AQuA®©

Bulk DeWatering

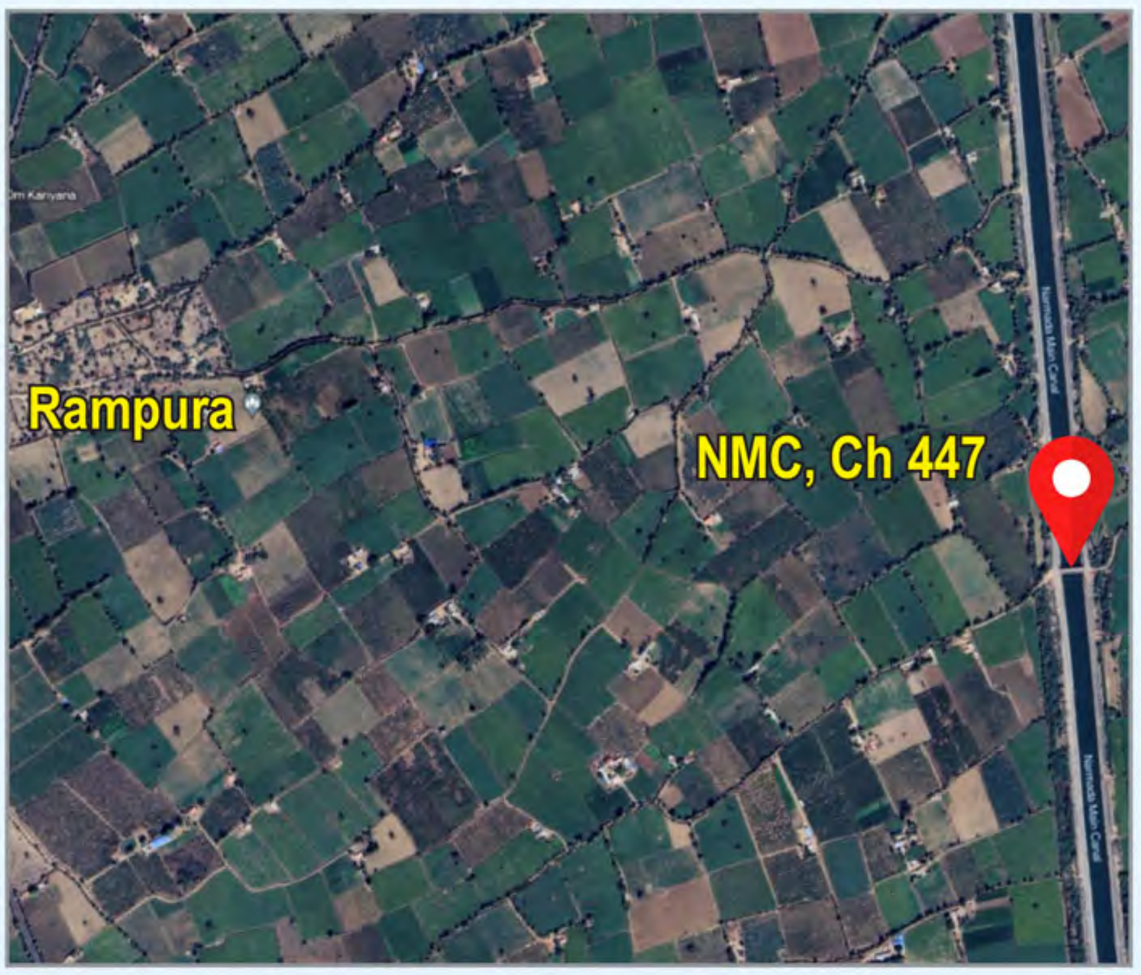
Surgical Dewatering

within Hours for the World's Largest (Lined) Canal

Narmada Main Canal

Narmada Canal is a **532km** long contour canal that starts from South Gujarat from the Sardar Sarovar Dam fed by the Narmada river extending upto South Rajasthan. It has a capacity to flow **40,000 cusecs** at its head *(Kevadia)* tapering down to 2,500 cusecs at it's tail *(Barmer & Jhalore)* in Rajasthan.

It not only irrigates farms of approx 3125 villages spread across 17 districts in Gujarat & Rajasthan - it is the **Source of Drinking Water** to around 1336 villages & Cities - hence, it is aptly called as the **"Life Line of Gujarat"** - otherwise a semi arid state.



Situation :

The Canal was **lined** with **Plain Cement Concrete** *(to attain higher velocity)*. **Since** it's commissioning in **2008;** the NMC was **never shut down** for cleaning & lining maintenance. Over the 15 years of Non Stop usage, **unavoidable seepage raised the surrounding local Ground Water Table..!**

This led to local farmers suffering water logging **conditions subsequently** reducing the quality & quantity of their crop.

Non Stop Seepage over 15years was **causing Water Logging** in Farms...

Overall **Solution :**

After receiving repeated representations from the local farmers to reduce water logging in their fields; m/s SSNNL & Chairman of the Legislative Assembly, **Shri Shankarbhai Chaudhary** got the nod from the Governments of Gujarat & Rajasthan for **Special Repairs** which included :

a) DeWatering,
b) DeSilting,
c) Cleaning,
d) Applying of Water Repellent **Nano-Seal** Hydraulic Liquid Protective **Coating** on Canal Slopes &
e) Repairing / Recasting of Damaged Bed.

Challenges for Pumping *(for dewatering)* :

1) **Ultra Short time** :
   Since this Canal is a **Source of Drinking Water for many districts**; shutting it down would lead to huge public suffering - hence, just 15days were allowed for the Total Out to Out Project which would leave **just 72hours** for the Total Planned DeWatering.
2) **Huge Quantum** of **DeWatering -** even the Planned DeWatering was **5,90,000m^3** of live water.
3) The Damaged Canal Bed Lining would **continuously ooze Sub Soil Ground Water** into the Canal **Increasing the Quantum of DeWatering** *(over & above the planned quantum)*.
4) Also, the **IMD** issued warning of **Cyclone Biparjoy** which could bring in Rains increasing Quantum of Dewatering even further & also could **Reduce** the already short **Available Working Time**.
5) Lots of **Mud, Muck, Plastics** & **Vegetation** in the canal posed a serious **Risk of Pump Clogging.**
6) Vast **variation** in **Water Submergence level** - varying from **20'** to **1'**..!
7) Near the end of Bulk DeWatering, the Pumpsets would have **to run** under **just 1'** of water **submergence** - this could pose a **fatal risk** of **Motor Burnout** & possible **Suction Vortexing...!**
8) Due to the **Long** *(from banks to canal bed)* **Distances** & **Lack** of **Permanent Material Handling Equipment;** the pumpsets would be required to be **very Portable** & **yet Robust.**
9) **No Electrical power** availability - multiple DG sets would be required spread over Kilometers.

Aqua's **Solution :**

The work was distributed & carried out in 2 different phases.

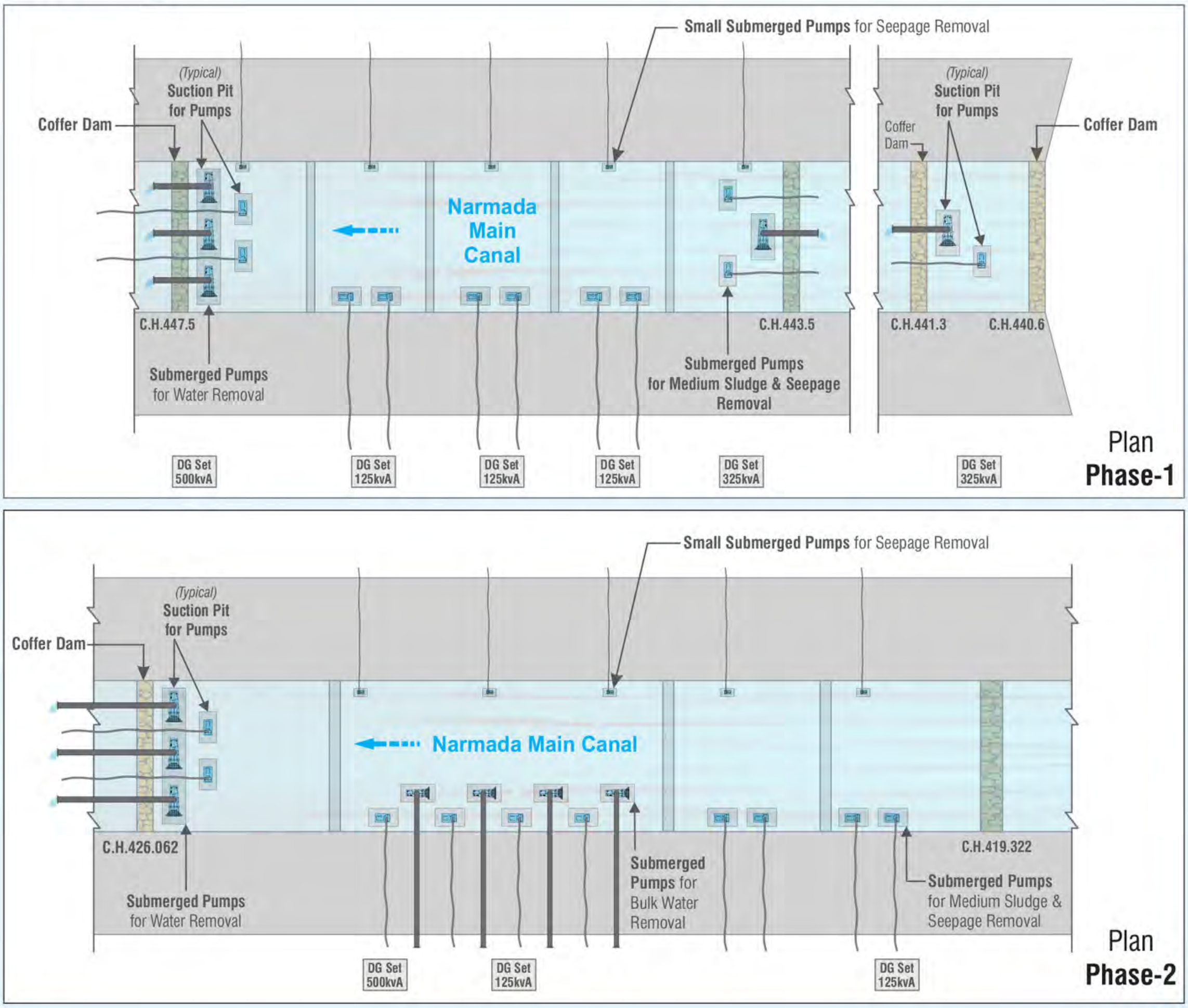
Phase-1: Work of 6.74 km length *(between Ch 419.322 km to 426.062 km)* of NMC in 15 days i.e. 01-05-2023 to 15-05-2023

Phase-2: Work of 4.80 km length *(between Ch 440.600 km to 441.300 km & between Ch 443.500 km to 447.600 km)* of NMC in 15 days i.e. 15-06-2023 to 30-06-2023

Submerged Elbow Pumpsets

Aqua's unique **Submerged Elbow** *(AES)* **pumpsets** can handle Solids *(mud, muck)* as well as Fibrous Vegetative Materials without any problem.

G A Drawing :



Work in Progress :

The **Gravity of the Problem on hand** & **Pressure of Timely Completion** meant that **many Dignitaries visited** the project site frequently - seen above are the **Hon Speaker of Gujarat State Assembly, Director SSNNL,** etc...

The Pumps had to withstand **severe Cantilever loads** during **installation, shifting** & **removal** which posed a serious risk of **Mechanical Cracks -** but thanks to the Robust design, Aqua's Pumps have not suffered any damage.

Work in Progress :

Team Aqua **at work.....**

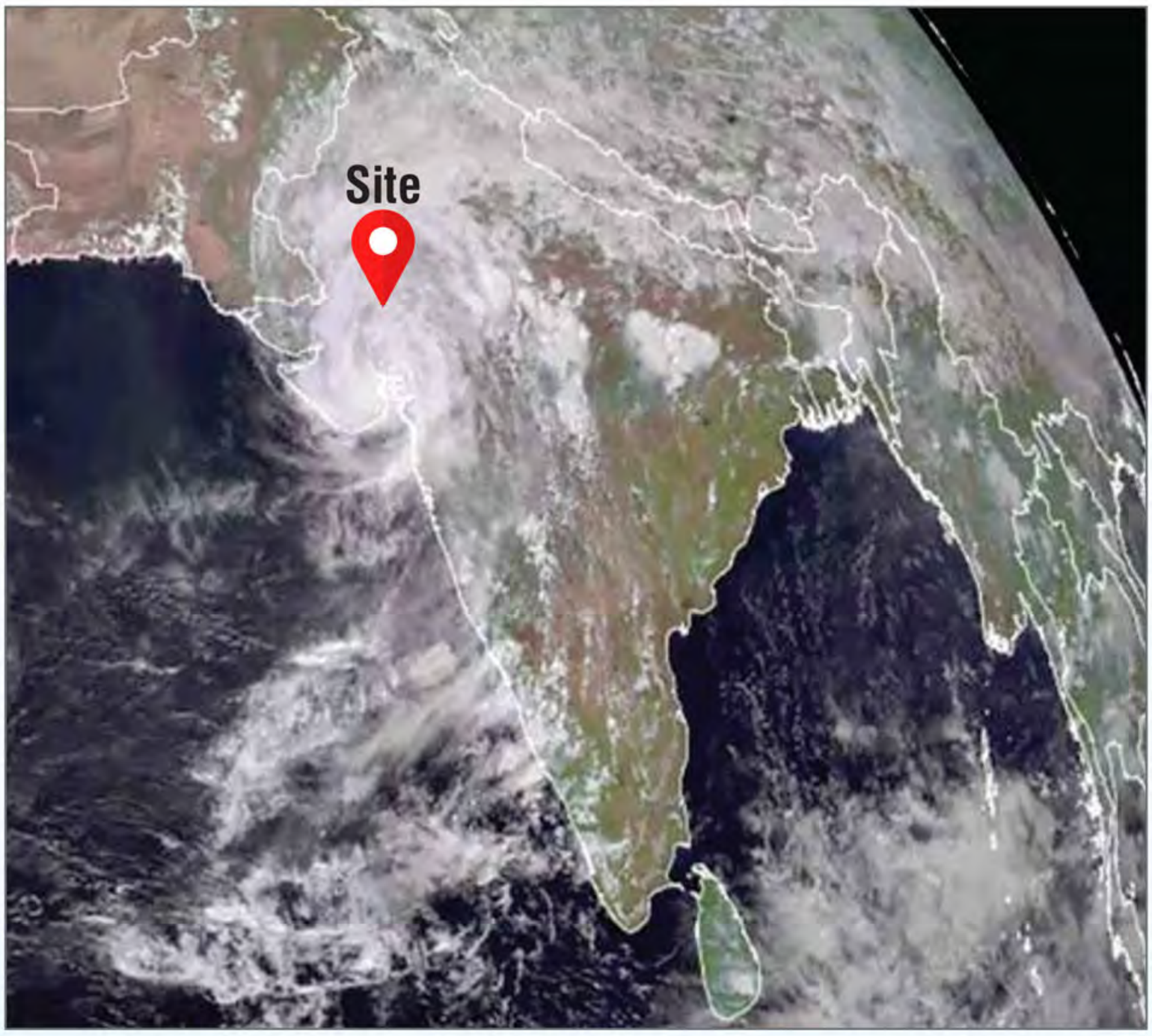
To a **Branch Canal**

Disposal of **Bulk** Water

Beyond the Coffer Dam

Disposal of **Sub-Soil Seepage** Water carried out Round the Clock for days together...

To add to the woes : Cyclone Biparjoy



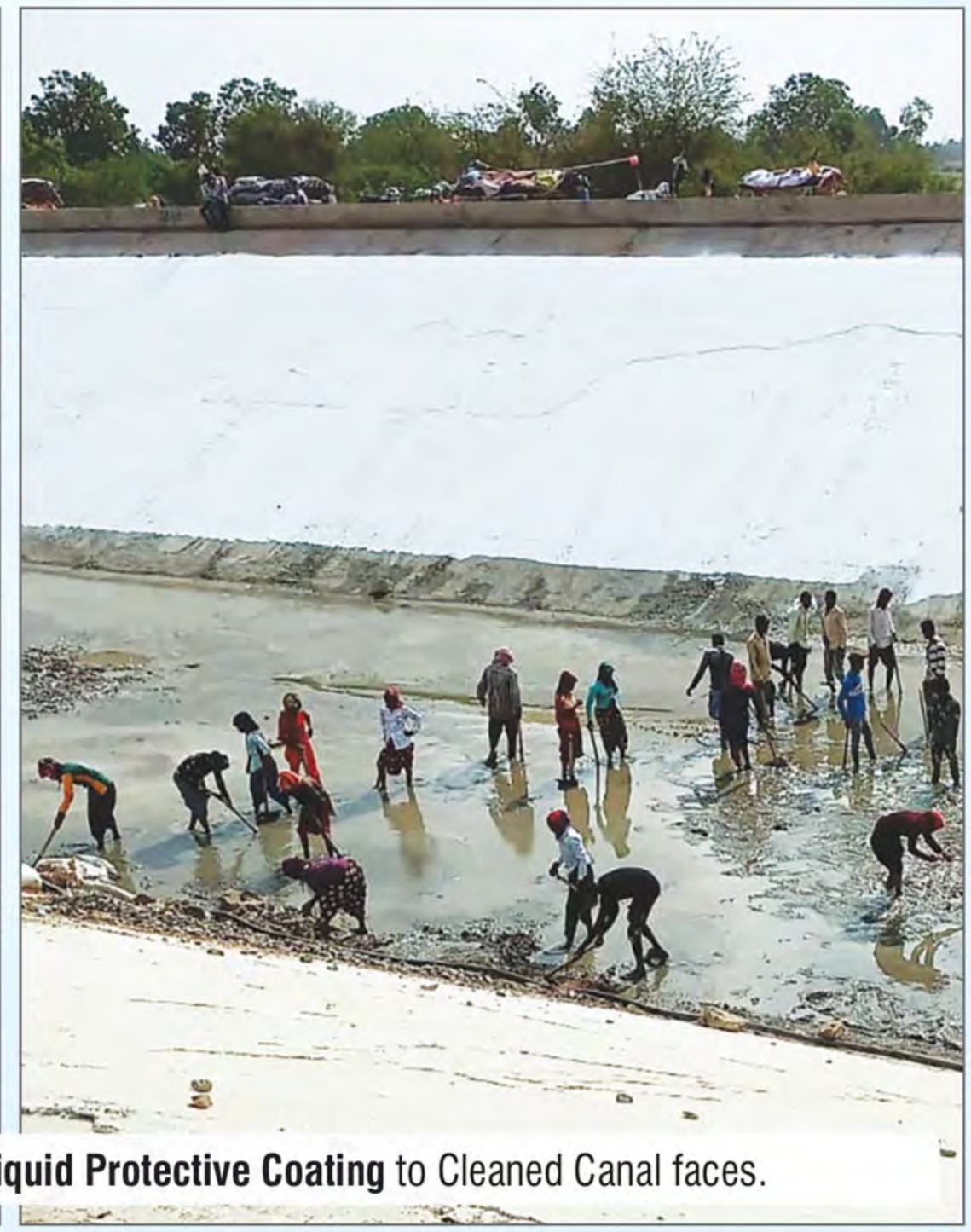
Exceeding the IMD's warnings; Biparjoy turned out to be "***Long Lived & Extremely Severe***" Tropical Cyclone that brought in **substantial Rains** which nearly **Re-Filled** up the **already DeWatered canal** thereby **Sinking** nearly 30 to 40 hours of DeWatering Work..!

This necessiated **Duplicate DeWatering** & also led to substantial DownTime due to Statutory Shutdown of all activities - nearly 48 hours.

Yet again, this challange was tackled well by Aqua's Submerged pumpsets which ultimately had to **DeWater** nearly **2.2X** to **2.8X** the Planned Quantum but in **just 0.4X** to **0.5X** of the **Planned Time.**

High Flow pumps operating under just a feet of submergence - thanks to Aqua's design **focus on Low NPSHr** & **Ultra Low Submergence requirements**... yet the Pumps worked without any damage or breakdown.

Despite **substantial choking of Suction Bell** due to hyacinth & grass; Aqua's pumps kept on **running without a single breakdown / tripping.**



Applying Water Repellant **NanoSeal Hydraulic Liquid Protective Coating** to Cleaned Canal faces.

Phase-1

Sardar Sarovar Narmada Nigam Ltd.
(A wholly owned Govt. of Gujarat undertaking)

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Office of the Executive Engineer,
Narmada Project Main Canal Division No. 3,
Narmada Colony, Chanasma-384220
Dist : Patan (North Gujarat)

No.NPMCDn.3/NMC/1432/2023 Date: 11/05/2023

Certificate

To whomsoever it may concern

This is to certify that the work of "Providing and executing a set of services for dewatering from the canal section (inner prism) including removal of all flowing materials etc. dewatering from the canal section below lining under water condition from ch.406.997 km to 410.650 km & 419.322 km to 426.062 km. of NMC during the Closure-2023 (Package-1 of Phase-I)" was entrusted to **M/s. Jay Ambe Construction, Mehsana** vide Work order no. CPC/Main canal/NMC Closure/Package 1/2023/1671/73 dated **01st May 2023.**

M/s. Aqua Machineries Pvt. Ltd, Ahmedabad had supplied the pumps to **M/s Jay Ambe Construction, Mehsana** as per MOU and special condition of the tender.

The purpose of work is to dewatering from Narmada Main canal so as enable to special repair the NMC Slope & Bed.

The dewatering was to be done for 6740 mtr length (between ch. 419.322 km to 426.062 km) of the Narmada Main canal near Khanpur & Nagla village, Ta. Tharad, Dist. Banaskantha, Gujarat. The brief scope of work was as under:

- Providing a combination of Large, Medium and Low Discharge capacity of Submerged Elbow pumps ranging from 1200 m3/hr to 50 m3/hr & total 20 nos of pumps were placed at various locations to dewater the NMC.
- Providing and commissioning the necessary electrical accessories like DG sets – 500KVA, 125 KVA, 30KVA, Control Panels, Cables etc. required.
- Providing and commissioning all required mechanical accessories like, pipes, ms specials etc with required machineries – Cranes/Hydra etc.
- Entire scope of work was to be completed in 48-60 hrs from the start of shutdown of NMC.

M/s. Jay Ambe Construction & MOU partner M/s. Aqua Machineries Pvt. Ltd, Ahmedabad started the installation work on 01/05/2023 and completed the entire dewatering work in time to enable the repairing of NMC.

We commend the Engineering capabilities of M/s. Jay Ambe Construction & MOU partner M/s. Aqua Machineries Pvt. Ltd, Ahmedabad for designing & executing this ultra-critical water dewatering project within the very short time, space & terrain constraints.

SSNNI is satisfied by the Simple ITC, Minimal Maintenance of Aqua make Submerged CF Elbow pumpsets & recommend them for robust handling of raw & muddy water.

Executive Engineer
N.P.M.C Division No 3
Chanasma

Phase-2

Sardar Sarovar Narmada Nigam Ltd.
(A wholly owned Govt. of Gujarat undertaking)

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Email: ee-npmc3-ssnnl@gujarat.gov.in

Office of the Executive Engineer,
Narmada Project Main Canal Division No. 3,
Narmada Colony, Chanasma-384220
Dist : Patan (North Gujarat)

No.NPMCDn.3/NMC/AB/1295 /2023 Date: 24/7/2023

Certificate

To whomsoever it may concern

This is to certify that the work of "Providing and executing a set of services for dewatering from the canal section (inner prism) including removal of all flowing materials etc. dewatering from the canal section below lining under water condition from ch.440.600Km to 441.300km & 443.500 km to 447.600 km. of NMC during the Closure-2023 (Package-1 of Phase-II)" was entrusted to **M/s. Aqua Machineries Pvt Ltd.,** Ahmedabad vide Work order no. NPCMDn 3/NMC/AB/1022 of 2023 dated **12th June 2023.**

The purpose of work is to remove the water from Narmada Main canal so as enable to repair the NMC Slope & Bed.

The dewatering was done for 700 mtr length (between ch.440.600Km to 441.300km) & 4100 mtr length (between ch.443.500Km to 447.600km) – Total 4800 mtr length of the Narmada Main canal near Bhapi village, Ta. Tharad, Dist. Banaskantha, Gujarat. The brief scope of work as under:

- Providing a combination of Large, Medium and Low Discharge capacity of Submerged Elbow pumps ranging from 1200 m3/hr to 50 m3/hr & total 20 nos of pumps were placed at various locations to dewater from NMC.
- Providing and commissioning the necessary electrical accessories like DG sets – 500KVA, 125 KVA, 30KVA, Control Panels, Cables etc. required.
- Providing and commissioning all required mechanical accessories like, pipes, ms specials etc with required machineries – Cranes/Hydra etc.
- Entire scope of work was to be completed in 48-60 hrs from the start of shutdown of NMC.

M/s. Aqua started the installation work on 18/06/2023 and completed the entire dewatering work on 20/06/2023 successfully

We commend the Engineering capabilities of m/s Aqua Machineries Pvt. Ltd for designing & executing this ultra-critical water dewatering project within the very short time, space & terrain constraints.

We are satisfied by the Simple ITC, Minimal Maintenance of Submerged CF Elbow pump sets & recommend them for Robust handling of raw muddy water.

Executive Engineer
N.P.M.C Division No 3
Chanasma

FROM NO. 3 (A)

(REFERED TO IN RULE NO.5B (ii))

Workwise details of work completed or in progress by the contractor

1	Name of contractor	:-	Aqua Machineries Pvt. Ltd. Ahmedabad
2	Name of work	:-	Providing and executing a set of services for dewatering from the canal section (inner prism) including removal of all flowing materials etc. dewatering from the canal section below lining under water condition from ch 440.600Km to 441.300 Km & from ch. 443.500 km to 447.600 km. of NMC during the Closure-2023 (Package-1 of Phase-II)
3	Work Order No	:-	NPMCDn.3/NMC/AB/1022 of 2023, Dated.12/06/2023
4	Estimated cost of work put to tender	:-	Rs. 2,77,46,513.75
5	Tendered amount	:-	Rs. 2,74,69,048.61
6	Date of starting work	:-	15-06-2023
7	Date of completion of work (As per contract agreement)	:-	30-06-2023
8	Actual Date of the completion of the work	:-	30-06-2023
9	Amount of work done up to date	:-	Rs. 2,74,16,875.00

Aqua Machineries Pvt. Ltd. Ahmedabad
Signature of contractor

10	State whether the detailsed as above,given by the contractor are correct . if not state as to what is the correct information	:-	Yes
11	State whether contractor has executed the work in progress satisfatorily as per specifications areas completed.If not give the correct position of the work.	:-	Work is Completed
12	Any othar remarks.	:-	Above works consisting of follwing major item. 1. SITC of 20 Submerged Elbow pumpsets ranging from 50 M³/Hour To 1200 M3/Hour. 2. SITC of DG Sets.8 Nos. ranging fron 30 KVA To 500 KVA

No: NPMC/Dn3/AB/1254/of 2023
Office of Executive Enginner
Narmada Project Main Canal Division No:03
Mehsana Chanasma Highway Dist:Patan
Date 22/9/2023

Executive Engineer
N.P.M.Canal Division No.03
Chanasma

Office of the Ex. Engr. N.P.M.C. Dn. No. 3 Chanasma

"Some Contractors used Multiple Makes of pumpsets – but apart from Aqua make almost all other pumps failed within hours – so we had to deploy Aqua's Pumps for their unplanned duties also.

On top of it, due to Cyclone Biparjoy; there was a huge increase of DeWatering Quantum & Loss of Production Time – had it not been for the Bullet Proof Reliability of "Aqua" make pumps; we may have missed the time lines of this ambitious & hitherto unprecedented project.

Farmers are now happy that the water logging is drastically reduced which will lead to improved & robust crop yield."

– Er. **J K Vaidya**, EE Tharad, NMC; m/s SSNNL

Aqua Machineries Private Limited
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marketing@aquapumps.com