

# Ahmedabad રાજકોશ

*Augmenting the Pumping Capacity of a Waste Water Pumping Station to **2.4X** (from 285mld to 681mld) in just **15** days....!*



Ahmedabad lies just 53m above MSL on the flood plains of the **Sabarmati** river which drains it.

Covering an area of **505km<sup>2</sup>** it houses nearly 64Lakh souls.



**Sabarmati River**

## Situation:

Eastern Ahmedabad was very meticulously planned by m/s Ahmedabad Municipal Corporation (AMC) - there are not less than 29 numbers of large dedicated Storm Water Pumping stations which can drain approximately **2,25,000 m<sup>3</sup>/hr** of storm water - all of them are equipped with Aqua's Sub

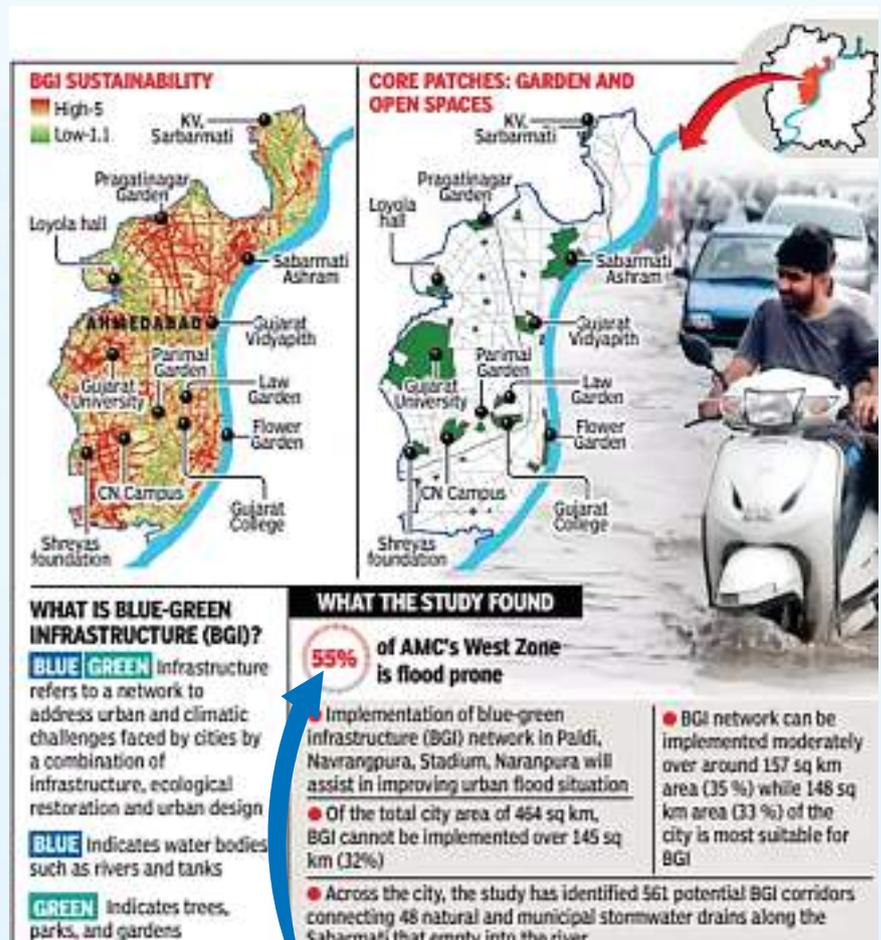


However, the much larger portion of Ahmedabad - i.e. The **Western** Ahmedabad was developed a mix of Local Self Government, Nagar palika's, Municipal Boroughs & other Development Authorities - it grew very fast & wide but due to development by multiple small local bodies; Western Ahmedabad **did not have any dedicated Storm Water pumping stations...** ⚠️

Later on Western Ahmedabad was **merged into AMC** - at that time it had already grown large but because of sporadic development many **natural drains, lakes, etc** were **encroached** so the **natural drainage** of storm water was **impeded.** ⚠️



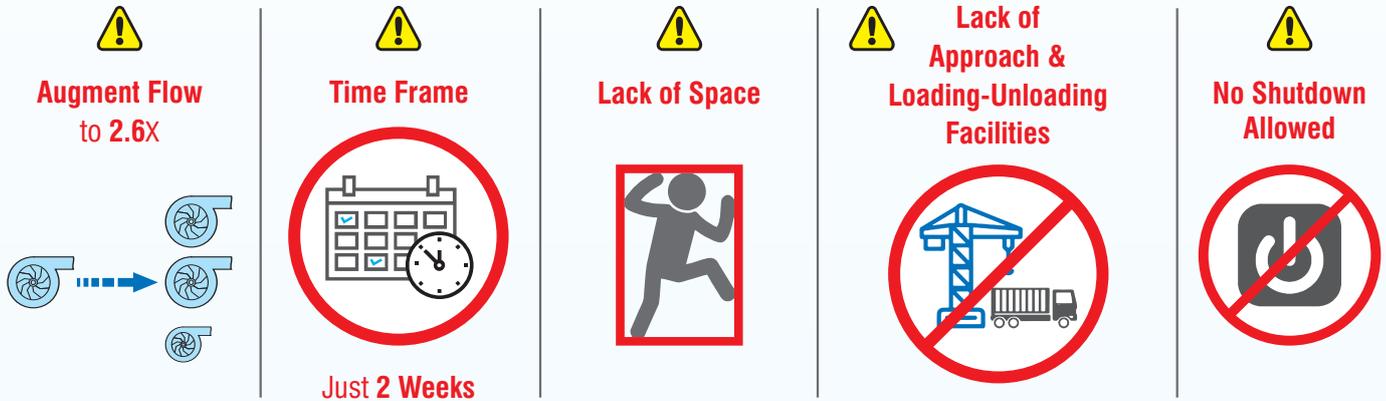
Hence, AMC was handed over a burning problem of **managing storm water upto 396mld** (along with 285mld of regular sewage) of entire Western Ahmedabad through a single **285mld Vasna Terminal Sewage Pumping Station** at Gyaspur village...! In this 285mld TSPS often 675mld of combined (Sewage + Storm Water) rushes in during Monsoon causing a havoc on this pumping station..



...55% of AMC's West Zone is Flood Prone"

## Multiple Challenges:

Hence, the existing **285mld** Terminal Sewage Pumping Station **had to be augmented to 681mld** on a war footing basis of **just two weeks** if Western Ahmedabad was to be saved from floods... ⚠️

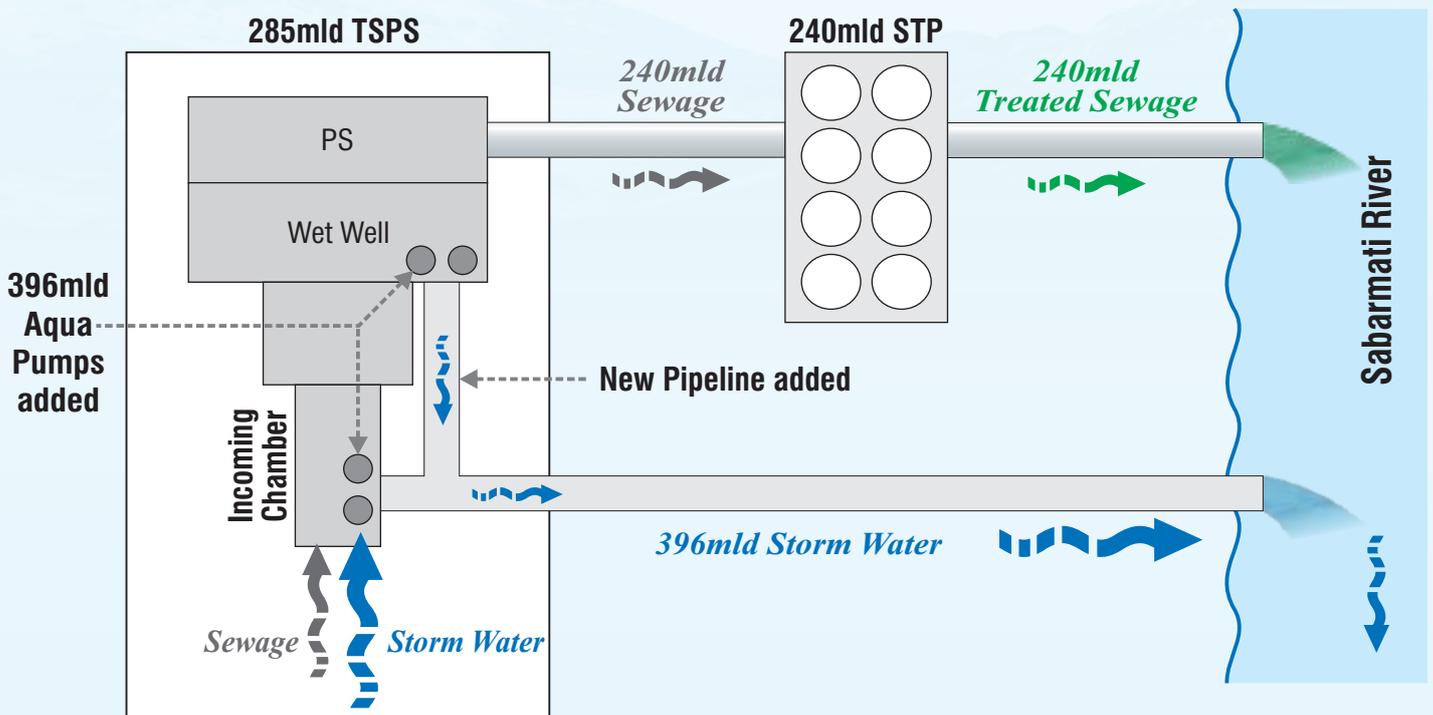


## Solution:

Aqua already had experience of commissioning **2 x 1468mld** Pumping Stations in the past. So it was decided to entrust the **Entire Project on Single Point Turnkey basis** to India's most reputed & largest manufacturer of Submersible Non Clog pumps - m/s Aqua Machineries Pvt. Ltd.



## Schematic Solution



240mld Sewage is sent straight to the Sewage Treatment Plant - where as upto 396mld of Storm water is Lift Pumped and fed to a combination of MS Pipeline & Gravity Duct which finally drains the Storm Water into the River.

Pump Model	Motor Rating (kW/hp)	Discharge	Head	Qty.
ANS.._V_AC_1st_VoG_6081_TQ_8P_270hpN_ER_4_NJ.	270 hp	3500 m <sup>3</sup> /hr	12m	2 Nos.
ANS.._V_AC_1st_VoG_6284_MW_8P_400hpN_ER_4_NJ.	400 hp	4500 m <sup>3</sup> /hr	12m	1 Nos.
ANS.._V_AC_1st_VoG_5064_M_6P_450hpN_ER_4_NJ.	450 hp	5000 m <sup>3</sup> /hr	12m	1 Nos.

Aqua's Client:  
End User:

**Ahmedabad Municipal Corporation (AMC)**



### Aqua's ANS : The First 2<sup>nd</sup> generation of Submersible Sewage pumps

*"Aqua's ANS is the First 2nd generation of Submersible Sewage pump specifically upgraded for real life Indian operating conditions. . ."*

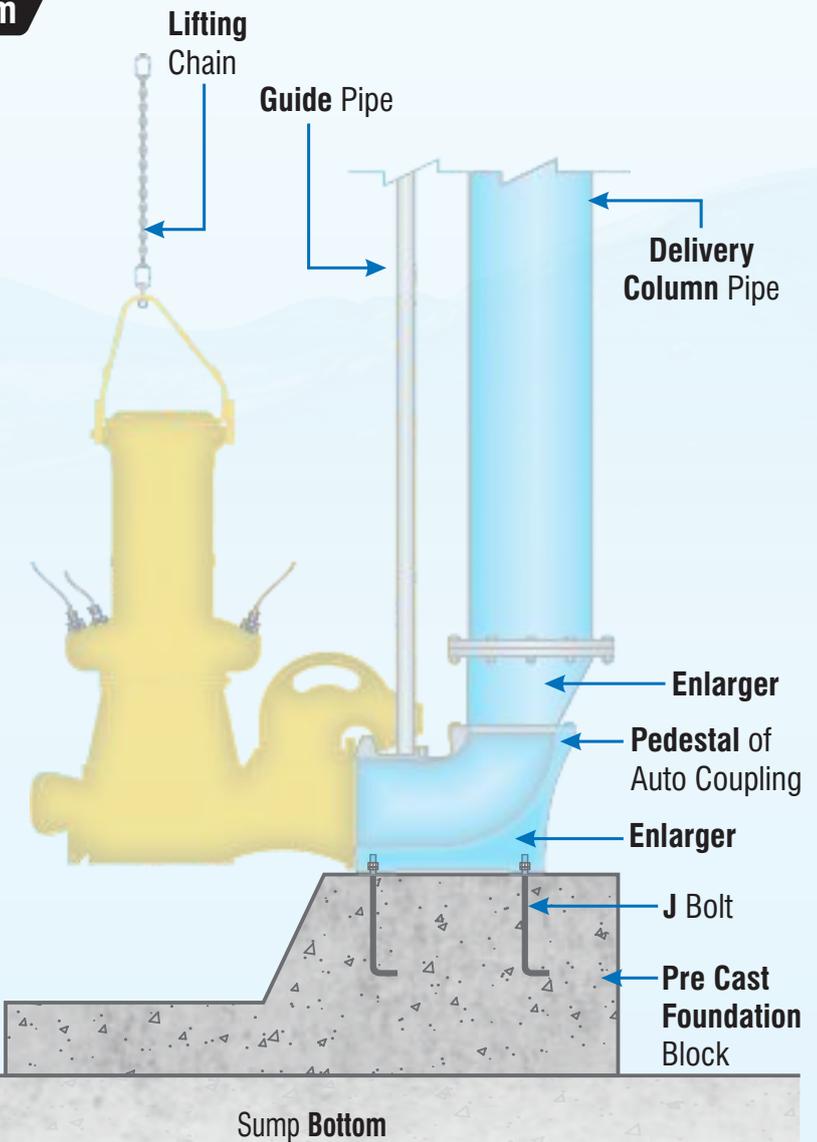
**Manan Shah,**  
Manager, AMPL

#### Concept : PreCast Auto Coupling System

But the task was very challenging as such **monster size pumps** generally upto DN 600mm Nozzle size & upto 450hp require large footprint & a heavy, solid foundation - however the work had to be carried out during monsoon when no access to the bottom floor was possible...! How to install such large pumps on auto coupling without even able to touch the bottom raft...?

To overcome this challenge, Aqua's Engineers designed Over Sized & Over Safe Portable Precast RCC Base Frame on to which Auto Coupling was Bolted. The Precast RCC base (*on to which the auto coupling was **pre-grouted***) was lowered into the Incoming Chamber & Wet Well sump, even while the wet well sump & the incoming chamber already overflowing with storm water and sewage. **no shutdown was**

**Note:** There is no physical connection between the Sump Bottom & Pre Cast Foundation Block.

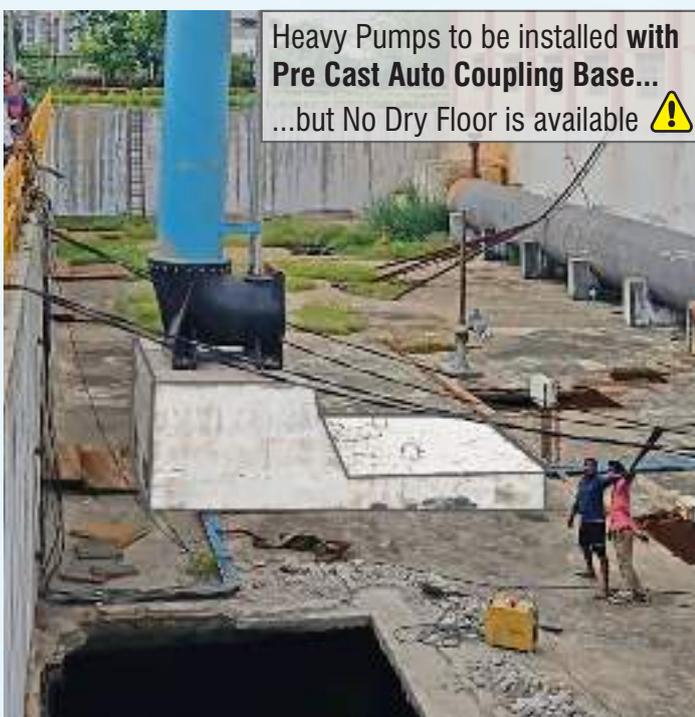


**Work in Progress:**

To have Stable Resting of **upto 450hp 600mm Nozzle Size**; the Pedestals (of AutoCoupling) are **permanently bolted onto PreCast Foundation Blocks** which are then simply dead weight rested onto the bottom (of sump / incoming chamber).



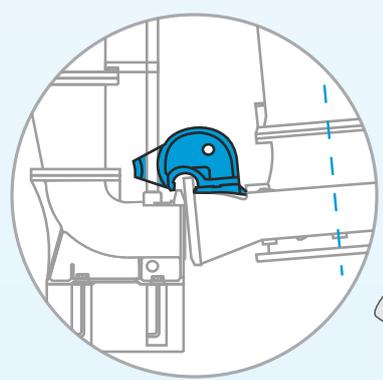
Pump being **lowered** into the AutoCoupling with **guidance by Guide Pipe**.



Heavy Pumps to be installed **with Pre Cast Auto Coupling Base...**  
 ...but No Dry Floor is available

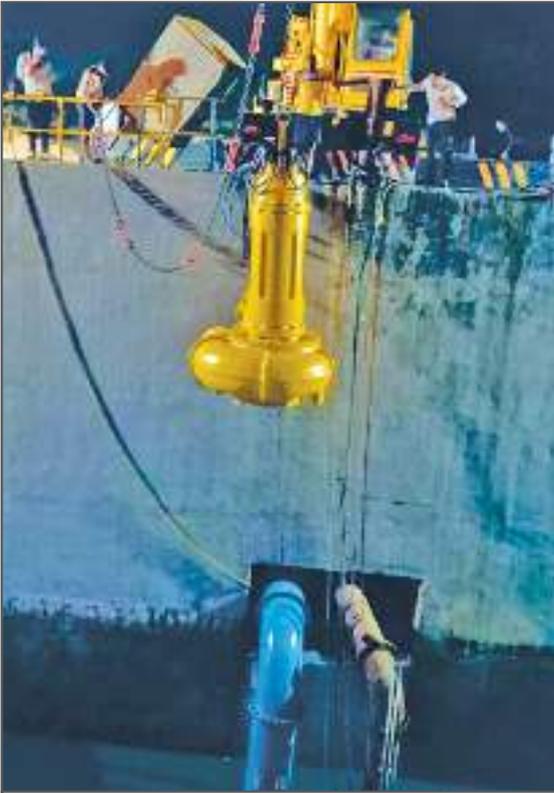
During full monsoon with full incoming flow of wastewater the precast based frame with the Auto Coupling was lowered and on it guide pipes be lowered and then pumps when lowered.

The entire activity right from start to commissioning was done in just two weeks without any shutdown.



Auto-Coupling's **Bracket** withstand heavy Cantilever loads & hence always built with **Ductile Iron**  
 (for added toughness & resistance to cracking).

**Work in Progress:**



The pumpset installed can be easily within minute onto the Auto Coupling **by a crane.**

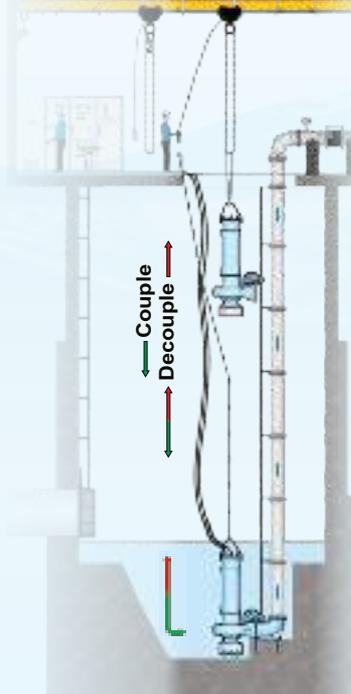


Gravity Duct for Storm Water

Pump being Lowered...

**Concept : Auto Coupling System**

Pumpsets in action...



This represents the **most Economical & most User-friendly** installation method.

The Pumpset is installed directly at the bottom of the wet pit using **Aqua's Automatic Coupling System**. This system ensures that the Pumpset is properly Lowered (& firmly connected to the discharge piping) or Lifted out (disengaged from discharge piping) in a **simple, precise & within minutes...!**

It uses **Guide Pipes** (which guide the

discharge flange matches that of the auto coupling pedestal.

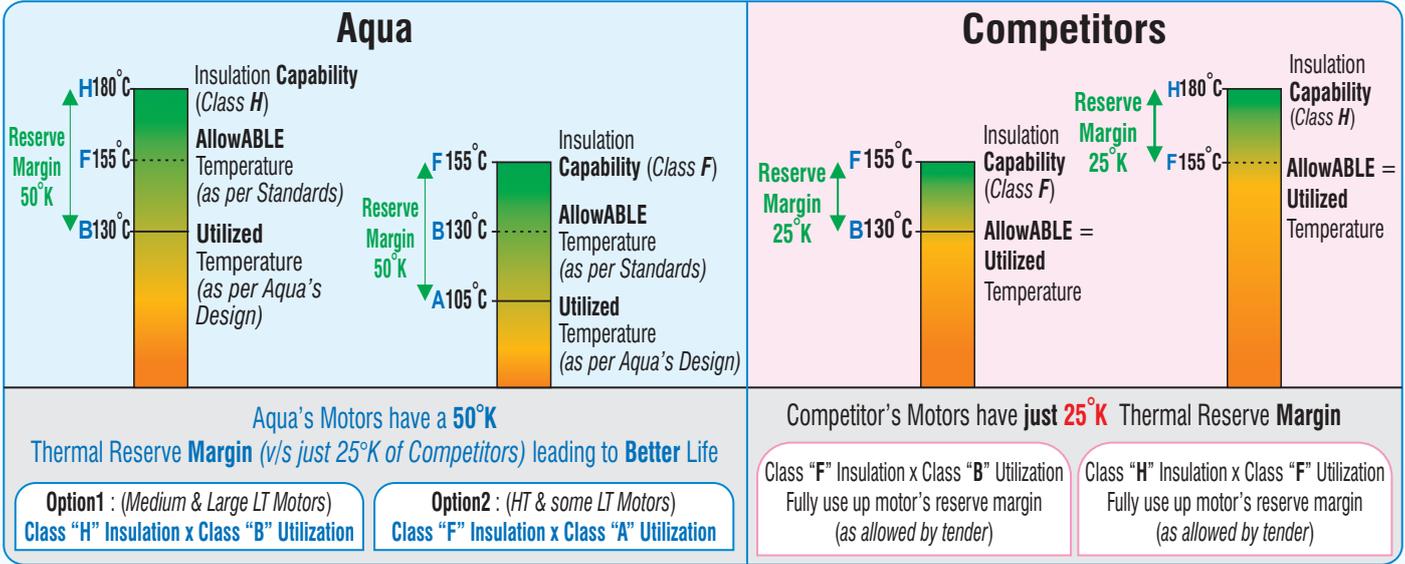
The pumpset is kept in place by its weight on to the Auto Coupling - **there is no need for any fastening of Bolt-Nut** to clamp it to the delivery piping.

Removing the pumpset for maintenance is equally simple - **just pull it up; there are no bolts to be dismantled.** The operator need not enter the sump once the automatic coupling system is fitted.

*...Minimum Installation - Removal Hassles...*



## Unique Advantages of Aqua's ANS

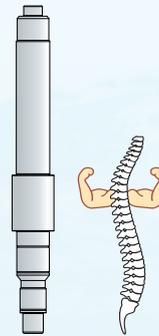


### Higher Motor STATOR Thermal Reserve Margin

As a rule of thumb in Motor Industry (based on **Arrhenius Equation**); for every 10°C (or more precisely 10°K) Drop in Temperature, the useful Life of Insulation is Doubled. Hence with a 50°K Reserve Margin (v/s just 25°K of Competitors); Aqua's (Motor {Stator}) Insulation will have a **6 times Higher Life** (than competitors)

### Oversized Robust Shaft

Pump Clogging though undesirable, is often unavoidable - it will cause Severe Stress on Shaft (possibly causing its Shearing) & Motor (possibly causing BurnOut due to Lock Rotor).

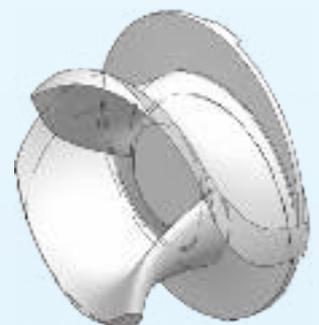


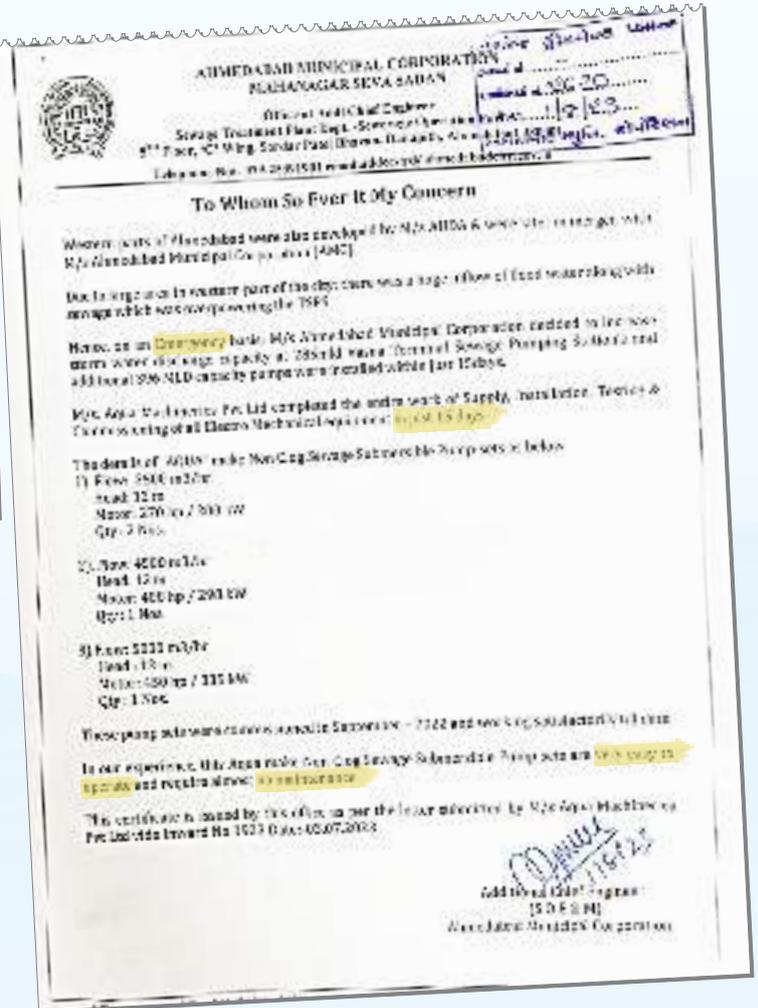
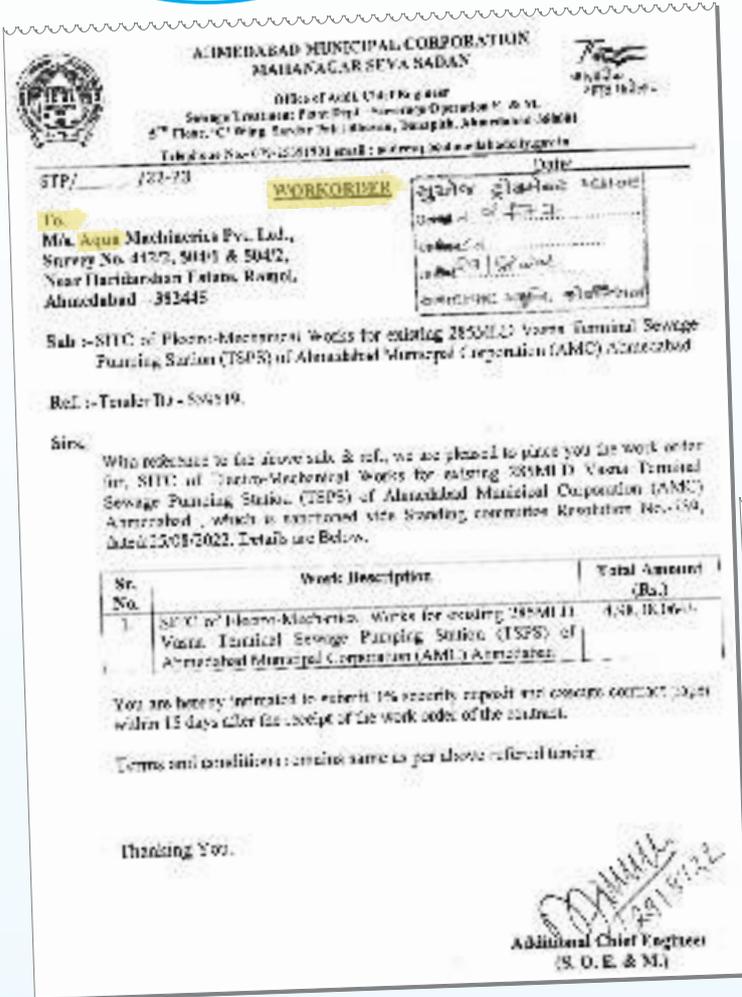
Shaft is designed with very high Factor of Safety (FoS) for failsafe performance even during the worst blockages/clogging- Shaft Shearing is virtually unheard of in Aqua's ANS pumps.

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

Aqua's Pumps work without any Trash Rack or any Screening. Sometimes the storm water also has tortoises, small aquatic animals, large bricks, stones, construction debris - but the Robust Aqua ANS Submersible Non Clog pumps are working

**150mm (6") Solid** Handling ability allows clog free performance even in Unscreened Storm Water+ Sewage





*“ Apart from Electro Mechanical challenges; Mounting such HEAVY (upto 450hp & upto 600mm nozzle size) pumps onto a Perennially WET & SLUSHY surface (of Incoming Chamber & Wet Well) without any Physical Connection (bolting/ grouting/ etc) to the Bottom was a challenge. . . !*

*But, Aqua did an excellent job - the pumps are working smoothly without any vibration.”*

- Chief Engineer (Retd.) & PHE Consultant : **Mr. V.T.Mistry**

# Aqua Machineries Private Limited

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

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