



# Hirwar

## *Pressurized Distribution Lift Irrigation Project Beohari Tehsil, Shahdol District; Sone River - MP*



**Bansagar Dam** is a multipurpose river Valley Project on the Sone River situated in the Ganges Basin in Madhya Pradesh with Irrigation & 435MW of Hydro Electric power generation.



Aqua's **1400hp 6.6kV** SubVT pumps enable  
Energy Efficient PDN Irrigation of **7000ha**

### Situation:

Madhya Pradesh is a hilly area, hence in spite of heavy rains; the farmers are deprived of taking a rabi crop due to scarcity of water in high-altitude regions.



The primary source of water in the country is south-west and north-east monsoon which is confined **only 3 to 4 months in a year** & the quantity of rainfall is highly variable in different parts of the basin

This limited rain-water & surface runoff needs to be conserved & made available throughout the year.

### Potential Solution:

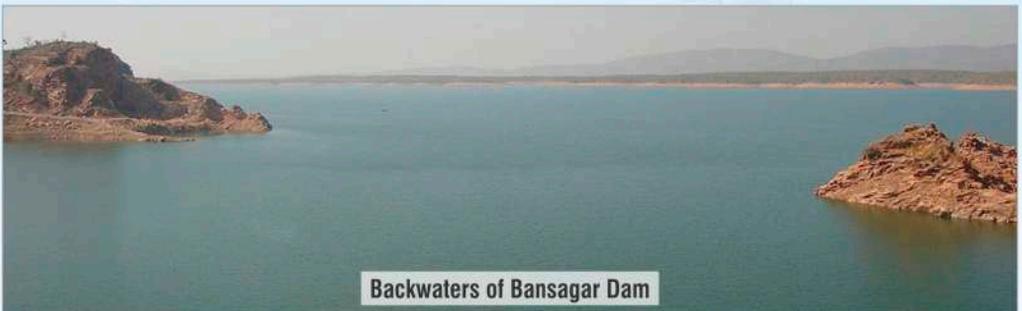
With an aim of increasing the agricultural production & improving the living standards of farmers; a Pressurized Lift Irrigation cum Distribution system utilizing limited water resources of Bansagar dam was proposed.

#### Location

- I. Tehsil/District - Beohari/Shahdol
- II. a) Longitude - 81004'18" E  
b) Latitude - 24000'30" N

#### Reservoir data

- b. Gross storage capacity - 0.637Mham
- c. Live storage capacity - 0.541Mham



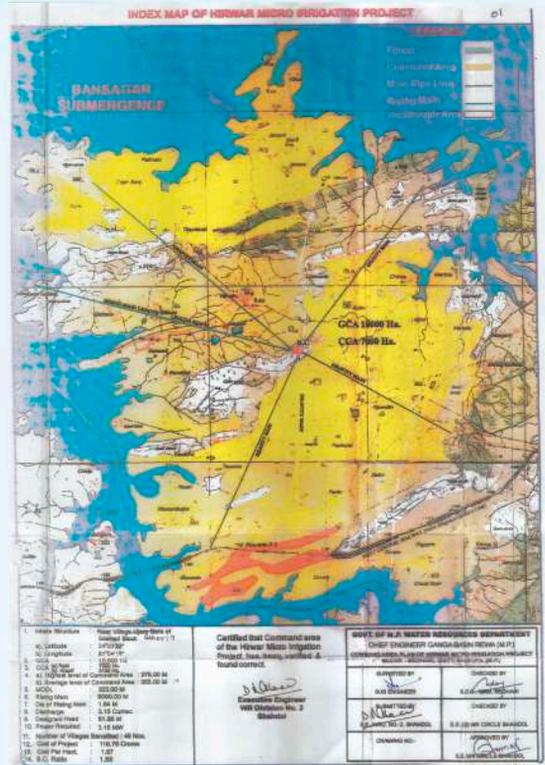
Backwaters of Bansagar Dam

## Scope of the EPC Contract

m/s. **Phaloudi Constructions & Infrastructure** was awarded EPC work of executing the Project from the right bank of the Bansagar reservoir system to deliver water to farmer's fields up to one hectare from the proposed system with a duty of 0.45 lit/Sec/ha by pressurized pipeline system for hose irrigation & maintaining it upto 30ha Chak (& discharge of minimum 10 times the duty at 1 ha) by Pressurized Pipeline Distribution system for Hose Pipe irrigation in the **Command Area of 7000ha**.

The work included all activities starting from Survey, Investigation, Designing, Procurement, Construction, Laying, Installing, Energizing, etc of Pumped / Gravity Mains, Branches & Distribution Network, Controlling & Regulation system, etc with SCADA, Automation including Management, Operation & Maintenance for the period of 5 years.

- **Total Pumping** : **3.15 Cumecs**
- **Total Power Consumption Limit** : **2.91 MW**
- **Length of Rising Main** : **Total Network. 8.00km (including Minors & Sub-Minors) 1000km approx from intake to D.C. 1.8km, 1400 mm dia.**



## Challenges

*Water Logged Site (hence challenging Civil works)...*  
*Low Energy Consumption requirements...*  
*Need of Low Maintenance Technology...*



**Panoramic View** (Left to Right) :

- 1) (white) Surge Vessel, 2) (blue) Intake, 3) (white) Electrical Switchgear Room &
- 4) Electrical Sub-Station

**Aqua's Solution for Project:**

**Pump Details**

Pump Model : AVT_V_SS_2nd_Bo_5069_M_L_1400N_6600_NJ				
Head	Discharge	Quantity	HP	Voltage
79m	3780m <sup>3</sup> /hr	4nos	1400hp	6.6kV







As the Pump Motor Set is **MonoBlock & Fully Assembled at Factory**; it can be Transported/ Stored in any Orientation



As the Pump Motor Set is Fully Assembled at Factory; it's **Installation is Simple** & does not require Highly Skilled Mechanics.

### A Strong, Mono Shaft for Fail Safe Operation



Single, Robust & oversized Shaft is Common between the motor & pump - it is made from Rust Free Stainless Steel & designed without any Sleeves (*below the Mechanical Seals*) thereby reducing maintenance problems & eliminating need of Costly Spare Parts.



Seals are rated for at least **16 bar** pressure capability for **L<sub>10H</sub>** life in excess of **50,000 hours** &/or **10 years**.

**Superb Bearing Life**  
thanks to Heavy Duty Designs  
(upto *Quadruplex*  
arrangements are offered)

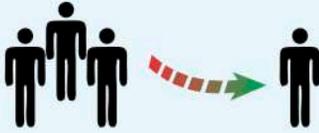


All Thrusts are absorbed by **Grease Lubricated, Anti Friction Bearings** located deep inside the motor & inherently **isolated from the pumped media** - this makes the **bearings Fail Proof** even in case of increased Silt / Abrasive levels in Pumped Liquid.

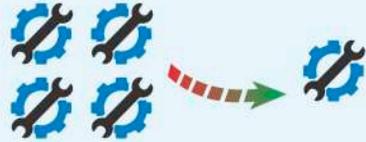


Anti Drip, Fully Synthetic; Super Premium Synthetic Grease ensures a minimum Regreasing Interval ( $F_{10H}$ ) of **75,000h** (for Pumpsets rated upto **650kW**) & **45,000h** (for larger kW)

## SubVT's Benefits



**Saves (upto 66%) O&M Staff\***



**Saves (upto 75%) Spare Parts & Consumables\***



**Low Energy Cost** : Due to Elimination of Ancillary & Auxiliaries; **Wire to Water Power Consumption** of Submerged Tubular Column Pump based Pumping Station is **slightly Lower** (compared to Conventional Bare Shaft Pump - Motor Set based Pumping Stations).\*

*\*(refer marketing@aquapumps.com for additional white papers)*



**Requires No Special Pre – Post / Ancillary Auxiliary Operations;** like Operating & Maintaining the Forced Water Lubrication systems operation.

- **Minimal Station Superstructure**
- **Simple Pipe Work**
- **Simple Foundation**

*- conducive for Water Logged Terrain*



**No need for Frequent Periodic....**



**Shafts/Sleeves &/or Coupling**



**Gland Packing**



**Oil &/or Grease**



**Low Life Cycle Costs (LCC)\***



**Minimal Noise, Vibration & Heat Emission;** due to **elimination** of Auxiliary & Ancillary systems (like Forced Water Lubrication, Thrust Bearing Cooling system, Motor Heat Exchanger).

*\*(refer marketing@aquapumps.com for additional white papers)*

## Intelligent InBuilt Monitoring

Easy Monitoring (& Remote Control<sup>#</sup>) of your Pumpset's Health.



- **PSLD** detects Pressurized Water Leakage from Mechanical Seals.
- **CCWLD** detects Accidental Water Leakage from Cable Sheath's Cuts &/or Nicks into the Motor.
- **SBWLD** detect Accidental Water Leakage in to Motor's Stator Chamber.
- **BTDs** in the form of Bi-metallic Switches (for All Pumpsets) & RTD's (PT100 - 3 Wire Simplex type - from Size > 150kW) to Monitor Bearing Temperature (without any Additional Cost)<sup>#</sup>.
- **WTDs** in the form of Bi-metallic Switches (for All Pumpsets) & RTD's (PT100 - 3 Wire Simplex type - 1 per each Phase - from Size > 150kW) to Monitor Winding Temperature (without any Additional Cost)<sup>#</sup>.

*#requires additional communication hardware*

**Office of Executive Engineer Light Machinery and E/M**  
**Water Resource Division – Rewa (MP)**  
 (Near Bajrang Nagar Gate, Urrahat, Rewa Ph No – 07662292818, Email – emerdrewa@gmail.com)

Ref: 1185/SAC/2024-25 Dated: 20/5/2024

**TO WHOMSOEVER IT MAY CONCERN**

This is to certify that M/S Aqua Machineries Pvt. Ltd. Ahmedabad Manufactured, Supplied, Erected and Commissioned the following Submerged Centrifugal Vertical Turbine Pumps for Hirwar Micro Irrigation Project, Under main contractor M/s Phaloudi Construction and Infrastructure Pvt. Ltd. Indore.

The details of pump sets are as under:  
 Pump sets Type : Submerged Centrifugal Vertical Turbine Pumps  
 Main Contractor : M/s Phaloudi Construction & Infrastructure Pvt. Ltd.  
 Pump set Make : Aqua Machineries Pvt. Ltd. Ahmedabad  
 Application : Raw Water Handling  
 Pump Model : AVT\_V\_55\_2nd\_Bo\_5069\_M\_L\_140DN\_06600\_NU  
 Head : 78mtr  
 Discharge : 3780m<sup>3</sup>/hr  
 No of Stage : Two  
 DN Size : 500MM  
 Motor Rating : 1400HP/1045KW  
 Voltage Level : 6600V  
 Quantity : 04 nos (3W+1S)  
 Motor Type : HT Submerged Squirrel Cage Induction -Dry Air Filled Totally Enclosed (IP68)  
 Self Frame Surface Water Cooled (TESWC) complying to IC4A1W0 of IS 6362  
 Installation : At Hirwar Intake well, Bansagar Dam, Dist. Shahdol

Aqua Machineries Pvt. Ltd. under main contractor M/s Phaloudi Construction and Infrastructure Pvt. Ltd. Indore has successfully commissioned 4 Nos. Submerged Centrifugal Vertical Turbine Pump sets with all Electro-Mechanical Items for Hirwar Micro Irrigation Project on Bansagar Dam. All pumps have been site tested on 01 August 2023. These pump sets are operating smoothly since commissioning dated 1<sup>st</sup> August 2021 without vibration or any abnormalities & performing as per desired Flow, Head & power. The pumps are very robust, yet simple to operate and use.

(Aditya Singh)  
 Executive Engineer  
 Light and Machinery & E/M,  
 WRD, Division Rewa (MP)

Endt No - 1185/SAC/2024-25 Reva Dated: 20/5/2024  
 Copy to – EE, Water Resource Division No. 2 Shahdol for information please

(Aditya Singh)  
 Executive Engineer  
 Light and Machinery & E/M,  
 WRD, Division Rewa (MP)



*Simple & Space Saving  
 Pumping Stations...  
 Energy Saving...  
 Ultra Low Maintenance...*



## Aqua Machineries Private Limited

[www.aquapumps.com](http://www.aquapumps.com)

**Registered Office & Manufacturing Plant**

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