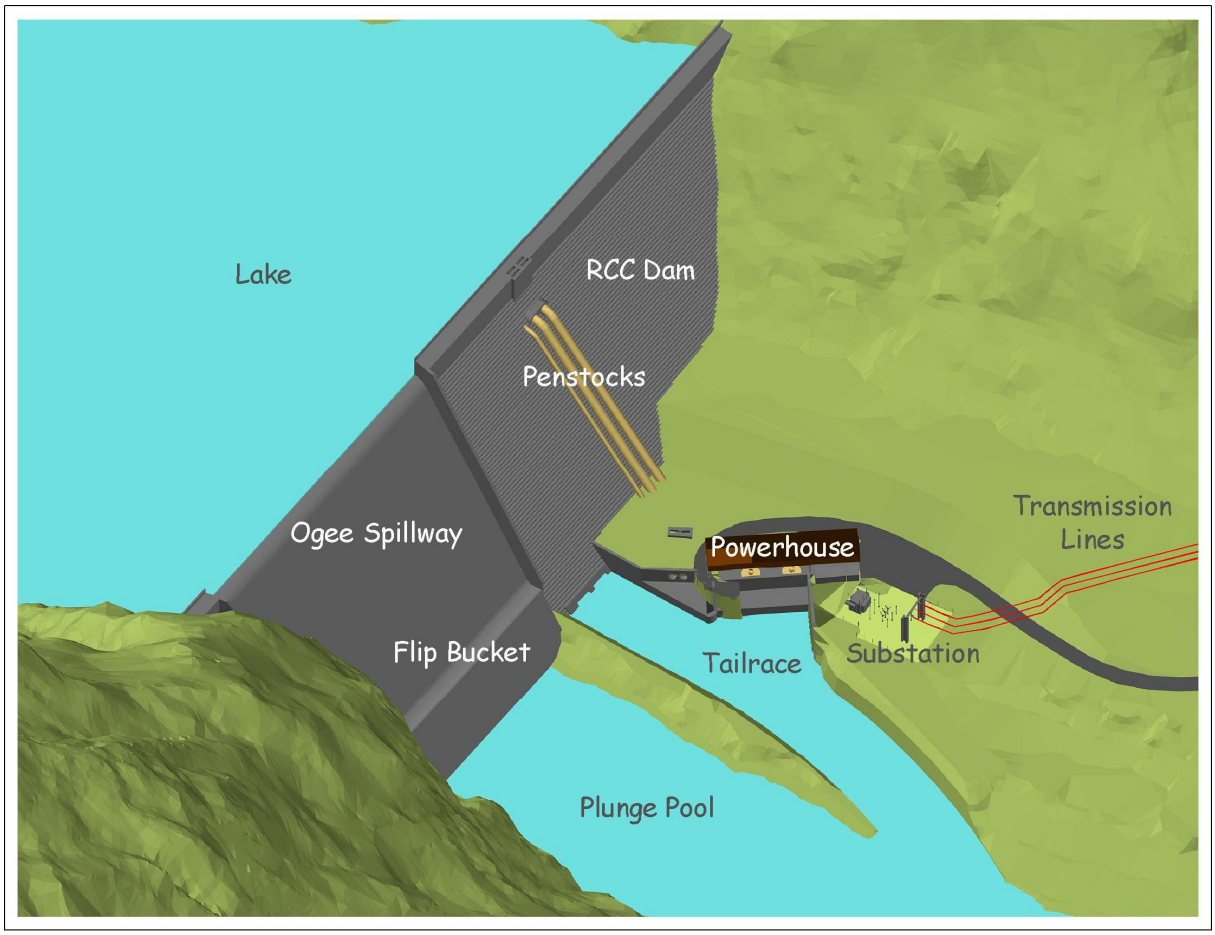
APPENDIX 1

MHP Proposal Description

Overview

1. The MHP includes a dam located on the Mokihinui River approximately 3 kms upstream from the township of Seddonville and 11 kms upstream from the river mouth, a new lake upstream of the dam extending to just below the Mokihinui Forks Ecological Area, a new transmission line to carry electricity from the power station to the existing Inangahua-Waimangaroa transmission line at Cedar Creek and a new substation at Cedar Creek. A schematic diagram of the dam and associated facilities is shown in Figure 1 below:

Figure 1



Dam

2. The dam itself will be an 85 m high concrete gravity dam constructed from roller compacted concrete (RCC). The typical dam section has a straight vertical upstream face and an inclined stepped downstream face. The spillway will be 77 m above river level and have a length of 120 m. The spillway chute and flip bucket will be constructed of conventional concrete and the spillway will discharge into a plunge pool downstream. The ogee crest is the curved profile at the spillway crest which smoothes the water passing over the dam and avoids destructive erosion damage to

the concrete. The ogee crest will be at a height of 100 m above mean sea level (amsl).

Lake

3. The lake behind the dam will be approximately 337 ha and 14 kms long. The water depth at the dam will be 77 m and the lake will have an operating range of 97 m to 100 m amsl to allow flexibility in the generation output to match electricity demand. The lake will rise above 100 m amsl during floods at which time the water will be discharged via the spillway. The width of the lake will vary from an average of 200 m to 300 m to a maximum of 500 m.

4. A boat launching ramp and jetty facilities will provide boat access to the lake for dam maintenance and safety inspections and a log management area will allow for the beaching and handling of logs intercepted by the log boom.

Power station

5. The power station will house 3 turbines comprising twin vertical shaft Francis turbines. The two main turbines will have approximately 40 MW nominal rated output under a gross head of 77 m and the smaller approximately 13 MW unit to primarily operate at minimum flow periods and at high flows when spilling. The detailed design has not yet been undertaken; however the total station output is estimated at 80 MW during normal operation and up to 100 MW during spilling operation, producing 360 to 410 GWh per annum of renewable generation, enough to meet the power needs of 45,000 to 51,000 average residential households. The turbine units are fed by penstocks which source water from a screened intake and head gate below the spillway crest. The turbines will discharge to a common 100 m long tailrace. Bypass valves are proposed to maintain station discharge if a station generation outage occurs. Vertical intake screens will intercept debris from the inflow and a floating log boom will limit floating debris being drawn into the intakes.

6. A 26 ha staging area for dam and power station construction activities is located immediately downstream from the dam site and on the true left bank of the Mokihinui River. The staging area will accommodate the aggregate extraction pit, stock piling areas, production plant, buildings, settling ponds, diesel generators and parking areas. The Mokihinui River will be diverted to the true left bank of the river during construction to permit foundation preparation. The foundations will extend to at least 20 m below the existing river bed.

Transmission line and sub-station

7. The power station output will be connected to the new single circuit 110 kV transmission line via the substation which will contain a single generator transformer near the power station. The single circuit 110 kV line will transmit power from the proposed power station to a new substation at Cedar Creek located between tower 46 and tower 47 on Transpower's Inangahua-Westport B line. This will allow the transmission line to connect into the existing Transpower lines. Transmission line termination gantries, switching, measuring and communications equipment will be located in the switchyard with the highest structures being no more than 6 m, combined lighting and lightning rod poles up to 25 m high, and a communications pole up to 30 m high. Two 110 kV - 33 kV transformers up to 5 m high will be located within the substation and will be fully bunded. The substation control, communications and monitoring equipment and their associated power supplies will

be accommodated within a building. This building will also contain a toilet and washroom. A car park will also be located within the building area.

8. The existing Cedar Creek Road will require repair between the Cedar Creek substation and Burnetts Face hairpin.

9. The transmission line will be approximately 28 km long and contain approximately 152 concrete or steel pole structures with an additional 2.8 m steel extension on top to carry an earth wire. The majority of the poles will be between 14 m and 20 m high, however, some 20 poles will be up to 50 m high to reduce vegetation clearance. The consent application seeks approval to locate the transmission line within the 200 m wide corridor to allow flexibility for precise placement of poles to suit topographical variations and avoid environmental effects.

Construction

10. Consent is also being sought for the activities associated with construction of the MHP. The construction activities include; diversion of the Mokihinui River, construction of coffer dams to enable dewatering of the dam foundation; excavation, crushing and screening of gravel located within the staging area; transportation of off-site aggregate material to meet demand; transportation and storage of cement and pozzolan (a substitute for cement to reduce concrete heat generation and improve long term concrete performance); concrete batching plant and concrete conveyance; foundation preparation; RCC dam construction involving the placement of relatively thin layers of concrete; upgrading the Mokihinui/Seddonville Road from State Highway 67 through to the site, the Burke Creek crossing, access road to the dam crest and to the power station extending into the diversion channel area.

11. In some places the erection of the transmission line will involve the formation of a track for vehicle access and the preparation of pole sites by either dug foundations or rock anchor foundations. To avoid ecological effects a significant proportion of the transmission line will be constructed using helicopters.

12. Vegetation will be removed at pole sites and along access tracks for the transmission line as necessary and trimmed to provide clearance for transmission lines. Vegetation clearance will also be necessary prior to and after inundation of the lake to clear trees between RL 92 m and RL 102 m. Tall canopy trees extending above RL 92 m between RL 70 m and RL 92 m will also be removed. Vegetation within the staging area will be cleared at the commencement of site establishment.

Flow Regime

13. In order to meet variable electricity demand water will be stored within the lake and the river flows will be varied, (compared with those flows that would occur if there was no dam on the river), in accordance with the proposed conditions. Under the proposed conditions Meridian will ensure the station discharge flow is not less than 16 cumecs, except when inflow in to the reservoir is less than 16 cumecs. During these periods the station will be operated so that inflows and discharges are matched as closely as possible until inflows of 16 cumecs or greater are reinstated. Meridian will ensure the generation discharge flow is not greater than 120 cumecs, except when inflows in to the reservoir are greater than 120 cumecs and water would be passing over the spillway, in which case the discharge flow from the power station shall not exceed approximately 150 cumecs. During the whitebait season (1 September to 14 November) lake inflows and station discharges will be matched as closely as practicable. However in the event of an emergency Meridian may need to

alter the outflow. It is proposed to have a three metre storage range ie between 97 and 100 m (amsl).

14. The rates of rise and fall in the river below the proposed dam are generally referred to as the "ramping rate" and it is expressed as the change in flow over a specified time interval. Meridian's proposal is that the ramping rate will be limited to:

    a. Summer months (15th November to 30th April) - 100% of the preceding flow and the flow rate shall be held constant for a 45 minute period for flows up to 32 cumecs, and 100% of the preceding flow and the flow rate shall be held constant for a 30 minute period for flows between 32 cumecs and 120 cumecs; and;
    b. Winter months (1 May to 31 August) - 175% of the preceding flow and the flow rate shall be held constant for a 45 minute period for flows up to 44 cumecs. Between 44 and 120 cumecs no ramping rate limitations are proposed; and
    c. Whitebait season (1st September to 14th November) - No ramping rates. During the whitebait season, best endeavours will be made to operate MHP so that outflows match inflows as closely as practicable.

15. In normal circumstances the water will flow through the power station intakes and the turbine or turbines to generate electricity. The water will then be discharged to the tailrace. During periods of higher inflows water will pass through the intakes and turbine or turbines, and when the lake is full water will discharge over the spillway. In the rare situation where the power station is shut down due to an emergency, and the lake is not discharging water over the spillway, water will be discharged via the turbine bypass.

Operation of the Power Station

16. The power station will be operated in accordance with market drivers and the proposed conditions of consent. In order to follow energy demand when reservoir inflow is lower than the power station capacity, power station discharges may be greater during the daytime and lower overnight; however this will not always be the case.