

**DRAFT LICENSE APPLICATION
EXHIBIT C
PROJECT CONSTRUCTION HISTORY
SKAGIT RIVER HYDROELECTRIC PROJECT
FERC NO. 553**

Seattle City Light

December 2022

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List of Acronyms and Abbreviations

AIR.....	Additional Information Request
cfs.....	cubic feet per second
CIP	capital improvement project
City Light.....	Seattle City Light
DLA	Draft License Application
ELC	Environmental Learning Center
FERC.....	Federal Energy Regulatory Commission
FLA	Final License Application
FPC	Federal Power Commission
HAER.....	Historic American Engineering Record
MW	megawatt
NRHP	National Register of Historic Places
PME	protection, mitigation, and enhancement
Project	Skagit River Hydroelectric Project
RLNRA	Ross Lake National Recreation Area
WDF.....	Washington Department of Fisheries

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EXHIBIT C: PROJECT CONSTRUCTION HISTORY

1.0 CONTENTS AND PURPOSES OF THIS EXHIBIT

The Skagit River Hydroelectric Project (Skagit River Project or Project) is licensed by the Federal Energy Regulatory Commission (FERC) as FERC Project No. 553. The current FERC license expires on April 30, 2025.

This Exhibit C, that is being filed as part of the Draft License Application (DLA), presents a summary of the history and chronology of construction and commercial operation of the Skagit River Project and a history of additions or modifications that have been made to the Project since its initial construction, as well as a proposed schedule for proposed development.

2.0 CONSTRUCTION AND UPGRADE HISTORY

The Project was developed over a 42-year period, beginning with construction of Gorge Powerhouse and a timber-crib dam in 1919, and finishing with the completion of the existing concrete-arch dam at the Gorge Development in 1961. The final phase of the Project, construction of High Ross Dam, was suspended in 1984 with the signing of the High Ross Treaty between the United States and Canada.

The current license, the second one for the Project, was issued in 1995 for a term of 30 years.¹ It consists of 21 articles related to generation operations, as well as measures for mitigating effects on natural and cultural resources. The current license is also subject to the standard articles set forth in Form L-5, “*Terms and Conditions of License for Constructed Major Project Affecting Navigable Waters of the United States and Lands of the United States*” (54 FPC 1832 (1975)). The license was modified by FERC in a 1996 Rehearing Order to include, at Seattle City Light (City Light) and other signatories’ request, all the settlement agreement measures.²

2.1 Chronology of Construction

The City of Seattle received permission from the federal government to start developing hydroelectric generating facilities on the Skagit River on December 22, 1917. In 1919, the City’s electrical utility, City Light Department, began constructing Gorge (timber crib) Dam and Powerhouse along with support facilities in what is now the town of Newhalem and a railroad to transport equipment, materials, and workers to the site. Gorge Powerhouse began generation in 1924. In 1927, FERC’s predecessor, the Federal Power Commission (FPC), issued the first license to the City of Seattle for the then-existing Gorge Development and the planned upstream Diablo Dam and Powerhouse. The construction of the Diablo Development was completed in 1936. Together, these facilities were licensed as the Skagit River Hydroelectric Project (Project No. 553).

Ross Powerhouse was completed in 1952. High Gorge Dam was completed in 1961. Plans to raise the height of Ross Dam by 125 feet, approved by the FPC in 1977, were suspended in 1985 with the signing of the High Ross Treaty in 1984. Development at the Project therefore concluded in 1961 with the construction of High Gorge Dam.

The original license for the Project expired in 1977 and City Light operated the Project under annual licenses for an 18-year relicensing period. The current Project license was issued by FERC on May 16, 1995 for a term of 30 years and will expire April 30, 2025. The most recent major amendment to the current Project license was issued in 2013 authorizing the addition of a second power tunnel between Gorge Dam and Powerhouse, as well as incorporating several changes in Project flows to better protect downstream fish habitat, and adding conservation measures for three fish species federally listed as threatened after 1995.³ The second power tunnel has not been

¹ Skagit River Hydroelectric Project Order Accepting Settlement Agreement, Issuing New License and Terminating Proceeding, May 16 1995, 71 FERC ¶ 61,159.

² Order on Rehearing, June 26, 1996, 75 FERC ¶ 61,319.

³ Order Amending License and Revising Annual Charges, Skagit River Hydroelectric Project, FERC No. 553, July 17, 2013, 144 FERC ¶ 62,044.

constructed, however, and there have been no additions or significant modifications to Project facilities under the current license.

A summary of construction and license milestones for Project facilities and dates for other significant events in the history of the Project are provided in Table 2.1-1. More details on the 40-year construction history can be found in the Historic American Engineering Record (HAER 2000), Pitzer (2001), and the National Register of Historic Places (NRHP 2011).

Table 2.1-1. Summary of construction milestones and other significant events relating to operation of the Skagit River Project.

Year(s)	Event/Milestone
1917	Department of Agriculture gives permission for City Light to build dams on the Skagit River
1919	Work begins on Gorge Dam (timber crib) and Powerhouse
1920-21	Railway between Rockport and Newhalem constructed; the Department of Agriculture issues a permit for construction of the Gorge Dam (May 27)
1921	Work begins on Gorge power tunnel
1922	Clearing begins for 100 miles of transmission lines from Newhalem to Seattle
1924	Gorge Powerhouse, timber-crib dam, and power tunnel complete; one generator installed in powerhouse; transmission lines to Seattle finished; generation begins (September 14)
1926-27	Railroad extended to Diablo
1927	Work begins on Diablo Dam; FPC issues first license for the Skagit River Hydroelectric Project (No. 553) that includes the Gorge and Diablo plants (October 27)
1930	Diablo Dam finished
1931	Construction of Diablo Powerhouse begins
1932-34	All Diablo construction suspended
1936	Construction of Diablo Powerhouse completed; first generator installed; power generation begins (October 10)
1937	Amendment 1 to the Project license authorizes construction of Phases 1-3 of Ruby Dam. Phase 1 of Ruby Dam construction begins
1939	USFS completes a road from Rockport to Newhalem
1940	Phase 1 of Ruby Dam construction complete (to 300 feet high)
1942	City Light's planned Phase 4 for Ross Dam is approved by the International Joint Commission ¹ ; Phase 4 would raise the level of Ross Dam by 121 feet to a height of 661 feet (High Ross Dam)
1946	Ruby Dam construction resumes following World War II; minimum flows below Gorge Powerhouse established by Washington Department of Fisheries (WDF); Amendment 3 to Project license changes the name of Ruby Dam to Ross Dam in honor of J.D. Ross, long-time superintendent of City Light
1947	Under a contract with the WDF, City Light agrees to contribute \$50,000 to build a fish hatchery at Marblemount and to maintain a minimum flow of 1,000 cubic feet per second (cfs) in the river below Gorge Powerhouse
1948	Construction of Ross Powerhouse starts; work begins on Gorge masonry dam and expansion of Gorge Powerhouse
1949	Phases 2 and 3 of Ross Dam completed (to 540 feet high)
1951	Gorge masonry dam and powerhouse expansion finished; timber dam removed
1952	Ross Powerhouse complete; first generator installed
1954-55	Skagit Railway is removed between Rockport and Newhalem
1957	Road extension from Newhalem to Diablo is complete; work begins on building High Gorge Dam

Year(s)	Event/Milestone
1961	High Gorge Dam complete
1962	Amendment 15 authorizes the construction of the Happy Creek-Ross Lake diversion tunnel
1967	City Light reaches agreement with British Columbia on compensation for building High Ross, which would flood an additional 4,750 acres in Canada
1968	North Cascades National Park and Ross Lake National Recreation Area (RLNRA) are created
1970	City Light files an application with the FPC to amend the Project license to include construction of High Ross
1972	North Cascades Highway is completed and opened to the public; City Light begins automating the powerhouses
1977	Amendment 18 authorizes construction of High Ross; the original 1927 license expires; City Light files application for new license that includes raising the elevation of Ross Dam; Skagit River Project begins operating on annual licenses
1979	FERC (successor to the FPC) accepts the 1977 license application; 12 interested parties intervene in the relicensing proceedings
1980	British Columbia appeals the 1942 International Joint Commission decision for a second time
1981	City Light implements the Voluntary Interim Flow Agreement to reduce effects on fish downstream of Gorge Powerhouse
1984	Seattle and British Columbia reach agreement on High Ross; the High Ross Treaty is negotiated between the U.S. and Canada and extends to January 1, 2066; City Light agrees not to build High Ross in exchange for British Columbia providing an equivalent amount of power
1979-89	City Light conducts research studies to acquire information on Project effects for relicensing and negotiates with the intervenors
1985	City Light implements the Interim Flow Agreement to reduce effects on salmon in the Skagit River downstream of Gorge Powerhouse
1988	FERC issues an Additional Information Request (AIR) identifying specific issues requiring additional study
1989	City Light submits Supplemental Environmental Information to FERC in response to the AIR
1991	City Light files an Offer of Settlement with FERC that resolves all issues with the intervenors for the term of the new license
1995	FERC issues an Order Accepting Settlement Agreement, Issuing New License, and Terminating Proceedings (May 16); City Light and intervenors file a request for rehearing to correct technical problems in the Environmental Assessment and include all elements of the Settlement Agreement (June 14)
1996	FERC issues an order to incorporate all elements of the Settlement Agreement in the license (June 26)
2006	City Light completes the North Cascades Environmental Learning Center (ELC) on Diablo Lake
2011	City Light files an application to amend the Project license to construct a second power tunnel between Gorge Dam and Powerhouse
2013	FERC issues an Order to Amend the License to include a second power tunnel at the Gorge Development (which has not yet been built); Order contains Reasonable and Prudent Measures identified in the Biological Opinions issued for listed fish species and expands Project Boundary to include fish and wildlife mitigation lands purchased to date, the Marblemount and Sauk River boat launches and the ELC.

¹ The International Joint Commission was created by the Boundary Waters Treaty of 1909 to have jurisdiction over boundary water issues between Canada and the U.S.

Significant major capital improvement projects (CIP) involving generation facilities and equipment over the last 40 years are summarized in Table 2.1-2. Combined, the generator rewinds

and turbine replacements increased the authorized installed capacity of the Project from 650.25 megawatts (MW) to 700.27 MW, with a generation capability of nearly 840 MW.⁴ The generator rewinds at Diablo Powerhouse and the new transformers at Ross resolved previous equipment-related limitations on generating capacity at these powerhouses. There have been no major modifications to transmission facilities.

Table 2.1-2. Summary of major CIP at generation facilities.

	Ross Development	Diablo Development	Gorge Development
Generator rewinds / rehabilitation	2005 (Unit 42) 2006 (Unit 43) 2007 (Unit 44) 2009 (Unit 41)	2008 (Unit 36) 2018 (Unit 31) 2019 (Unit 32) 2021 (Unit 35)	1982 (Unit 21) 1982 (Unit 22) 1983 (Unit 23) 1990 (Unit 24)
Generator disassembly, inspection, repairs		2020 (Unit 34) 2022 (Unit 36)	
Turbine runner replacement	1996 (Unit 42) 1997 (Unit 43)	1994 (Unit 31) 1995 (Unit 32)	1990 (Unit 23) 1991 (Unit 22) 1992 (Unit 21) 2004 (Unit 24)
Transformer bank replacements	2016-2017	1995	2004-2005 2015
Powerhouse rockfall / landslide / erosion mitigation and abatement	2011-2014 – rock scaling, blasting, and bolting to stabilize cliff near powerhouse following a major slide in 2010; also involved rebuilding part of the road to the dam.	2009 and 2022 – scaling, bolting and installation of wire mesh to minimize rockfall from the cliff behind the powerhouse; also includes repairs to powerhouse roof and back wall.	2009 – repairs to a washout of a portion of the crib wall at the tailrace for Unit 24.
Dam electrical upgrades	2022-2024 – upgrades to electrical and communication infrastructure in the tunnel between the powerhouse and dam (ongoing)		

2.2 Commencement of Commercial Operation

The Project consists of three power generating developments on the Skagit River – Ross, Diablo, and Gorge – that are hydraulically coordinated to act as a single project. The original Gorge Powerhouse began generation on September 14, 1924, with two Westinghouse generators (Units 21 and 22), with an additional unit (Unit 23) added in 1929. The Gorge Powerhouse was expanded in 1949, and in 1951, and a fourth unit was added (Unit 24). Units 21 and 22 have current authorized installed capacities of 31.5 MW each; Unit 23 with a current installed capacity of 30.2 MW; and Unit 24 is significantly larger, with a current authorized installed capacity of 96.1 MW.

The Diablo Powerhouse was completed in 1936 and holds two Westinghouse generators (Units 31 and 32), each with current authorized installed capacities of 78.035 MW and two smaller, house-

⁴ Per February 2, 2021 Order Amending License, Approving Revised Exhibits K and M, and Revising Annual Charges (174 FERC ¶ 62,066).

unit generators (Units 35 and 36), with capacities of 1.2 MW each. The Ross Powerhouse was completed in 1952 and operated with a single generator, with additional generating units added in 1953, 1954, and 1956, for a total of four, all manufactured by Westinghouse (Units 41, 42, 43, and 44), Units 42, 43, and 44 with current authorized installed capacity of 91.875 MW each and Unit 41 authorized installed capacity of 76.875 MW.

2.3 Additions or Modifications to the Project

The original license was issued by the FPC in 1927 for the existing Gorge Development as well as plans for the Diablo Dam and Powerhouse. The FPC granted amendments between 1927 and 1977 authorizing the Ross Dam and Powerhouse and other Project changes. The only major amendment to the current Project license was issued in 2013 authorizing the addition of a second power tunnel between Gorge Dam and Powerhouse. A recent amendment authorized construction of a new fuel dock on Diablo Lake. The second power tunnel has not been constructed; the fuel dock is scheduled for installation in 2023. There have been no other additions or major modifications to the Project under the current license (for complete details of the license amendments issued under the current license, see Exhibit A of this DLA).

3.0 PLANNED AND PROPOSED NEW DEVELOPMENT

Table 3.0-1 lists the new development planned for the new license term related to hydroelectric infrastructure and the estimated intervals following issuance of a license when the work will commence and be completed. For the Final License Application (FLA), the table will be expanded to include protection, mitigation, and enhancement (PME) measures from the Applicant's Proposal that include a construction component.

Table 3.0-1. Summary of new development planned and proposed for the new license term.

Proposed/Planned Improvement Projects and New Facilities	Start Date (year from license issuance)	End Date (year from license issuance)
Major Capital Improvement Projects (CIP) at Powerhouses, Dams, and Reservoirs		
Ross Unit 41 Generator Rewind (2049)	Year 25	Year 27
Ross Unit 42 Generator Rewind (2045)	Year 21	Year 23
Ross Unit 43 Generator Rewind (2046)	Year 22	Year 24
Ross Unit 44 Generator Rewind (2047)	Year 23	Year 25
Diablo Unit 31 Generator Rewind (2058)	Year 34	Year 36
Diablo Unit 32 Generator Rewind (2059)	Year 35	Year 37
Diablo Unit 35 Generator Rewind (2027)	Year 3 and Year 43	Year 5 and Year 45
Diablo Unit 36 Generator Rewind (2027)	Year 3 and Year 43	Year 5 and Year 45
Gorge Unit 21 Generator Rewind (2029)	Year 5 and Year 45	Year 7 and Year 47
Gorge Unit 22 Generator Rewind (2030)	Year 6 and Year 46	Year 8 and Year 48
Gorge Unit 23 Generator Rewind (2031)	Year 7 and Year 47	Year 9 and Year 49
Gorge Unit 24 Generator Rewind (2033)	Year 9 and Year 49	Year 11 and Year 51
Ross Unit 41 Turbine Runner Replacement (2027)	Year 3 and Year 43	Year 5 and Year 45
Ross Unit 42 Turbine Runner Replacement (2036)	Year 12	Year 14
Ross Unit 43 Turbine Runner Replacement (2037)	Year 13	Year 15
Ross Unit 44 Turbine Runner Replacement (2026)	Year 2 and Year 42	Year 4 and Year 44
Diablo Unit 31 Turbine Runner Replacement (2034)	Year 10 and Year 50	Year 12 and Year 52
Diablo Unit 32 Turbine Runner Replacement (2035)	Year 11	Year 13
Diablo Unit 35 Turbine Runner Replacement (2027)	Year 3 and Year 43	Year 5 and Year 45
Diablo Unit 36 Turbine Runner Replacement (2027)	Year 3 and Year 43	Year 5 and Year 45
Gorge Unit 21 Turbine Runner Replacement (2032)	Year 8 and Year 48	Year 10 and Year 50
Gorge Unit 22 Turbine Runner Replacement (2031)	Year 7 and Year 47	Year 9 and Year 49
Gorge Unit 23 Turbine Runner Replacement (2030)	Year 6 and Year 46	Year 3 and Year 33
Gorge Unit 24 Turbine Runner Replacement (2046)	Year 22	Year 24
Diablo Transformer Replacement (2055)	Year 31	Year 33
Gorge Transformer Replacement (2065)	Year 41	Year 43
Powerhouse major maintenance and other projects to address building code revisions and climate change impacts, including roof replacement, HVAC system upgrades, and seismic reinforcement	Year 1	Year 50
Ross Dam Low-Level Outlet (LLO) Upgrades/Decommissioning (2027)	Year 3	Year 6

Proposed/Planned Improvement Projects and New Facilities	Start Date (year from license issuance)	End Date (year from license issuance)
Ross Dam LLO Intake Grizzly/Trash Rack Replacement (2029)	Year 5	Year 6
Diablo Tailwater Restoration (2025)	Year 1	Year 1; repeat every 10 years
Diablo Lerner-Johnson Valve – Rehabilitation/Decommissioning (2029)	Year 5	Year 5
Diablo Powerhouse Tailrace Bridge Upgrades, Painting, Repair (2039)	Year 15	Year 20
Diablo Automated Trash Rack Cleaning System Rehabilitation/Installation (2025)	Year 1	Year 2
Gorge Automated Trash Rack Cleaning System Rehabilitation/Installation (2026)	Year 2	Year 3
Gorge Spillway Gate Hoist Superstructure Seismic Upgrade (2025-2029)	First 5 years	Year 10
Dredging to Reduce Fish Trapping/Stranding Risk and Improve Operational Flexibility (portions of Diablo and Gorge reservoirs, as needed)	Year 1	Year 3; repeat every 10 years
Powerhouse and Dam Rockfall Mitigation (all dams, as needed)	Year 1	Year 50
Spillway Gates and Operator Maintenance and Upgrades (all dams, as needed)	Year 1	Year 50
Spillway Bridge Upgrades, Painting, and Repair (all dams, as needed)	Year 1	Year 50
Spillways and Training Walls Repairs (all dams, as needed)	Year 1	Year 50
Structural Safety Improvements, Repairs, Upgrades of Dam Structures, Abutments, Foundation (all dams, as needed)	Year 1	Year 50
Surface Drainage and Dam Monitoring Instrumentation Upgrades/Improvements (all dams, as needed)	Year 1	Year 50
Major CIP in Townsite and at Other Project Facilities		
Diablo and Newhalem Water Tower Major Maintenance	Year 1	Year 50
Diablo and Newhalem Water Main Repairs / Replacement	Year 1	Year 50
Newhalem Wastewater Treatment Plant Major Maintenance	Year 1	Year 50
Newhalem Lineman's Warehouse Contaminant Remediation and Demolition or Rehabilitation/Reconstruction (2030)	Year 6	Year 15
Newhalem and Diablo Lodging Rehabilitation and Energy Upgrades	Year 1	Year 50
Currier Hall Rehabilitation and Upgrades (2034)	Year 10	Year 15
Sourdough Trail Garage Demolitions (2029)	Year 5	Year 10
Diablo Incline Lift Make-safe Stabilization (2025)	Year 1	Year 5
Diablo Incline Lift Restoration, Decommissioning, or Modification (2034)	Year 10	Year 50
Diablo Reflector Bar Administration Building Rehabilitation/Upgrades (2044)	Year 20	Year 25
Ladder Creek Blue Pool Stabilization and Erosion Mitigation (2025-2034)	First 10 years	Year 10

Proposed/Planned Improvement Projects and New Facilities	Start Date (year from license issuance)	End Date (year from license issuance)
Babcock Creek and Diablo Communication Base Station Upgrades (2025-2034)	First 10 Years	Year 10
Emergency Outdoor Warning Sirens at Colonial Creek and Gorge Bypass Reach (2025-2029)	First 5 years	Year 10
<u>Major CIP Involving Transportation and Marine Infrastructure</u>		
Newhalem Road Reconstruction and Maintenance (2034-2044)	Year 10-20	Year 20
Diablo Road Replacement and Repairs (2044)	Year 20	Year 30
Bridge Upgrades/Repairs/Painting, as needed	Year 1	Year 50
Diablo Dam to ELC Road Reconstruction and Pedestrian Safety Upgrades (2025-2034)	First 10 years	Year 20
Sourdough Vented Ford Replacement (2025-2034)	First 10 years	Year 20
Ross Lake Emergency Helipad Improvement 2039	Year 15	Year 20
Diablo Lake West Barge Landing Reconfiguring (2034-2044)	Year 10-20	Year 20
Diablo Lake West Boat Launch Extension (2034-2044)	Year 10-20	Year 20
Diablo Dry Dock Rail System Restoration or Modification (2029)	Year 5	Year 10
Reservoir Debris Booms and Anchorage Improvements / Upgrades / Replacements (all dams, as needed)	Year 1	Year 50
Babcock Creek Bridge Abutments and Approaches Replacement (2034-2044)	First 10 years	Year 20
<u>Major CIP for Proposed New Facilities</u>		
Ross Powerhouse Spare Transformer Concrete Pad (2034)	Year 10	Year 20
Diablo Lake Tour Dock (2025-2029)	First 5 years	Year 10
Diablo Lake Ferry Kiosk (2027)	Year 3	Year 5
Newhalem Radio/Microwave Base Station (2025-2034)	Year 3	Year 10
EV Charging Stations (2025-2034)	First 10 years	Year 10
<u>Major CIP for New Facilities Under Consideration</u>		
Diablo Firehouse (2025-2034)	First 10 years	Year 50
Newhalem Operations Building (2025-2034)	First 10 years	Year 50
Newhalem Administration Building (2025-2034)	First 10 years	Year 50
Newhalem Firehouse (2025-2034)	First 10 years	Year 50
Newhalem RV/Boat Storage (2025-2034)	First 10 years	Year 50
Newhalem Service Yard Employee Parking Area (2025-2034)	First 10 years	Year 50
Newhalem Materials Storage Area (2025-2034)	First 10 years	Year 50
Minor Improvement Projects	Year 1	Year 50

4.0 REFERENCES

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