



360 Portage Ave (16) • Winnipeg Manitoba Canada • R3C 0G8
Telephone / N^o de téléphone : 204-360-3018 • Fax / N^o de télécopieur : 204-360-6136
wpenner@hydro.mb.ca

2014 10 30

Mr. R. Matthews
Manager, Water Use Licensing
Manitoba Conservation and Water Stewardship
Box 16-200 Saulteaux Crescent
Winnipeg MANITOBA R3J 3W3

Dear Mr. Matthews:

KELSEY WATER POWER SHORT-TERM EXTENSION LICENCE REQUEST

We request a five year short-term extension licence for the Kelsey Generating Station under the provisions of Section 92(1) of Water Power Regulation 25/88R.

We have included a Short Term Extension Report as supporting documentation and will continue to work with your Section to address this Water Power licence.

Manitoba Hydro continues to operate the Kelsey Generating Station in accordance with the Final Licence and amendments thereto under the Water Power Act. The Final Licence expires on January 1, 2015. Manitoba Hydro requested a renewal licence on December 17, 2010. 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.

Please call me at 204-360-3018 if you need additional information.

Yours truly,

pp: *Brian Giesbrecht*

W.V. Penner, P. Eng.
Manager
Hydraulic Operations Department

MJD/sl/ 00111-07311-0034_00
Encl.

WATER POWER ACT LICENCES

KELSEY GENERATING STATION SHORT TERM LICENCE EXTENSION APPLICATION

SUPPORTING DOCUMENTATION

Prepared for:
Manitoba Water Stewardship
200 Saulteaux Crescent
Winnipeg MB R3J 3W3

Prepared by:
Manitoba Hydro
360 Portage Avenue
Winnipeg MB R3C 0G8

October 29, 2014

Report No: PS&O – 14/07

HYDRAULIC OPERATIONS DEPARTMENT
POWER SALES & OPERATIONS DIVISION
GENERATION OPERATIONS

WATER POWER ACT LICENCES
KELSEY SHORT TERM LICENCE EXTENSION APPLICATION
SUPPORTING DOCUMENTATION

Originally signed by M.D.J.
Duenas



2014 10 29



PREPARED BY:

Originally signed by
M.J. Duenas

M.J. DUENAS

Originally signed by P.
Chanel

P. CHANEL

REVIEWED BY:

Originally signed by
B.W. Giesbrecht

B.W. GIESBRECHT

Originally signed by W.V.
Penner

APPROVED BY:

W.V. PENNER

NOTED BY:

Originally signed by
D.Cormie

D. CORMIE

DATE:

2014 10 29

REPORT NO:

PS&O - 14/07

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 Kelsey Generating Station in accordance with the Final Licence dated March 10, 1966. This Final Licence was amended on April 29, 1971 and on April 8, 1983 when Units #6 and #7 were added.

The Final Licence was also amended by seven Short-Term Amending Licences issued on the following dates to address the effect of the Kelsey re-runnering project to December 31, 2014:

- July 16, 2010;
- December 29, 2010;
- March 31, 2011;
- February 29, 2012;
- August 28, 2012;
- April 23, 2013; and
- December 27, 2013.

The Final Licence for the Kelsey GS expires on January 1, 2015. Manitoba Hydro requested a renewal licence on December 17, 2010. However due to licensing requirements for other projects, Manitoba Hydro is requesting a short-term extension licence to allow the license renewal to occur at a later date.

2.0 PROJECT COMPONENTS

Kelsey Generating Station is located on the Nelson River approximately 680 km north of the City of Winnipeg and approximately 137 km upstream of the Kettle Generating Station. The site can be accessed by air or by rail from Thompson. The geographical location of the station is shown in Figure 1. Photograph 1 shows the Kelsey Generating Station powerhouse, main dam, sluiceway, and the centre and east dykes. An overall site map outlining the layout of the major project components is shown in Figure 2.

The Kelsey Generating Station has a name plate capacity of 315.7 MW (423,500 hp). The station was constructed from 1957 to 1961 and originally included 5 units with room for expansion. A sixth unit was installed in 1969 and the seventh was added in 1972. The Kelsey re-runnering project was recently completed between 2006 and 2013 and involved the installation of more efficient turbine runners.

Along with the seven unit powerhouse, the station components include a nine bay spillway, a dam and a number of auxiliary dykes. Figures 3, 4, 5 and 6 show details of these concrete and earth structures. Table 1 summarizes major characteristics of the generating station.

Table 1: Kelsey GS Major Characteristics

Construction Period	1957 to 1961
Capacity	315.7 MW (423,500 hp)
Average Annual Generation	1,800 million kW-h
Waterfall Drop (head)	17.1 m (56 ft)
Maximum Licence Forebay Elevation	184.4 m (605 ft)
Maximum Operating Forebay Elevation (MOFE)	184.4 m (605 ft)
Available Freeboard @ MOFE - Concrete Structures	1.5 m (5 ft)
Available Freeboard @ MOFE - Earth Structures	0.6 m (2 ft)

Table 2 summarizes major characteristics of the Kelsey powerhouse, spillway, and dykes.

Table 2: Kelsey GS Component Characteristics

Powerhouse	Number of Units	7 units
	Length	205.5 m (664.4 ft)
	Deck Elevation	185.9 m (610 ft)
	Discharge Capability (at full gate)	1,700 m ³ /s (60,000 ft ³ /s)
	Power Production ¹ - Unit 1,2,3,4,5,6,7	45.1 MW (60,500 hp)/unit
Spillway	Number of Bays	9 bays
	Length	142.6 m (467.8 ft)
	Deck Elevation	186.2 m (611 ft)
	Discharge Capability (at MOFE)	8,500 m ³ /s (300,000 ft ³ /s)
Crest Elevation of Dam and Dykes	Main Dam	186.6 m (612.2 ft)
	Centre Dyke	186.2 m (611 ft)
	Dyke 1E and 1W	186.2 m (611 ft)
	Dyke 2E and 2W	185.9 m (610 ft)

¹ Units 1 to 7 received major overhauls, and the replacement of turbine runners from 2006 to 2013. Each unit was originally rated for a power production of 31 MW (42,500 hp).

3.0 WATER POWER LICENSING REQUIREMENTS

3.1 Licence Terms

Condition #2 of the Final Licence stipulates that:

“The undertaking authorized to be maintained and operated by the Licensee under this Final License shall comprise the following: ... a reinforced concrete powerhouse with five vertical turbines, each of 42,000 horsepower capacity...”

The Seventh Short-Term Amending Licence amends Condition #2 of the Final Licence (as previously amended) by replacing the words “seven vertical turbines each of 42,000 horsepower” with the words “seven vertical turbines each with a generating capacity of 45.1 megawatts”.

Condition #4 of the Final Licence stipulates that:

“The Licensee shall not raise the headwater of its development to an elevation higher than 605.0 feet above mean sea level, Canadian Geodetic Datum 1929 Adjustment.”

Manitoba Hydro operates the Kelsey Generating Station so that the forebay water level does not exceed 605.0 feet.

3.2 Licence Area

The licence area of the Kelsey Generating Station extends from approximately 200 km (125 mi) upstream of Kelsey at the upstream edge of Sipiwesk Lake to approximately 2.0 km (1.2 miles) downstream of Kelsey. Included as part of the licence area are Sipiwesk Lake, Prud’homme Lake, Cauchon Lake, and several other smaller lakes. The licence area is shown in Manitoba Water Stewardship file number 51-4-1027.

4.0 MONITORING PROGRAMS

4.1 Water Levels

The forebay water level at Kelsey is measured in a still well located in the Unit #1 hoist house. The forebay gauge consists of a float attached to a steel tape that is draped over a pulley connected to a Selsyn (self-synchronous) system. This system electronically transmits the angular position of the pulley to a receiving device in the control room. The position information is converted to a water level, indicated on a display and also

output to the Remote Transmittal Unit for transmission to System Control Centre and Hydraulic Operations Department.

The station operators at Kelsey check the calibration of the gauge by comparing manual measurements with electronic readings in the control room once a month or as required.

4.2 Dam Safety

Manitoba Hydro's Dam Safety Program is based on the Canadian Dam Association Guidelines. All water retaining and flow control structures at Kelsey GS are inspected and maintained at regular intervals.

Routine inspections of embankment dams and concrete structures by trained Manitoba Hydro staff are performed semi-monthly to annually, depending on the type of structure and the dam classification. Maintenance and testing of flow control and related equipment is carried out by site staff at least annually. Additional inspections of all water retaining structures as well as instrumentation data reviews are also performed by specialists from Manitoba Hydro's Engineering Services Division. An independent dam safety review of the Kelsey GS was recently completed and a report issued in 2014.

4.3 Aquatic Monitoring

There are two sites upstream from the Kelsey Generating Station that are monitored every three years as part of the Coordinated Aquatic Monitoring Program (CAMP). One site is on Sipiwesk Lake and the other is on the Nelson River downstream from Sipiwesk Lake. Water levels at both sites were first affected by Kelsey GS in 1960, and further altered by the operation of Lake Winnipeg Regulation (LWR) in 1976. Sipiwesk Lake was previously monitored under the 1985-89 Ecological Monitoring Program (EcoMon). It supports a commercial fishery operating out of Wabowden and is an important subsistence harvest area for both Wabowden and Cross Lake First Nation. The Nelson River also has an important commercial fishery, with an additional large scale fishery on the connected tributary, Cauchon Lake. There has been minimal aquatic monitoring near the Nelson River site. 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) affected by Manitoba Hydro's generating system.

5.0 SYSTEM UPGRADES/STUDIES AND AGREEMENTS

5.1 System Upgrades/Studies

Construction of the GS began in 1957 and the first five units were in-service by 1961, producing a total of 219 MW. The sixth and seventh units were added in 1969 and 1972.

The units at Kelsey GS were upgraded and the turbine runners replaced between 2006 and 2013 to make the GS more efficient and increase the total capacity of the plant.

Manitoba Hydro completed the following studies for the Kelsey re-running project:

- 2002 - Project Description and Environmental Assessment
- 2003 - Kelsey Generating Station, Project Description & Environmental Assessment, Re-Running Project
- 2005 - Kelsey Re-Running Project Aquatic Assessment - Assessment of the Potential Effects of Kelsey Re-Running on Fish and Fish Habitat in the Sipiwek lake to Split Lake Reach of the Nelson River
- 2007 - Fish Movements and Turbine Passage at Selected Manitoba Hydro Generating Stations
- 2009 - Survival and Movement of Fish Experimentally Passed Through a Re-Runned Turbine at the Kelsey Generating Station, 2008.
- 2010 - Kelsey Generating Station - Quantification of Fish Habitat for the Kelsey Re-Running Project, 2008.

5.2 Agreements

The Tataskweyak Cree Nation has provisions for compensation resulting from the forebay operations of the Kelsey Generating Station in agreements dated 1996 and 2008. In the 1980's agreements were reached with several private fishing interests on Sipiwek Lake and Cauchon/Archibald Lakes.

6.0 CLOSURE STATEMENT

Manitoba Hydro continues to operate the Kelsey Generating Station in accordance with the Final Licence issued on March 10, 1966 and amendments thereto under *The Water Power Act* for the Development of water power at the Kelsey Site on the Nelson River.

The amendments currently in force are:

- Licence Amending Final Licence for six units (April 29, 1971)
- Second Amending Licence amending Final Licence for seven units (April 8, 1983)
- Seventh Short-Term Amending Licence (December 27, 2013)

Manitoba Hydro operates and maintains the generating station and associated structures based on the Canadian Dam Association Guidelines.

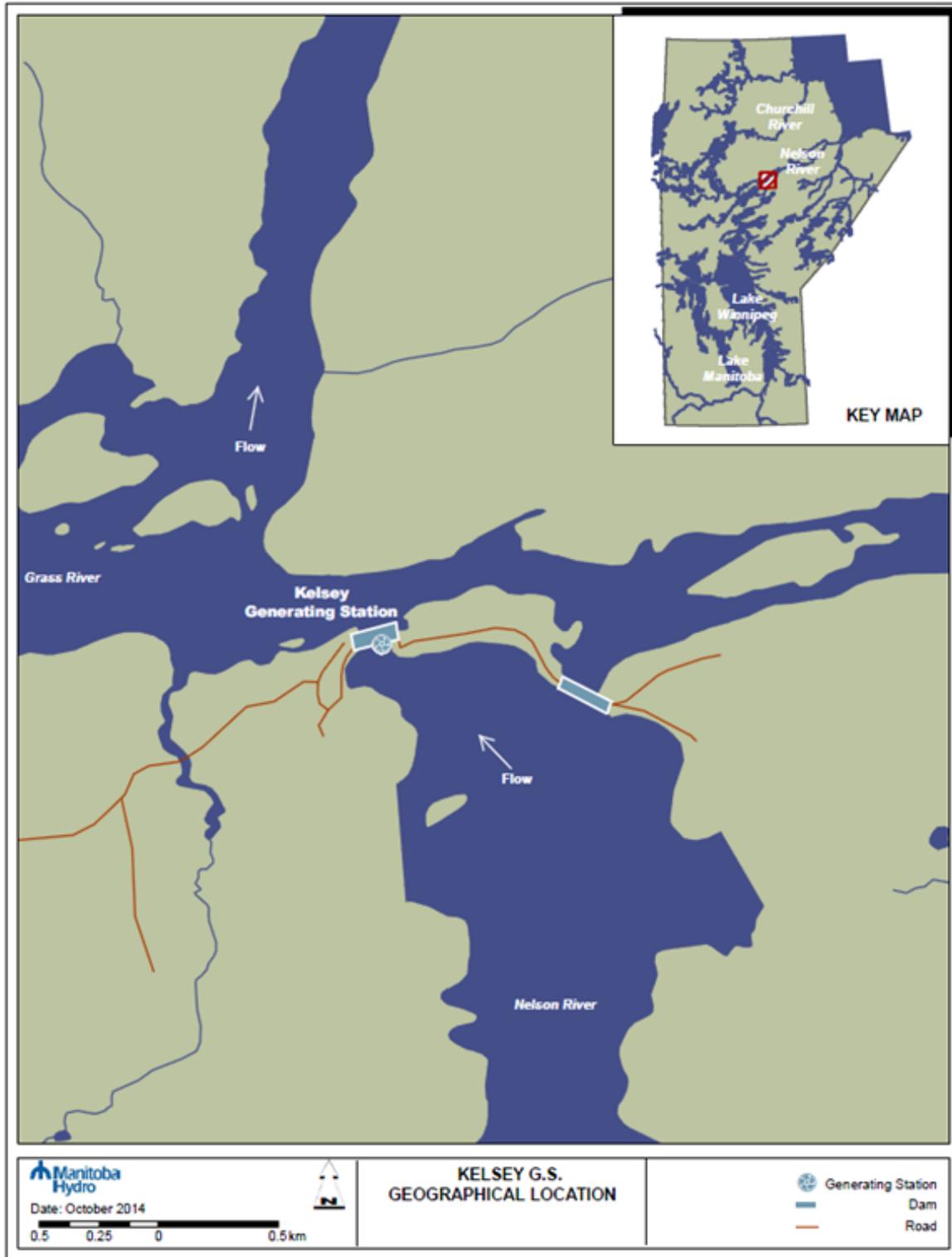


Figure 1: Kelsey GS General Location

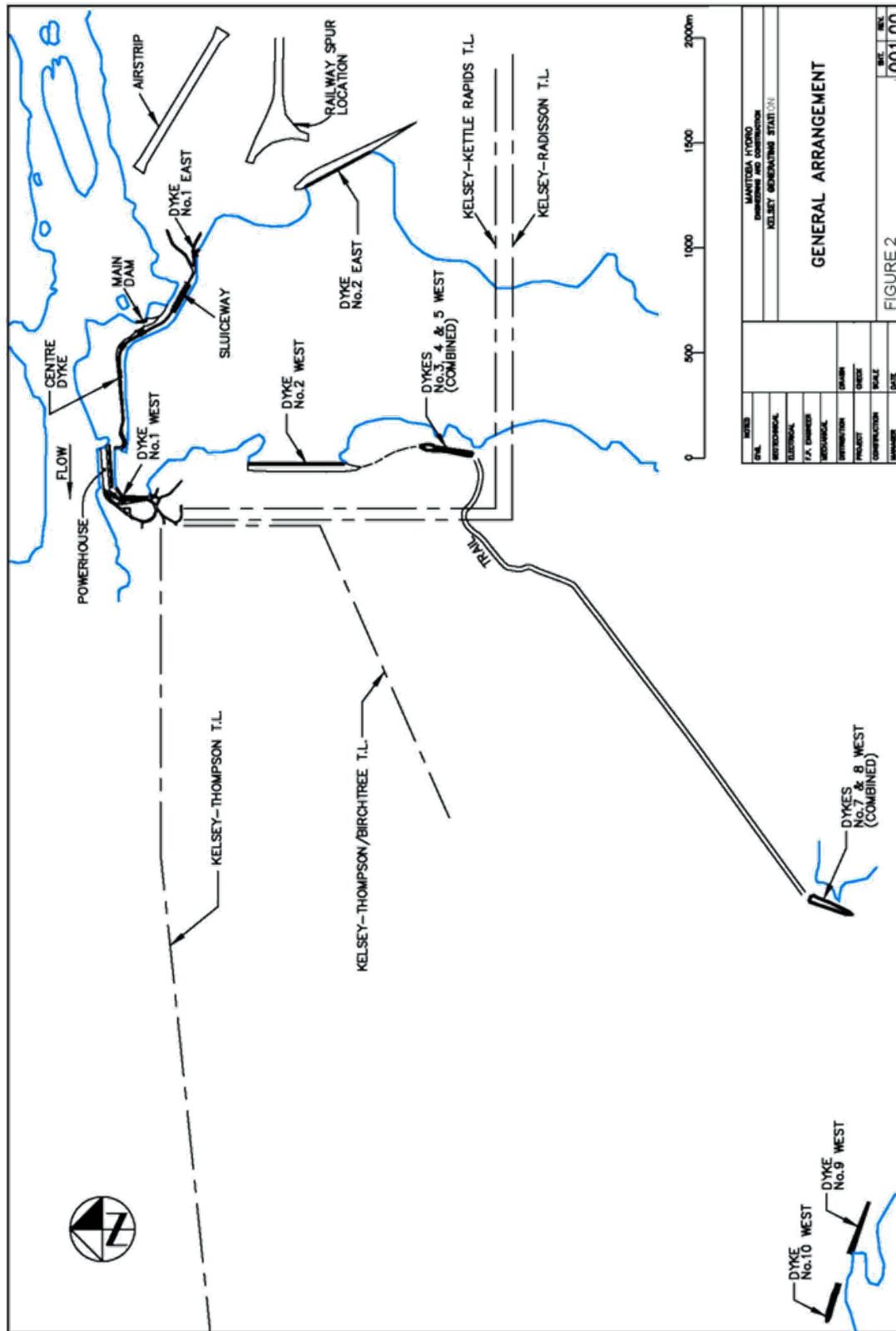


Figure 2: Kelsey Generating Station Overall Site Map

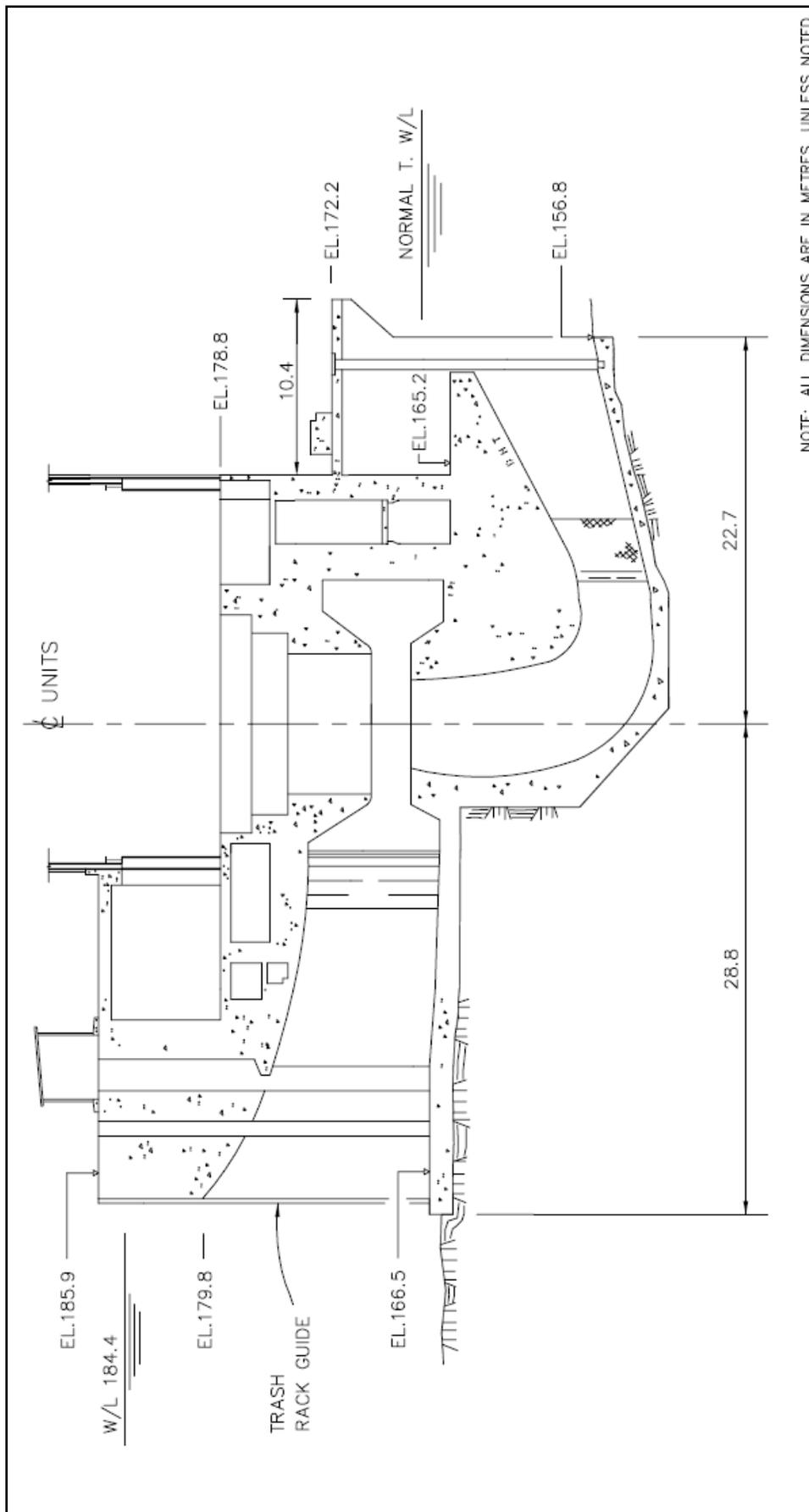


Figure 3: Powerhouse Cross Section

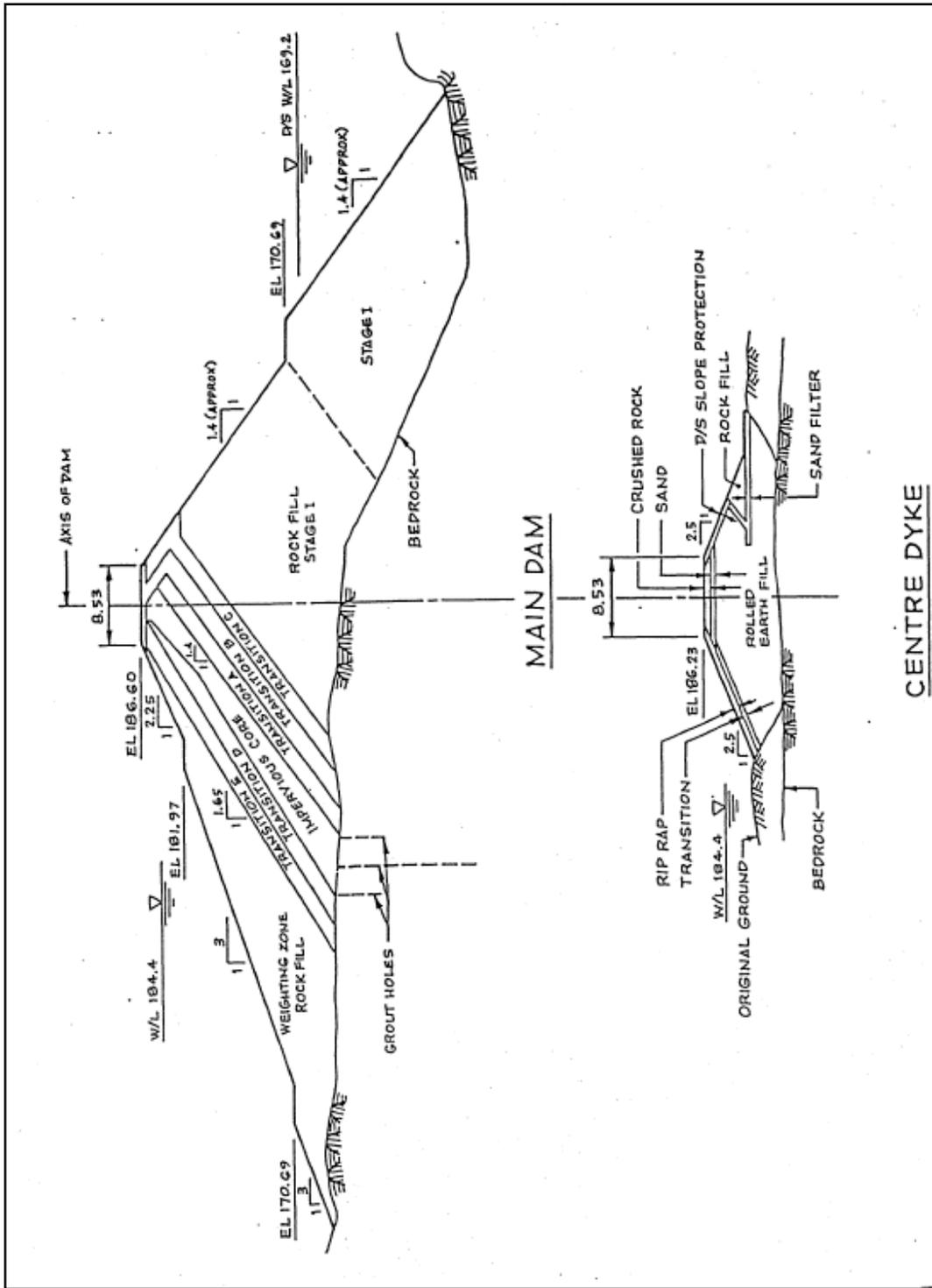


Figure 4: Cross Sections of Main Dam and Centre Dyke

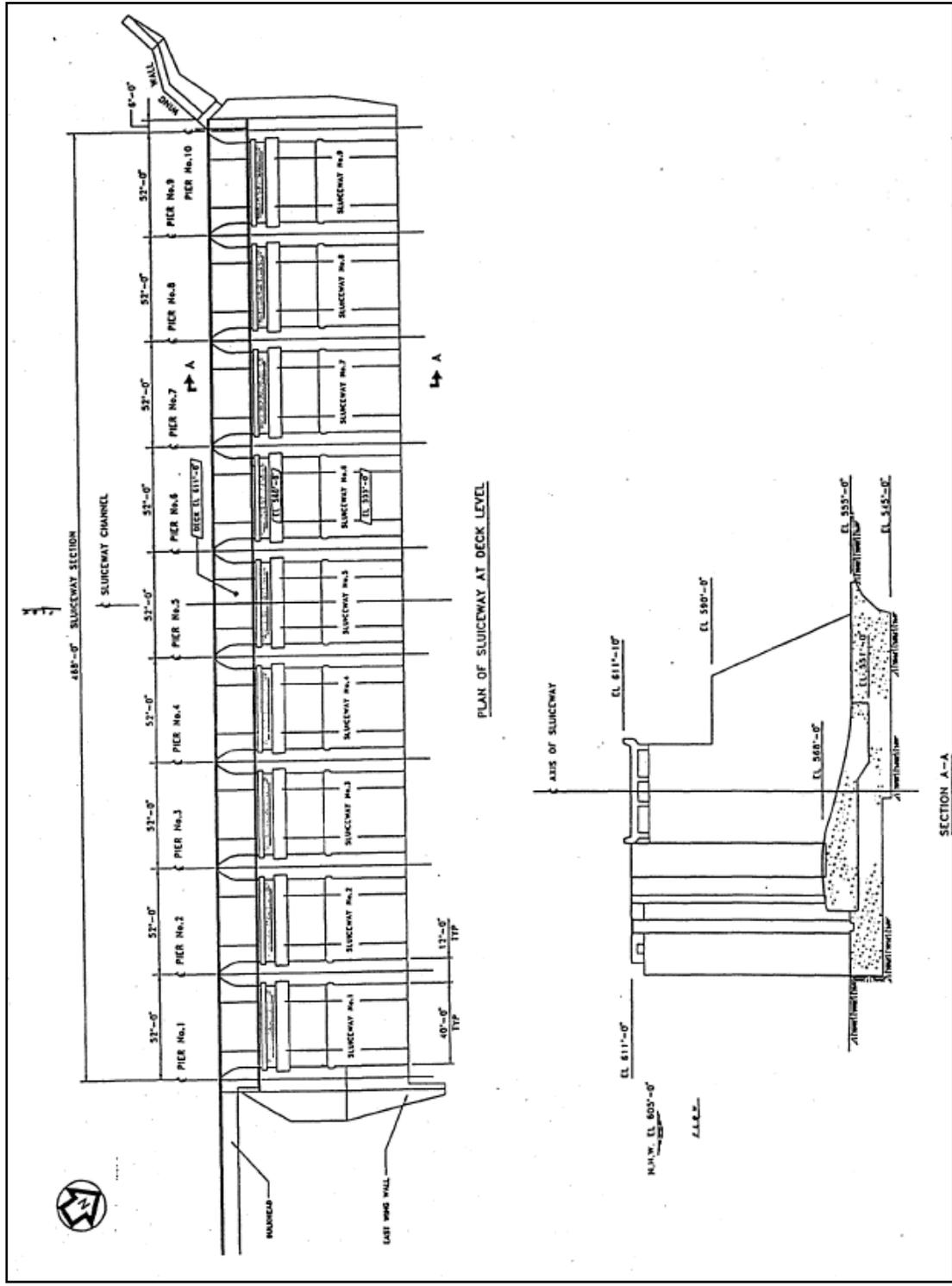
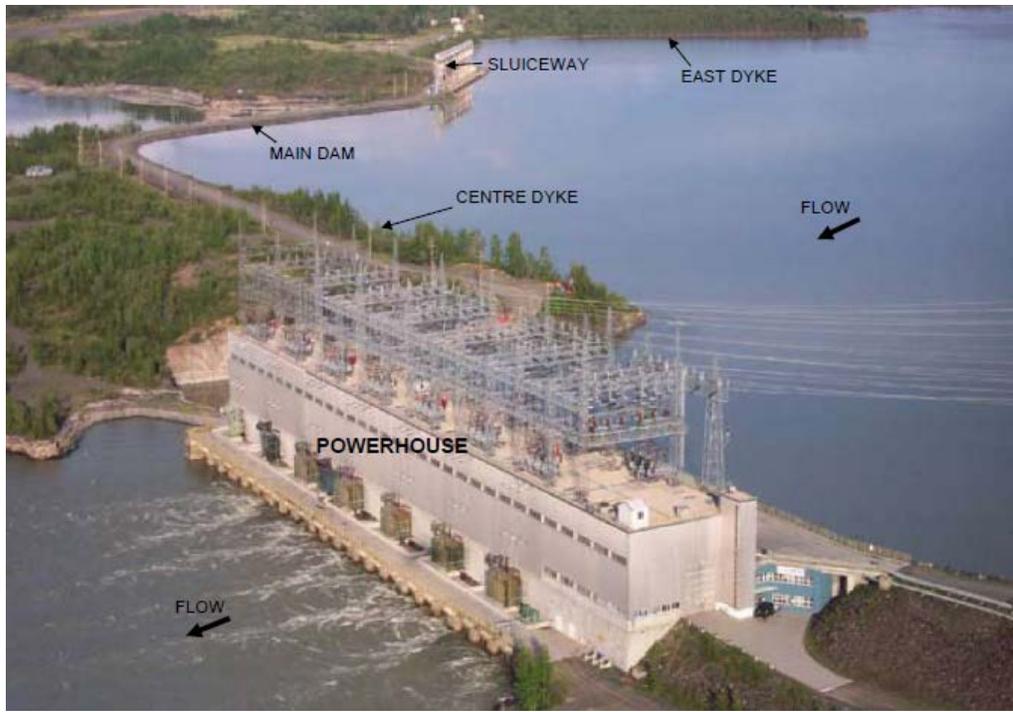


Figure 6: Spillway Plan and Section



Photograph 1: Kelsey Generating Station

