PP05 Swan Lake Hydro Facility

TopoMap

The Swan Lake Hydroelectric Facility is located on Revillagigedo Island at the head of Carroll Inlet, about 22 miles northeast of the City of Ketchikan. Primary facilities include:

- reservoir with a surface of 1,500 acres at normal maximum elevation and usuable storage capacity of 86,000 acre-feet between elevations 330' and 271.5'
- 174' high concrete thin arch dam (430' long at its crest)
- uncontrolled ogee spillway section, 100' long with crest elevation of 330'
- 2,217' long, 11' diameter power tunnel
- powerhouse with two Francis turbine generating units having a combined nominal generating capacity of 25 megawatts (MW)
- 13.8/115-kV substation located adjacent to the powerhouse
- port facilities 1000' north of the powerhouse, a staging area adjacent to the port facilities, and access roads from the port facilities to the powerhouse and dam
- 115 kV transmission line extending from the powerhouse substation 30.5 miles to the existing S.W. Bailey Substation.

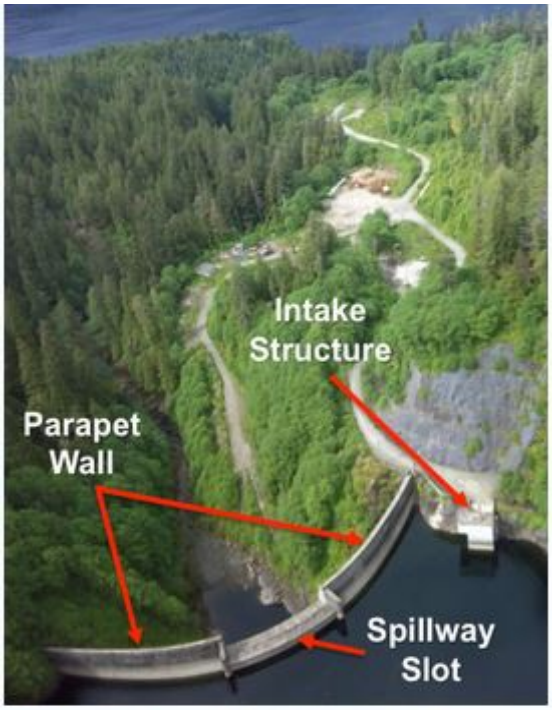
Near the end of project construction, the State of Alaska, under the department of the Alaska Energy Authority, assumed ownership of the project from Ketchikan and began commercial operation in June 1984. Ownership transferred from the State to the Four Dam Pool Power Agency (FDPPA) in 2002, and SEAPA assumed ownership when the FDPPA was restructured in 2009.

http://www.seapahydro.org/Swan-Lake-Hydro-Facility.php

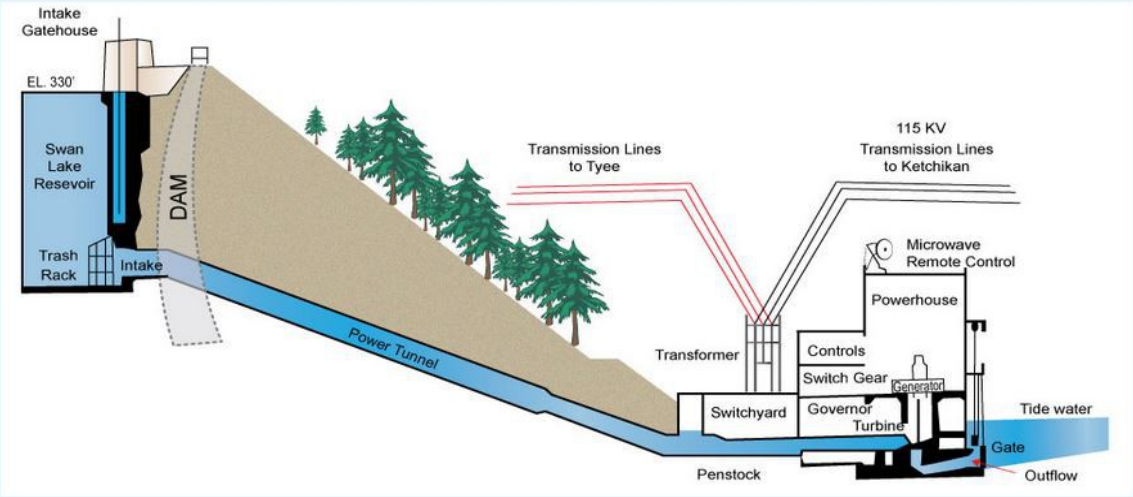
http://www.seapahydro.org/pdfs/swanLake/Final%20Swan%20Lake%20Wetlands_RR_Jan%202014.pdf

Figure 3. Project Area Below the Dam

Swan Lake Hydroelectric Project (FERC No. 2911)



Dam 174' high x 430' wide
Spillway 15' high x 100' wide



How do Dams and Lake Taps Work?

Dam	Holds back the water creating a reservoir.
Lake Tap	Involves excavating a tunnel almost to the water/rock contact and then blasting out thefinal protective rock to allow water to suddenly inflow into the tunnel from the lake. The water then runs the turbine. The tunnel is expected to carry water with a tremendous force to run the turbine to generate the electricity.
Intake	Gates open on the dam (or the tap) and pull water through the penstock.
Penstock	A pipeline that leads to the turbine. As water flows through the pipe, it builds pressure.
Turbine	The water strikes and turns the large blades of the turbine that are attached to a generator.
Generator	As turbine blades turn, so do a series of magnets inside the generator. Magnets rotate past copper coils, producing alternate current (AC) by moving electrons.
Transformer	The transformer inside the powerhouse takes the AC and converts it to a higher-voltage current.
Outflow	Used water is carried through pipelines, called tailraces, and re-enters the river downstream.