

UNITED STATES OF AMERICA
BEFORE THE FEDERAL ENERGY REGULATORY COMMISSION

**DRAFT APPLICATION FOR NEW LICENSE FOR MAJOR PROJECT -
EXISTING DAM**

**EXHIBIT A – PROJECT
DESCRIPTION**

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**CRESCENT HYDROELECTRIC PROJECT
RELICENSING**

FERC NO. 4678



**NY Power
Authority**

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1 Introduction

The Crescent Hydroelectric Project (Project) (FERC No. 4678) is an 11.8 MW conventional hydroelectric project located on the Mohawk River, approximately 4 miles upstream from its confluence with the Hudson River. The Crescent Project is located in Saratoga, Albany, and Schenectady Counties, New York, and in the Towns of Waterford, Colonie, Halfmoon, Clifton Park, and Niskayuna. It is located approximately two miles upstream of the School Street Hydroelectric Project (FERC No. 2539) owned by Erie Boulevard Hydropower, L.P. The Crescent impoundment is approximately 10 miles long and the upstream terminus of the impoundment is located at the Vischer Ferry Project dam (FERC No. 4679). The Project is owned and operated by the Power Authority of the State of New York (d/b/a “New York Power Authority” and referred to as “the Power Authority”).

The Crescent Project dam was originally constructed as part of the New York State Barge Canal System¹ (Barge Canal System²) to ‘canalize’ the Mohawk River from Scotia to Crescent, providing navigable conditions for barges and vessels and facilitating water level control and lock operations.

This exhibit is required under the Federal Energy Regulatory Commission (FERC) regulations which can be found in Title 18 of the Code of Federal Regulations (CFR), Sections 4.51(b) and 5.18(a)(5)(iii). The information provided herein covers the specifics prescribed for Exhibit A and serves the purpose of providing a description of the Project.

¹ The existing Barge Canal System was created following the passage of the Barge Canal Act in 1903. However, some portion of the original Erie Canal built between 1817 and 1825 still exists. For the purposes of this document, the Licensee will consistently refer to the portions of the Barge Canal or Erie Canal adjacent to the Projects as the Barge Canal System.

² The Barge Canal System is owned by the People of the State of New York and operated by the New York State Canal Corporation (NYSCC), which was created by the New York State Legislature in 1992 as a subsidiary of the New York State Thruway Authority (NYSTA). Prior to 1992, the operations of the Barge Canal System fell under the New York State Department of Transportation. On January 1, 2017, the NYSCC became a subsidiary of the Power Authority (N.Y. Public Authorities Law § 1005-b).

2 Project Description

The principal features of the Crescent Project are the dam, powerhouse, impoundment, and appurtenant facilities. The Crescent Dam consists of two independent concrete gravity overflow sections which link each river bank to a rock island in the middle of the Mohawk River. The powerhouse is located adjacent to the dam on the western bank of the river (Figure 2-1). The powerhouse contains four generating units. Table 2-1 provides a summary of Project components. A more detailed description of Project components is provided in the sections below.

Figure 2-1
Major Project Facilities of the Crescent Project

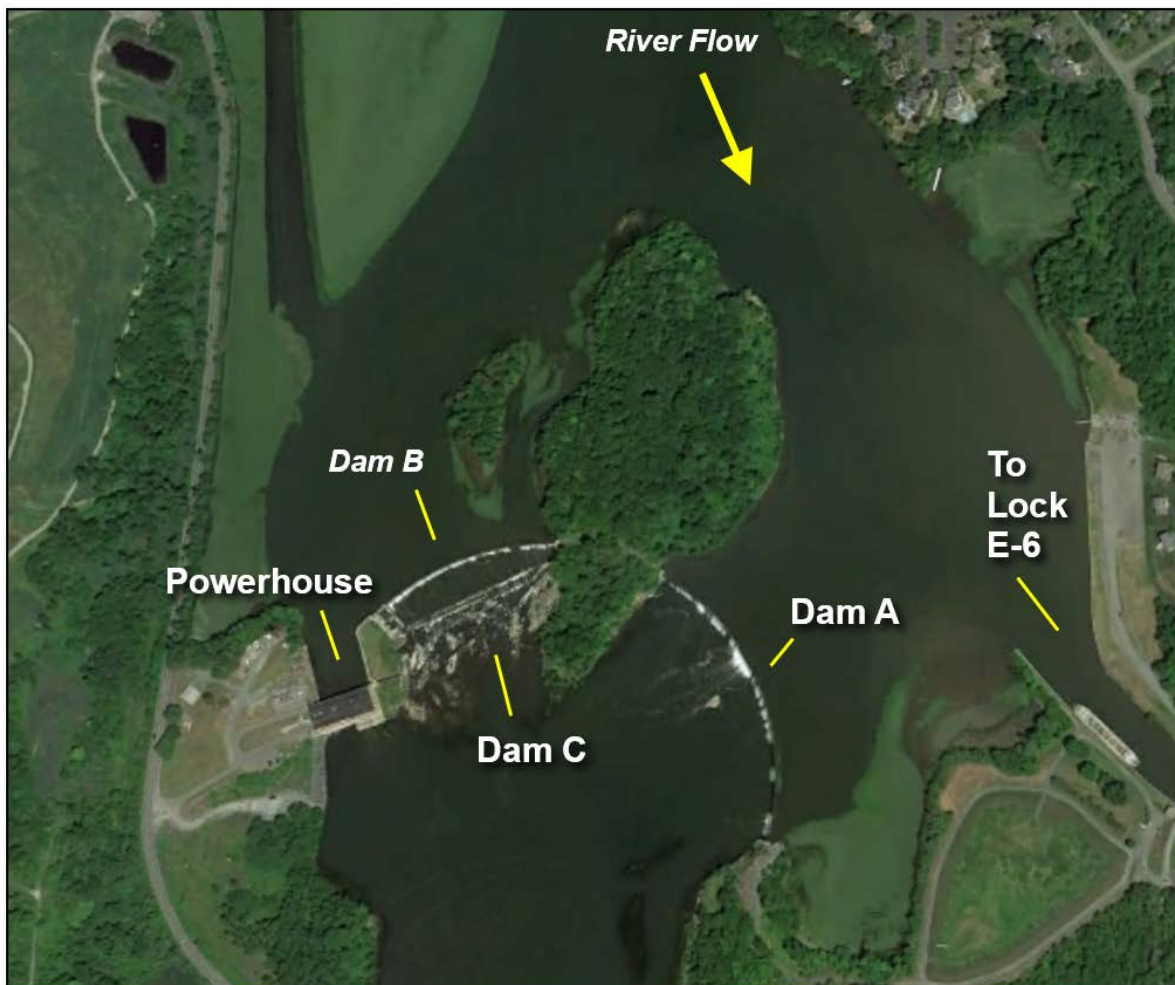


Table 2-1
Description of Crescent Project Facilities

Description	Number or Fact
General Information	
FERC Project Number	4678
License Issued	June 26, 1984
License Expiration Date	May 31, 2024
Licensed Capacity	11.8 MW
Project Location	Located on the Mohawk River in the counties of Saratoga, Albany, and Schenectady, NY in the towns of Waterford, Colonie, Halfmoon, Clifton Park, and Niskayuna.
Owner/Operator of Project	New York Power Authority
Total Area Encompassed by Existing Project	~ 2,283 acres
Federal lands within the Project boundary	None
Impoundment	
Water Surface Elevation	Elevation (El.) 184' BCD (flashboards down) El. 185' BCD (12 inch flashboards up)
Water Surface Area	2,257 acres at elevation 185' BCD (12 inch flashboards up)
Average Depth	23.7 feet
Drainage Area	3,460 square miles
Usable Storage	None – operated run-of-river
Gross Storage Capacity	50,000 acre ft.
Shoreline	~20 miles
Maximum Depth	30 feet
Dam	
Construction Type	Concrete gravity dam
Length	Dam A – 901 ft. Dam B – 534 ft. Dam C – 530 ft.
Height at Top	Dam A – 52 ft. Dam B – 32 ft. Dam C – 16 ft. at crest El. 171 ft.
Crest Elevation	Dam A crest El. 184 ft. Dam B crest El. 184 ft. Dam C crest El. 171 ft.
Water Conveyance Structures	
Headrace/Forebay	175-foot-long headrace channel
Intake	The powerhouse includes an intake structure with trashracks, a rake, stoplogs, and gates.

Description	Number or Fact
Powerhouse	
Construction Type	Masonry
Location	Western end of dam
Dimensions	180 ft. long and 73 ft. wide
Trashracks	Trashrack bar spacing width is 3 7/8 inches
Turbines	
Type	2 Francis; 2 Vertical Kaplan
Number	4
Rating	two 2.8 MW rated Francis turbines; two 3.0 MW rated Kaplan turbines
Maximum Discharge	two Francis turbines max discharge of 1,500 cubic feet per second (cfs) each; two Kaplan turbines max discharge of 1,820 cfs each
Switchyard/Transmission Lines	
Switchyard/Transmission Lines	40 ft. by 45 ft. switchyard

* All elevations refer to Barge Canal Datum (BCD) unless stated otherwise. BCD= NAVD88 -1.67 feet or USGS Datum +0.99 feet.

2.1 Structures (18 CFR Section 4.51(b)(1))

The following existing components are included as part of the Project. The Power Authority is not proposing to install any new structures as part of the relicensing.

2.1.1 Project Dam

The Crescent Dam consists of two independent concrete gravity overflow sections which link each river bank to a rock island in the middle of the Mohawk River (Figure 2-1). Both sections are curved in plan and have a crest at elevation (El.) 184 BCD.³ The total length of the dams is 1,435 ft. The eastern overflow section (Dam A) is 901 ft. long and 52 ft. in height. The western section (Dam B) is 534 ft. long and 32 ft. in height; providing 1,435 feet of spillway crest at El. 184 ft. BCD. A smaller overflow section, Dam C, is 530 ft. long and is located immediately downstream of Dam B. The maximum structural height of this dam is approximately 16 ft., and it has a crest elevation of El. 171 ft. BCD. In order to aid canal navigation, one-foot-high (12 inch) wooden flashboards are installed along the crests of both spillways (Dams A and B) seasonally in Spring (generally in April based on seasonal conditions) and removed in the Fall (generally in November based on seasonal conditions). When the flashboards are installed, the spillway crest is El. 185 ft. BCD.

The regulating section is located at the western end of Dam B. It is constructed of reinforced concrete and consists of an 8-foot-wide sluiceway and a 30-foot-wide Tainter gate bay. The sill of the sluiceway is at El. 182 ft. BCD. The sluiceway is equipped with stoplog slots. The sill of the Tainter gate is at El. 176 ft. BCD; in the closed position, the top of the gate is at El. 188.5 ft. BCD. The gate is operated electrically from a local control panel.

Water is directed to the powerhouse through a 175-foot-long headrace channel. The bottom of the headrace channel is cut rock, and the sides are formed by two mass concrete retaining walls. The channel is rectangular in plan and is approximately 123 ft. wide at the powerhouse. The elevation of the channel bottom varies from El. 171 ft. BCD at the upstream end of the headrace to El. 161 ft. BCD at the powerhouse.

2.1.2 Powerhouse

The existing powerhouse located on the western bank is constructed of brick, concrete block, and concrete, and is approximately 180 ft. long and 73 ft. wide. The powerhouse includes an intake structure with trashracks, rake, stoplogs, and gates. The trashrack bar spacing width is 3 7/8 inches. The powerhouse houses four turbine/generator units: two 2.8 MW rated Francis turbines and two 3.0 MW vertical Kaplan turbines. The original portion of the powerhouse contains the two original Francis units (Units 1 and 2). In 1990, the powerhouse was expanded to include the two Kaplan units (Units 3 and 4), which are located riverward of the original powerhouse (Figure 2-1 and Table 2-2).

³ All elevations refer to Barge Canal Datum (BCD) unless stated otherwise. BCD= NAVD88 -1.67 feet or USGS Datum +0.99 feet.

Table 2-2
Crescent Project Turbine and Generator Nameplate Data

Turbines				
Number of Units	4 units			
	Unit 1	Unit 2	Unit 3	Unit 4
Type	Vertical Francis	Vertical Francis	Vertical Kaplan	Vertical Kaplan
Design Head	26.9' (wo FB) ¹ 27.9' w FB ¹	26.9' (wo FB) 27.9' w FB	26.9' (wo FB) 27.9' w FB	26.9' (wo FB) 27.9' w FB
Rated Capacity	4,000 hp ²	4,000 hp	4,000 hp	4,000 hp
Minimum Discharge	400 cfs ³ per unit	400 cfs per unit	350 cfs per unit	350 cfs per unit
Maximum Discharge	1,500 cfs per unit	1,500 cfs per unit	1,820 cfs per unit	1,820 cfs per unit
Operating Speed	90 rpm ⁴	90 rpm	144 rpm	144 rpm
Generators				
Type	Vertical configuration	Vertical configuration	Vertical configuration	Vertical configuration
Rated Capacity	2,800 kW ⁵	2,800 kW	3,000 kW	3,000 kW
Power Factor	0.80	0.80	0.80	0.80
Phase	3 Phase	3 Phase	3 Phase	3 Phase
Voltage	2,300 V ⁶	2,300 V	4,160 V	4,160 V
Frequency	60 Hz ⁷	60 Hz	60 Hz	60 Hz
Synchronous Speed	90 rpm	90 rpm	144 rpm	144 rpm

¹ without flashboards (wo FB), with flashboards (w FB), ² horsepower (hp), ³ cubic feet per second (cfs), ⁴ revolutions per minute (rpm), ⁵ kilowatt (kW), ⁶ volt (V), ⁷ hertz (Hz)

The powerhouse tailrace is an open, unlined rock cut approximately 145 ft. wide and 65 ft. long. Elbow-type draft tubes discharge water directly into the excavated tailrace channel. The tailwater is approximately El. 157 ft. BCD, and is controlled by Erie Boulevard's School Street Station, located approximately 2 miles downstream of the Crescent Project.

2.1.3 Impoundment

The Crescent impoundment extends upstream approximately 10 miles to the Vischer Ferry Project Dam. At El. 185 ft. BCD (with 12 inch boards up), the surface area of the impoundment is approximately 2,257 acres. At El. 184 ft. BCD (with boards down) the surface area of the impoundment is approximately 2,108 acres and impounds approximately 50,000 acre-feet of water. Installation of the flashboards increases the normal full pool elevation of the impoundment by 1 foot, and the impoundment retains an additional 2,000 acre-feet of water.

2.1.4 Other Facilities

Generator output is directed to a 45 ft. by 40 ft. outdoor switchyard. The switchyard is located approximately 60 feet west of the headrace. The switchyard is connected to two 34.5 kV non-Project transmission lines.

2.1.5 Single Line Diagram

The Crescent Project Single Line Diagram is located below.

Single Line Diagram

CONTAINS CRITICAL ENERGY INFRASTRUCTURE INFORMATION – DO NOT RELEASE – CUI//CEII

3 Lands of the United States

There are no Federal lands or facilities within the Project boundary.