

WATER POWER ACT LICENCES

SLAVE FALLS GENERATING STATION SHORT- TERM LICENCE EXTENSION APPLICATION

SUPPORTING DOCUMENTATION

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WATERWAY APPROVALS AND MONITORING
ASSET MANAGEMENT DIVISION
ASSET PLANNING AND DELIVERY

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APPLICATION

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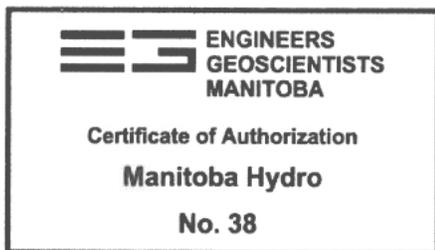


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DATE:

2021 06 10

1.0 INTRODUCTION

This report provides information in support of a short-term extension licence application. Manitoba Hydro requests this extension licence in accordance with Section 92 of The Water Power Regulation, Manitoba Regulation 25/88R of The Water Power Act.

Manitoba Hydro operates the Slave Falls Generating Station (GS) in accordance with the Renewal Licence for the Development of Water Power at the Slave Falls site on the Winnipeg River. This licence was issued in accordance with the provisions of The Water Power Act on June 30, 1982. The Renewal Licence is valid for a term of 40 years and is in effect until January 1, 2022.

Manitoba Hydro requested a Second Renewal Licence on September 12, 2017. However due to licensing requirements for other projects, Manitoba Hydro is requesting a short-term extension licence to allow the licence renewal to occur at a later date.

2.0 PROJECT COMPONENTS

The Slave Falls GS is located on the Winnipeg River in the Whiteshell Provincial Park, approximately 160 km northeast of Winnipeg by road and 10 km down river from Pointe du Bois as shown in Figure 1. The station is accessible by private road from Pointe du Bois and is in Treaty 3 territory and in the homeland of the Metis Nation.

A photograph showing the Slave Falls GS is provided in Figure 2 and an overall site map outlining the layout of the major project components is shown in Figure 3.

The Slave Falls GS is a run-of-river hydroelectric generating facility consisting of an 8-unit close-coupled intake/powerhouse with a generating capacity of 71.6 MW. The station was constructed in stages from 1928 to 1948 by City Hydro, later known as Winnipeg Hydro. Manitoba Hydro acquired the generating station in 2002.

The station components include an 8-unit powerhouse, a 28-bay north spillway, 7-bay north sluiceway, 3-bay ice sluiceway, 2-bay regulating sluiceway, concrete non-overflow dams, and earthfill dykes. Figures 4 to 6 show the general arrangement and cross sections of the concrete structures. Tables 1 and 2 summarize major characteristics of the station and project components.

Table 1: Slave Falls GS Major Characteristics

Construction Period	1928 to 1948
Nameplate Capacity	71.6 MW (96,000 horsepower)
Average Annual Generation (1982-2020)	449 million kW-h
Waterfall Drop (head)	9.75 m
Maximum Operating Forebay Elevation	284.62 m (933.8 ft)

Table 2 Principal Structures of the Slave Falls GS

<i>Powerhouse</i>	Number of Units	8 vertical propeller type turbines
	Length	180 m
	Discharge Capacity (at full gate)	962.8 m ³ /s
	Unit Power Production	8 Units @ 8.94 MW/unit = 71.6 MW
<i>Spillways</i>	Number of Bays	North spillway - 28 North sluiceway - 7 Ice sluiceway - 3 Regulating sluiceway - 2
	Discharge Capacity (at maximum operating forebay elevation)	4,454 m ³ /s
<i>Rockfill Dam</i>	Material	Granite rockfill
	Crest Elevation	287.9 m
	Available Freeboard	3.28 m
South Non-Overflow Dam	Material	Concrete
	Crest Elevation	286.7 m
	Available Freeboard	2.08 m

3.0 WATER POWER LICENSING REQUIREMENTS

3.1 Licence Terms

Condition #2 of the Renewal Licence stipulates that:

“The undertaking authorized to be maintained by the Licensee under the Renewal Licence shall comprise the following: in the east channel of the Winnipeg River, a powerhouse with eight 12,000 horsepower vertical type main turbines...”

The station was constructed in stages from 1928 to 1948. Since 1948, the capacity of each of the eight units has been 12,000 horsepower (8.94 MW) for a total station capacity of 96,000 horsepower (71.6 MW).

Condition #4 of the Renewal Licence stipulates that:

“The Licensee shall not raise the headwater of its development to an elevation higher than 933.8 feet above mean sea level, Canadian Geodetic Datum 1929 Adjustment. A higher elevation may be created only with written permission by the Minister in accordance with Section 72 of the Regulation”

Manitoba Hydro operates the Slave Falls GS so that the forebay water level does not exceed 284.62 m (933.8 feet). Compliance with this condition typically exceeds 99.9 percent of hourly water level measurements.

3.2 Licence Area

The licence area extends from the upstream boundary located downstream from Pointe du Bois to downstream of Slave Falls GS. The licence area is shown in Manitoba Conservation and Climate file number 21-11-7013 (Sheet 1).

Manitoba Hydro is reviewing the licence area and will propose changes/refinements based on current cadastral information, updated geotechnical analysis of shoreline erosion and wind setup and wave uprush analysis. It is expected that the updated licence area will be submitted as part of the licence renewal process.

4.0 MONITORING PROGRAMS

4.1 Water Levels

The forebay water level at Slave Falls is measured using an ultrasonic transducer and transmitter unit. The transducer is submerged at a depth of 2 m inside of a stilling well which is connected to the forebay by a pipe. Operating staff monitor the water level data and respond to alarms as required.

Data is collected on site and approved by the operating supervisor. Data is then sent to the Energy Supply Planning Department of Manitoba Hydro, uploaded into a database and checked for errors. Data errors are then corrected or verified by plant operating staff with technical assistance from Energy Supply Planning Department staff as needed. Once data has been verified, it may be used for operations planning, studies, model development and reporting.

Manitoba Hydro prepared the Slave Falls Generating Station Licence Implementation Guide for Water Levels to document a common understanding of compliance with the water regime terms of the Slave Falls Water Power Act Licence. The report was approved by Manitoba in 2017.

Manitoba Hydro prepares an Annual Water Levels and Flows Compliance Report to document compliance with all of its Water Power Act licences. The report contains analysis of water level and flow data related to the licence conditions for the calendar year. Information specific to Slave Falls includes the analysis of forebay level data, maps, photos, project description, and gauge and data collection description. In addition to the annual report, Manitoba Hydro performs weekly licence compliance checks for all Water Power Act licence conditions. Manitoba Hydro reports licence limit exceedances to Manitoba Conservation and Climate upon occurrence.

4.2 Dam Safety

Manitoba Hydro's Dam Safety Program is based on the Canadian Dam Association (CDA 2007) Guidelines and operates in accordance with two key CDA principles:

Principle 1a

The public and the environment shall be protected from the effects of dam failure, as well as release of any or all retained fluids behind a dam, such that the risks are kept as low as reasonably practicable.

Principle 2d

Documented surveillance procedures shall be followed to provide early identification and to allow for timely mitigation of conditions that might affect dam safety.

Manitoba Hydro's program objectives aim to detect changes in the condition of dams and to initiate timely remedial measures when necessary. The program includes visual inspections, instrument data analysis, engineering analysis, testing, evaluations, and reporting. Manitoba Hydro maintains inspection guidelines for surveillance of concrete and embankment dams based on the dam classification, condition and professional judgment.

Concrete and embankment dams continue to be inspected at regular intervals for any anomalies or deficiencies. Manitoba Hydro staff perform routine inspections once per month for the embankment dams and bi-monthly for the concrete dams, including the spillway. Specialists from Manitoba Hydro's Asset Management Division perform additional inspections of all dams annually.

Dam Safety Reviews (DSR) of generating stations and water control structures are undertaken on a prescribed schedule. This type of review is a systematic evaluation of dam safety through a comprehensive performance assessment of the structures and review of original design, construction, operation and maintenance records to ensure that the generating station meets current industry standards. The CDA Guidelines are the applicable standard. Qualified external consulting engineering

firms carry out DSRs and typically include a site inspection of the station, dams, and spillway gates, including mechanical and electrical aspects of gate operation. A comprehensive DSR report includes observed deficiencies and recommendations for follow-up. SNC Lavalin performed a DSR at Slave Falls in 2010. Several deficiency investigations are now complete, while the remaining items are prioritized within the appropriate work management system.

Manitoba Hydro maintains **Dam Safety Emergency Plans** for all of its generating stations. These plans are consistent with the CDA's Dam Safety Guidelines and bulletins and are issued to local authorities and emergency response agencies to assist in responding to an emergency situation. The **Pointe du Bois and Slave Falls Dam Safety Emergency Plan** contains detailed information regarding the verification, and classification of the emergency, and contains communication notification and reporting procedures.

Manitoba Hydro updates notification charts in the emergency plans annually to reflect ongoing personnel and content change. Major revisions to the plans are currently underway and will include updated dam breach mapping and a new format that aligns with the latest CDA emergency management guidance.

4.3 Aquatic Monitoring

There are several sites on the Winnipeg River both upstream and downstream from the Slave Falls GS that are monitored as part of the Coordinated Aquatic Monitoring Program (CAMP). CAMP was established in 2008 and is a long-term aquatic monitoring program to study and monitor the health of water bodies (rivers and lakes) effected by Manitoba Hydro's generating system. Manitoba Hydro and the Province of Manitoba jointly manage the CAMP through a partnership.

CAMP has established annual monitoring sites along the Winnipeg River on Eaglenest Lake, in the Pointe du Bois forebay, at Lac du Bonnet, and in the Pine Falls forebay. Monitoring at these sites has helped characterize the fish species composition, water quality, and other aquatic ecosystem conditions along the Winnipeg River. More information about CAMP is available at www.campmb.com.

5.0 COMMUNITY INVOLVEMENT AND SYSTEM UPGRADES/STUDIES

One of Manitoba Hydro's foundational principles is respectful engagement with the public, Indigenous communities and groups affected by its hydro system and operations with a priority to respect and support Indigenous peoples in all aspects of its business. In addition to having a business unit dedicated to External & Indigenous Relations and Communications, Manitoba Hydro has a section within the Waterway

Approvals and Monitoring Department tasked with community and stakeholder engagement on hydro system waterways (Waterway Community Engagement Section).

Manitoba Hydro has undertaken significant engagement activities in the past several years in response to multiple maintenance and safety projects at Slave Falls Generating Station. Project engagements have involved over 20 municipalities, Indigenous communities, recreational, commercial and cottage associations, and government with an interest in the Winnipeg River in vicinity to Slave Falls GS. The form of the engagement has ranged from interactive websites, on-line surveys, tours, presentations, emails, phone calls, meetings and circulation of project updates (notices). These engagements have facilitated on-going working relationships with the individuals, groups, businesses, and communities that make up the waterway community on the Winnipeg River. Following are details about community involvement on specific projects.

Slave Falls Creek Spillway Conversion Project

In 2017, Manitoba Hydro performed rehabilitation work that involved converting the creek spillway located to the south of the generating station into a non-overflow dam. The engagement process included notifications and feedback mechanisms with stakeholders and Indigenous interests, and specific involvement of an Indigenous Nation in a heritage assessment of the quarry used for the rehabilitation work.

Concrete Structure Repairs

In 2018, Manitoba Hydro discovered that the concrete in one of the station's sluiceway piers was in poor condition after over 90 years of exposure to water flow, ice and annual freeze/thaw cycles. Over the 2018–19 winter season, Manitoba Hydro lowered the upstream water level by 1 metre (3 feet) to allow for the necessary repairs. In 2020, Manitoba Hydro continued to assess the conditions of the concrete structures at Slave Falls. Manitoba Hydro informed anyone who might be affected by the planned or potential work at Slave Falls and implemented remedial measures for people affected by the 2018/19 water lowering. Manitoba Hydro also invited those who live along or use the waterway to provide feedback through an online survey on the potential effects of any work involving lowered water levels, so potential impacts could be better understood. This input will inform our future work plans and help us find ways to avoid or limit impacts where possible – considering potential safety, environmental, social, and economic impacts under different scenarios.

Public Water Safety Around Dams – new portage and safety boom

Following a Public Water Safety Around Dams safety review at Slave Falls Generating Station, the existing safety boom and portage route around the station had to be moved. A new all-season safety boom that crosses the entire Winnipeg River upstream of Slave Falls is scheduled for installation in 2021. The safety boom is a barrier that limits water access around the station to make the area safe for the public. Warning buoys will also be installed on the downstream side of the generating station to alert boaters to the dangerous waterway zone in this area. The new safety boom will permanently block access to the existing portage route, so a new portage route was constructed to provide safe passage around the generating station and enable access to the waterway downstream of Slave Falls. Through the project engagement plan, Manitoba Hydro reached out to local residents, Indigenous and surrounding communities, and recreational waterway users to collect feedback, understand concerns, and assess potential impacts related to the proposed new portage route. This input helped inform our final routing and design of the new portage.

Project and engagement information for both the concrete work and the new portage and safety boom is available at www.hydro.mb.ca/slavefalls

6.0 CLOSURE STATEMENT

Manitoba Hydro continues to operate the Slave Falls GS in accordance with the Renewal Licence for the Development of Water Power at the Slave Falls Site on the Winnipeg River. Manitoba Hydro operates and maintains the generating station and associated structures based on the Canadian Dam Association Guidelines.

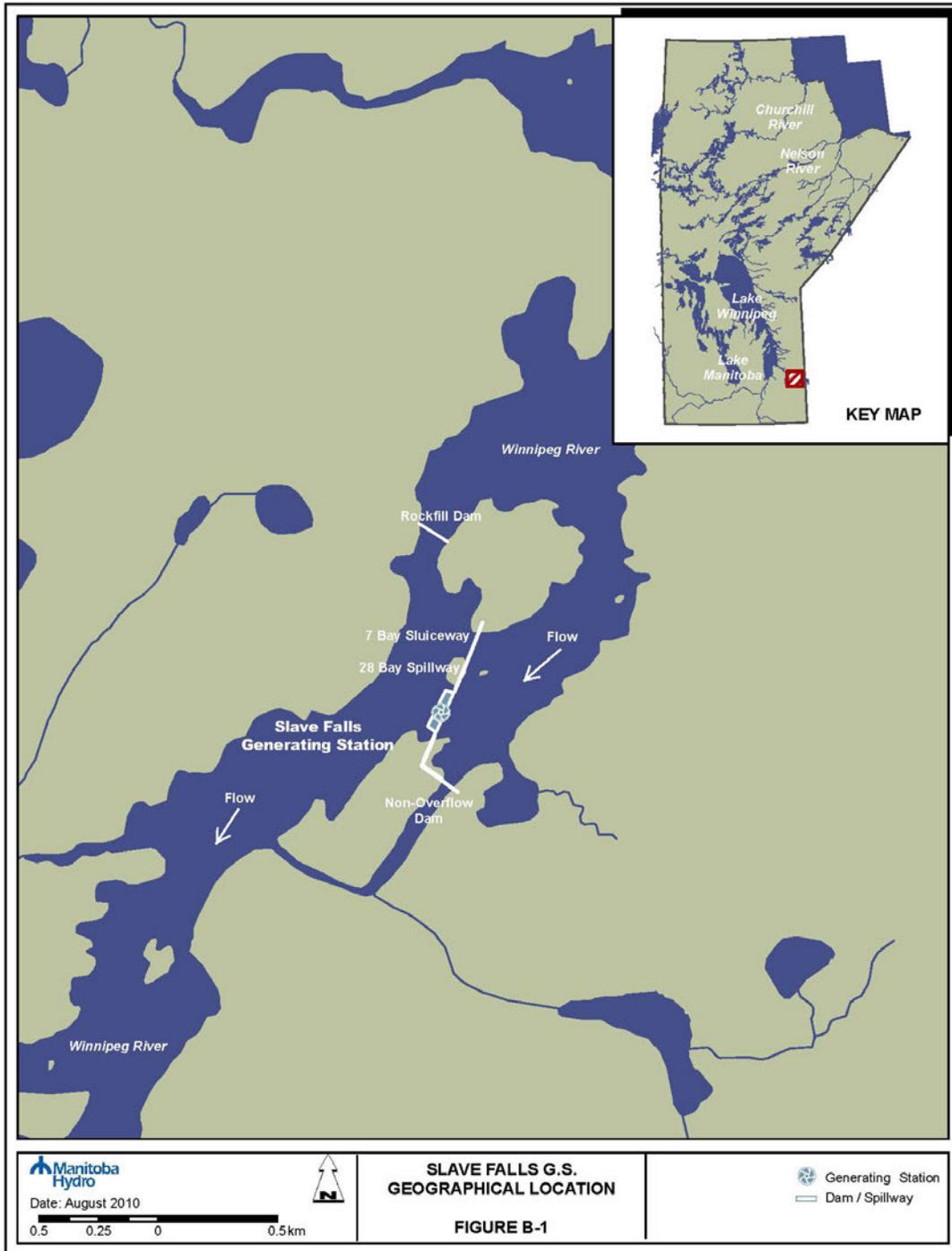


Figure 1 Geographical Location of Slave Falls GS



Figure 2 Photograph of Slave Falls GS (view from south of non-overflow dam)

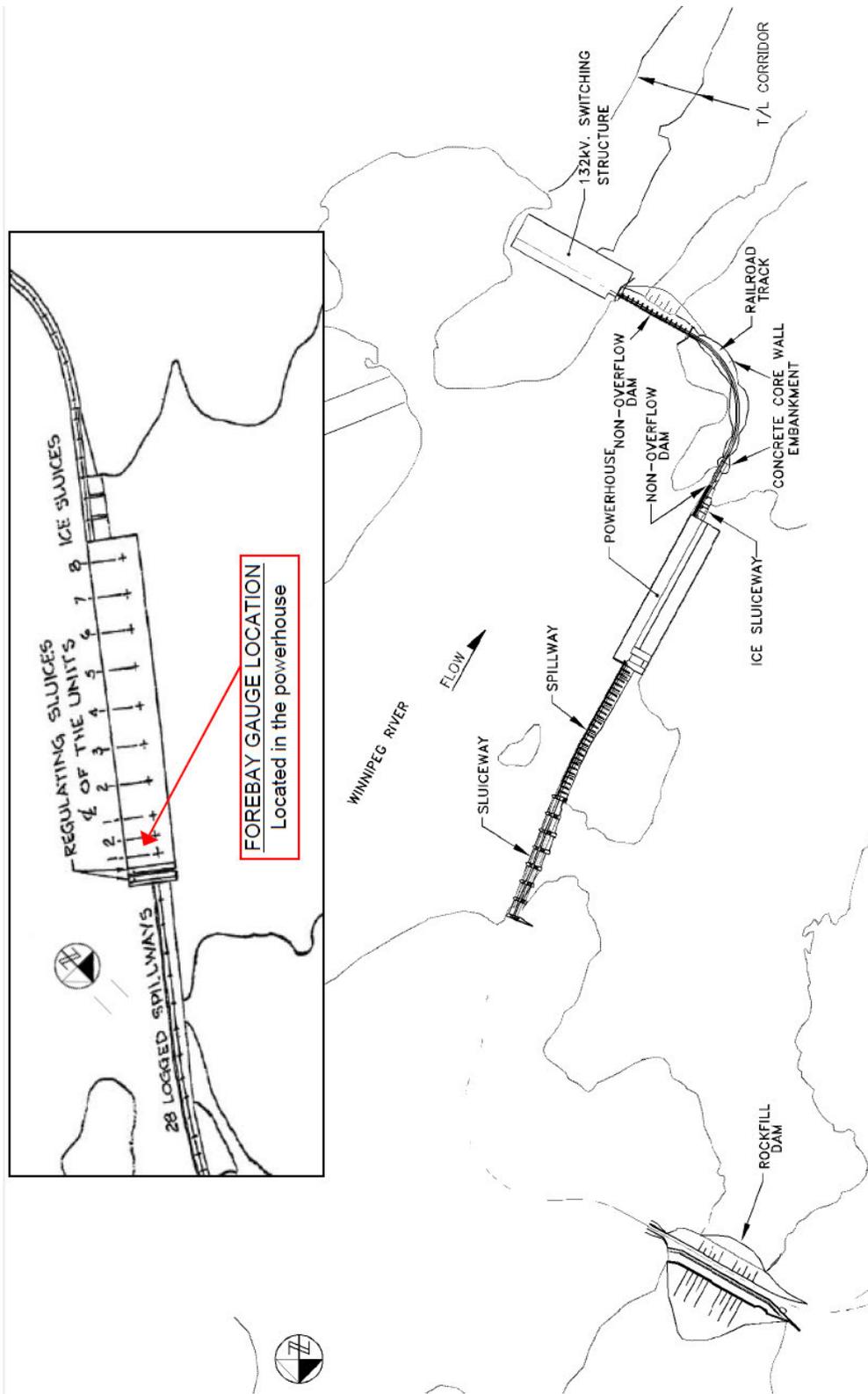


Figure 3 General Arrangement of Slave Falls GS

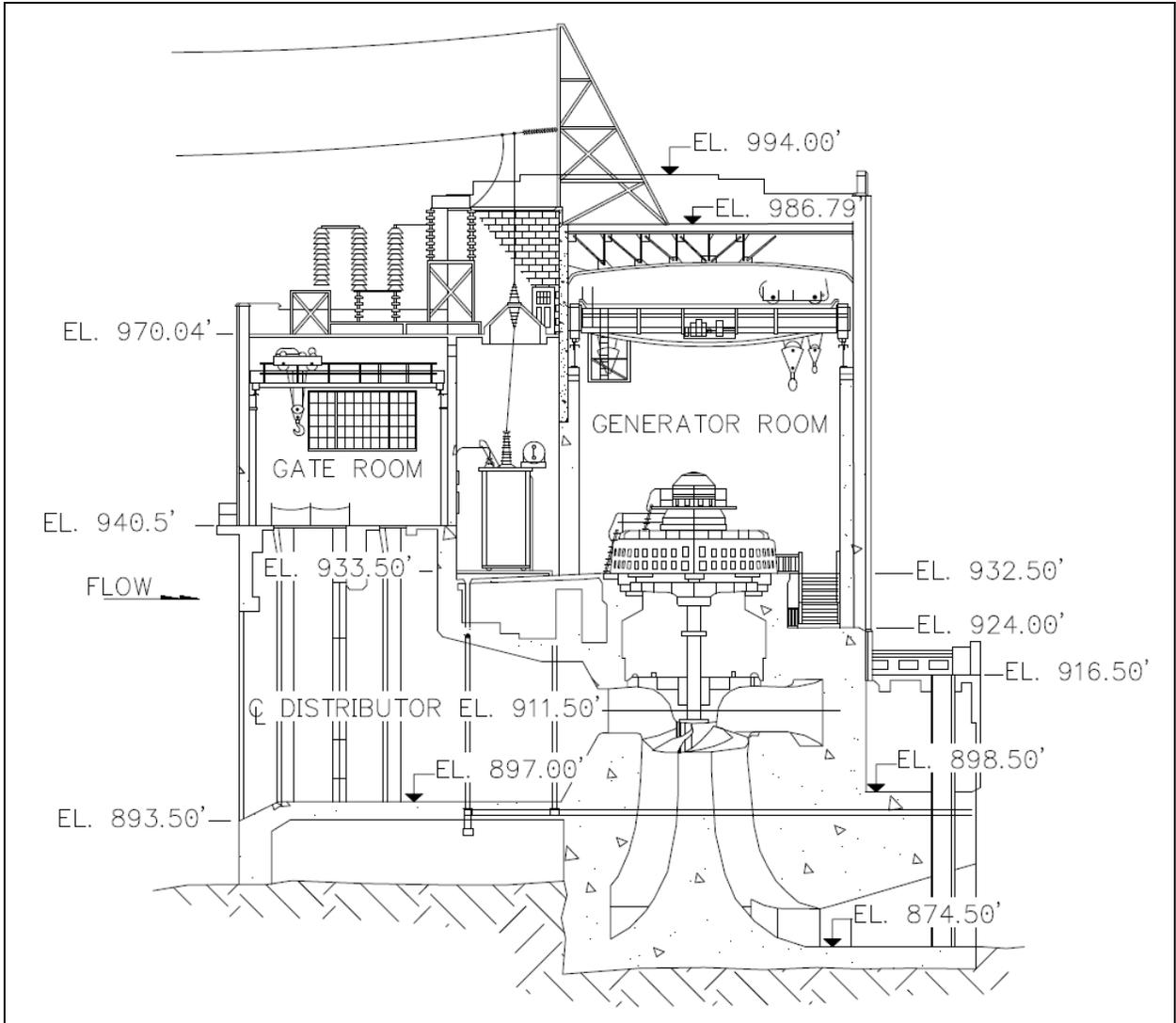


Figure 4 Slave Falls Powerhouse Cross Section

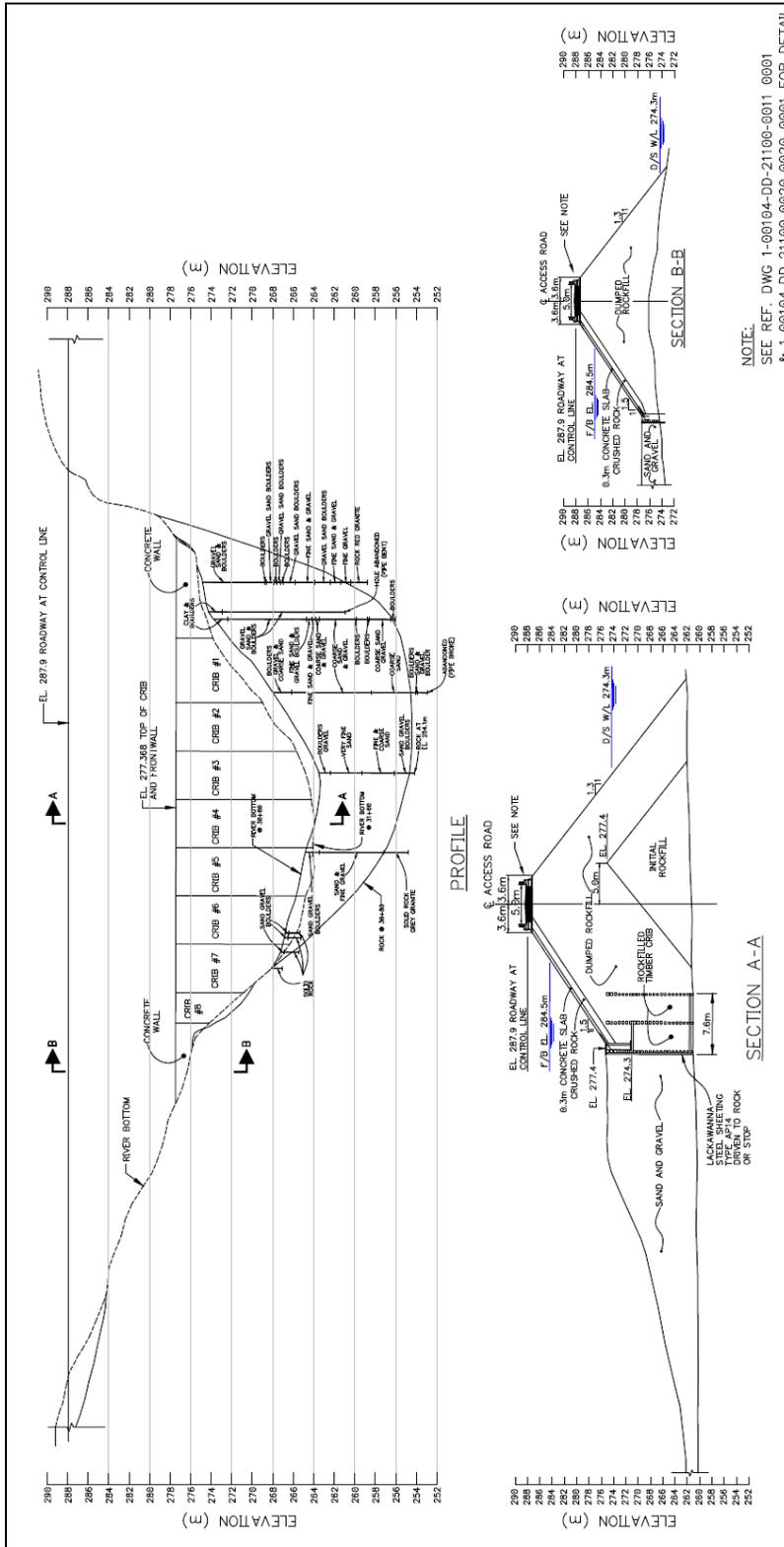


Figure 5 Slave Falls Rockfill Dam Profile and Sections

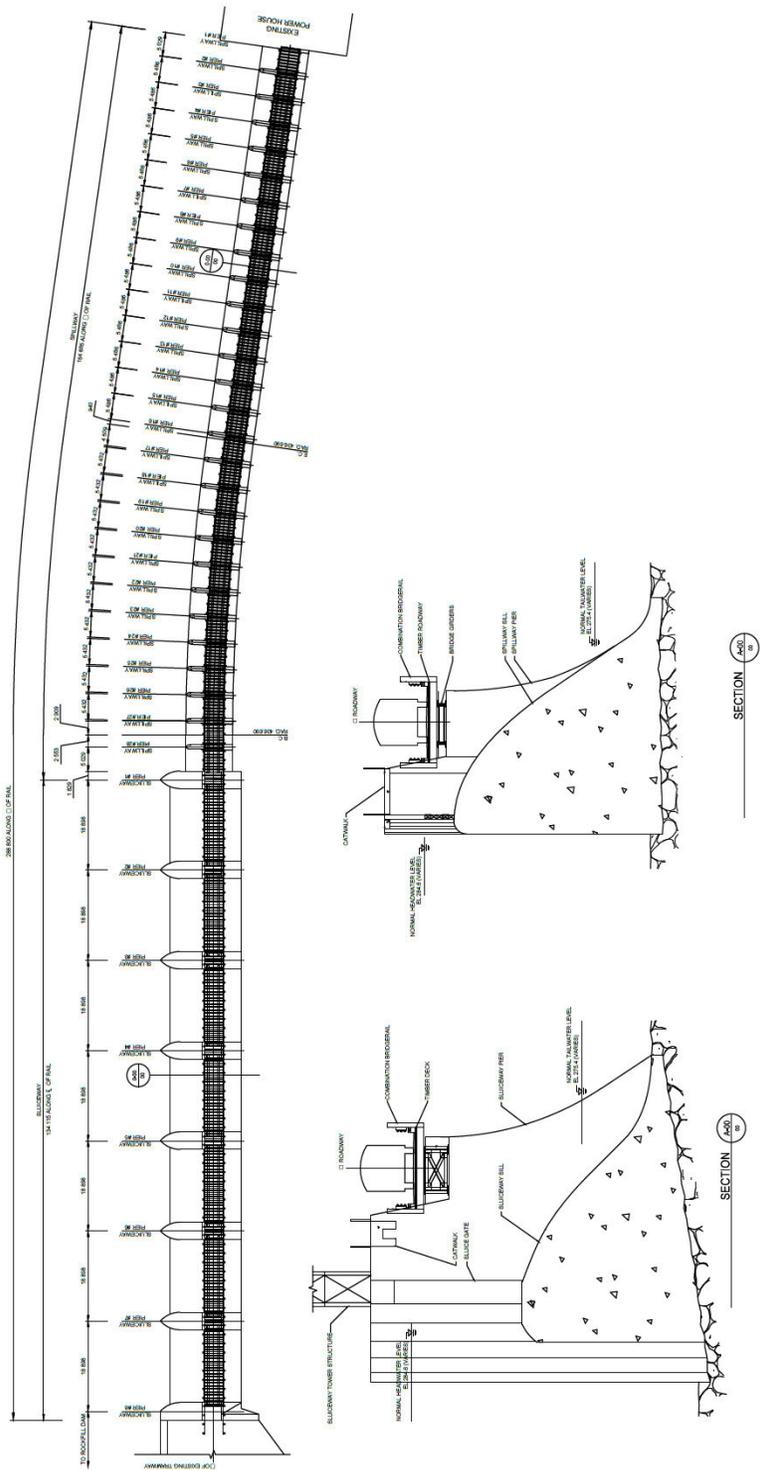


Figure 6 Slave Falls Spillway Plan and Sections