NORTHWEST TERRITORIES POWER CORPORATION
Empowering Communities
Health, Safety, & Environment, 4 Capital Drive, Hay River, NT X0E 1G2

Snare Hydroelectric Facility General Information **November 2017**

General

The Snare Hydroelectric System is located on the Snare River, approximately 145 km northwest of Yellowknife, NT. The facility is owned and operated by NTPC (excluding Snare Cascades which NTPC operates but does not own) and comprises four power stations in cascade that utilize the difference in elevation between Big Spruce Reservoir (above Snare Rapids) and Strutt Lake (below Snare Forks) for electric power production. The four plants that make up the Snare Facility and their corresponding power generation capacities are (from upstream to downstream):

- Snare Rapids = 8.5 MW
- Snare Falls = 7.4 MW
- Snare Cascades = 4.3 MW
- Snare Forks = 9.2 MW

The storage for the system is provided by the Big Spruce Reservoir which is a medium sized reservoir with a maximum surface area of 130 km^2 when full. This reservoir is large enough to provide flow regulation on an annual cycle, but too small to support multi-year regulation. Storage volumes in the forebay reservoirs of the downstream plants are relatively limited, sufficient for daily regulation at Snare Falls and Snare Forks but too small for any practical regulation at Snare Cascades.:

The Snare Hydroelectric System is a remote facility that is air access only for most of the year and has winter road access for some of the winter months. Air access to the facility is available year round and personnel and freight are delivered to the facility by aircraft which land on Big Spruce Lake and at the all-weather landing strip located near Snare Falls. The four plants are connected by an all-weather road and a winter road is constructed annually linking the facility to Yellowknife via NWT Highway #3, allowing fuel, oversized equipment, and freight to be delivered to site.

The Snare Hydroelectric Facility is the primary provider of power to the North Slave communities of Yellowknife, Behchokǫ̀, Dettah and N'Dilo along with the power generated by the Bluefish Hydroelectric Facility. The Snare Hydro System is connected to Yellowknife by a 144 km long transmission line operating at a voltage of 115 KV with a 39km 115K V tie line that runs to Behchokǫ̀.

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Figure 1: North Slave Hydroelectric System

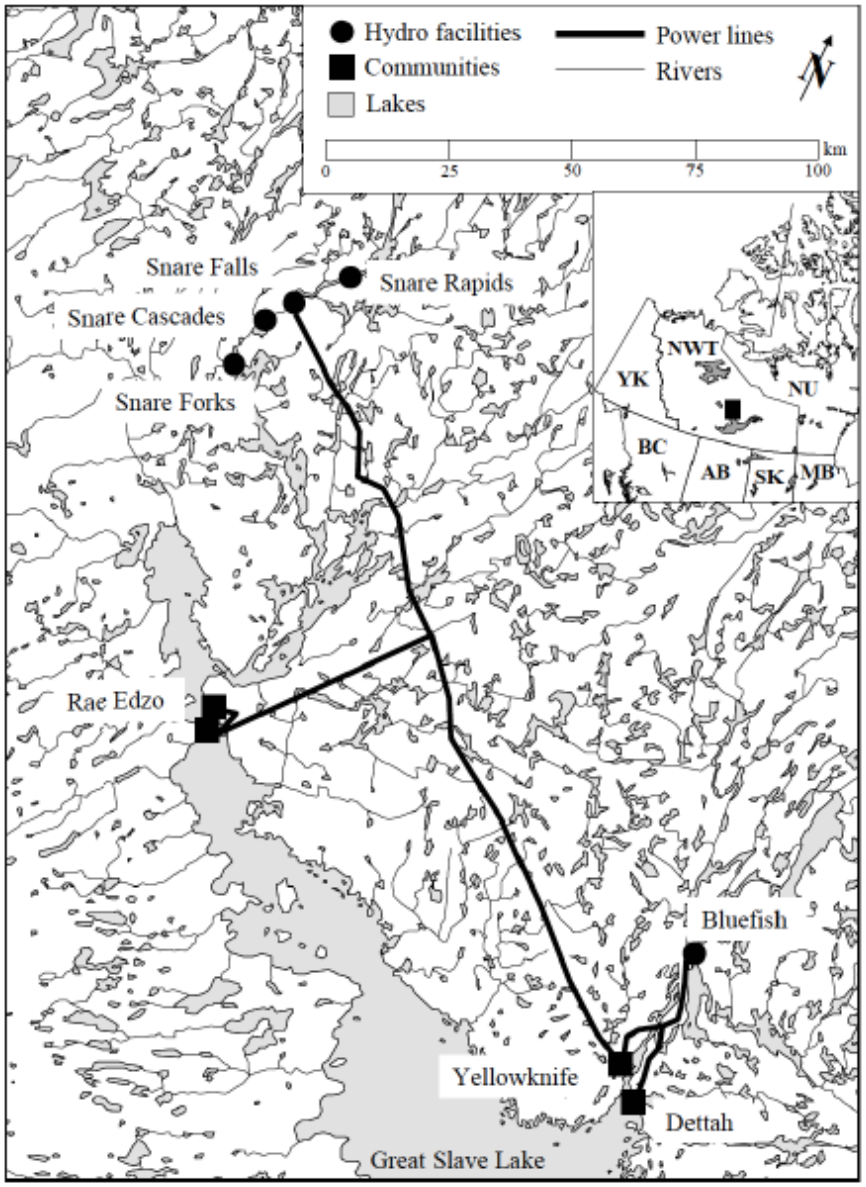
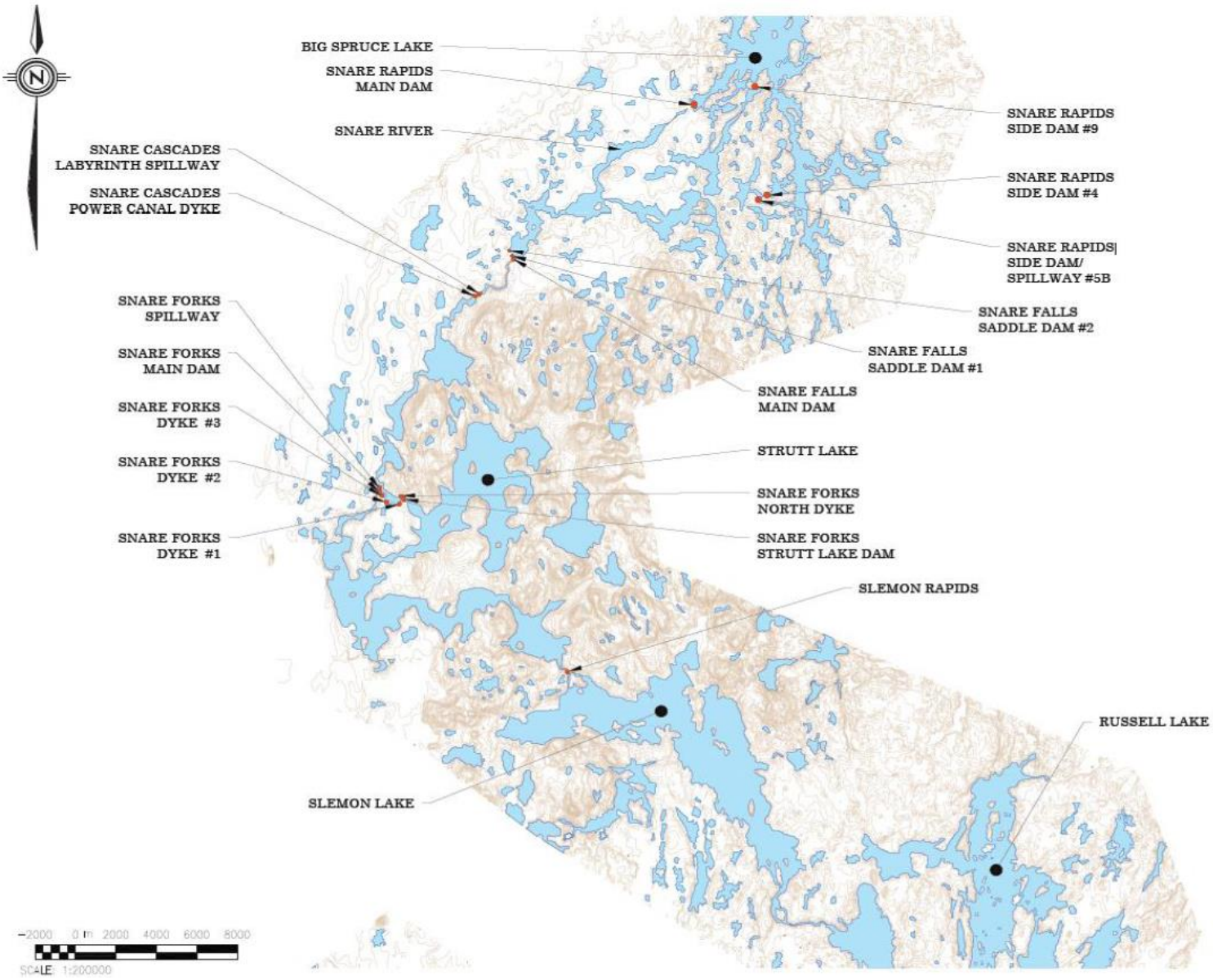


Figure 2: Snare Hydroelectric System



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Snare Rapids

The Snare Rapids hydro plant (630 31' N, 1160 00' W) is located 145 km northwest of Yellowknife on the southwest end of Big Spruce Lake which is the main storage reservoir for the hydro system. Snare Rapids is the oldest plant in the Snare Hydro System and was completed in 1948. Snare Rapids is the uppermost plant in the cascade and controls the water released through the system. The rated plant capacity is 8.5 MW. Flow through the plant is controlled by the 5B spillway south east of the plant.

The plant is directly below the Snare Rapids Dam which is a conventional rockfill dam with an impermeable core of glacial fill on Big Spruce Reservoir. The substation is immediately south of the plant. The headgate house sits on the upstream side of the dam above the plant and the boathouse sits on the south upstream side of the dam next to the dock. The camp site sits 100 meters (m) southwest of the plant and consists of a camp house (kitchen and sleeping quarters), staff trailer, and freezer building, all surrounded by an electric bear fence. West of the camp is a garage, fire shed, small line storage shed, an electrical shop, and a carpenter shop. In a clearing west of the carpenter shop sits the incinerator. 200 m south of the carpenter shop sits Knob Hill. Buildings on Knob Hill include a line storage shop and a staff house, which is no longer in use. Southeast of Knob Hill sits the helicopter pad and Emergency Response shed.

The 5B spillway is located at the end of an arm off the southern end of Big Spruce Reservoir. The spillway is a stoplog type structure comprising six openings of 6m (wide) x 2.5m (deep) and two openings 6m x 5.8m. Water released from the spillway returns to Snare River via a 13 km long waterway, including two small lakes, rejoining the main channel 7.5 km downstream of Snare Rapids and 8 km above Snare Falls. The 5B spillway can be reached by boat during summer and skidoo during winter or helicopter, as appropriate.

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Figure 3: Snare Rapids Facility

Figure 4: Snare 5B Dam

Snare Falls

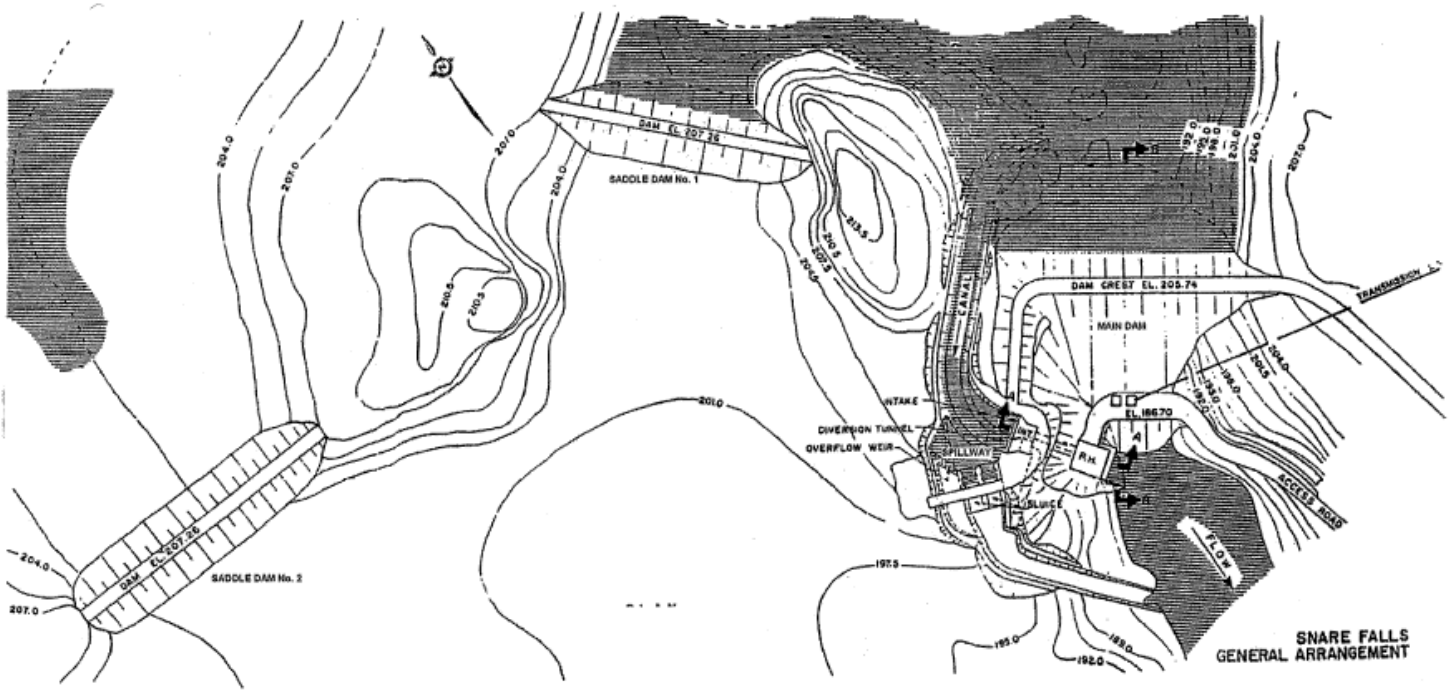
The Snare Falls hydro plant and airstrip (630 26' N, 1160 11' W) is located 15 km southwest of Snare Rapids. The plant has been in service in 1960 and the rated plant capacity is 7.4 MW.

The plant sits directly below the Snare Falls Dam with the substation immediately east of the plant. The headgate sits west of the plant and two spillway gates control flows through the spillway. The tie substation sits approximately 200 m east of the plant. Two side saddle dams, Saddle Dam 1 and 2, are northwest of the main dam.

The airstrip sits approximately 250 m east of the plant. Airstrip facilities include the garage and storage tent on the south side of the strip, oil storage shed, a parts storage shed, and the SSI Micro satellite dish and communication shed site behind the garage. A sea-can with line equipment storage sits east of the garage.

Figure 5: Snare Falls Facility

Figure 6: Snare Falls Facility



Snare Cascades

The Snare Cascades hydro plant (630 25' N, 1160 13' W) is located 2 km west of Snare Falls. The plant has been in service since 1996 and the rated plant capacity is 4.3 MW.

The plant sits directly below the Snare Cascades Dam with a substation next to the plant. The staff house sits southeast of the plant. Flow through the spillway north of the plant is controlled by a fixed elevation weir. This plant and staff house is owned by the Dogrib Power Corporation and operated by NTPC.

Figure 7: Snare Cascades Facility

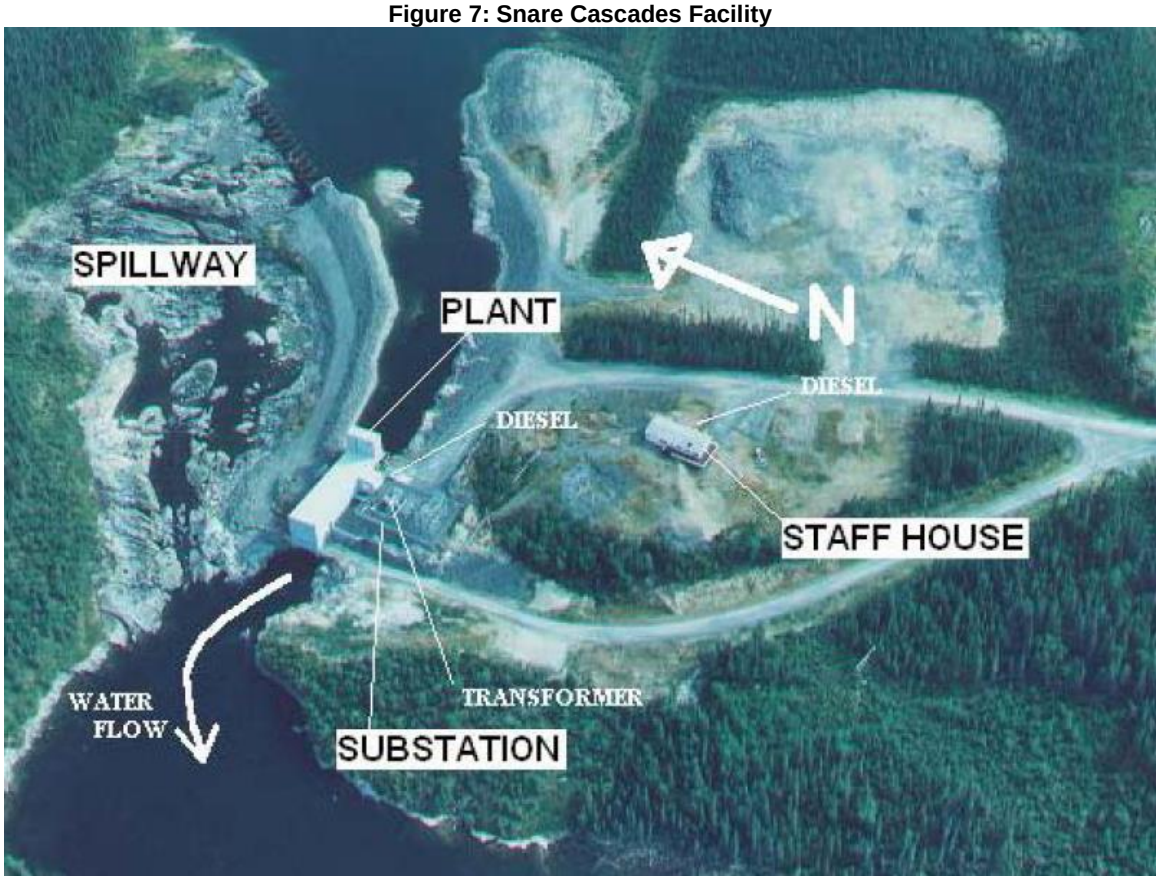


Figure 8: Snare Cascades Facility

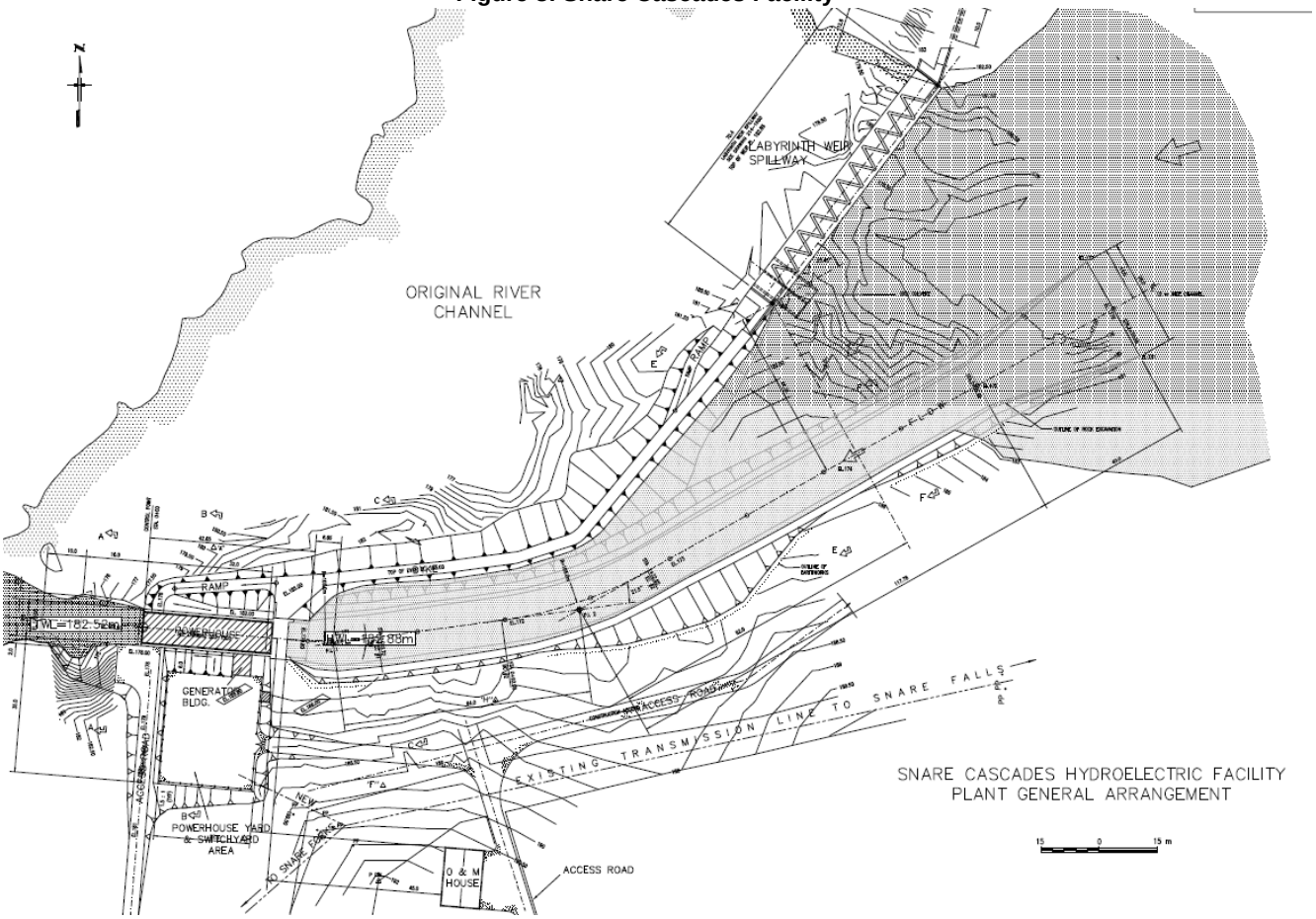


Figure 9: Snare Cascades Spillway

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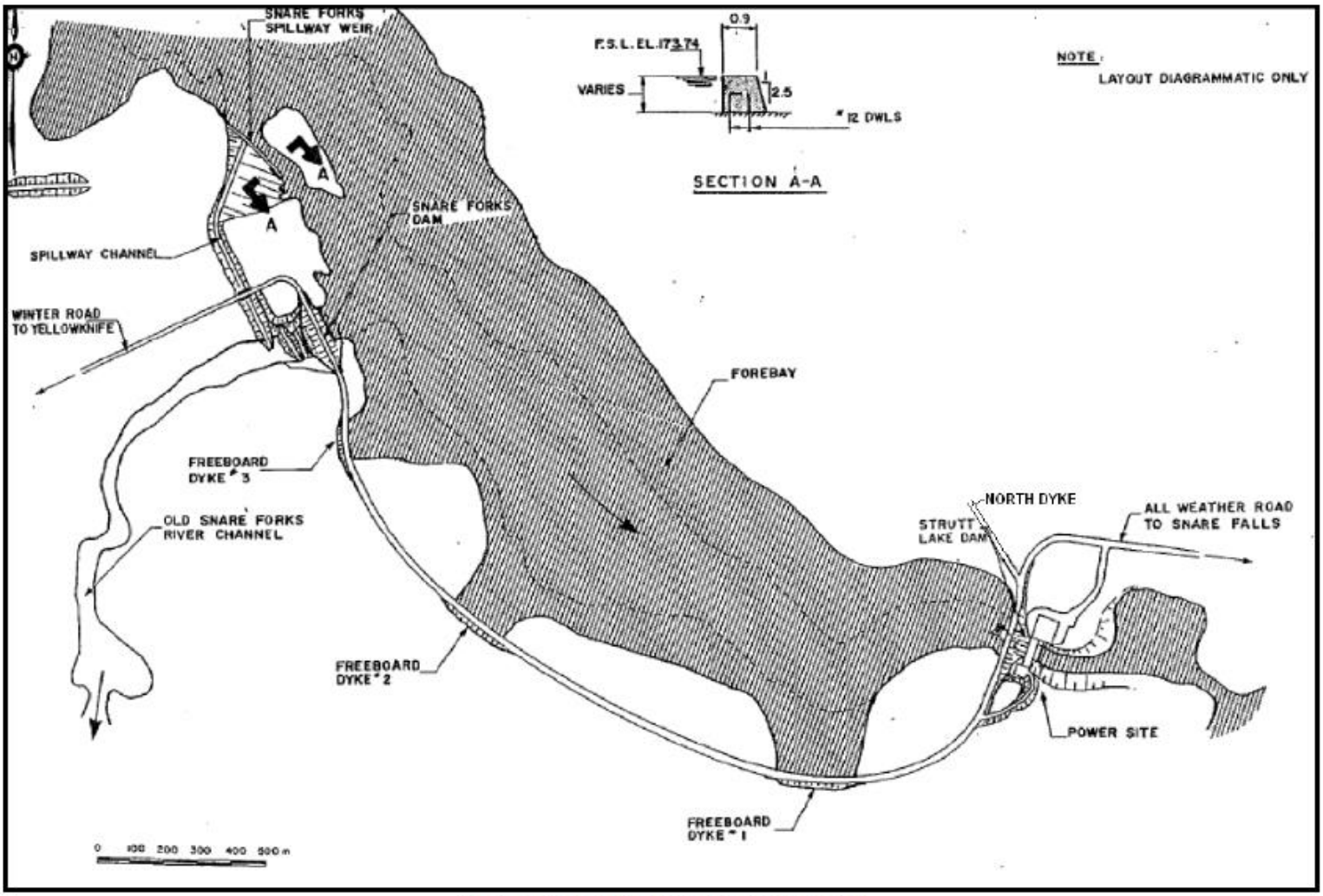
Snare Forks

The Snare Forks hydro plant (630 20' N, 1160 20' W) is located 10 km southwest of Snare Cascades and discharges into Strutt Lake. The plant has been in service since 1976 and the rated plant capacity is 9.2 MW.

The plant is directly below the Strutt Lake Dam with the substation immediately east of the plant. The headgate house sits on the upstream side of the dam above the plant. A rock quarry sits approximately 200 m northeast of the plant. The Snare Forks dam sits 1.25 km northwest of the Snare Forks facility and is next to the Snare Forks spillway. Flow through the spillway is controlled by a fixed elevation weir. There are three side dams between the Strutt Lake Dam and the Snare Forks Dam, Freeboard Dyke 1, 2 and 3.

Figure 10: Snare Forks Facility



Snare Forks General Layout & Spillway Section

Figure 10: Snare Forks Facility

Figure 9: Snare Watershed including WSC Gauges