

# **Providing Technical Advice to Karnataka Power Corporation Regarding Physical Model Studies for its Upcoming and Prestigious Sharavathy pumped storage hydroelectric project**

## **Background**

The increasing penetration of renewable energy, driven by the need to reduce dependence on fossil fuels and mitigate climate change, has created a growing requirement for large-scale energy storage. Solar and wind energy are inherently intermittent and their generation may not coincide with the temporal pattern of electricity demand. Pumped Storage Hydroelectric Projects (PSPs) provide an effective and proven solution by storing electrical energy in the form of gravitational potential energy. During periods of surplus or low-demand electricity, water is pumped from a lower reservoir to an upper reservoir, while during periods of high demand, the stored water is released through reversible pump-turbines to generate electricity. PSPs thereby provide peak-load support, frequency regulation, grid stability, spinning reserve and black-start capability, while facilitating greater integration of variable renewable energy.

In India, the development of PSPs has gained considerable importance with the anticipated large-scale addition of renewable generation and the transition of the power sector. However, development of new reservoirs involves substantial land acquisition, submergence and environmental challenges. Utilizing existing reservoirs for PSP development therefore offers significant advantages.

The Sharavathy Pumped Storage Project (PSP) in Karnataka is a notable example of such an approach. The project proposes to utilize the existing Talakalale Reservoir as the upper reservoir and Gerusoppa Reservoir as the lower reservoir, thereby minimizing the need for additional reservoir infrastructure and associated land requirements. With an installed capacity of approximately 2000 MW and a gross head of about 478 m, Sharavathy is among the high-head pumped storage schemes being considered in India. The combination of existing reservoirs, substantial head and large storage capacity makes the project particularly attractive for supporting Karnataka's energy system and facilitating the integration of renewable energy into the national grid.

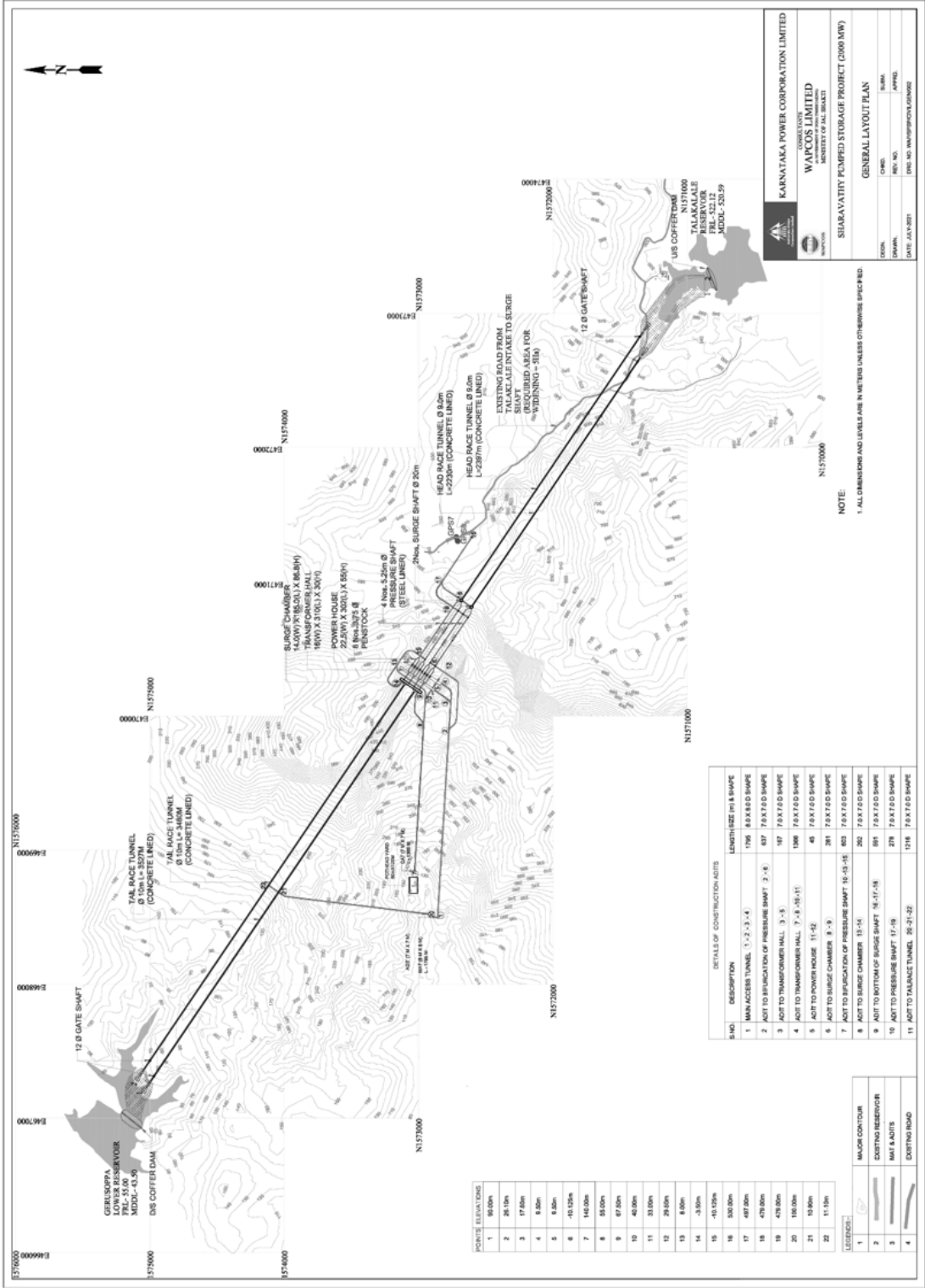
## **Technical Advice by AquaMAP**

Any project of this magnitude and complexity requires rigorous validation of its hydraulic and mechanical design through scaled physical model studies before implementation. Such studies are essential for assessing the hydraulic performance of various components, identifying potential flow-related issues, and confirming the adequacy of the proposed design.

The Sharavathy Pumped Storage Scheme is being implemented by Megha Engineering & Infrastructure Limited (MEIL). The physical model tests for civil works are conducted by Peach Engineering Pvt. Ltd., Bengaluru. The pump-turbine model studies will be carried out by General Electric, most likely in France. The surge analysis has been already completed by a consultant engaged by M/s MEIL.

A Research-Based Industrial Consultancy (RBIC) project has been sanctioned by Karnataka Power Corporation Limited (KPCL) to provide technical advice on the physical model studies for the upcoming and prestigious Sharavathy Pumped Storage Hydroelectric Project.

General Layout of the System



## Scope

### Civil Works

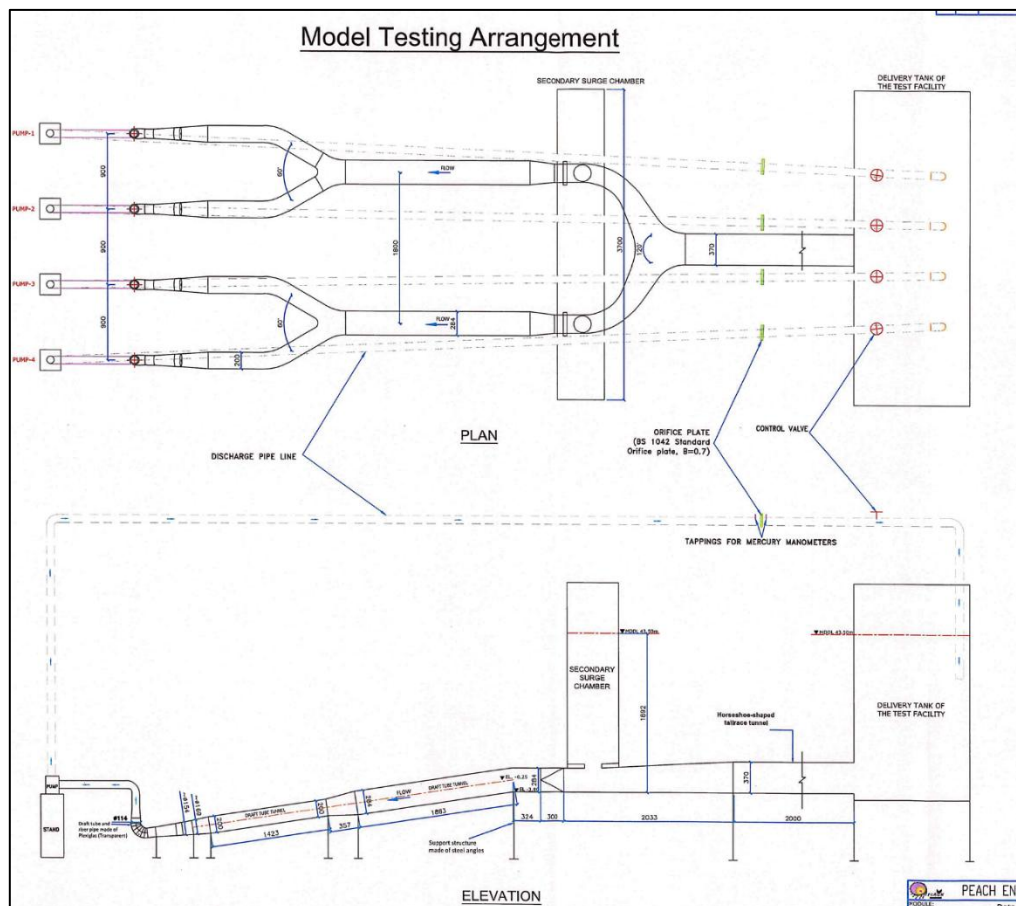
1. Review and approval of Model Test and finalization of report pertaining to Reservoirs, Inlet, outlet, HRT, U/s Surge, Pressure shaft, D/s surge and TRT.
2. Review the surge studies carried out by M/s MEIL as part of the scope coming under Civil Works

### E& M Works: Model Test of Pump Turbine

1. Review and approval of model test procedure for 250 MW pump-Turbine
2. Witnessing of model tests at manufacturer's labs
3. Review and approval of final model test report for 250 MW Pump-turbine

## Progress

- AquaMAP reviewed the procedure suggested for conducting physical model studies for hydraulics of the system.



- AquaMAP reviewed the procedure suggested for conducting the physical model studies for hydro-turbo machinery.
- The consultant has constructed the setup for conducting physical model studies for hydraulics.
- Physical model tests were conducted on 29<sup>th</sup> December 2025, in presence of Profs. Mohankumar, Murty and Kuiry.
- The consulting organization (Peech Consultants) has submitted the detailed report. AquaMAP team reviewed the report and submitted its comments on February 10<sup>th</sup> 2026.
- The consultant has submitted the proposals for conducting the physical model tests for turbo-machinery and electrical equipment. AquaMAP has submitted its comments to KPC