multispecies Fishery Management Plan; Amendment #9 to the Atlantic sea scallop Fishery Management Plan; Amendment #1 to the monkfish Fishery Management Plan; Amendment #1 to the Atlantic salmon Fishery Management Plan; and Components of the Proposed Atlantic herring Fishery Management Plan for Essential Fish Habitat. Volume 1. October 7, 1998.
15. National Marine Fisheries Service. 1998. Final Recovery Plan for the shortnose sturgeon (Acipenser brevirostrum). Prepared by the Shortnose Sturgeon Recovery Team for the National Marine Fisheries Service, Silver Spring, Maryland. December 1998.
16. National Park Service. The Nationwide Rivers Inventory. Department of the Interior, Washington, D.C. 1993.
17. Technical Committee for Fishery Management of the Merrimack River Basin. 2021. Merrimack River Watershed Comprehensive Plan for Diadromous Fishes. U.S. Fish and Wildlife Service. 1989.
18. Atlantic salmon restoration in New England: Final environmental impact statement 1989-2021. Department of the Interior, Newton Corner, Massachusetts. May 1989.
19. U.S. Fish and Wildlife Service and Canadian Wildlife Service. 1986. North American waterfowl management plan. Department of the Interior. Environment Canada. May 1986.

H.9 Financial and Personnel Resources (18 CFR §5.18(c)(1)(i)(I))

H.9.1 Financial Resources

Essex is dedicated to operating the Project in a safe and reliable manner to provide clean renewable electric energy to the electricity grid. As demonstrated under the existing license, Essex has the financial resources to meet the operation, maintenance, and capital requirements of the Project.

Operations, maintenance, environmental and license compliance, modification, technical and administrative activities required for the Project are performed and supported by employees and contractors of Essex. Essex will provide additional details related to personnel resources in the FLA to be filed with the Commission by November 30, 2026.

H.10 Expansion of Project Lands (18 CFR §5.18(c)(1)(i)(J))

At this time, Essex does not anticipate a proposed expansion of Project lands at the Project.

H.11 Electricity Consumption Efficiency Improvement Program (18 CFR §5.18(c)(1)(i)(K))

Because the Licensee is an independent power producer, this section is not applicable to the Project.

H.12 Names and Addresses of Native American Tribes (18 CFR §5.18(c)(1)(i)(L))

The Project is not located on Native American lands. Essex and the Commission consulted with the following federally recognized Native American tribes that may be affected by the Project throughout the relicensing process and in support of cultural resource studies. The following is a list of Native American Tribes that have been consulted by the Licensee (via distribution of the NOI, PAD, ILP filings) and by FERC:

Mashpee Wampanoag Tribe
483 Great Neck Road South
Mashpee, MA 02649
Wampanoag Tribe of Gay Head (Aquinnah)
20 Black Brook Road
Aquinnah, MA 02535

Penobscot Nation
23 Wabanaki Way
Indian Island, Maine 04468Narragansett Indian Tribe
PO Box 268
Charlestown, RI 02813

Stockbridge Munsee Tribe of Mohican Indians
N8467 Moh He Con Nuck Road
Bowler, WI 54416

H.13 Safe Management, Operation, and Maintenance of the Project (18 CFR §5.18(c)(1)(ii)(B))

H.13.1 Operating During Flood Conditions

A description of operations during flood conditions is provided in Exhibit B of this Final License Application.

H.13.2 Proposed Project Operation and Emergency Action Plan

To be provided in the FLA.

H.13.3 Warning Devices for Downstream Public Safety

Essex maintains public safety measures at the Project for public safety upstream, in the vicinity of, and downstream of the Project pursuant to the Commission-approved Public Safety Plan. More information to be provided in the FLA.

H.13.4 Monitoring Devices

More information to be provided in the FLA.

H.13.5 Employee Safety and Public Safety Record

Essex manages the Project consistent with its long-standing commitment to employee safety. This commitment begins with compliance with applicable local, state, and federal regulations regarding the safe operation of industrial and electrical facilities.

More information to be provided in the FLA.

H.14 Current Operation of the Project (18 CFR §5.18(c)(1)(ii)(C))

The Project has been operated in a manner consistent with the requirements of the current license. Details regarding operation and constraints of the Project are discussed in Exhibit B of this application. The Project will continue to operate in a manner consistent with the requirements of the current license until the new license is issued, after which time the Project will be operated in accordance with the requirements and conditions of the new license.

H.15 Project History (18 CFR §5.18(c)(1)(ii)(D))

A summary of the history of the Project, including recent operation and maintenance upgrades, are provided in Exhibit C of this application.

H.16 Summary of Generation Lost at the Project Due to Unscheduled Outages (18 CFR §5.18(c)(1)(ii)(E))

A summary of unscheduled outages for the Project over the past five years will be provided in the FLA.

H.17 Record of Compliance (18 CFR §5.18(c)(1)(ii)(F))

Essex has operated the Project in accordance with the FERC license with no violations. In accordance with the license, under Article 32, the Project operates in ROR mode and fulfills the minimum flow requirement.

On June 7, 2017, the City of Lawrence, Conservation Law Foundation, Groundwork Lawrence, Inc., Lawrence Community Works, Inc., 60 Island Street LLC, Everett Mills Real Estate LLC, GES Realty LLC, and Pacific Mills Acquisition LLC (Complainants) filed a complaint against the Licensee alleging multiple violations of its FERC license. On May 16, 2019, FERC's DHAC conducted a site visit. Subsequently, DHAC issued a response to the complaint on August 8, 2019, finding no violation of the license. On September 9, 2019, Complainants filed a Request for Rehearing, which was subsequently denied on March 19, 2020.

Following a Regional Engineer's inspection of the Project on August 4, 1998, FERC requested operational data from June 1 through August 31, 1998. In response, LHA provided the operational data in a letter dated October 13, 1998. On December 7, 1998, FERC concluded the Project was operated in a manner consistent with the minimum flow requirements of Article 32.

H.18 Actions that Affect the Public (18 CFR §5.18(c)(1)(ii)(G))

Essex holds that past actions and future actions related to the Project will not adversely affect the public. To the contrary, Essex believes that actions by the Licensee are favorable to the public in that the Project provides clean, renewable electric energy as well as other non-power benefits associated with the Project.

H.19 Expenses Affected by Transfer of License (18 CFR §5.18(c)(1)(ii)(H))

There is presently no proposal or application to transfer the Project license from the existing Licensee; therefore, this section is not applicable.

H.20 Annual Fees Under Part I of the Federal Power Act (FPA) (18 CFR §5.18(c)(1)(ii)(I))

Given that there are no federal or Native American lands associated with the Project, Essex does not pay annual fees under Part 1 of the FPA.

Literature Cited

EagleView. 2026. Aerial Imagery & Geospatial Solutions. https://www.eagleview.com/product/aerial-imagery/

Essex Company, LLC (Essex). 2014. Eel Passage Plan. Lawrence Hydroelectric Project.

_____. 2019. Fishways Operation and Maintenance Plan. Prepared by Normandeau Associates.

_____. 2020. Lawrence Hydroelectric Project (FERC No. 2800). Certification Application.

Federal Energy Regulatory Commission (FERC). 1978. Lawrence Hydroelectric Project (P-2800). Order Issuing Major License and Authorizing Negotiations for Sale of Securities.

Lawrence Hydroelectric Associates (LHA). 1983. Lawrence Hydroelectric Project (P-2800). Revised Exhibits K, L, and M. [Online] URL: https://elibrary.ferc.gov/eLibrary/filelist?accession_number=19831208-0308&optimized=false

_____. 1999. Comprehensive Fish Passage Plan for the Lawrence Hydroelectric Project FERC Project No. 2800.

_____. 2008. Lawrence Hydroelectric Project (FERC No. 2800-MA) Crest Gate System Operation Plan.

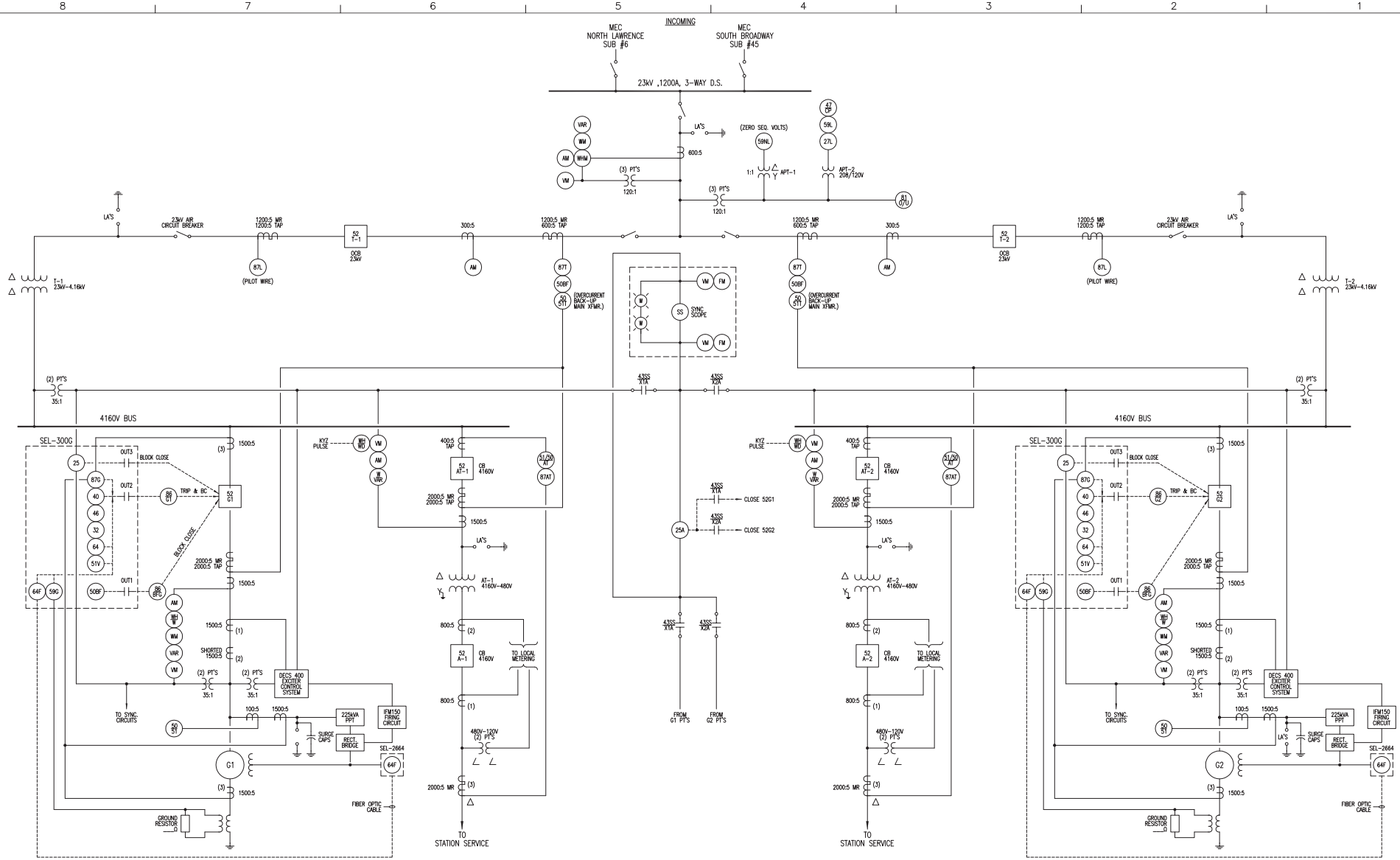
Massachusetts Executive Office of Energy and Environmental Affairs (MEOEEA). 2001. Merrimack River: A Comprehensive Watershed Assessment Report, 2001.

OCM Partners. 2026. 2021 USGS Lidar DEM: Central Eastern Massachusetts from 2010-06-15 to 2010-08-15. NOAA National Centers for Environmental Information, https://www.fisheries.noaa.gov/inport/item/75261.

U.S. Geological Survey [USGS] 2023a. NWIS Site Information for USA: Site Inventory. USGS 01100500 Merrimack River at Lawrence, MA. Accessed January 17, 2023. [Online] URL: https://waterdata.usgs.gov/nwis/inventory?site_no=01100500&agency_cd=USGS

_____. 2023b. Merrimack River BL Concord River At Lowell, MA. Online [URL]: https://waterdata.usgs.gov/monitoring-location/01100000/#parameterCode=00065&period=P7D

Appendix A – Single-Line Diagram



REVISION		
1	1/22/10	AS RECORDED

DFTR: SXL	DATE: 08/27/09	EATON | Electrical Services & Systems	
ENGR: IP	DATE: 08/27/09	TITLE: ENEL – LAWRENCE HYDRO STATION ONE-LINE DIAGRAM	
SCALE: NONE		TYPE: X	ONE-LINE
CAD FILENAME: EMP00130-3-01	PRODUCT CODE: X	REVISION: 1	G.O.: EMP00130
DWG: EMP00130-3-01	SHEET: 1 OF 1		

Appendix B – Copies of Project FERC License, Amendments, and 401 WQC

UNITED STATES OF AMERICA
FEDERAL ENERGY REGULATORY COMMISSION

Before Commissioners: Charles B. Curtis, Chairman; Georgiana Sheldon, and George

Lawrence Hydroelectric Associates and Essex Company) Project No. 2800
) Docket No. ES78-44

ORDER ISSUING MAJOR LICENSE AND AUTHORIZING NEGOTIATIONS FOR SALE OF SECURITIES

(Issued December 4, 1978)

On June 30, 1977, Lawrence Hydroelectric Associates ("Applicant" or "LHA") filed an application 1/ for a major license for the proposed Lawrence Hydroelectric Project, FERC No. 2800. The project would be located in Lawrence, Massachusetts, on the Merrimack River, a navigable waterway of the United States. 2/

Public Notice

Public notice of the application for Project No. 2800 was given. Eight organizations and governmental bodies filed petitions to intervene. Seven were granted intervention and the eighth petitioner was granted permission to withdraw its request for intervention. The issues and concerns raised by the various intervenors are addressed below.

The Secretary of the Commission requested comments on the application from appropriate federal and state agencies pursuant to Section 4(e) of the Federal Power Act. 3/ Applicant responded to these comments by letters dated June 21 and July 11, 1978. The significant issues raised in the various agency letters and Applicant's responses are also presented below.

1/ This proceeding was commenced before the Federal Power Commission (FPC). By regulation of October 1, 1977 (10 CFR 1000.0), it was transferred to the Federal Energy Regulatory Commission (FERC). In this order, the term "Commission" refers to the FPC for actions or statements that occured before October 1, 1977; otherwise it refers to the FERC.

2/ Order Issuing License for Project No. 1893 (issued May 5, 1949) found the Merrimack River to be navigable.

3/ 16 U.S.C. 797(e).

Status of Applicant

Applicant, Lawrence Hydroelectric Associates, is a limited partnership organized pursuant to the laws of Massachusetts. LHA consists of a number of individual partners with limited liability and a general partner, the Essex Development Associates (EDA), also a Massachusetts partnership. As proposed in its application, Lawrence Hydroelectric Associates will be responsible for the construction of the project as well as the subsequent generation and sale of electric power.

The Essex Company (Essex), a Massachusetts' corporation, owns the water rights, flowage rights, and easements which are integral to the proposed project. Under the terms of an existing stock option agreement, EDA will acquire control of the Essex Company and make available to LHA all necessary properties and rights.

Given the relationships which exist among LHA, EDA, and Essex, any license for Project No. 2800 should be issued jointly to Lawrence Hydroelectric Associates and the Essex Company. LHA has indicated that it would take the steps necessary to make the Essex Company accept a joint license, if the Commission desires. Accordingly, we issue a joint license to LHA and Essex, effective for a period of 50 years, beginning December 1, 1978, and terminating November 30, 2028.

Project Description

The Lawrence Hydroelectric Project will provide 14.8 megawatts of capacity and an average annual generation of 91,100 megawatt hours. 4/ The project will consist of an existing dam, reservoir, and canal works plus a new powerhouse. The existing dam (known as the Great Stone Dam), the North Canal, and gatehouse were built between 1845 and 1848. In 1866 the South Canal and its gates were constructed and in 1896 the South Canal was expanded.

Safety

The Great Stone Dam has been analyzed for stability and found to be safe for loading conditions under maximum

---

4/ This hydroelectric energy production will be based primarily on a run-of-the-river operation and will save the equivalent of approximately 149,600 barrels of oil or 42,000 tons of coal per year.

flood flows, normal reservoir elevation with ice, and normal reservoir elevation with earthquake. Our staff has also inspected the existing portions of the project and found them to be in satisfactory condition. Applicant filed on March 2, 1978, an engineering consultant's field inspection and office report which found the dam to be sound and capable of continued use. The consultant suggested that additional subsurface explorations be made during excavation for the new powerhouse to ensure that the dam is founded on competent rock and to verify that there has been no undercutting at the contact of the dam with the foundation bedrock. Special Article 37 has been inserted in the license to require Licensees to make additional investigations by subsurface explorations during excavations for the powerhouse. If there is a need for remedial work, Article 37 also requires Licensees to submit a plan and schedule for such work to the Director of the Office of Electric Power Regulation.

Transmission Facilities

The electrical equipment associated with the turbine-generator units will be located in the powerhouse structure. No substations or switchyards will be constructed. Energy produced by the Lawrence Hydroelectric Project will travel approximately 2,500 feet via a 13.8 kV overhead power line to the existing Lawrence substation No. 1 of the Massachusetts Electric Company. The energy will then flow into the interconnected system of the New England Power Company. Thus, the transmission facilities to be included as part of Project No. 2800 consist of one 13.8 kV line approximately 2,500 feet long and appurtenant facilities to connect to the existing substation.

Fish and Wildlife

The National Marine Fisheries Service (NMFS) of the Department of Commerce, the Fish and Wildlife Service (FWS) of the Department of the Interior, the Office of the Secretary of the Department of the Interior (Interior), and the Division of Fisheries and Game of the Commonwealth of Massachusetts commented on the possible effects of the proposed project on fish and wildlife resources.

Interior noted that "[t]errestrial wildlife resources will not be affected by project construction or operation due to the fact that the project is located in an urban industrial area."

With regard to fisheries, Interior noted that Applicant had consulted with the Policy and Technical Committees for Anadromous Fishery Management of the Merrimack River. As a result, Applicant's proposal for fish passage and related facilities incorporated the comments and plans of the Massachusetts Division of Marine Fisheries, Massachusetts Division of Fisheries and Game, the New Hampshire Fish and Game Department, NMFS, and FWS.

NMFS expressed concern with respect to the protection and safety of adult shortnose sturgeon during downstream migration. Applicant met with officials from NMFS and provided that agency with sufficient information to demonstrate that adequate safeguards are incorporated in the project design. NMFS subsequently reported that, based on the additional information, it now concludes that the project will not have an adverse effect on any population of shortnosed sturgeon in the Merrimack River.

The FWS and the Massachusetts Division of Fisheries and Game both stated that no significant adverse impacts on fish species are expected from the construction or operation of Project No. 2800.

On January 27, 1978, Applicant filed an Exhibit S which incorporated the comments of the aforementioned agencies and which generally conforms to this Commission's Rules and Regulations. The Exhibit S, however, contains conceptual plans, and not functional design drawings for fish passage facilities. Therefore, the Exhibit S is approved only to the extent that it proposes measures to conserve and enhance fishery resources affected by the project and conceptual plans for fishways. Special Article 30 has been included in the license to require Licensees to file functional design drawings for fish passage facilities to be constructed at the project and to file "as-built" drawings following construction of the facilities.

Articles 15 and 16, 31 and 33 of the license for the Lawrence Hydroelectric Project also relate to fish and fish passage facilities. Articles 15 and 16 provide for the installation of additional fish passage facilities should they become necessary. Special Article 31 requires Licensees

to conduct operational studies and to file a final report to the Commission on the effectiveness of the proposed fish ladder. Special Article 33 provides for monitoring of the fish passage facilities for determining the presence of threatened or endangered species, and implementing any measures necessary to protect and conserve such species.

Navigation

The U.S. Army Corps of Engineers (Corps) reported that the proposed Lawrence Hydroelectric Project will not be in conflict with any existing or anticipated Corps projects; that it will have no effect on the navigability of the Merrimack River; and that the plans of the structures for Project No. 2800 are approved in accordance with the provisions of Section 4(e) of the Federal Power Act. 5/

Water Quality and Minimum Flow

Interior reported that "[t]here is a need for determining instantaneous minimum flow requirements at this and other upstream dams." Interior added that until the upstream minimum flows are determined, a minimum release of 400 cfs should be required from the Lawrence Project. Once minimum releases are set for upstream dams, Interior recommended increasing Project No. 2800's minimum flow from 400 cfs to 890 cfs.

The Massachusetts Division of Water Pollution Control (MDWPC) commented on the effect of the proposed project on the water quality of the Merrimack River. MDWPC stated in its letter of July 5, 1978, that "the Division was concerned lest the regimen of the river would be so changed through the operation of the proposed facility that the Class B standard would be violated." MDWPC determined that a minimum of 951 cfs should be released from the Great Stone Dam to maintain the "B" classification for the Merrimack River. MDWPC then issued, in accordance with the Federal Water Pollution Control Act, 6/ a Water Quality Certificate. The certificate subjects the project to a minimum release of 951 cfs unless and until the reservoir water surface elevation is drawn below the crest of the dam; thereupon the required minimum release would be equal to inflow.

5/ We are not including a special article requiring the licensee to comply with the Federal Water Pollution Control Act Amendments of 1972, §404, because it would be superfluous.

6/ See Section 401 of the Federal Water Pollution Control Act Amendments of 1972.

Applicant noted in response that the ability to maintain minimum releases from the Great Stone Dam in excess of those recommended by Interior had been demonstrated to FWS and the Policy Committee for Anadromous Fishery Management of the Merrimack River. In reference to the minimum releases required by the Water Quality Certificate, Applicant stated that the project will be operated in a manner that will not cause a violation of applicable water quality standards.

Article 32 of the license requires Licensees to maintain a continuous minimum flow of 951 cfs, unless and until the reservoir water surface elevation is drawn below the crest of the dam; thereupon the minimum release must equal inflow.

Recreation

Project No. 2800 will be located in a highly industrial area bounded by numerous light industries such as shoe and electronics manufacturers. 7/ The industrial nature of the area limits recreational development at the Lawrence Project. Notwithstanding this limitation, Applicant submitted an Exhibit R recreation plan which will allow public access and enjoyment of the historical aspects of the project area as well as the new power generating facility. In its Exhibit R, Applicant proposes to provide a parking area, sanitary facilities, access walkways to fish viewing facilities, picnic tables, and trash receptacles. Applicant also proposes to provide a multi-media slide/tape presentation on hydroelectric generation, the functioning of the fish passage facilities, and the history of the Great Stone Dam.

In these circumstances we conclude that the Exhibit R is adequate and should be approved.

Cultural Resources

The Great Stone Dam and the North Canal, two structures listed in the National Register of Historic Places, are part of the Lawrence Hydroelectric Project. The South Canal and its associated gatehouse structure are eligible, as determined by the Secretary of the Interior, for inclusion in the National Register. These cultural resources will not be adversely affected by the redevelopment and operation of hydroelectric facilities for Project No. 2800.

7/ These light industries occupy buildings that once housed the textile mills for which the Great Stone Dam and canal system was constructed. At the turn of the century, the Lawrence textile center was the largest in the world.

Pursuant to the National Historic Preservation Act of 1966, 8/ the Commission's Staff, in conjunction with the Massachusetts Historical Commission, determined that Project No. 2800 would not adversely affect the historical structures. The Massachusetts State Historical Preservation Officer concurred in the "no adverse determination" report and suggested that the Advisory Council on Historic Preservation (Advisory Council) be notified. By letter dated August 21, 1978, the Advisory Council reported that it does not object to the no adverse determination report and that the project may proceed.

Environmental Impacts

Redevelopment and operation of the Lawrence Hydroelectric Project will not significantly affect the human environment. The major project works - the dam, reservoir, and canal system - have been in existence for more than a century. Construction of the new powerhouse could cause some temporary turbidity of the river near the work site; this impact, however, will be short term and minor in nature. The project will be operated in a manner that duplicates the historical operation of the dam and canals. The operating procedures will permit the continuation of traditional uses of the river and adjacent lands. For the above reasons, approval of the application for major license for the Lawrence Hydroelectric Project does not constitute a major Federal action significantly affecting the quality of the human environment.

Exhibits

As part of its application for major license, Applicant filed exhibits F, J, K, L, M, R, and S. As previously discussed, the Exhibit R is approved and the Exhibit S is approved only to the extent that it proposes measures to conserve and enhance fishery resources affected by the project and shows conceptual fishway plans. The Exhibit J, which is a general map of the entire project area, complies with the Commission's regulations and is also approved.

Exhibits F, K, L, and M are incomplete. The Exhibit K does not define the project boundary line by a contour or a survey as required by our regulations. In addition, the Exhibit K does not indicate the owners of land adjacent to the project boundary. The Exhibit F does not fully

---

8/ 16 U.S.C. 470f, as amended, 90 Stat. 1320.

describe lands owned by Applicant or to be used as part of the project. Article 36 requires Licensees to file revised Exhibits L and M showing final designs and locations of project works prior to construction. Article 41 requires Licensees to file revised Exhibits F and K within three years from the date of issuance of this order.

Intervenors Comments

The Andover Village Improvement Society (AVIS), Massachusetts Municipal Wholesale Electric Company (MMWEC), Merrimack Valley Building Trades Council, New England Power Company (NEPCO), the Town of Andover, Massachusetts, the Town of Metheun, Massachusetts, and Mayor L. P. LeFebre on behalf of the City of Lawrence, Massachusetts have been permitted to intervene in this proceeding. 9/ AVIS, the Town of Metheun, the Town of Andover, and the City of Lawrence all own or lease lands adjacent to the project. These intervenors are concerned with the possible impacts the hydroelectric facility may have upon the public's use and enjoyment of those lands. The municipalities also draw water for public consumption from the Merrimack River and they are concerned with potential impacts on the public water supplies. According to the petitions, AVIS and the municipalities have intervened in order to ensure that the Lawrence Hydroelectric Project will be operated in a manner which duplicates the historical operation of the dam and canals of the Essex Company. AVIS and the municipalities have each requested that a special article be included in the license to restrict Licensees' ability to alter the project's mode of operation. Except for emergencies, the operation of the Lawrence Hydroelectric Project would be carried out pursuant to Article 32 of this license. We would approve a change only after public notice and an opportunity for hearing. We believe that these procedures are adequate to protect the concerns of AVIS and the municipalities and, therefore, the suggested articles have not been inserted in the license. We further note that Article 13 of this license provides for the joint use of the project reservoir or other facilities by municipalities, industrial concerns, and others.

9/ Merrimac Paper Company and Aquamac Corporation filed a joint petition to intervene, but were permitted to withdraw that petition.

Intervenor New England Power Company had been in negotiations with Applicant concerning the purchase of electricity from Project No. 2800. In its petition, NEPCO alleged that the terms and conditions of any license obtained by Applicant may have an effect on the availability, reliability, and cost of power from the Lawrence Hydroelectric Project. Intervenor Massachusetts Municipal Wholesale Electric Company stated in its petition that it, too, had been negotiating the acquisition and use of the output of Project No. 2800. On October 27, 1978, Applicant filed with the Commission copies of a power contract dated October 25, 1978, between Lawrence Hydroelectric Associates and New England Power Company. That filing eliminates the issues and interests asserted in the petitions filed by NEPCO and MMWEC.

The final intervenor in the proceedings concerning the application for the Lawrence Hydroelectric Project is the Merrimack Valley Building Trades Council (Council). The Council intervened to show its support for the project and to request that a license be promptly issued to Applicant.

Economic Feasibility

The Commission's staff has estimated the annual cost of hydroelectric energy to be produced at Project No. 2800. Based on estimated costs in 1981, the year the project becomes operational, the total project cost would be $23,413,000. Using a 50 year amortization period, the total estimated annual cost of energy produced at the Lawrence Hydroelectric Project would be $4,274,000 which is equivalent to 46.9 mills per kWh. This estimated annual cost figure assumes that assets and mill powers owned by the Essex Company are not capitalized but carried as part of the annual variable charges.

On October 27, 1978, Applicant filed copies of a power contract between LHA and New England Power Company. Under the terms of the contract, NEPCO will make monthly payments sufficient to cover LHA's debt service obligations and to pay the cost of operating and maintaining the project during the term of the license. Accordingly, we find the proposed project economically and financially feasible. 10/

10/ This finding should not be construed as prejudging any Commission rate review that may be required in the future under Parts I or II of the Federal Power Act.

Issuance of Securities

On June 1, 1978, LHA, Applicant in Docket No. ES78-44, filed a petition with the Federal Energy Regulatory Commission seeking a declaratory order disclaiming jurisdiction pursuant to Section 204 (16 USC 824c(a) and 20 (16 USC 813) of the Federal Power Act and Part 34 of the Commission's Regulations under the Federal Power Act (18 CFR Part 34), requiring prior Commission authorization for the issuance of securities to finance the project. Alternatively, the Applicant requested Commission authorization to engage in negotiations for the sale or underwriting of securities pursuant to Section 34.2(f)(2) of the Commission's Regulations (18 CFR 34.2(f)(2)).

On November 20, 1978, LHA renewed its petition for a declaratory order disclaiming Commission jurisdiction over the issuance of securities to finance the project.

Sections 34.1a(a)(4) and 34.2(f)(2) of the Commission's Regulations under the Federal Power Act (18 CFR 34.1a(a)(4) and 34.2(f)(2)) require Commission authorization for the negotiation for the sale or underwriting of securities. Section 34.1 of the Commission's Regulations (18 CFR 34.1) applies the requirement of prior Commission authorization for the sale or underwriting of securities to "...licensees and others seeking authority under Section 19 and 20 of the Federal Power Act...in accordance with Part 20 11/ of the subchapter..." and to "... public utilities seeking under Section 204 of the Federal Power Act."

Applicant, becoming a licensee by issuance of this order, is required to file an application for the issuance of securities pursuant to Section 204 of the Federal Power Act.

11/ Section 20.2 of the Commission's Regulations (18 CFR 20.2) states that licensee or other person issuing or proposing to issue securities shall comply with the same requirements as the Commission would administer to it as if it were a public utility issuing securities pursuant to Section 204 of the Federal Power Act.

LHA's alternative request for Commission authorization to engage in negotiation for the issuance of securities states that the proposed financing would require complex arrangements with the equipment supplier, the general contractor and the sources of debt and equity funds. Applicant further states that this project is its first venture and believes that financing could not be arranged other than on a negotiated basis and therefore requests that the Commission exempt it from the competitive bidding requirements of Part 34 of the Commission's Regulations.

Upon good cause shown the Commission has determined that the LHA should not be precluded by the second clause of Seciton 34.2(f)(2) or the next to the last sentence of Section 34.1(a)(4) of the Commission's Regulations under the Federal Power Act from applying for and obtaining an order of the Commission exempting the proposed underwriting and sale of securities from the competitive bidding requirements of Part 34 of the Commission's Regulations. Therefore, LHA is hereby authorized, pursuant to its request, to engage in negotiations for the sale of securities subject to the following:

(1) Licensees will be required to file a separate application requesting Commission approval for the issuance of securities pursuant to final negotiated terms;

(2) The authorization granted by this order is solely for the purpose of engaging in negotiations and shall have no other or further effect, and shall be without prejudice to the consideration on the merits of any application which may be filed; and

(3) The provisions hereof shall not be construed as dispensing with the necessity for full compliance with any of the applicable requirements of the Securities Act of 1933, the Securities Exchange Act of 1934, or any order, rule or regulation thereunder.

Comprehensive Development

The Great Stone Dam is situated within the Merrimack River Basin which has a drainage area of 5,015 square miles of which 4,460 lie above the dam. The average flow of the river in the vicinity of the Great Stone Dam is 7,430 cfs varying from an approximate average of 2,300 cfs in September to about 17,200 cfs in April. Applicant proposes to install two, high efficiency, bulb type turbine generator units each rated at 7,400 kw.

The Lawrence Hydroelectric Project would reasonably develop the usuable head at the project site. Located about 11 miles upstream of the Great Stone Dam is the Pawtuckett Dam, FERC No. 2790. Between the two dams the land on both sides of the Merrimack River is heavily developed by commercial and industrial concerns. In this stretch of the river there is approximately 10 feet of undeveloped head. Increasing the height of the Great Stone Dam, and thereby flooding additional land in order to develop that 10 feet of head would not be economically feasible. Accordingly, we conclude that the project as conditioned in this order is best adapted to a comprehensive plan of development of the waterway.

The Commission orders:

(A) This license is issued under Section 4(e) of the Federal Power Act to Lawrence Hydroelectric Associates and the Essex Company of Lawrence, Massachusetts, effective December 1, 1978, and terminating November 30, 2028, for the construction, operation, and maintenance of the Lawrence Hydroelectric Project No. 2800, located on the Merrimack River, a navigable waterway of the United States, subject to the terms and conditions of the Act, which is incorporated by reference as part of this license, and subject to such rules and regulations as the Commission issues or prescribes under the provisions of the Act.

(B) Project No. 2800 consists of: (i) all lands, to the extent of the Licensees' interest in those lands, constituting the project area and enclosed by the project boundary, the project area and boundary being shown and described by certain exhibits which form part of the application for license and are designated and described as:

Exhibit	FERC Drawing No. 2800	Titled
J-1	1	General Map of the Project Project Area
K-1	2	Detail Map of the Project Area
K-2	3	"
K-3	4	"
K-4	5	"
K-5	6	"
K-6	7	"

(ii) Project works consisting of: (1) the existing 33-foot high and 900-foot-long dam of rubble masonry construction; (2) an existing 9.8-mile-long reservoir having a surface area of 655 acres at normal high water elevation 44.17 msl and a maximum storage capacity of approximately 19,900 acre-feet; (3) the existing South Canal approximately 35 feet wide and 10 feet deep, originating at the south abutment of the Essex Dam and generally paralleling the Merrimack River bed, below the Essex Dam, for a distance of approximately 2,750 feet; (4) the existing North Canal, approximately 95 feet wide and 15 feet deep, originating at the north abutment of the dam and paralleling the Merrimack River below the dam for a distance of approximately 5,300 feet; (5) a fish elevator installed at the dam and a fish ladder; (6) a powerhouse containing two 7.4 MW hydroelectric generating units and a tailrace channel extending into the Merrimack River Channel; (7) a single-circuit overhead 13.8-kV powerline to the Massachusetts Electric Company's Lawrence No. 1 substation; and (8) appurtenant facilities which are generally shown and described by the previously mentioned exhibits and specifically described by the following exhibits:

Exhibit	FERC Drawing No. 2800	Titled
L-1	8	Powerhouse Plan
L-2	9	Powerhouse and Section Details
L-3	10	Existing Essex Dam Plan-Profile Section
L-4	11	Existing Canals-North
L-5	12	Canal, Wasteway Plans and Sections

Exhibit M

Entitled, "Description of Major Equipment", consisting of 12 typewritten pages filed January 27, 1978.

Exhibit R

Filed June 30, 1977, and as supplemented on November 15, 1977, and January 27, 1978, consisting of: (1) 7 pages of text; (2) 5 pages of photographs; (3) Plate 1; (4) Exhibit R Map, Sheet 1, entitled "Recreation Plan Extended Project Area", (FERC No. 2800-13), and Exhibit R Drawing, Sheet 2, entitled "Recreation Plan Immediate Project Area", (FERC No. 2800-14); and (5) Appendix 1.

Exhibit S

Filed June 30, 1977, consisting of: (1) 5 pages of text; (2) 1 page of photographs; (3) 2 tables; and (4) 2 drawings, entitled "Conceptual Plan of Proposed Fish Elevator System at Lawrence Hydro Plant", (Plate 1) and "Schematic Elevation Fish Elevator or Fish Lift System", (Plate 2).

(iii) All of the structures, fixtures, equipment, facilities or property which may be employed in connection with the project, located on or off the project area, as approved by the Commission, and all riparian or other rights, which are necessary or appropriate for the maintenance or operation of the project.

(C) Exhibits K, L, and M, designated and described in Paragraph (B) above, are hereby approved and made a part of the license only to the extent that they show the general location and layout of the project. Exhibit S, also designated and described in Paragraph (A), is also approved and made a part of the license only to the extent that it proposes measures to conserve and enhance fishery resources affected by the project and conceptual plans for fishways.

(D) Exhibits J and R designated and described in Paragraph (B) above, are hereby approved and made a part ot the license.

(E) This license is also subject to the terms and conditions set forth in FERC Form L-4 (revised October 1975) entitled "Terms and Conditions of License for Unconstructed Major Projects Affecting Navigable Waters of the United

States." These terms, designated as Articles 1 through 28, are made a part of the license. This license is also subject to the following special conditions set forth as additional articles:

ARTICLE 29: Licensees shall continue to cooperate with the Massachusetts Historical Commission in order to avoid any adverse impact on identified historic structures at the project. In addition, if any previously unrecorded archeological resources are discovered during the course of construction, construction activity shall be halted, a qualified archeologist shall be consulted to determine the significance of the resources, and the Licensees shall consult with the Massachusetts Historical Commission and the State Archeologist to develop a mitigation plan for the protection of significant archeological resources. Licensees shall provide funds in a reasonable amount for any salvage activities which may be necessary. If at any point the Licensee and the Executive Director of the Massachusetts Historical Commission (State Historic Preservation Officer) cannot agree on the amount of money to be expended on archeological work at the project, the Commission reserves the right, after notice and opportunity for hearing, to require the Licensees to conduct at their own expense such archeological work as may be found necessary.

ARTICLE 30: Licensees shall, within two years after the date of issuance of this license, file, for Commission approval, a revised Exhibit S developed in cooperation with the U. S. Fish and Wildlife Service, the National Marine Fisheries Service, and the Massachusetts Division of Fisheries and Game. The revised Exhibit S shall include, but not be limited to, functional design drawings of the fish lift and passage facilities to be constructed at the project, a construction schedule, and cost estimates for the facilities. Within six months from the date of completion of construction of the fish passage facilities, Licensee shall file with the Commission "as built" drawings.

ARTICLE 31: Licensees shall, within two years following completion of construction of the fish passage facilities, in cooperation with the U. S. Fish and Wildlife Service, National Marine Fisheries Service, and the Massachusetts Division of Fisheries and Game, conduct or pay for others to conduct an operational study to determine the effectiveness of the fish passage facilities in assisting the migration of anadromous fish. A final report containing the results of the study, together with recommendations of any need for further studies or for changes in operation of fish passage

facilities, shall be filed with the Commission within six months following completion of the study. The Commission reserves the right, after notice and opportunity for hearing, to require additional studies and require such reasonable changes in the project's fish passage facilities and operations as may be found necessary to maintain fish migration.

ARTICLE 32: Licensees shall maintain a continuous minimum flow of 951 cfs unless and until the reservoir water surface elevation is reduced below the crest of the dam; thereupon the minimum flow shall equal the inflow to the reservoir. The release of minimum flows from the reservoir shall be made at locations determined in cooperation with the U. S. Fish and Wildlife Service, the National Marine Fisheries Service, and the Commonwealth of Massachusetts. A report developed in consultation and cooperation with these agencies, indicating the location and quantities to be released from project outlet works, shall be filed with the Commission within one year from the date of issuance of this order. Such established flows may be modified temporarily if required by operating emergencies and other emergencies beyond the control of the Licensees; and for short periods of time in the interest of recreation and protection of the fisheries resource, upon mutual agreement between the Licensees and the Massachusetts Division of Fisheries and Game.

These flow requirements may be altered by further order of the Commission, upon its own motion, or upon the recommendations of the Commonwealth of Massachusetts or the Secretary of the Interior, after notice and opportunity for hearing.

ARTICLE 33: Licensees shall, in cooperation with the U. S. Fish and Wildlife Service, the National Marine Fisheries Service and the Massachusetts Division of Fisheries and Game, monitor or arrange for the monitoring of the fish lift and passage facilities when in operation, for the purpose of determining the presence of threatened or endangered fish species such as the shortnose sturgeon, and, if any are found, Licensees shall implement measures to protect and conserve any such species that may pass through the project works. A monitoring plan shall be submitted to the Commission within one year after the initial operation of the project.

ARTICLE 34: Licensees shall, to the satisfaction of the Commission's authorized representative, install and operate

any signs, lights, sirens, or other safety devices that may reasonably be needed to warn the public of fluctuations in flow from the project and protect the public in its recreational use of project lands and waters.

ARTICLE 35: In the interest of protecting and enhancing the scenic, recreational, and other environmental values of the project, Licensees: (1) shall supervise and control the use and occupancy of project lands and waters; (2) shall prohibit, without further Commission approval, the further use and occupancy of project lands and waters other than as specifically authorized by this license; (3) may authorize, without further Commission approval, the use and occupancy of project lands and waters for landscape plantings and the construction, operation, maintenance of access roads, power and telephone distribution lines, piers, landings, boat docks, or similar structures and facilities, and embankments, bulkheads, retaining walls, or other similar structures for erosion control to protect the existing shoreline; (4) shall require, where feasible and desirable, the multiple use and occupancy of facilities for access to project lands and waters; and (5) shall ensure to the satisfaction of the Commission's authorized representative that all authorized uses and occupancies of project lands and waters: (a) are consistent with shoreline aesthetic values, (b) are maintained in a good state of repair, and (c) comply with State and local health and safety regulations. Under item (3) of this Article, Licensees may, among other things, institute a program for issuing permits to a reasonable extent for the authorized types of use and occupancy of project lands and waters. Under appropriate circumstances, permits may be subject to the payment of a fee in a reasonable amount. Before authorizing construction of bulkheads or retaining walls, Licensees shall: (a) inspect the site of the proposed construction, (b) determine that the proposed construction is needed, and (c) consider whether the planting of vegetation or the use of riprap would be adequate to control erosion at the site. If an authorized use or occupancy fails to comply with the conditions of this Article, or with any reasonable conditions imposed by the Licensees for the protection of the environmental quality of project lands and waters, Licensees shall take appropriate action to correct the violations, including, if necessary, cancellation of the authorization and removal of any noncomplying structures or facilities. Licensees' consent to an authorized use or occupancy of project lands and waters shall not, without their express agreement, place upon the Licensees any obligation to construct or maintain any associated facilities. Within

one year of issuance of this license, Licensees shall furnish a copy of their guidelines and procedures used to implement the provisions of this Article to the Commission's authorized representative and its Director, Office of Electric Power Regulation. Whenever Licensees make any modifications to those guidelines and procedures, they shall promptly furnish a copy to each of those persons. The Commission reserves the right to require modifications to these guidelines and procedures.

ARTICLE 36: Licensees shall file, for Commission approval, revised Exhibit L drawings and an Exhibit M showing final designs and locations of project works. Licensees shall not begin construction of any such project structures until the Director, Office of Electric Power Regulation, has approved the Exhibit L drawings.

ARTICLE 37: Licensees shall, within one year from the date of issuance of this license, make additional investigations by subsurface explorations during the excavations for the powerhouse, to ensure that the dam is founded on competent rock and to verify that there has been no undercutting at the contact of the dam with the foundation bedrock. A final report containing the results of the investigation, together with a recommendation of any need for further studies or for remedial work, shall be filed with the Commission within six months following completion of the investigation. If the investigation shows a need for remedial work, Licensees shall submit as part of the final report a plan and schedule for such work for approval by the Director, Office of Electric Power Regulation.

ARTICLE 38: Pursuant to Section 10(d) of the Act, after the first 20 years of operation of the project under the license, the rate as computed below shall be the specified rate of return on the net investment in the project for determining surplus earnings of the project for the establishment and maintenance of amortization reserves. One-half of the project surplus earnings, if any, accumulated after the first 20 years of operation under the license, in excess of the specified rate of return per annum on the net investment, shall be set aside in a project amortization reserve account as of the end of each fiscal year: Provided, that, if and to the extent that there is a deficiency of project earnings below the specified rate of return per annum for any fiscal year or years after the first 20 years of operation under the license, the amount of any surplus earnings accumulated thereafter until absorbed, and one-half of the remaining surplus earnings, if any, thus cumulatively computed, shall be set aside in the project amortization

reserve account; and the amounts thus established in the project amortization reserve account shall be maintained until further order of the Commission.

The annual specified reasonable rate of return shall be the sum of the weighted cost components of long-term debt, preferred stock, and the cost of common equity, as defined herein. The weighted cost component for each element of the reasonable rate of return is the product of its capital ratios and cost rate. The current capital ratios for each of the above elements of the rate of return shall be calculated annually based on an average of 13 monthly balances of amounts properly includable in the Licensee's long-term debt and proprietary capital accounts as listed in the Commission's Uniform System of Accounts. The cost rates for such ratios shall be the weighted average cost of long-term debt and preferred stock for the year, and the cost of common equity shall be the interest rate on 10-year government bonds (reported as the Treasury Department's 10-year constant maturity series) computed on the monthly average for the year in question plus four percentage points (400 basis points).

Article 39: The Licensees shall pay the United States the following annual charge, effective as of the first day of the month in which this license is issued for the purpose of reimbursing the United States for the cost of administration of Part I of the Act: a reasonable annual charge as determined by the Commission in accordance with the provisions of its regulations, in effect from time to time The authorized installed capacity for such purposes is 19,700 horsepower.

Article 40. Licensees shall file with the Commission within one year from the date of issuance of this order, implement, and modify when appropriate, an emergency action plan designed to provide an early warning to upstream and downstream inhabitants and property owners if there should be an impending or actual sudden release of water caused by an accident to, or failure of, project works. That plan shall include: instructions to be provided on a continuing basis to operators and attendants for actions they are to take in the event of an emergency; detailed and documented plans for notifying law enforcement agents, appropriate Federal, State, and local agencies, operators of water-related facilities, and those residents and owners of properties that could be endangered; actions that would be taken to reduce the inflow to the reservoir, if possible, by limiting the outflow from upstream dams

or control structures; and actions to reduce downstream flows by controlling the outflow from dams located on tributaries to the stream on which the project is located. Licensee shall also submit a summary of the study used as a basis for determining the areas that may be affected by an emergency, including criteria and assumptions used. Licensee shall monitor any changes in upstream or downstream conditions which may influence possible flows or affect areas susceptible to damage, and shall promptly make and file with the Commission appropriate changes in the emergency action plan. The Commission reserves the right to require modifications to the plan.

Article 41: The Licensees shall, within three years following the date of issuance of the license, file a revised Exhibit F and, for Commission approval, an Exhibit K to show the project as finally constructed and located pursuant to the Commission's regulations.

Article 42: The Licensees shall commence construction of the project within one year of the date of issuance of the license, and shall thereafter in good faith and with due diligence prosecute and complete construction of the project works within four years of the date of issuance.

(F) Licensees are authorized to engage in negotiations for the sale of securities subject to the following:

(1) Licensees are required to file a separate application requesting Commission approval for the issuance of securities pursuant to final negotiated terms;

(2) The authorization granted by this order is solely for the purpose of engaging in negotiations and shall have no other or further effect, and shall be without prejudice to the consideration on the merits of any application which may be filed; and

(3) The provisions hereof shall not be construed as dispensing with the necessity for full compliance with any of the applicable requirements of the Securities Act of 1933, the Securities Exchange Act of 1934, or any order, rule or regulation thereunder.

(G) This order shall become final 30 days from the date of its issuance unless application for rehearing shall be filed as provided in Section 313(a) of the Act, and failure to file such an application shall constitute acceptance of the license for Project No. 2800. In acknowledgment of this acceptance of the license and its terms and conditions, the license shall be signed for the Licensees and returned to the Commission within 60 days from the date of issuance of this order.

By the Commission.

(S E A L)

Lois D. Cashell,
Acting Secretary.

Project No. 2800

In Testimony of its acknowledgement of acceptance of all provisions, terms and conditions of the foregoing order, Lawrence Hydroelectric Associates this _____ day of _____, 197__, has caused its partnership name to be signed hereto by _____, Partner and authorized representative and attested by _____ _____ Partner, pursuant to a resolution of its members duly adopted on the _____ day of _____, 197__, a certified copy of the record of which is attached hereto.

By _____
Partner and authorized representative

Attest:

_____
Partner

(Executed in Quadruplicate)

Project No. 2800

In Testimony of its acknowledgement of acceptane of all provisions, terms and conditions of the foregoing order, the Essex Company this _____ day of _____ , 197__, has caused its corporate name to be signed hereto by _____, Chairman of the Board of Directors and its Corporate Seal to be affixed hereto and attested by _____, its _____Secretary, pursuant to a resolution of its Board of Directors duly adopted on the ____ day of _____, 197__, a certified copy of the record of which is attached hereto.

By _____
Chairman of the Board
of Directors

Attest:

_____
Secretary

(Executed in Quadruplicate)

Form L-4
(Revised October, 1975)

FEDERAL ENERGY REGULATORY COMMISSION

TERMS AND CONDITIONS OF LICENSE FOR UNCONSTRUCTED MAJOR PROJECT AFFECTING NAVIGABLE WATERS OF THE UNITED STATES

Article 1. The entire project, as described in this order of the Commission, shall be subject to all of the provisions, terms, and conditions of the license.

Article 2. No substantial change shall be made in the maps, plans, specifications, and statements described and designated as exhibits and approved by the Commission in its order as a part of the license until such change shall have been approved by the Commission: Provided, however, That if the Licensee or the Commission deems it necessary or desirable that said approved exhibits, or any of them, be changed, there shall be submitted to the Commission for approval a revised, or additional exhibit or exhibits covering the proposed changes which, upon approval by the Commission, shall become a part of the license and shall supersede, in whole or in part, such exhibit or exhibits theretofore made a part of the license as may be specified by the Commission.

Article 3. The project works shall be constructed in substantial conformity with the approved exhibits referred to in Article 2 herein or as changed in accordance with the provisions of said article. Except when emergency shall require for the protection of navigation, life, health, or property, there shall not be made without prior approval of the Commission any substantial alteration or addition not in conformity with the approved plans to any dam or other project works under the license or any substantial use of project lands and waters not authorized herein; and any emergency alteration, addition, or use so made shall thereafter be subject to such modification and change as the Commission may direct. Minor changes in project works, or in uses of project lands and waters, or divergence from such approved exhibits may be made if such changes will not result in a decrease in efficiency, in a material increase in cost, in an adverse environmental impact, or in impairment of the general scheme of development; but any of such minor changes made without the prior approval of the Commission, which in its judgment have produced or will produce any of such results, shall be subject to such alteration as the Commission may direct.

Upon the completion of the project, or at such other time as the Commission may direct, the Licensee shall submit to the Commission for approval revised exhibits insofar as necessary to show any divergence from or variations in the project area and project boundary as finally located or in the project works as actually constructed when compared with the area and boundary shown and the works described in the license or in the exhibits approved by the Commission, together with a statement in writing setting forth the reasons which in the opinion of the Licensee necessitated or justified variation in or divergence from the approved exhibits. Such revised exhibits shall, if and when approved by the Commission, be made a part of the license under the provisions of Article 2 hereof.

Article 4. The construction, operation, and maintenance of the project and any work incidental to additions or alterations shall be subject to the inspection and supervision of the Regional Engineer, Federal Power Commission, in the region wherein the project is located, or of such other officer or agent as the Commission may designate, who shall be the authorized representative of the Commission for such purposes. The Licensee shall cooperate fully with said representative and shall furnish him a detailed program of inspection by the Licensee that will provide for an adequate and qualified inspection force for construction of the project and for any subsequent alterations to the project. Construction of the project works or any feature or alteration thereof shall not be initiated until the program of inspection for the project works or any such feature thereof has been approved by said representative. The Licensee shall also furnish to said representative such further information as he may require concerning the construction, operation, and maintenance of the project, and of any alteration thereof, and shall notify him of the date upon which work will begin, as far in advance thereof as said representative may reasonably specify, and shall notify him promptly in writing of any suspension of work for a period of more than one week, and of its resumption and completion. The Licensee shall allow said representative and other officers or employees of the United States, showing proper credentials, free and unrestricted access to, through, and across the project lands and project works in the performance of their official duties. The Licensee shall comply with such rules and regulations of general or special applicability as the Commission may prescribe from time to time for the protection of life, health, or property.

Article 5. The Licensee, within five years from the date of issuance of the license, shall acquire title in fee or the right to use in perpetuity all lands, other than lands of the United States, necessary or appropriate for the construction, maintenance, and operation of the project. The Licensee or its successors and assigns shall, during the period of the license, retain the possession of all project property covered by the license as issued or as later amended, including the project area, the project works, and all franchises, easements, water rights, and rights of occupancy and use; and none of such properties shall be voluntarily sold, leased, transferred, abandoned, or otherwise disposed of without the prior written approval of the Commission, except that the Licensee may lease or otherwise dispose of interests in project lands or property without specific written approval of the Commission pursuant to the then current regulations of the Commission. The provisions of this article are not intended to prevent the abandonment or the retirement from service of structures, equipment, or other project works in connection with replacements thereof when they become obsolete, inadequate, or inefficient for further service due to wear and tear; and mortgage or trust deeds or judicial sales made thereunder, or tax sales, shall not be deemed voluntary transfers within the meaning of this article.

Article 6. In the event the project is taken over by the United States upon the termination of the license as provided in Section 14 of the Federal Power Act, or is transferred to a new licensee or to a non-power licensee under the provisions of Section 15 of said Act, the Licensee, its successors and assigns shall be responsible for, and shall make good any defect of title to, or of right of occupancy and use in, any of such project property that is necessary or appropriate or valuable and serviceable in the maintenance and operation of the project, and shall pay and discharge, or shall assume responsibility for payment and discharge of, all liens or encumbrances upon the project or project property created by the Licensee or created or incurred after the issuance of the license: Provided, That the provisions of this article are not intended to require the Licensee, for the purpose of transferring the project to the United States or to a new licensee, to acquire any different title to, or right of occupancy and use in, any of such project property than was necessary to acquire for its own purposes as the Licensee.

Article 5. The Licensee, within five years from the date of issuance of the license, shall acquire title in fee or the right to use in perpetuity all lands, other than lands of the United States, necessary or appropriate for the construction, maintenance, and operation of the project. The Licensee or its successors and assigns shall, during the period of the license, retain the possession of all project property covered by the license as issued or as later amended, including the project area, the project works, and all franchises, easements, water rights, and rights of occupancy and use; and none of such properties shall be voluntarily sold, leased, transferred, abandoned, or otherwise disposed of without the prior written approval of the Commission, except that the Licensee may lease or otherwise dispose of interests in project lands or property without specific written approval of the Commission pursuant to the then current regulations of the Commission. The provisions of this article are not intended to prevent the abandonment or the retirement from service of structures, equipment, or other project works in connection with replacements thereof when they become obsolete, inadequate, or inefficient for further service due to wear and tear; and mortgage or trust deeds or judicial sales made thereunder, or tax sales, shall not be deemed voluntary transfers within the meaning of this article.

Article 6. In the event the project is taken over by the United States upon the termination of the license as provided in Section 14 of the Federal Power Act, or is transferred to a new licensee or to a non-power licensee under the provisions of Section 15 of said Act, the Licensee, its successors and assigns shall be responsible for, and shall make good any defect of title to, or of right of occupancy and use in, any of such project property that is necessary or appropriate or valuable and serviceable in the maintenance and operation of the project, and shall pay and discharge, or shall assume responsibility for payment and discharge of, all liens or encumbrances upon the project or project property created by the Licensee or created or incurred after the issuance of the license: Provided, That the provisions of this article are not intended to require the Licensee, for the purpose of transferring the project to the United States or to a new licensee, to acquire any different title to, or right of occupancy and use in, any of such project property than was necessary to acquire for its own purposes as the Licensee.

Article 7. The actual legitimate original cost of the project, and of any addition thereto or betterment thereof, shall be determined by the Commission in accordance with the Federal Power Act and the Commission's Rules and Regulations thereunder.

Article 8. The Licensee shall install and thereafter maintain gages and stream-gaging stations for the purpose of determining the stage and flow of the stream or streams on which the project is located, the amount of water held in and withdrawn from storage, and the effective head on the turbines; shall provide for the required reading of such gages and for the adequate rating of such stations; and shall install and maintain standard meters adequate for the determination of the amount of electric energy generated by the project works. The number, character, and location of gages, meters, or other measuring devices, and the method of operation thereof, shall at all times be satisfactory to the Commission or its authorized representative. The Commission reserves the right, after notice and opportunity for hearing, to require such alterations in the number, character, and location of gages, meters, or other measuring devices, and the method of operation thereof, as are necessary to secure adequate determinations. The installation of gages, the rating of said stream or streams, and the determination of the flow thereof, shall be under the supervision of, or in cooperation with, the District Engineer of the United States Geological Survey having charge of stream-gaging operations in the region of the project, and the Licensee shall advance to the United States Geological Survey the amount of funds estimated to be necessary for such supervision, or cooperation for such periods as may be mutually agreed upon. The Licensee shall keep accurate and sufficient records of the foregoing determinations to the satisfaction of the Commission, and shall make return of such records annually at such time and in such form as the Commission may prescribe.

Article 9. The Licensee shall, after notice and opportunity for hearing, install additional capacity or make other changes in the project as directed by the Commission, to the extent that it is economically sound and in the public interest to do so.

Article 10. The Licensee shall, after notice and opportunity for hearing, coordinate the operation of the project, electrically and hydraulically, with such other projects or power systems and in such manner as the Commission may direct in the interest of power and other beneficial public uses of water resources, and on such conditions concerning the equitable sharing of benefits by the Licensee as the Commission may order.

Article 11. Whenever the Licensee is directly benefited by the construction work of another licensee, a permittee, or the United States on a storage reservoir or other headwater improvement, the Licensee shall reimburse the owner of the headwater improvement for such part of the annual charges for interest, maintenance, and depreciation thereof as the Commission shall determine to be equitable, and shall pay to the United States the cost of making such determination as fixed by the Commission. For benefits provided by a storage reservoir or other headwater improvement of the United States, the Licensee shall pay to the Commission the amounts for which it is billed from time to time for such headwater benefits and for the cost of making the determinations pursuant to the then current regulations of the Commission under the Federal Power Act.

Article 12. The United States specifically retains and safeguards the right to use water in such amount, to be determined by the Secretary of the Army, as may be necessary for the purposes of navigation on the navigable waterway affected; and the operations of the Licensee, so far as they affect the use, storage and discharge from storage of waters affected by the license, shall at all times be controlled by such reasonable rules and regulations as the Secretary of the Army may prescribe in the interest of navigation, and as the Commission may prescribe for the protection of life, health, and property, and in the interest of the fullest practicable conservation and utilization of such waters for power purposes and for other beneficial public uses, including recreational purposes, and the Licensee shall release water from the project reservoir at such rate in cubic feet per second, or such volume in acre-feet per specified period of time, as the Secretary of the Army may prescribe in the interest of navigation, or as the Commission may prescribe for the other purposes hereinbefore mentioned.

Article 13. On the application of any person, association, corporation, Federal agency, State or municipality, the Licensee shall permit such reasonable use of its reservoir or other project properties, including works, lands and water rights, or parts thereof, as may be ordered by the Commission, after notice and opportunity for hearing, in the interests of comprehensive development of the waterway or waterways involved and the conservation and utilization of the water resources of the region for water supply or for the purposes of steam-electric, irrigation, industrial, municipal or similar uses. The Licensee shall receive reasonable compensation for use of its reservoir or other project properties or parts thereof for such purposes, to include at least full reimbursement for any damages or expenses which the joint use causes the Licensee to incur. Any such compensation shall be fixed by the Commission either by approval of an agreement between the Licensee and the party or parties benefiting or after notice and opportunity for hearing. Applications shall contain information in sufficient detail to afford a full understanding of the proposed use, including satisfactory evidence that the applicant possesses necessary water rights pursuant to applicable State law, or a showing of cause why such evidence cannot concurrently be submitted, and a statement as to the relationship of the proposed use to any State or municipal plans or orders which may have been adopted with respect to the use of such waters.

Article 14. In the construction or maintenance of the project works, the Licensee shall place and maintain suitable structures and devices to reduce to a reasonable degree the liability of contact between its transmission lines and telegraph, telephone and other signal wires or power transmission lines constructed prior to its transmission lines and not owned by the Licensee, and shall also place and maintain suitable structures and devices to reduce to a reasonable degree the liability of any structures or wires falling or obstructing traffic or endangering life. None of the provisions of this article are intended to relieve the Licensee from any responsibility or requirement which may be imposed by any other lawful authority for avoiding or eliminating inductive interference.

Article 15. The Licensee shall, for the conservation and development of fish and wildlife resources, construct, maintain, and operate, or arrange for the construction, maintenance, and operation of such reasonable facilities, and comply with such reasonable modifications of the project structures and operation, as may be ordered by the Commission upon its own motion or upon the recommendation of the Secretary of the Interior or the fish and wildlife agency or agencies of any State in which the project or a part thereof is located, after notice and opportunity for hearing.

Article 16. Whenever the United States shall desire, in connection with the project, to construct fish and wildlife facilities or to improve the existing fish and wildlife facilities at its own expense, the Licensee shall permit the United States or its designated agency to use, free of cost, such of the Licensee's lands and interests in lands, reservoirs, waterways and project works as may be reasonably required to complete such facilities or such improvements thereof. In addition, after notice and opportunity for hearing, the Licensee shall modify the project operation as may be reasonably prescribed by the Commission in order to permit the maintenance and operation of the fish and wildlife facilities constructed or improved by the United States under the provisions of this article. This article shall not be interpreted to place any obligation on the United States to construct or improve fish and wildlife facilities or to relieve the Licensee of any obligation under this license.

Article 17. The Licensee shall construct, maintain, and operate, or shall arrange for the construction, maintenance, and operation of such reasonable recreational facilities, including modifications thereto, such as access roads, wharves, launching ramps, beaches, picnic and camping areas, sanitary facilities, and utilities, giving consideration to the needs of the physically handicapped, and shall comply with such reasonable modifications of the project, as may be prescribed hereafter by the Commission during the term of this license upon its own motion or upon the recommendation of the Secretary of the Interior or other interested Federal or State agencies, after notice and opportunity for hearing.

Article 18. So far as is consistent with proper operation of the project, the Licensee shall allow the public free access, to a reasonable extent, to project waters and adjacent project lands owned by the Licensee for the purpose of full public utilization of such lands and waters for navigation and for outdoor recreational purposes, including fishing and hunting: Provided, That the Licensee may reserve from public access such portions of the project waters, adjacent lands, and project facilities as may be necessary for the protection of life, health, and property.

Article 19. In the construction, maintenance, or operation of the project, the Licensee shall be responsible for, and shall take reasonable measures to prevent, soil erosion on lands adjacent to streams or other waters, stream sedimentation, and any form of water or air pollution. The Commission, upon request or upon its own motion, may order the Licensee to take such measures as the Commission finds to be necessary for these purposes, after notice and opportunity for hearing.

Article 20. The Licensee shall consult with the appropriate State and Federal agencies and, within one year of the date of issuance of this license, shall submit for Commission approval a plan for clearing the reservoir area. Further, the Licensee shall clear and keep clear to an adequate width lands along open conduits and shall dispose of all temporary structures, unused timber, brush, refuse, or other material unnecessary for the purposes of the project which results from the clearing of lands or from the maintenance or alteration of the project works. In addition, all trees along the periphery of project reservoirs which may die during operations of the project shall be removed. Upon approval of the clearing plan all clearing of the lands and disposal of the unnecessary material shall be done with due diligence and to the satisfaction of the authorized representative of the Commission and in accordance with appropriate Federal, State, and local statutes and regulations.

Article 21. Material may be dredged or excavated from, or placed as fill in, project lands and/or waters only in the prosecution of work specifically authorized under the license; in the maintenance of the project; or after obtaining Commission approval, as appropriate. Any such material shall be removed and/or deposited in such manner

as to reasonably preserve the environmental values of the project and so as not to interfere with traffic on land or water. Dredging and filling in a navigable water of the United States shall also be done to the satisfaction of the District Engineer, Department of the Army, in charge of the locality.

Article 22. Whenever the United States shall desire to construct, complete, or improve navigation facilities in connection with the project, the Licensee shall convey to the United States, free of cost, such of its lands and rights-of-way and such rights of passage through its dams or other structures, and shall permit such control of its pools, as may be required to complete and maintain such navigation facilities.

Article 23. The operation of any navigation facilities which may be constructed as a part of, or in connection with, any dam or diversion structure constituting a part of the project works shall at all times be controlled by such reasonable rules and regulations in the interest of navigation, including control of the level of the pool caused by such dam or diversion structure, as may be made from time to time by the Secretary of the Army.

Article 24. The Licensee shall furnish power free of cost to the United States for the operation and maintenance of navigation facilities in the vicinity of the project at the voltage and frequency required by such facilities and at a point adjacent thereto, whether said facilities are constructed by the Licensee or by the United States.

Article 25. The Licensee shall construct, maintain, and operate at its own expense such lights and other signals for the protection of navigation as may be directed by the Secretary of the Department in which the Coast Guard is operating.

Article 26. If the Licensee shall cause or suffer essential project property to be removed or destroyed or to become unfit for use, without adequate replacement, or shall abandon or discontinue good faith operation of the project or refuse or neglect to comply with the terms of the license and the lawful orders of the Commission mailed to the record address of the Licensee

or its agent, the Commission will deem it to be the intent of the Licensee to surrender the license. The Commission, after notice and opportunity for hearing, may require the Licensee to remove any or all structures, equipment and power lines within the project boundary and to take any such other action necessary to restore the project waters, lands, and facilities remaining within the project boundary to a condition satisfactory to the United States agency having jurisdiction over its lands or the Commission's authorized representative, as appropriate, or to provide for the continued operation and maintenance of nonpower facilities and fulfill such other obligations under the license as the Commission may prescribe. In addition, the Commission in its discretion, after notice and opportunity for hearing, may also agree to the surrender of the license when the Commission, for the reasons recited herein, deems it to be the intent of the Licensee to surrender the license.

Article 27. The right of the Licensee and of its successors and assigns to use or occupy waters over which the United States has jurisdiction, or lands of the United States under the license, for the purpose of maintaining the project works or otherwise, shall absolutely cease at the end of the license period, unless the Licensee has obtained a new license pursuant to the then existing laws and regulations, or an annual license under the terms and conditions of this license.

Article 28. The terms and conditions expressly set forth in the license shall not be construed as impairing any terms and conditions of the Federal Power Act which are not expressly set forth herein.

40M-1-77-129302

402.2

THE COMMONWEALTH OF MASSACHUSETTS

WATER RESOURCES COMMISSION

DIVISION OF WATER POLLUTION CONTROL

110 TREMONT STREET, BOSTON 02108

OFFICE OF THE DIRECTOR

July 5, 1978

Dr. Kenneth Plumb, Secretary
Federal Energy Regulatory Commission
825 North Capitol Street
Washington, D.C. 20426

Re: Water Quality Certification
Lawrence Hydroelectric Project
FERC License Application P-2800
Lawrence, Mass.

Dear Dr. Plumb:

This letter is written at the request of Lawrence Hydroelectric Associates, developers of a proposed 14.1 Megawatt generating station on the Merrimack River at Lawrence, Mass. The Associates have requested a letter from this Division as to the effect of the operation of the proposed facility on the water quality of the Merrimack River below the project.

The proposed development will be located at the existing Essex Dam in Lawrence, approximately two miles upstream of the outfall from the recently-completed Greater Lawrence Sanitary District Wastewater Treatment Plant. This plant was designed to produce an effluent of such quality and characteristics that, with a 7-day, 10-year low flow on the Merrimack River at the outfall, the assigned "B" classification of the river would be attained. The Division was concerned lest the regimen of the river would be so changed through the operation of the proposed facility that the Class B standard would be violated.

Staff of this Division have had numerous meetings and correspondence with staff of the developers. As a result, this Division has now received reasonable assurances from the applicant that the proposed project will be operated in a manner which will not cause a violation of applicable water quality standards adopted by this Division under authority of Section 27 (5) of Chapter 21 of the Massachusetts General Laws.

Therefore, based on these assurances and our own investigations, this Division hereby issues this Water Quality Certification relative to this project, in accordance with the provisions of Section 401 of the Federal Water Pollution Control Act as amended (Public Law 95-217), subject to the following conditions:

1. A minimum flow of 951 c.f.s. (equivalent to approximately 1,000 c.f.s. at the Greater Lawrence Sanitary District Wastewater Treatment Plant outfall) shall be continuously released from the impoundment behind the Essex Dam by whatever means or combination of means necessary to accomplish this release, unless or until the pool elevation behind the dam is so drawn down that it reaches the crest of the dam.

2. At such times, outflow released from the dam shall be equal to inflow as recorded at the U.S.G.S. Lowell, gage, during the period the flow is less than 951 c.f.s. When the flow exceeds 951 c.f.s., the excess flow over 951 c.f.s. may be utilized to refill the impoundment to the top of flashboards, whereupon Condition 1 above will again go into effect.

Should any violation of the water quality standards or the terms of this Certification occur as a result of the proposed activity, the Division will direct that the condition be corrected. Non-compliance on the part of the permittee will be cause for this Division to recommend the revocation of the permit(s) issued therefor or to take such other action as is authorized by the General Laws of the Commonwealth.

Very truly yours,

Thomas C. McMahon
Director

TCM/WAS/rew

cc: Gordon A. Marker, Lawrence Hydroelectric Associates, 8 Arlington Street, Boston 02116
David Standley, Commissioner, Department of Environmental Quality Engineering, 100 Cambridge Street, Boston 02202
Barbara Ingle, Deputy Commissioner, Department of Environmental Quality Engineering, 100 Cambridge Street, Boston 02202
Morgan Rees, Chief, Permits Branch, Corps of Engineers, 424 Trapelo Road, Waltham 02154
John J. Hannon, Director, Division of Land & Water Use, Department of Environmental Quality Engineering, 100 Nashua Street, Boston 02114
Matthew Connolly, Director, Division of Fisheries & Wildlife, 100 Cambridge Street, Boston 02202

UNITED STATES OF AMERICA72 FERC •62,215
FEDERAL ENERGY REGULATORY COMMISSION

Lawrence Hydroelectric Associates and Essex Company — Project No. 2800-018 Massachusetts

ORDER AMENDING ORDER APPROVING REVISED EXHIBIT R

Issued September 8, 1995

On August 17, 1995, Lawrence Hydroelectric Associates and Essex Company, licensees for the Lawrence Project, FERC No. 2800, filed a request for clarification of an Order Approving Revised Exhibit R issued on August 1, 1995.1

In this order, it states that "in the proposed revised Exhibit R, the licensees will provide educational information through tours of the powerhouse and fish lifting area. These tours are to be scheduled on an as-needed basis. . . Interpretive displays will be erected to explain different aspects of the project's operation and exhibits will be constructed in the North Canal Carriage House which will display educational information. In addition, a portable fence will be provided to safely direct tour groups past the intake and fish lift area to the dam overlook. The Department of Environmental Management of the Commonwealth of Massachusetts (DEM) and Lawrence Heritage State Park (LHSP) suggested that a clearly marked walkway be painted on the pavement to direct tours to points of interest. The licensees agreed to provide a marked walkway and signage at the site."

The licensees requested clarification of two sections of this order. First, instead of providing tours of the powerhouse and fish lifting area, the order should state that the licensees will provide tours through the North Canal Carriage House. These tours will provide the same information as stated in the August 1 order, but will occur in safer areas of the project. Second, the licensees agreed to paint markings and provide signage to the Carriage House as requested by the LHSP and DEM, but will not erect a portable fence to direct tour groups past the intake and fish lift area since these areas are no longer being used for tours.

These clarifications do not change the recreation facilities that are being provided by the licensees or the intent of the August 1 order. They should be incorporated into the order to clearly state what the licensees intend to provide.

1 See 72 FERC 62,074.

The Director orders:

(A) The Order Approving Revised Exhibit R issued August 1, 1995 is amended to state that: the licensees will provide tours through the North Canal Carriage House. Further, the licensees will paint markings on the paved walkway and provide signage to direct visitors to the Carriage House. The portable fence will not be installed to direct tour groups past the intake and fish lift areas.

(B) This order constitutes final Commission action. Requests for rehearing by the Commission may be filed within 30 days of the date of issuance of this order, pursuant to 18 C.F.R. • 385.713.

J. Mark Robinson
Director, Division of Project
Compliance and Administration

119 FERC ¶ 62,243
UNITED STATES OF AMERICA
FEDERAL ENERGY REGULATORY COMMISSION

Essex Company and Lawrence Hydroelectric Associates — Project No. 2800-037

ORDER AMENDING LICENSE

(Issued June 19, 2007)

On January 10, 2007, Essex Company and Lawrence Hydroelectric Associates, licensees for the Lawrence Hydroelectric Project, FERC No. 2800,[1] filed an application to amend its license by proposing to replace the existing wooden flashboards on the crest of the project's Essex Dam with an inflatable flashboard system. The project is located on the Merrimack River in Lawrence, Essex County, Massachusetts.

BACKGROUND

The project consists of 900-foot-long stone-masonry gravity dam (Essex or Great Stone Dam) dam with 5-foot high wooden flashboards supported by irregularly spaced steel pins. The impoundment created by the dam and flashboards covers an area of about 655 acres. According to the licensees, maintenance of the flashboard system over the years has been limited almost exclusively to the replacement of flashboards and flashboard pins which are damaged during high flow events. The replacement of the flashboards results in drawdown of impoundment for extended periods of time. In order to reduce the number, extent and duration of impoundment drawdowns, the licensees are proposing to replace the existing wooden flashboards on the crest of the Essex Dam with an inflatable flashboard system.

The proposed flashboard system would consist of multiple-operating-zone inflatable system anchored into the dam crest, separated by at least two concrete piers. By controlling air pressure within the bladder, the flashboard height can be increased or decreased to maintain normal headpond elevation.

[1] 5 FERC ¶61,202 Order Issuing Major License and Authorizing Negotiations for Sale of Securities, issued December 4, 1978.

AGENCY CONSULTATION

By a letter dated October 25, 2006, the licensees requested comments from state and federal resource agencies on their proposal to replace the wooden flashboards with an inflatable flashboard system. Responses were received from the Massachusetts Historical Commission (MAHC), U.S. Fish & Wildlife Service (FWS), Massachusetts Division of Marine Fisheries (MAMF), Massachusetts Division of Fisheries & Wildlife (MAFWS), and Massachusetts Department of Environmental Protection (MADEP).

The MAHC stated that the proposed project is unlikely to affect significant historic or archeological resources. The MADEP expressed its support for the project and reminded the licensees that they need approval from the fishery resource agencies regarding appropriate construction timing, and should comply with the provisions of the Wetlands Protection Act, and notify appropriate conservation commission prior to work. The MAFWS strongly endorsed the licensees' proposal.

The FWS stated that based on their experience at the Holyoke Project, it would be beneficial to have more small bladders than three large ones to provide greater flexibility in the distribution of spill flows across the dam, which is critical for effective upstream fish passage.

The MAMF recommended that construction be completed in the low flow period between July 15 and September 15, outside of spring and fall upstream passage seasons.

REVIEW

The project is operated as run-of-river and has no useable storage capacity. The proposed flashboard system will not change the authorized headpond elevation or the project mode of operation.

Our review found that the inflatable flashboard system would (a) allow the licensees to more consistently maintain water levels and thereby enhancing the efficiency and generation capabilities of the project, (b) improve upstream fish passage, (c) eliminate dangers associated with the replacement of wooden flashboards, and (d) enhance the aesthetics.

Prior to the start of construction of the inflatable flashboard system, the licensees must file for Commission approval contract plans and specifications and cofferdam construction drawings as we are requiring in the ordering paragraphs (C) and (D) of this order. Ordering paragraph (E) of this order requires the licensees to file for review and

comment operating procedures describing how the flashboards will be operated to control water levels.

After the construction is completed, the licensee must file as-built exhibit drawings for Commission's approval as we are requiring in ordering paragraph (F) of this order. The exhibit drawings must be prepared in accordance with Commission's regulations at 18 C.F.R. §§4.39 and 4.41

The Director orders:

(A) The license for the Lawrence Project is amended as provided by this order effective the day this order is issued.

(B) The licensee's request to replace a wooden flashboard system with an inflatable flashboard system is approved. Ordering Paragraph (B) (ii) of the license is revised in part to read as follows:

> (ii) Project works consisting of: (1) the existing 33-foot high and 900-foot-long dam of rubble masonry construction with five-foot-high inflatable flashboard system; (2) an existing 9.8-mile-long reservoir having a surface area of 655 acres at normal high water elevation 44.17 feet mean sea level (msl) and a maximum storage capacity of approximately 19,900 acre-feet; (3) the existing South Canal approximately 35 feet wide and 10 feet deep, originating at the south abutment of the Essex Dam and generally paralleling the Merrimack River bed, below the Essex Dam, for a distance of approximately 2,750 feet; (4) the existing North Canal, approximately 95 feet wide and 15 feet deep, originating at the north abutment of the dam and paralleling the Merrimack River below the dam for a distance of approximately 5,300 feet; (5) a fish elevator installed at the dam and a fish ladder; (6) a powerhouse containing two 7.4 MW hydroelectric generating units and a tailrace channel extending into the Merrimack River Channel; (7) a single-circuit overhead 13.8-5V power line to the Massachusetts Electric Company's Lawrence No. 1 substation; and (8) appurtenant facilities …..

(C) *Contract Plans and Specifications*. At least 60 days prior to the start of construction of the inflatable flashboard system, the licensee shall submit one copy of its plans and specifications and supporting design report to the Commission's Division of Dam Safety and Inspections (D2SI) – New York Regional Engineer, and two copies to the Commission (one of these shall be a courtesy copy to the Director, D2SI). The submittal must also include as part of preconstruction requirements: a Quality Control and Inspection Program, Temporary Construction Emergency Action Plan, and Soil Erosion and Sediment Control Plan. The licensee may not begin construction until the D2SI-New

York Regional Engineer has reviewed and commented on the plans and specifications, determined that all preconstruction requirements have been satisfied, and authorized start of construction.

(D) *Cofferdam Construction Drawings.* Before starting construction of the inflatable flashboard system, the licensee shall review and approve the design of contractor-designed cofferdams and deep excavations and shall make sure construction of cofferdams and deep excavations is consistent with the approved design. At least 30 days before starting construction of the cofferdam, the licensee shall submit one copy to the Commission's D2SI-New York Regional Engineer and two copies to the Commission (one of these copies shall be a courtesy copy to the Commission's Director, D2SI), of the approved cofferdam construction drawings and specifications and the letters of approval.

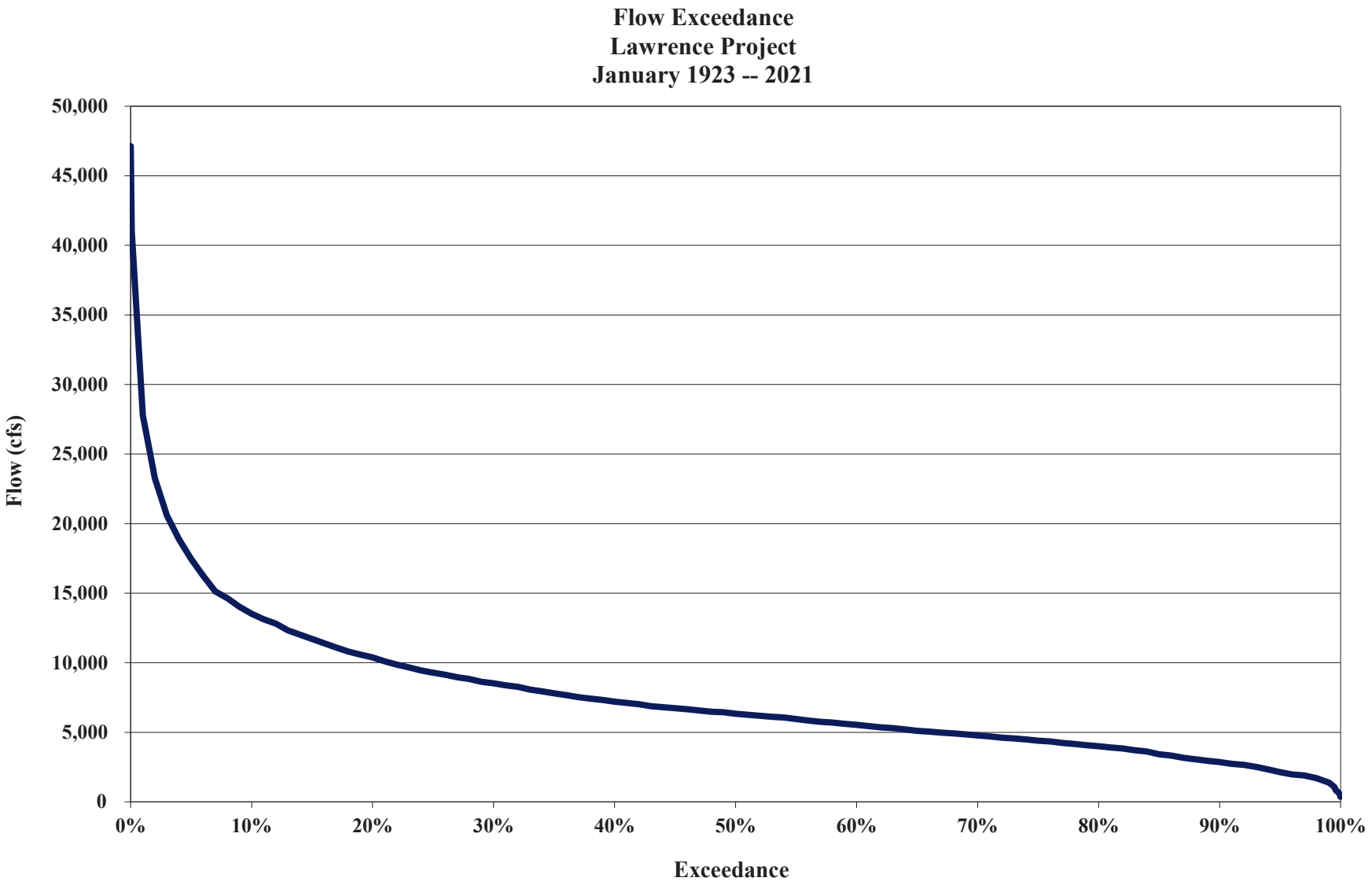
(E) *Operating Procedures.* At least 60 days prior to completing construction of the inflatable flashboard system, the licensee shall submit for review and comment one copy to the Division of Dam Safety and Inspections – New York Regional Engineer and two copies to the Commission (one of these shall be a courtesy copy to the Director, Division of Dam Safety and Inspections) of operating procedures describing how the flashboards will be operated to control water levels. The procedures should explain the water surface elevations that will trigger deflating and inflating the system.

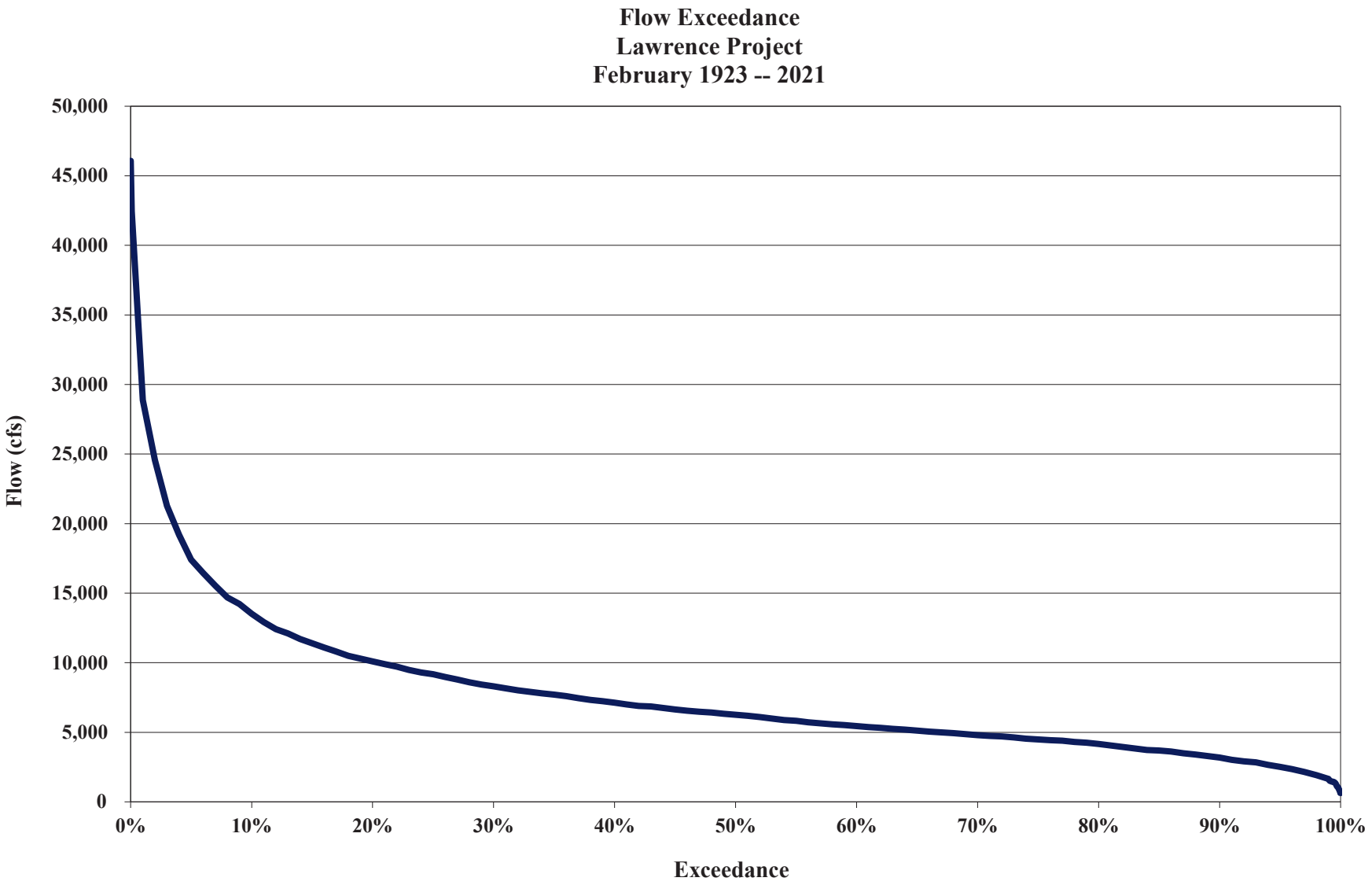
(F) *As-built Drawing*s. Within 90 days of completion of all construction activities, the licensee shall file for Commission approval, revised exhibit L drawings to describe and show those project facilities as built. A courtesy copy shall be filed with the Commission's D2SI-New York Regional Engineer, and the Director, D2SI.

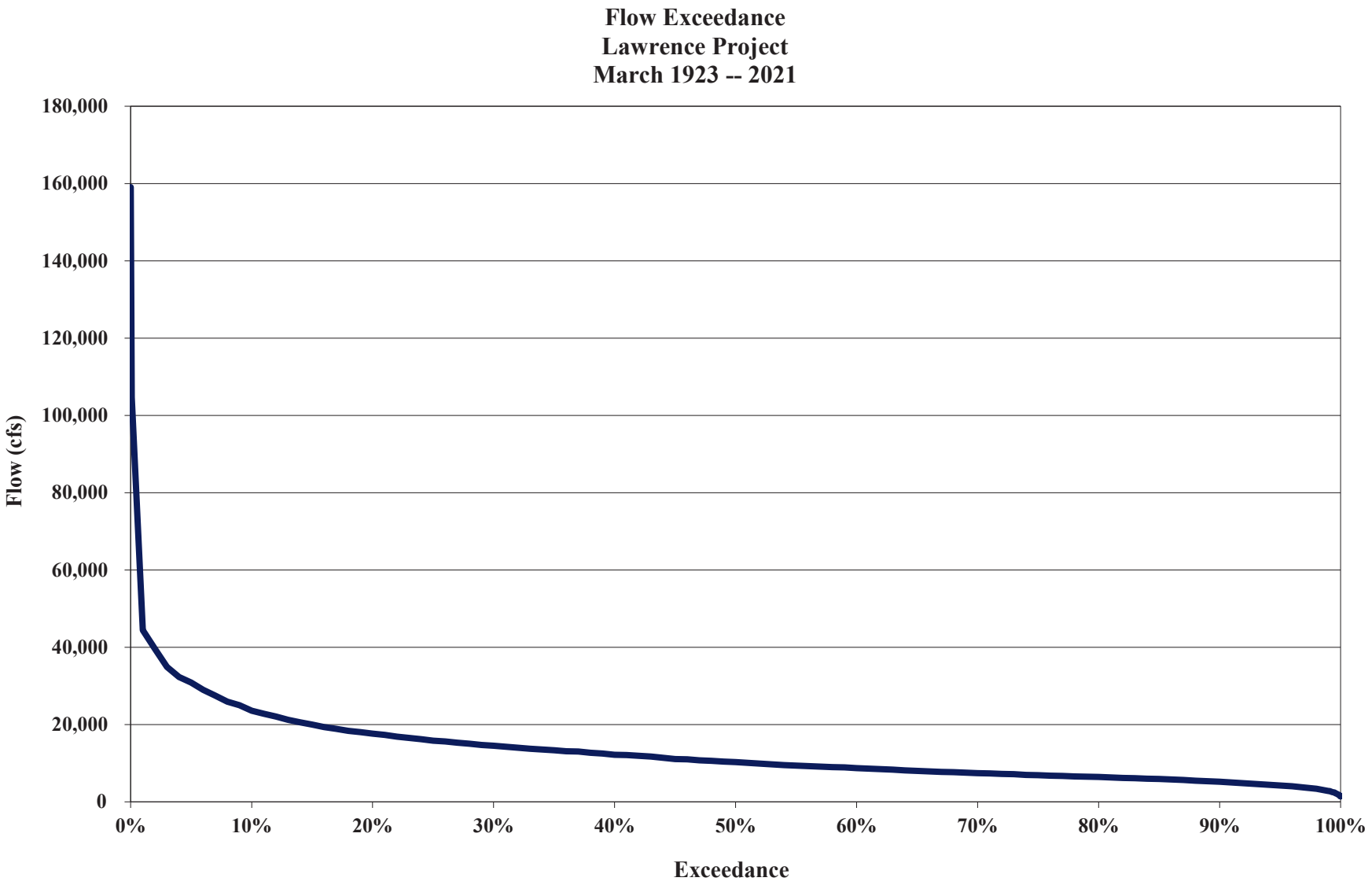
(G) This order constitutes final agency action. Requests for rehearing by the commission may be filed within 30 days of the date of issuance of this order, pursuant to 18 C.F.R. §385.713.

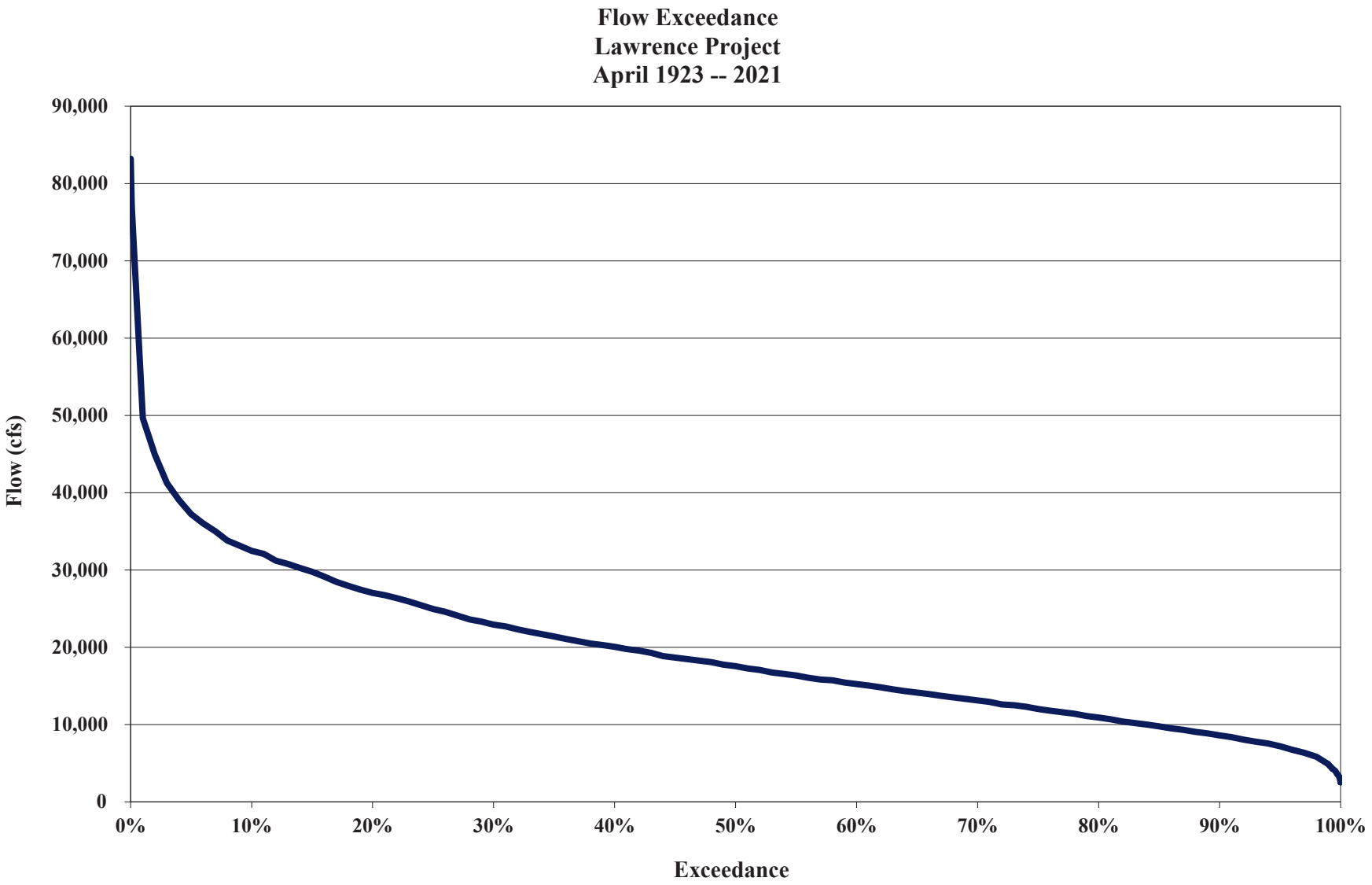
Mohamad Fayyad
Engineering Team Lead
Division of Hydropower Administration
and Compliance

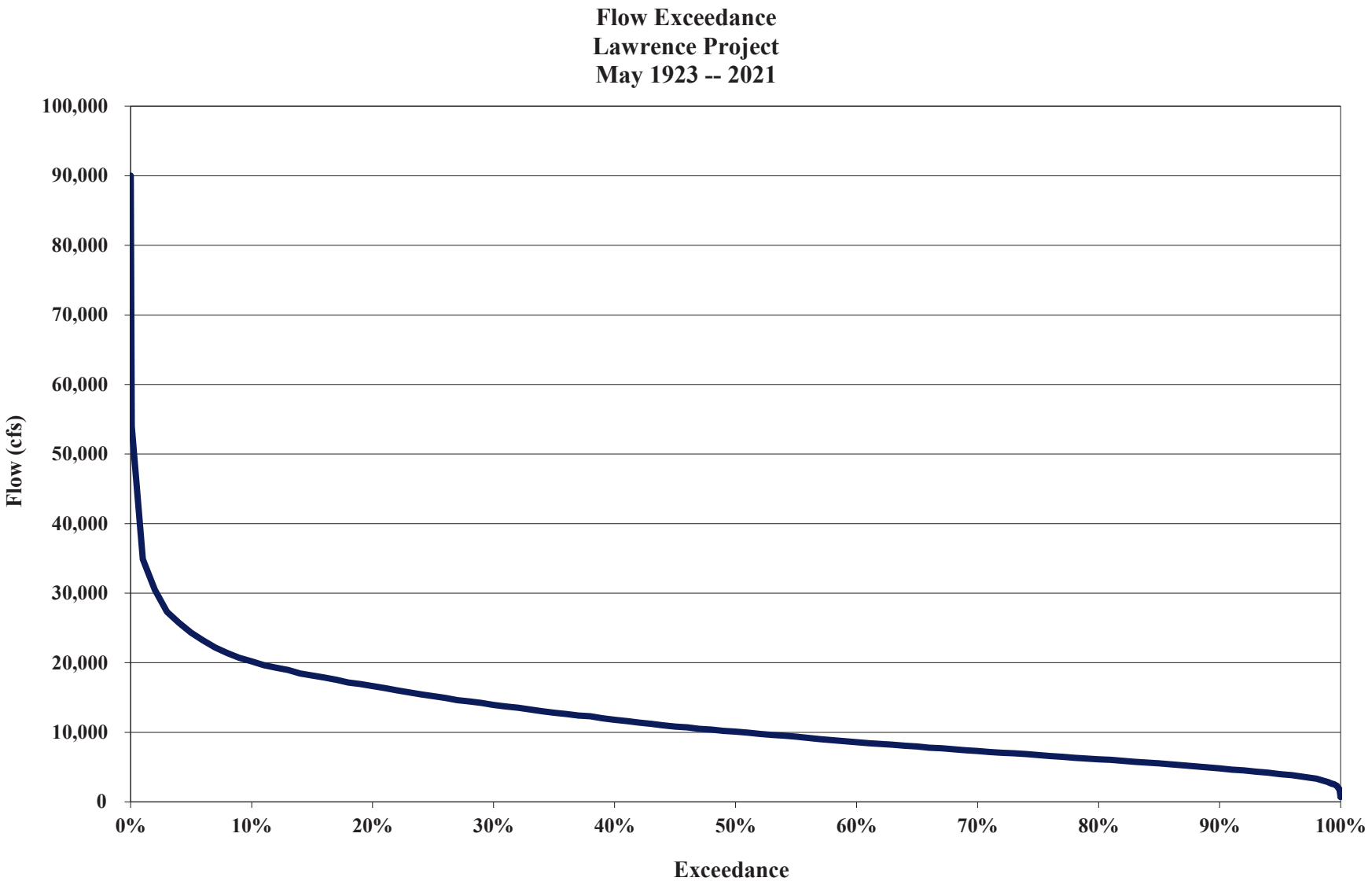
Appendix C – Flow Duration Curves

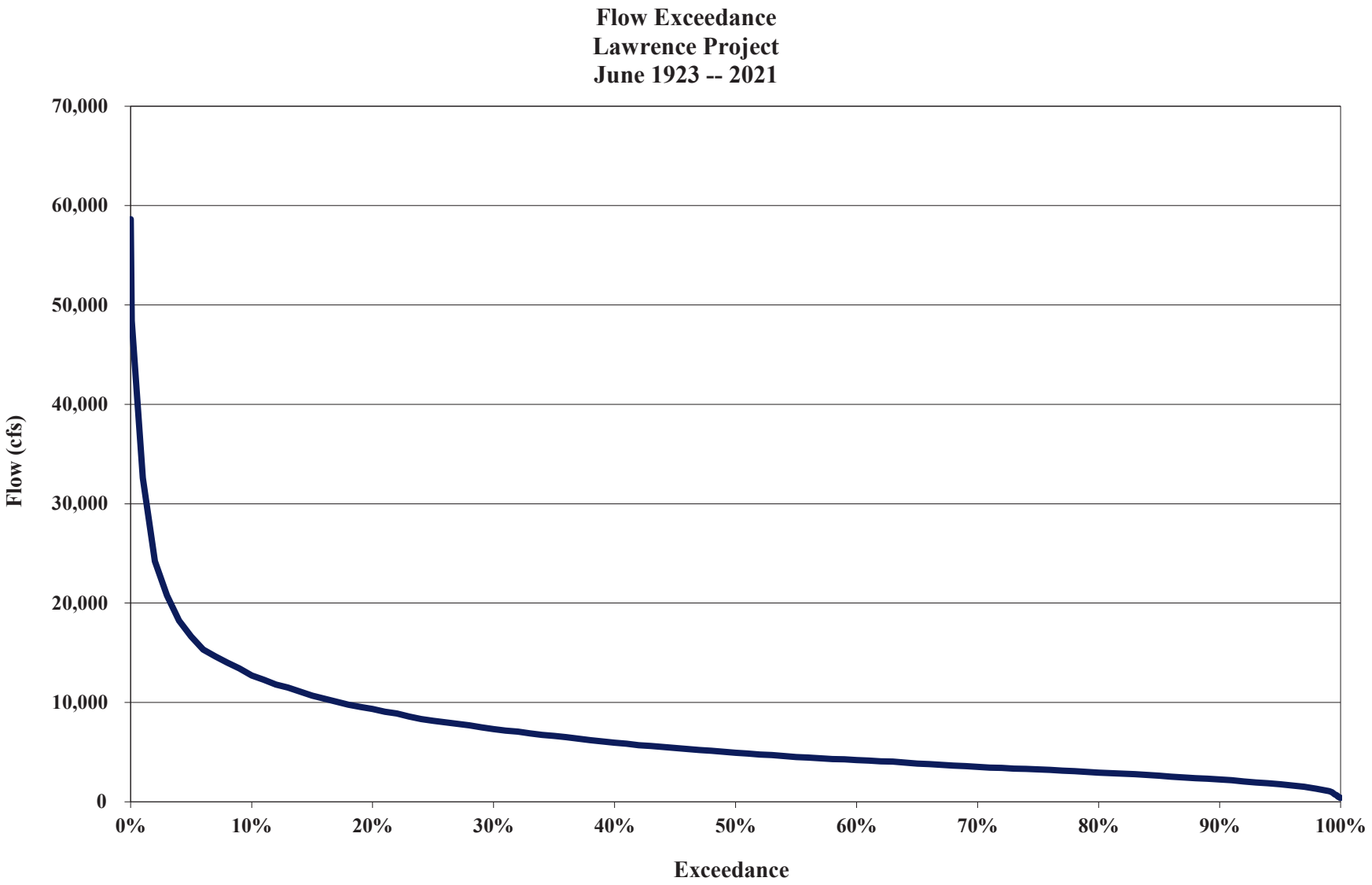

Flow Exceedance
Lawrence Project
January 1923 -- 2021
50,000
45,000
40,000
35,000
30,000
25,000
20,000
15,000
10,000
5,000
0
Flow (cfs)
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
Exceedance

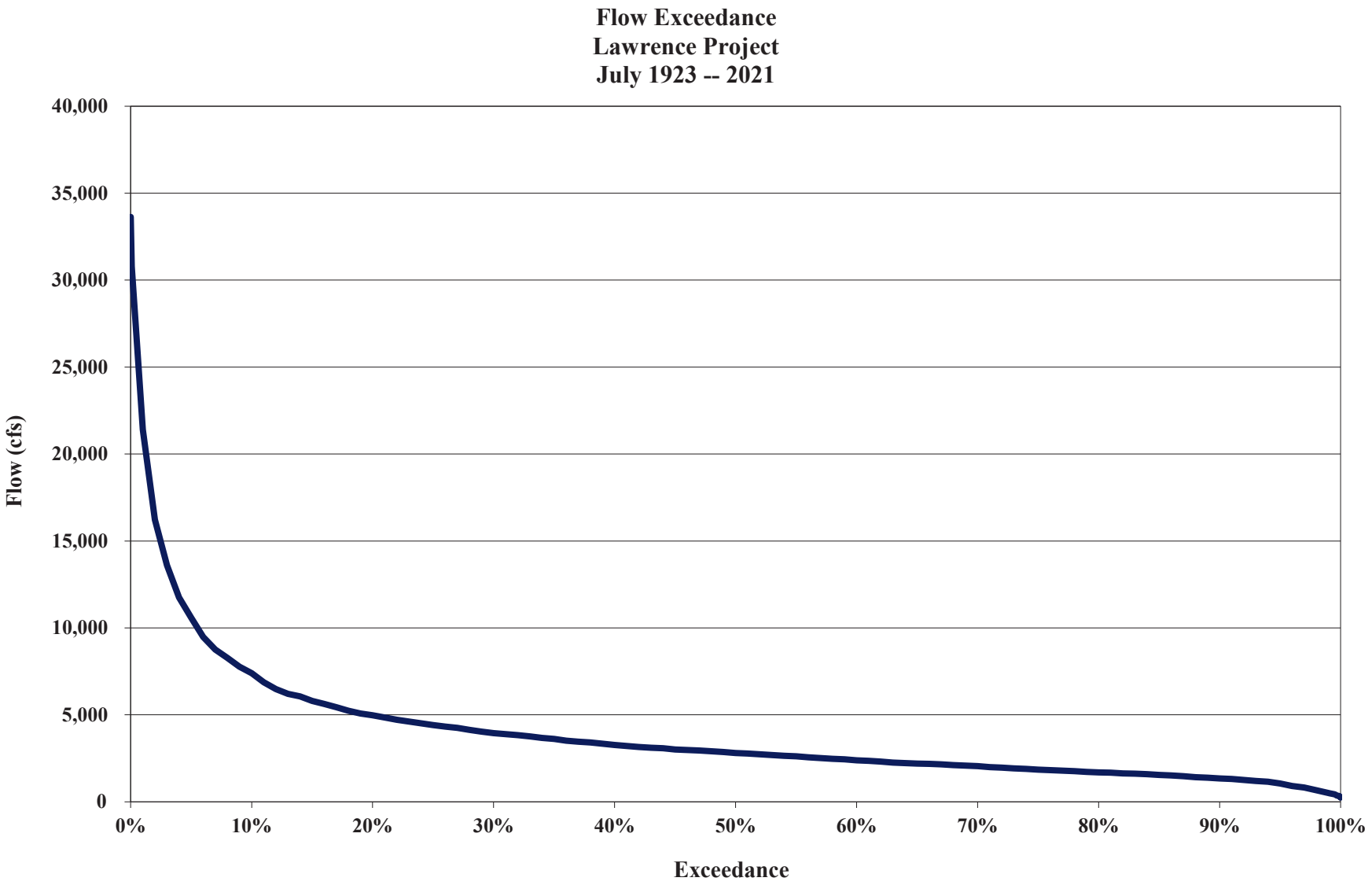

Flow Exceedance
Lawrence Project
February 1923 -- 2021
50,000
45,000
40,000
35,000
30,000
25,000
20,000
15,000
10,000
5,000
0
Flow (cfs)
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
Exceedance

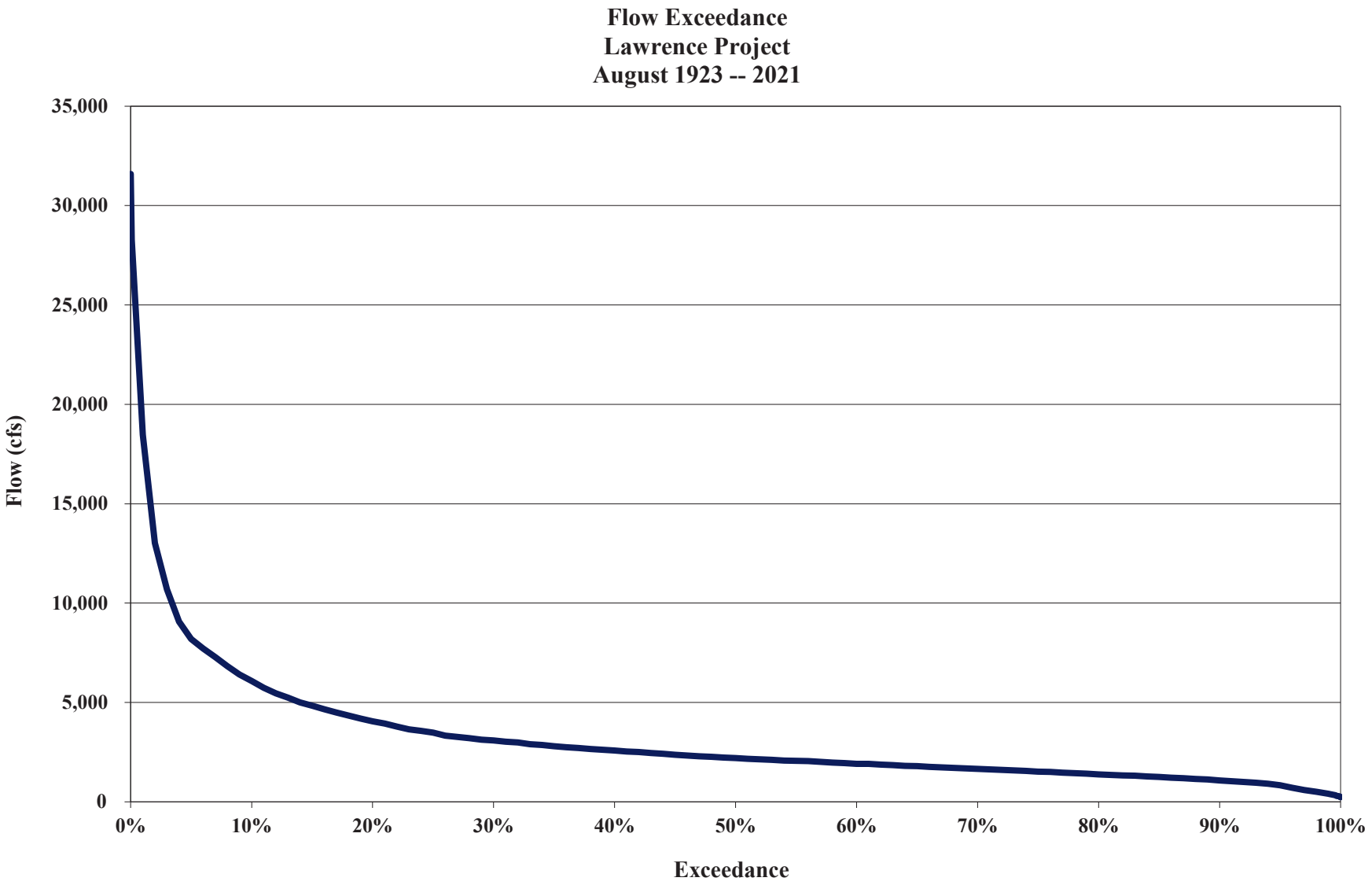

Flow Exceedance
Lawrence Project
March 1923 -- 2021
180,000
160,000
140,000
120,000
100,000
80,000
60,000
40,000
20,000
0
Flow (cfs)
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
Exceedance

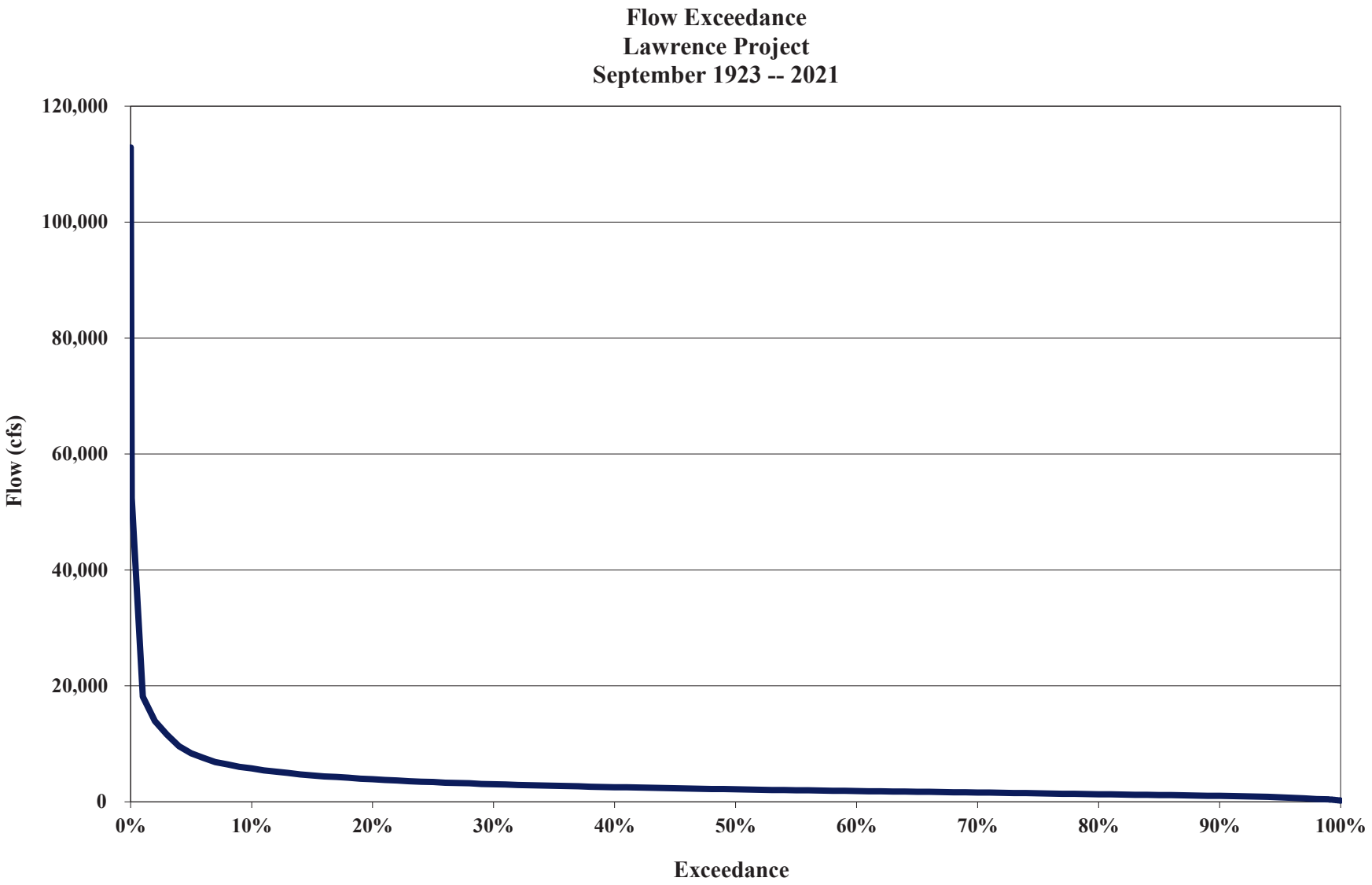

Flow Exceedance
Lawrence Project
April 1923 -- 2021
90,000
80,000
70,000
60,000
50,000
40,000
30,000
20,000
10,000
0
Flow (cfs)
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
Exceedance

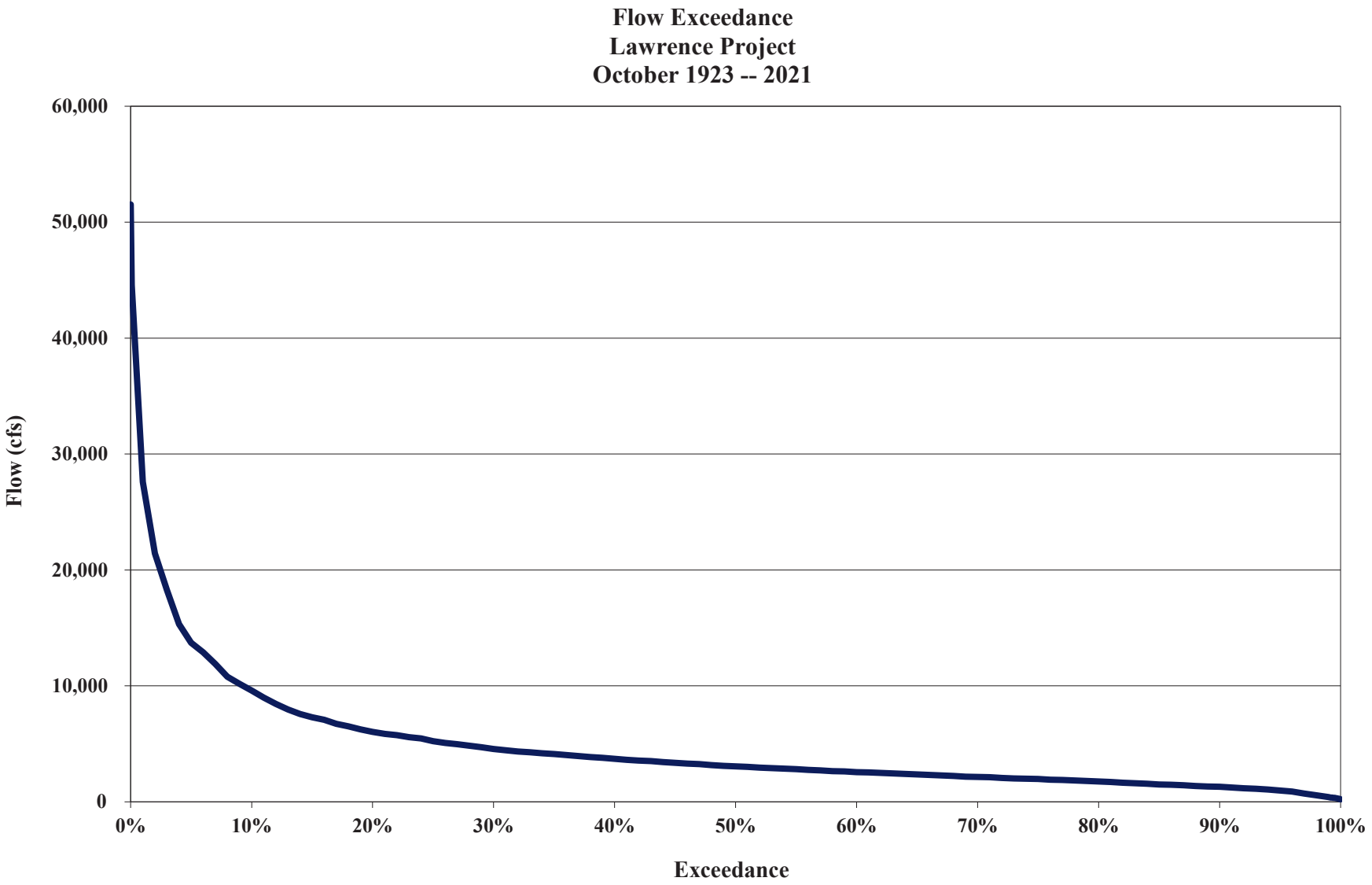

Flow Exceedance
Lawrence Project
May 1923 -- 2021
100,000
90,000
80,000
70,000
60,000
50,000
40,000
30,000
20,000
10,000
0
Flow (cfs)
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
Exceedance

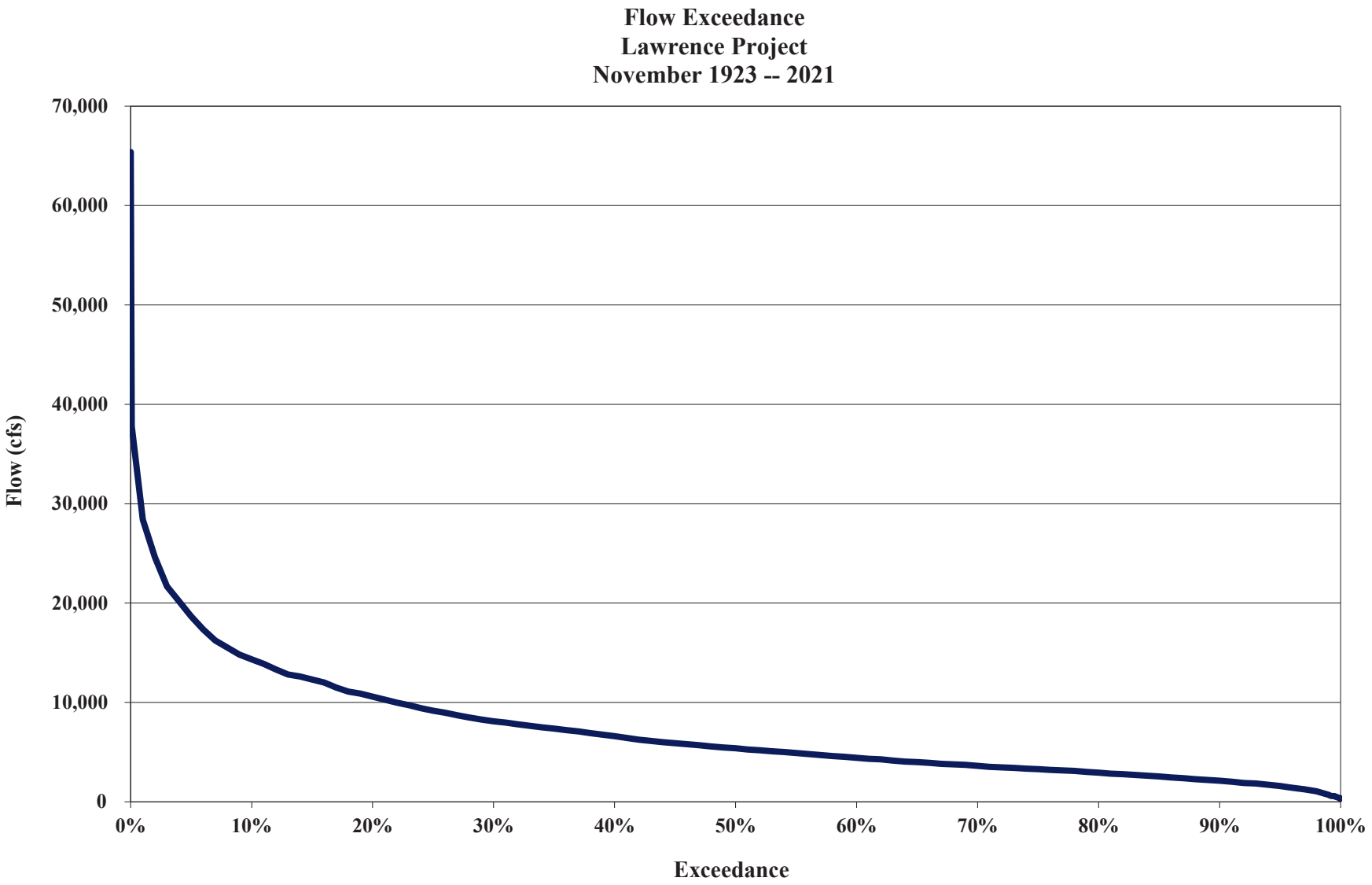

Flow Exceedance
Lawrence Project
June 1923 -- 2021
70,000
60,000
50,000
40,000
30,000
20,000
10,000
0
Flow (cfs)
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
Exceedance

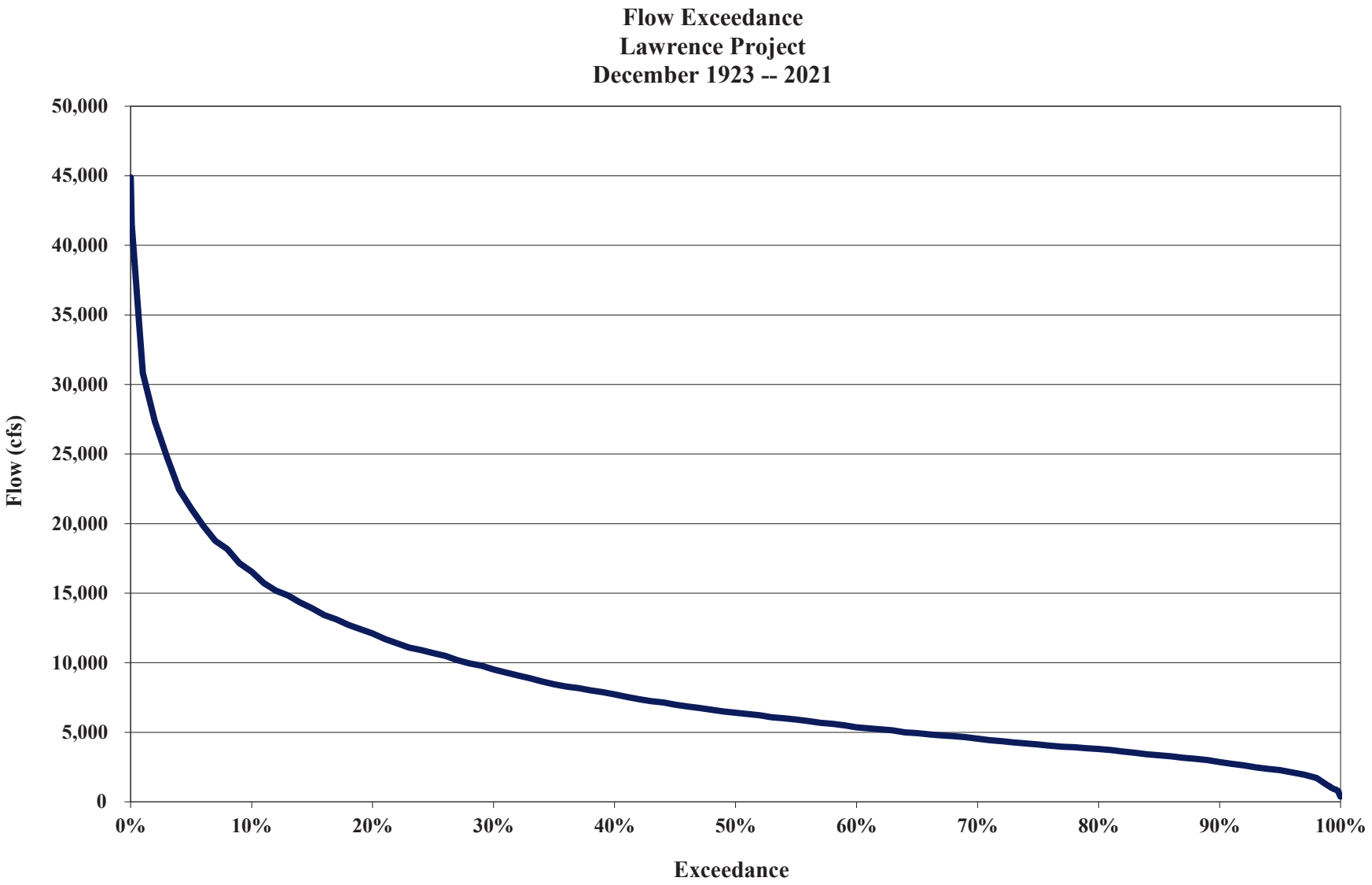

Flow Exceedance
Lawrence Project
July 1923 -- 2021
40,000
35,000
30,000
25,000
20,000
15,000
10,000
5,000
0
Flow (cfs)
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
Exceedance

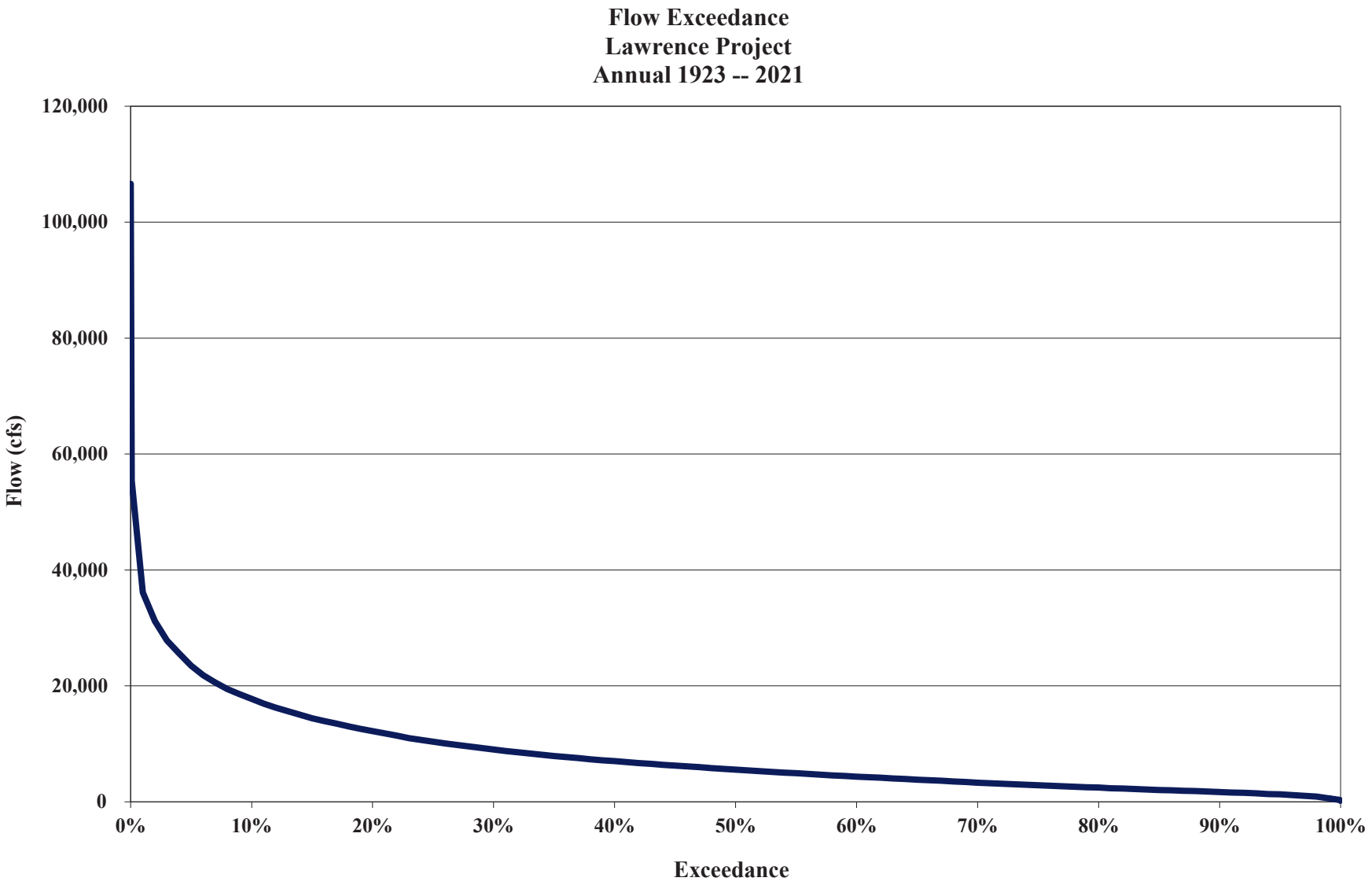

Flow Exceedance
Lawrence Project
August 1923 -- 2021
35,000
30,000
25,000
20,000
15,000
10,000
5,000
0
Flow (cfs)
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
Exceedance


Flow Exceedance
Lawrence Project
September 1923 -- 2021
120,000
100,000
80,000
60,000
40,000
20,000
0
Flow (cfs)
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
Exceedance


Flow Exceedance
Lawrence Project
October 1923 -- 2021
60,000
50,000
40,000
30,000
20,000
10,000
0
Flow (cfs)
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
Exceedance


Flow Exceedance
Lawrence Project
November 1923 -- 2021
70,000
60,000
50,000
40,000
30,000
20,000
10,000
0
Flow (cfs)
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
Exceedance


Flow Exceedance
Lawrence Project
December 1923 -- 2021
50,000
45,000
40,000
35,000
30,000
25,000
20,000
15,000
10,000
5,000
0
Flow (cfs)
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
Exceedance


Flow Exceedance
Lawrence Project
Annual 1923 -- 2021
120,000
100,000
80,000
60,000
40,000
20,000
0
Flow (cfs)
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
Exceedance