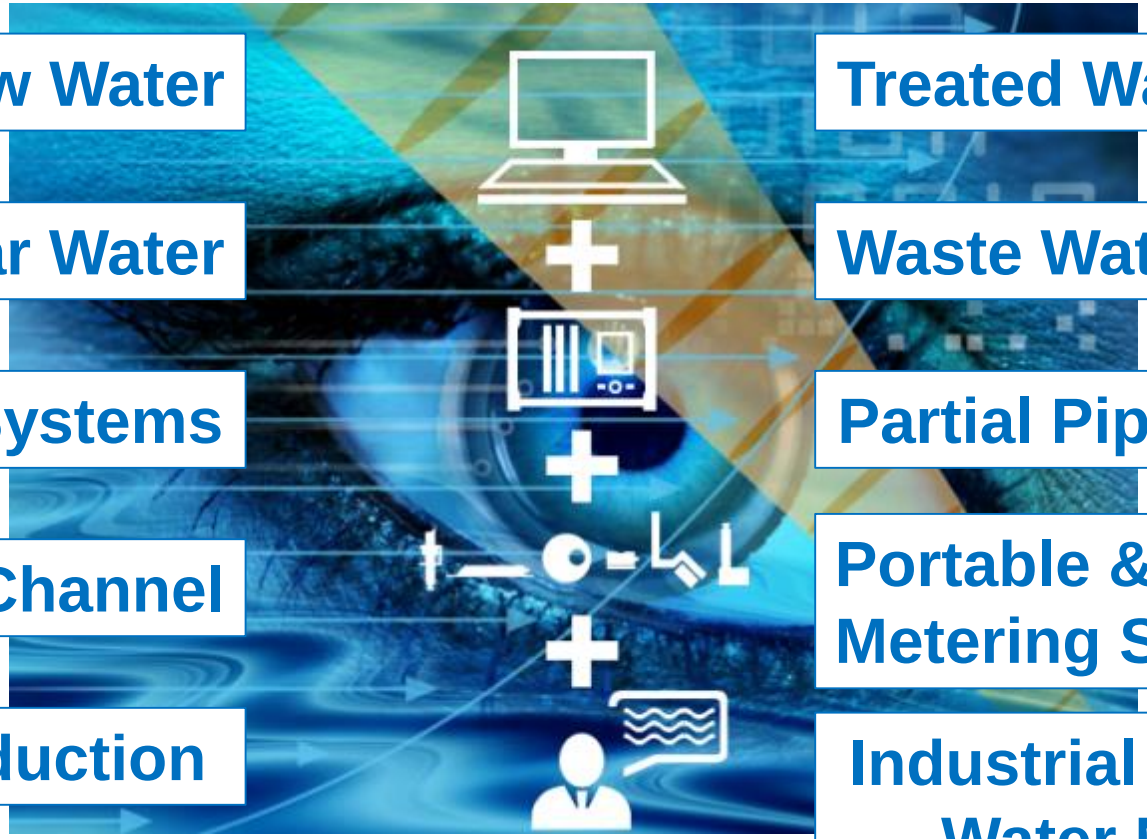
WASTEWATER MEASUREMENT & MONITORING

By

Automation and Maintenance Management Systems

We measure WATER !!



- Raw Water
- Clear Water
- Irrigation Systems
- Open Channel
- NRW Reduction
- Treated Water
- Waste Water
- Partial Pipe Flows
- Portable & Fixed Metering Solutions
- Industrial & Municipal Water Networks

“Measure Better to Manage Better”

Monitoring Wastewater Flows

- STP inlet and outlet flow measurement and data transmission.
- This helps in management of concession agreements.
- Treated wastewater quality parameters can also be monitored before discharging into water bodies.
- Sewage discharge through outfalls can be monitored.
- Sewer network flows can also be monitored to prevent surcharges and hence discharges into water bodies.

MONITORING TECHNOLOGIES

1. STP INLET AND OUTLET MONITORING WITH CONTACT AND NON-CONTACT BASED MEASUREMENT
2. SEWER MANHOLE LEVEL MONITORING
3. SEWER DISCHARGE MONITORING

STP Inlet/Outlet Monitoring

FLOW METERING AT A DN 3000 PIPE AT A WTP IN PARIS USING A SINGLE CROSS CORRELATION SENSOR

- Measure pumped inflows of STP with a single insertion sensor, in the process avoiding a shutdown for installation.
- Open channel gravity or pumped flows can be measured without a Parshall flume or Weir construction.

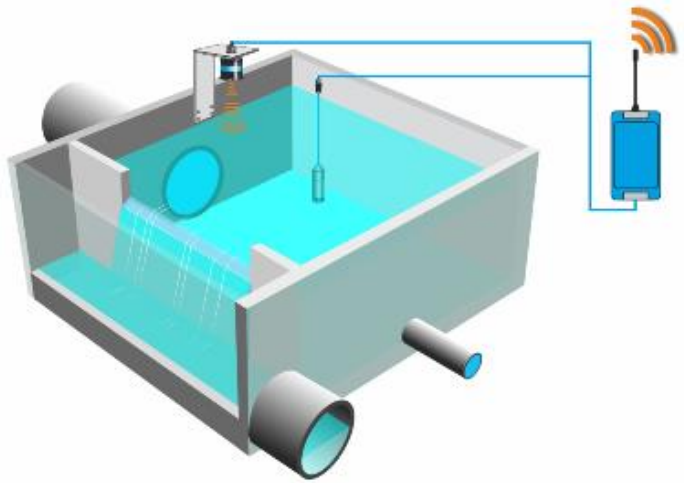
We Specialize in STP Flow Metering !!

REPLACEMENT OF A NON FUNCTIONAL MAG WITH A SINGLE SENSOR WITHOUT SHUTTING DOWN THE PROCESS

MEASURING IN A SEWAGE PUMPING LINE AT CHENNAI

Sewer Manhole Level Monitoring

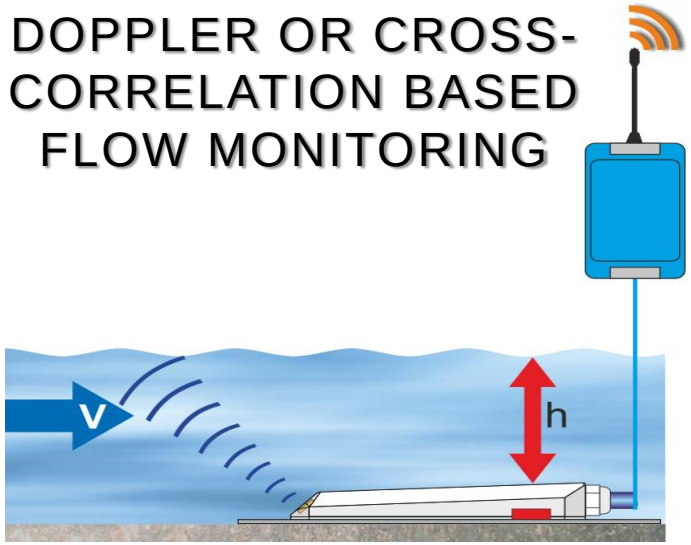
HYDROSTATIC OR ULTRASONIC BASED LEVEL MONITORING



- Monitor sewer level in manhole to raise early warnings on surcharges.
- Remote data transmission enabled to help proactive monitoring.
- GPS coordinates can be fed for easy location identification.
- Intuitive dashboards with trends, alarms and health status.

We Specialize in Sewer Monitoring !!

Sewer Discharge Monitoring



- Measure sewer discharges in manhole and raise early warnings on surcharges by detecting any clog in the network.
- Remote data transmission enabled to help proactive monitoring.
- GPS coordinates can be fed for easy location identification.
- Intuitive dashboards with trends, alarms and health status.

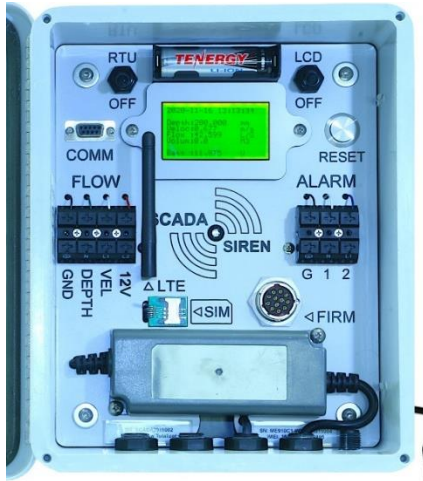
Open Channel Contact and Non-Contact Measurement

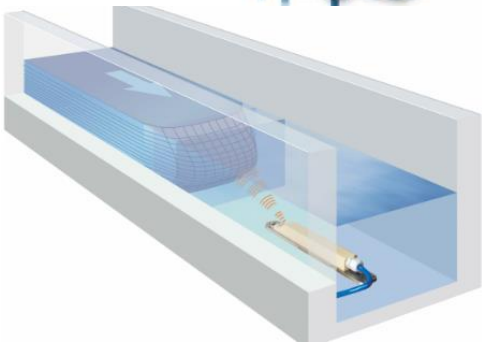
AuM SYSTEMS
People. Technology. Sustainability.
ISO 9001: 2015

PORTABLE TYPE

Monitor with camera

FIXED / PERMANENT TYPE





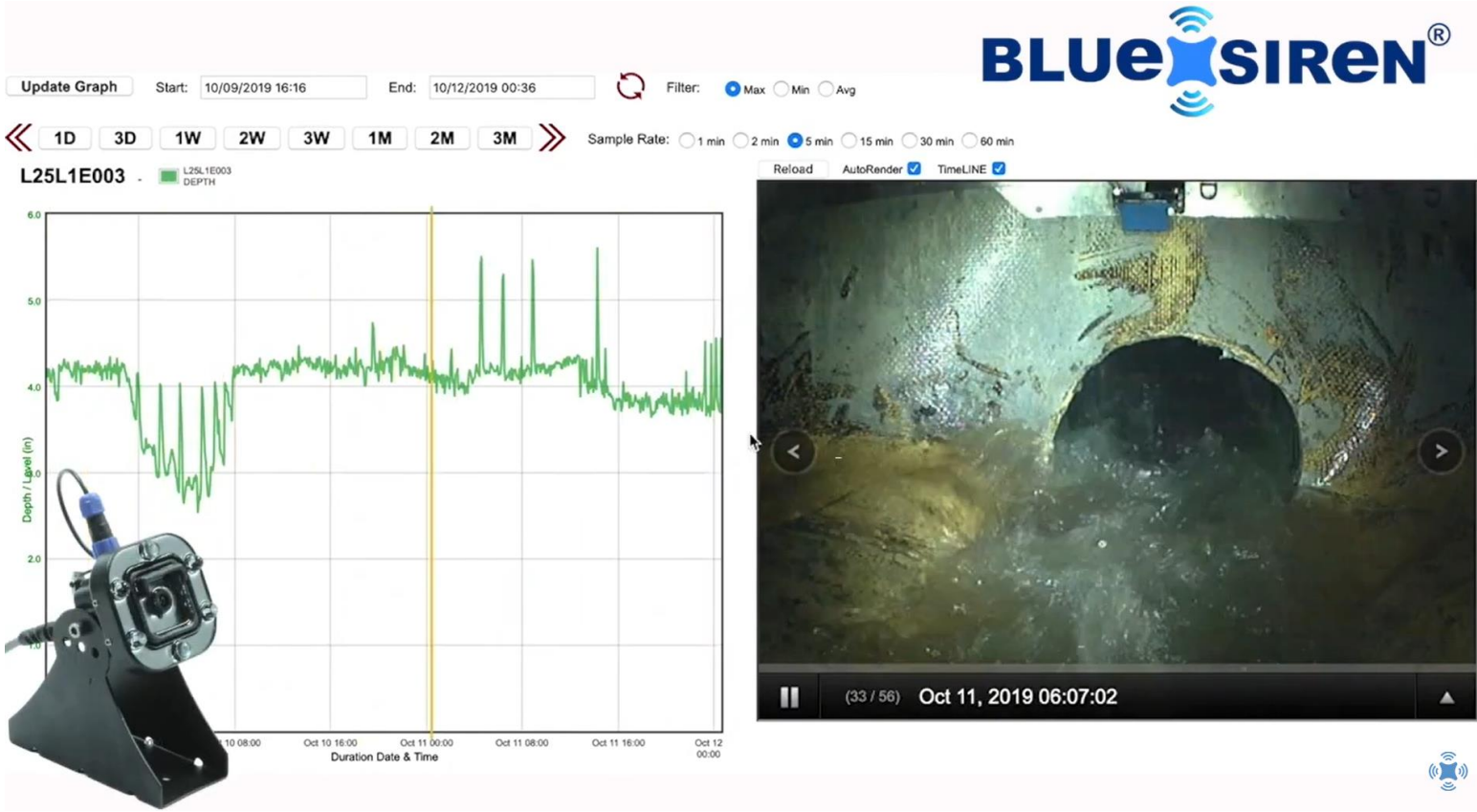
SENSORS

Non-contact Radar sensor

Monitor with Visual Information

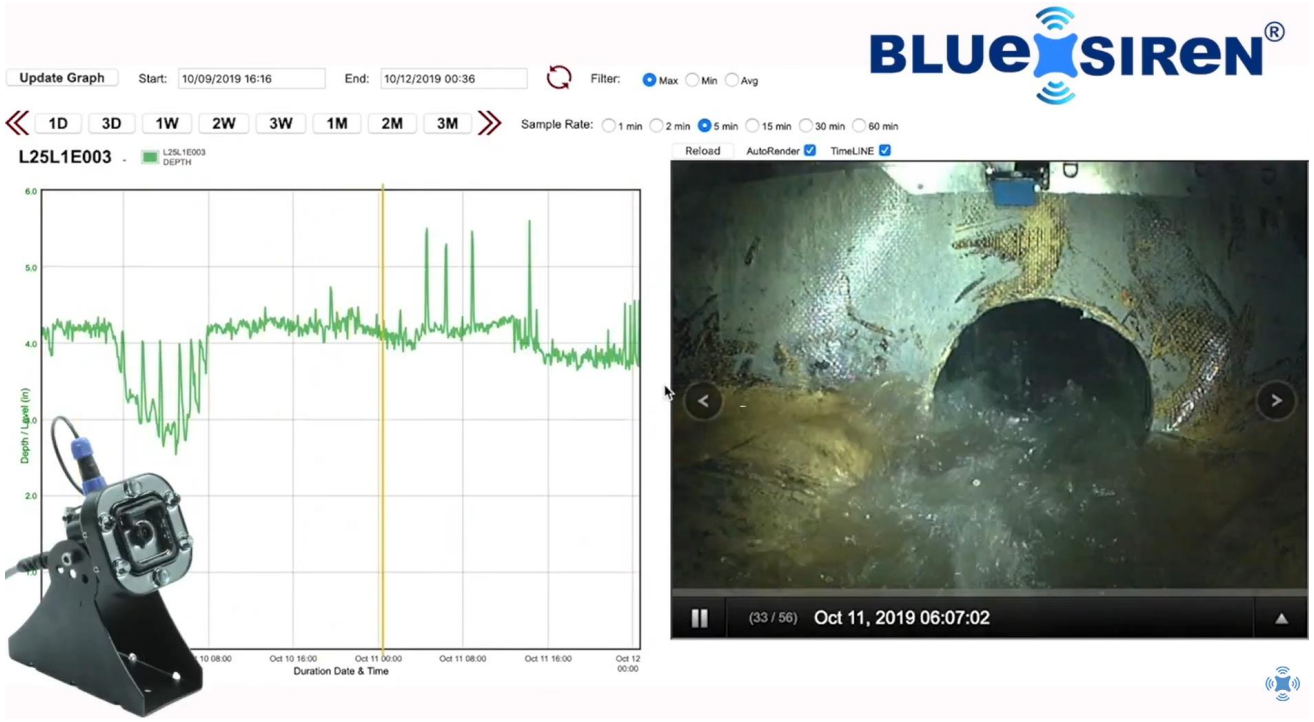
- Obtain time stamped visual information on your wastewater network flows.

- Historical information on flows, along with visual information serves as a vital information to diagnose and carry out corrective actions.



Possibility for CPHEEO

1. **Permanent monitoring** for STP inlets and outlets for continuous data availability over the web.
2. **Temporary measurements (Quarterly/Half yearly)** can be carried out periodically with our portable instruments and data reports can be submitted accordingly.



MONITORING WORK DONE IN INDIA- KEY REFERENCES

Key Wastewater References

- **145 no.s** of sewage discharge measurements at outfalls to Badi Nadi & Chhoti Nadi in Punjab for Tata Projects Limited.
- Measurements at old trunk sewer lines in Varanasi for Shriram EPC.
- Discharge flow measurements at 15 points, in and around Agra STP, for VA Tech Wabag Limited.
- Assessment of wastewater and treated water discharges for **15 days continuously** with **11 concurrent measurement points** for Indian Institute of Science (IISc), Bangalore.
- **24 hours of wastewater measurement** for municipalities in Tamilnadu like Kangayam, Dharapuram, Pallavaram etc.
- Wastewater measurement in open channels at Moradabad, Uttar Pradesh for Bioxgreen
- Wastewater measurement in open channels at Delhi for Ecoenix

CASE STUDY 1 @ Patiala, Punjab

PURPOSE

- Open Channel as well as Partial Pipe Sewage Discharge Measurement for Badi Nadi & Choti Nadi Outfalls, Punjab.

ACTIONS TAKEN

- Sewage flow measurement for a duration of 72 hours at 10 locations and 24 hours at 115 locations over a period of 3 weeks.
- Flowrates, flow velocities and levels were tabulated.

Sewage discharge monitoring @ Badi Nadi & Choti Nadi, Punjab

RESULTS

- Recorded per day Outfall on to Choti Nadi & Badi Nadi in m^3.

CASE STUDY 2 @ Varanasi, UP

PURPOSE

- Flow Measurement of Old Trunk Sewer (OTS) lines by using open Channel and Clamp-On Flow Meters in Uttar Pradesh.

ACTIONS TAKEN

- Sewage flow measurement at waste water discharges through pipes / channels for a duration of 24 hours at 7 locations.
- Flowrates, flow velocities and levels were tabulated.

Sewer discharge monitoring in Old Trunk Sewer Lines @ Varanasi, UP

RESULTS

- Total Cumulative Flow at all locations were recorded in m^3.

CASE STUDY 3 @ Dharapuram, Kangeyam & Palladam Municipalities, Tamil Nadu

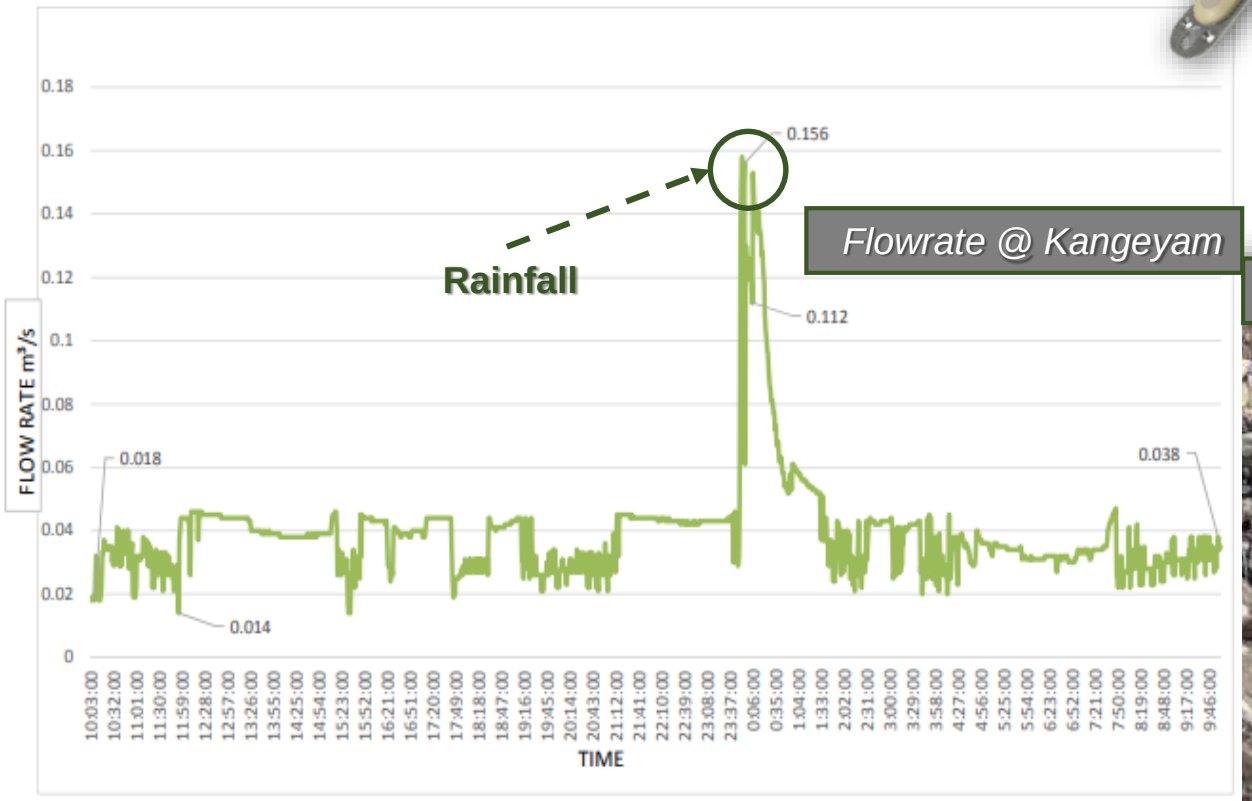
PURPOSE

- Flow Monitoring in Sewage Water at Dharapuram, Kangeyam and Palladam Municipalities, Tamil Nadu.

ACTIONS TAKEN

- Carried out sewage flow monitoring at Dharapuram, Kangeyam and Palladam municipalities for 72 hours, 24 hours and 5 days.
- Flowrates, flow velocities and levels were tabulated.

Sewage flow monitoring @ Dharapuram, Kangeyam, Palladam Municipalities



RESULTS

- At Dharapuram, Kangeyam and Palladam Municipalities, the Total Flow were recorded.
- Observed particularly high Flowrate around midnight.

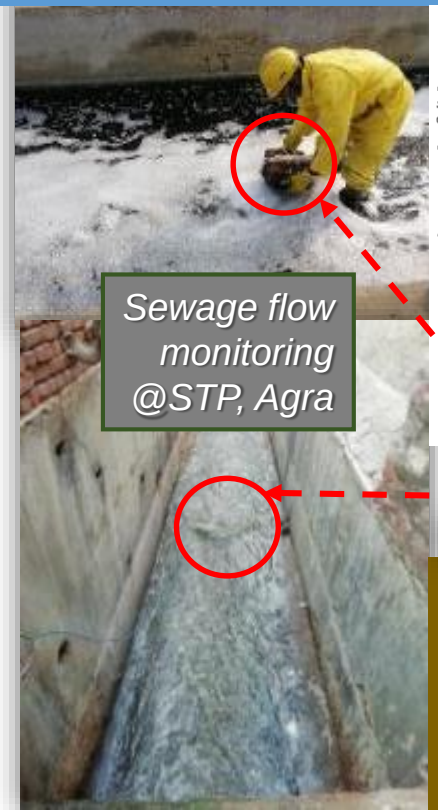
CASE STUDY 4 @ STP, Agra

PURPOSE

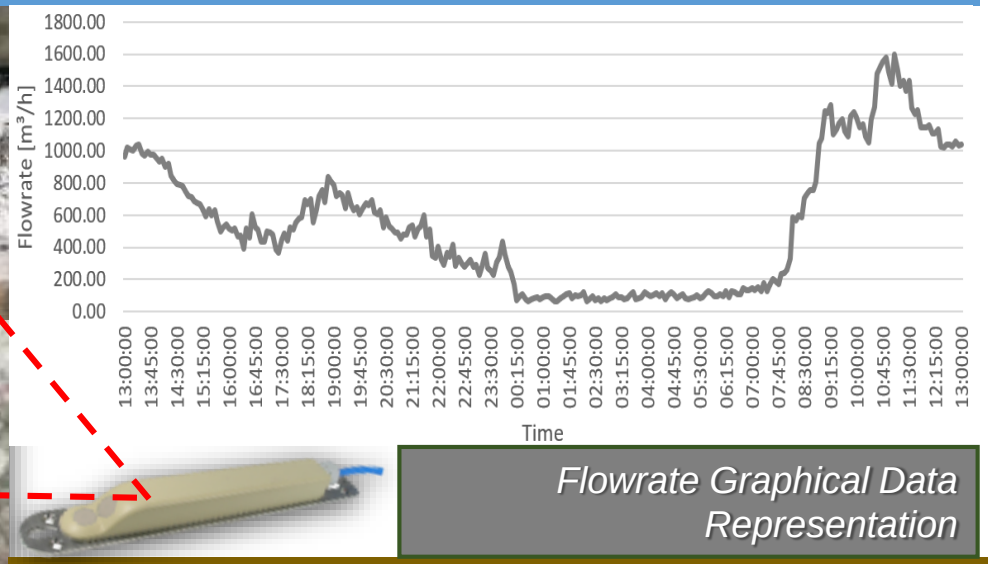
- Sewage Flow Monitoring at the inlets of Sewage Treatment Plant (STP) in the city of Agra.

ACTIONS TAKEN

- Carried out sewage flow measurement at waste water discharges through various channels in STP in Agra for a duration of 24 hours each at 10 locations.
- Flowrates, flow velocities and levels were tabulated.
- Compared measured values with the existing V-notch method used at the facility.



Sewage flow monitoring @STP, Agra



Flowrate Graphical Data Representation

RESULTS

- Total Cumulative Flow at all locations were recorded in MLD.
- Determined the measurement error in the V-notch method at the inlet of STP which was more than 15%.

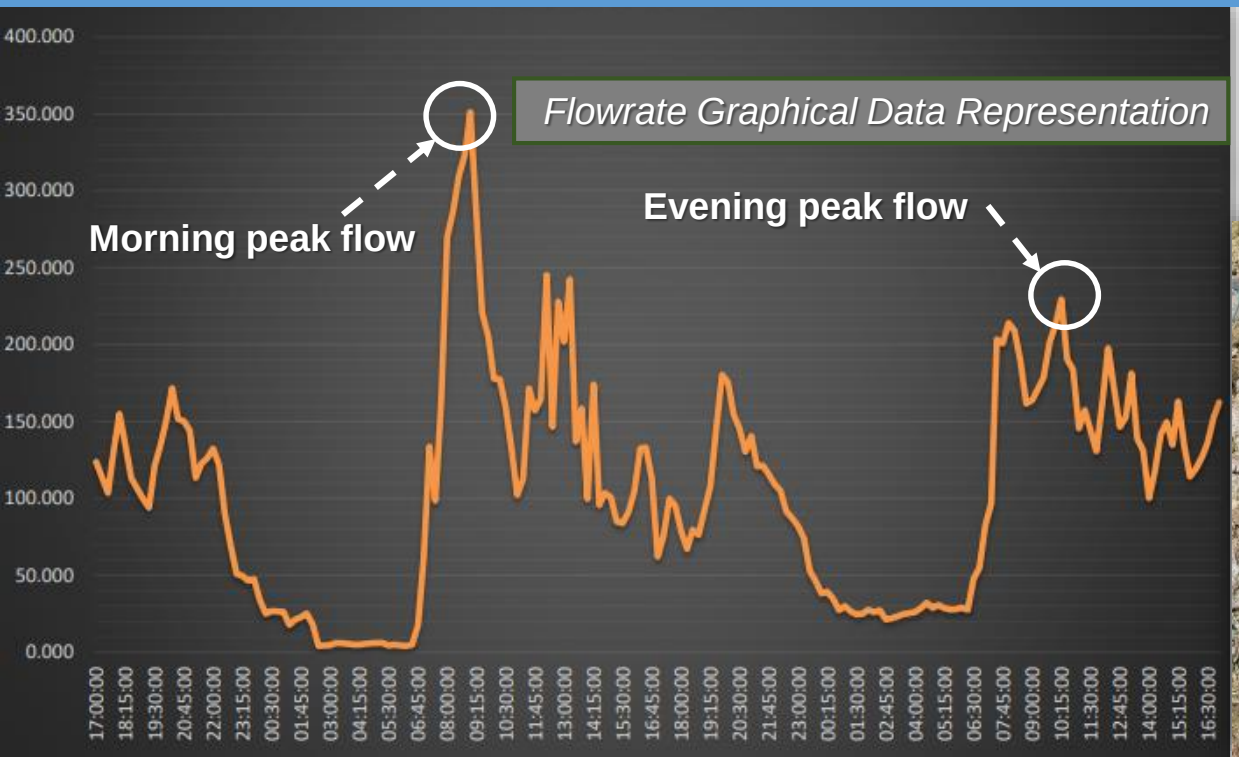
CASE STUDY 5 @ Dwarka, Delhi

PURPOSE

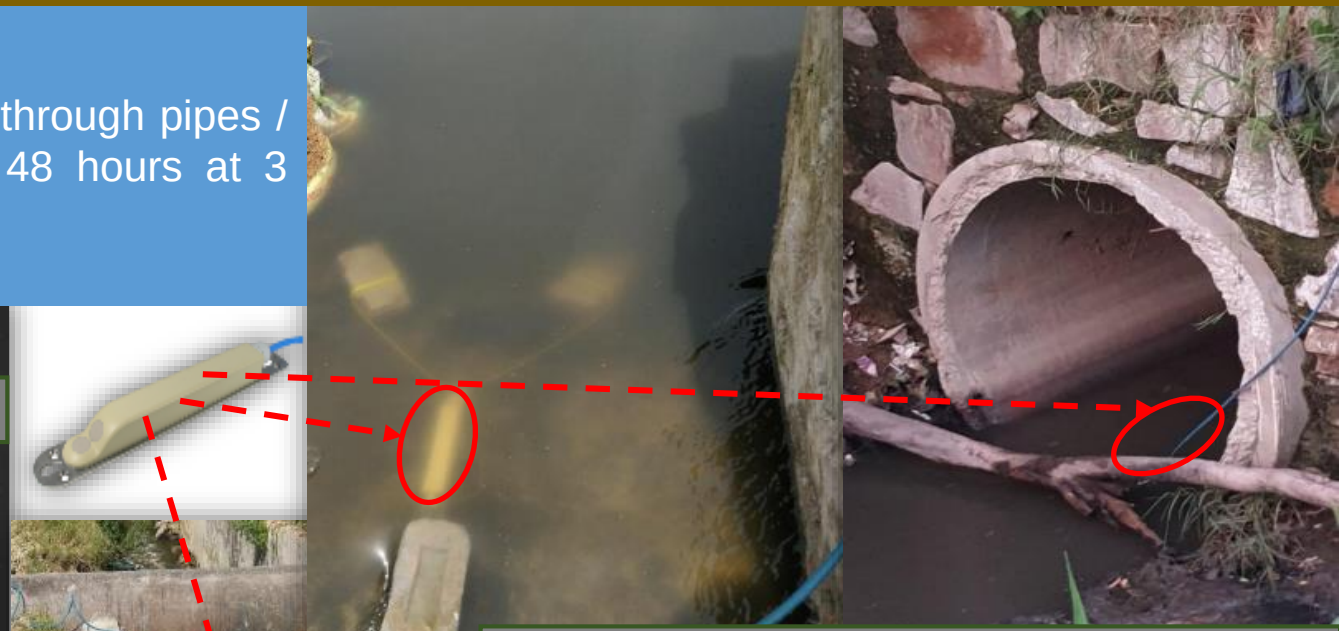
- Sewage Flow Measurement in three drains in Dwarka, Delhi, by using open channel flow meters to ascertain total flow over the period of measurement.

ACTIONS TAKEN

- Carried out flow measurements on waste water discharges through pipes / channels in Dwarka, Delhi to measure for a duration of 48 hours at 3 locations.
- Flowrates, flow velocities and levels were tabulated.



Flowrate Graphical Data Representation



Open channel flow measurement @ Dwarka, Delhi

RESULTS

- Total Cumulative Flow at all three locations were recorded in m^3.

CASE STUDY 6 @ 4 STP's, Karnataka

ALM SYSTEMS
People. Technology. Sustainability.
ISO 9001: 2015

PURPOSE

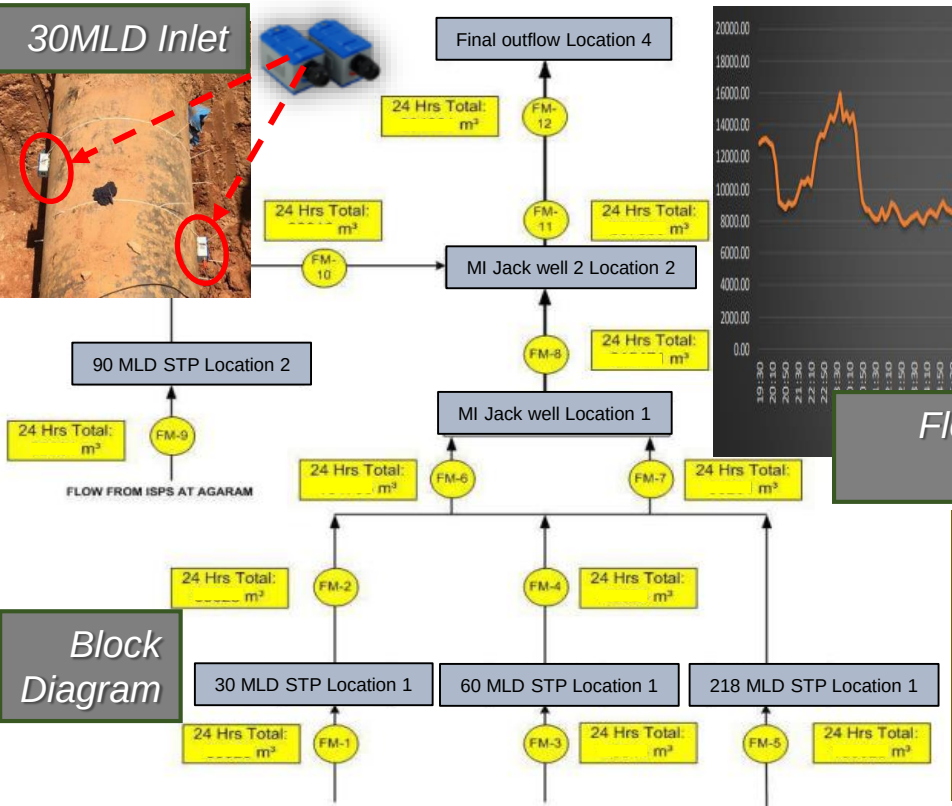
- Temporary Flow Measurements of Waste Water at 30, 60, 90 & 218 MLD Sewage Treatment Plants supplying treated water for irrigation

ACTIONS TAKEN

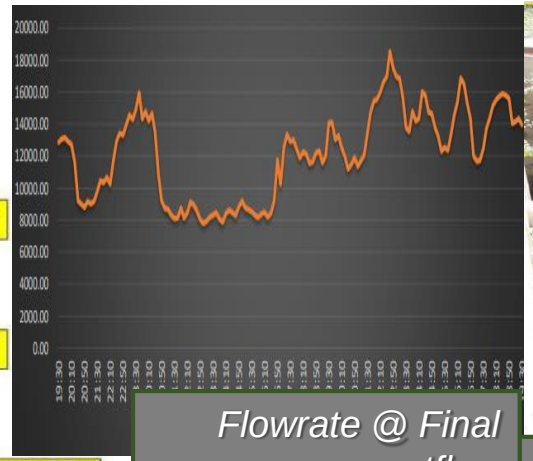
- Carried out flow measurements at waste water supply lines for a duration of 16days at identified points.
- Used Ultrasonic Clamp-on sensor for pipes and Ultrasonic Cross-Correlation Sensor for open channels.
- Flowrates & flow velocities were tabulated and graphically represented.
- Compared measured values with the existing method used at the facility.

Sub-contract for Indian Institute of Science, Bangalore

30MLD Inlet



Block Diagram


Flowrate @ Final outflow


MI Jack well 1 inlet


Final outflow

RESULTS

- Total Cumulative Flow on each day at identified locations were recorded in m³.
- Determined the measurement error in the existing method at the facility for inlet and outlet of 30 & 218 MLD plant.
- Plant deficiency was identified.

CASE STUDY 7 @ STP, Maraimalai Nagar, TN

PURPOSE

- Sewage Flow Survey at Sewage Treatment Plant (STP) in Maraimalai Nagar.

ACTIONS TAKEN

- Sewage flow measurement for a duration 24 hours.
- Flowrates, flow velocities and levels were tabulated.

Sewage flow survey @STP, Maraimalai Nagar

RESULTS

- The Total Flow in MLD was recorded.
- The plant inflows were significantly higher than expected.

CASE STUDY 8 @ Siruthuli, TN

PURPOSE

- Sewage Flow Measurement in Open Channel in Siruthuli, Tamil Nadu.

ACTIONS TAKEN

- Sewage flow measurement for a duration 24 hours.
- Flowrates, flow velocities and levels were tabulated.

Sewage flow survey @ Siruthuli

Siruthuli
Clean Kovai, Green Kovai

Chairman
Dr. S V Balasubramaniam
Chairman,
Kumar Ammon Group of Companies

Managing Trustee
Smt Vanitha Mohan
Chairman,
Prozd.

Trustees
Sri Ravi Sam
Director,
LMW Group of Companies

Sri Kanakalal Abhaichand
Partner
TV & Brothers

Sri N V Nagasubramaniam
Senior Advocate

Dr R V Ramani
Managing Trustee
Sankara Eye Society

Sri C R Swaminathan
President
RAAC

21st Sept 2019

To

Mr. Prakash Muthuswamy
Managing Partner
Automation and Maintenance Management Systems (AuM)
No. 6, Third Floor, Sri Ram Apartments,
Avinashi Road, Papanaikan Palayam,
Coimbatore - 37

Dear Sir,

Greetings from Siruthuli!

We would like to express our sincere gratitude towards your support in calibrating the flow of sewage in the Irugur channel. Your technical support has enabled us to have a better understanding to develop a suitable methodology for treatment of wastewater.

It is the magnanimity of people like you that has enabled Siruthuli to make a difference to the environment in Coimbatore region.

While thanking you once again we look forward to your continued support and guidance in carrying our eco message to as many people as possible in the times ahead.

Let's together make Mother Earth smile!

Green Regards,

Vanitha Mohan

Vanitha Mohan
Managing Trustee

NOYYAL LIFE CENTER: Sungam bypass road, Near flyover, Coimbatore - 641 045, India
+91 7397666833, +91 9894631551 | support@siruthuli.com | www.siruthuli.com

WATER CONSERVATION | ENHANCING TREE COVER | WASTE MANAGEMENT | SPREAD THE WORD

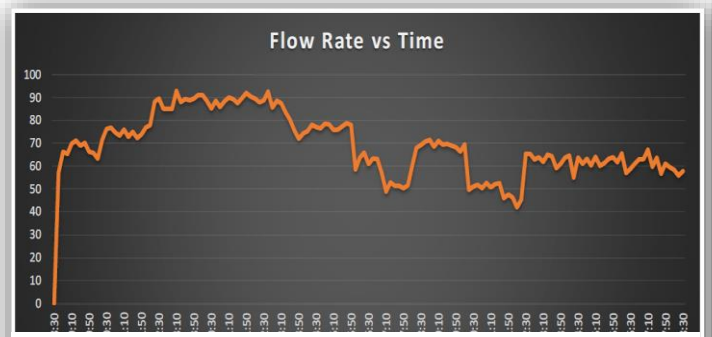
Appreciation Letter

RESULTS

- The Total Flow in MLD was recorded.

CASE STUDY 9 @ Municipal Water Network audit study for two cities in Southern India

- A total of 101 points were measured, each for a duration of 24 hrs.
- The measured points include WTP inlets, WTP outlets, feeder lines, distribution lines and OHT inlets
- Very low velocities (less than 0.5 m/s) were recorded for several hours a day
- Significant losses in the transmission line / feeder line network were noticed from our data analysis



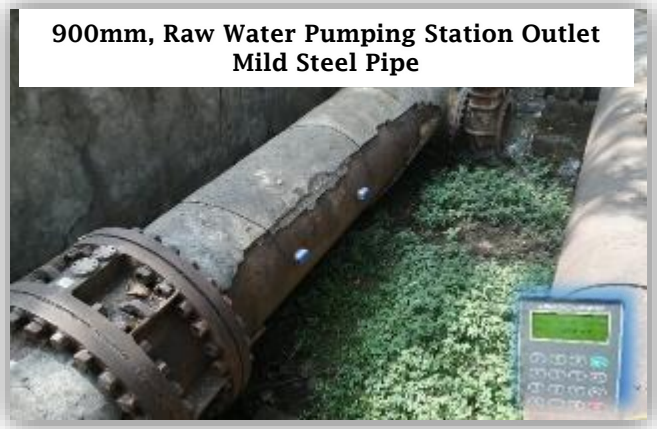
Typical graphical representation of flow data

800mm, WTP Outlet
Concrete Lined Mild Steel Pipe

350mm, OHT Inlet
HDPE Pipe

700mm, Transmission Line
Concrete Lined Mild Steel Pipe

900mm, Raw Water Pumping Station Outlet
Mild Steel Pipe

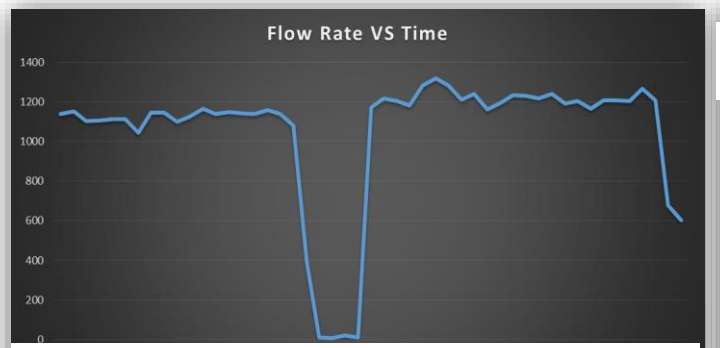


650mm, WTP Inlet
Mild Steel Pipe

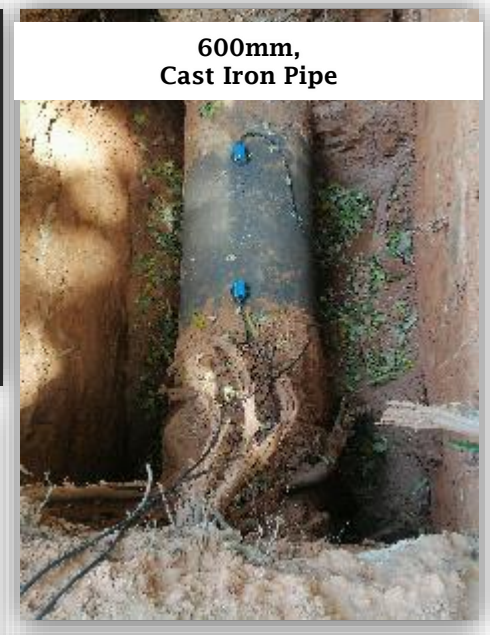
550mm, Transmission Line
Concrete Lined Mild Steel Pipe

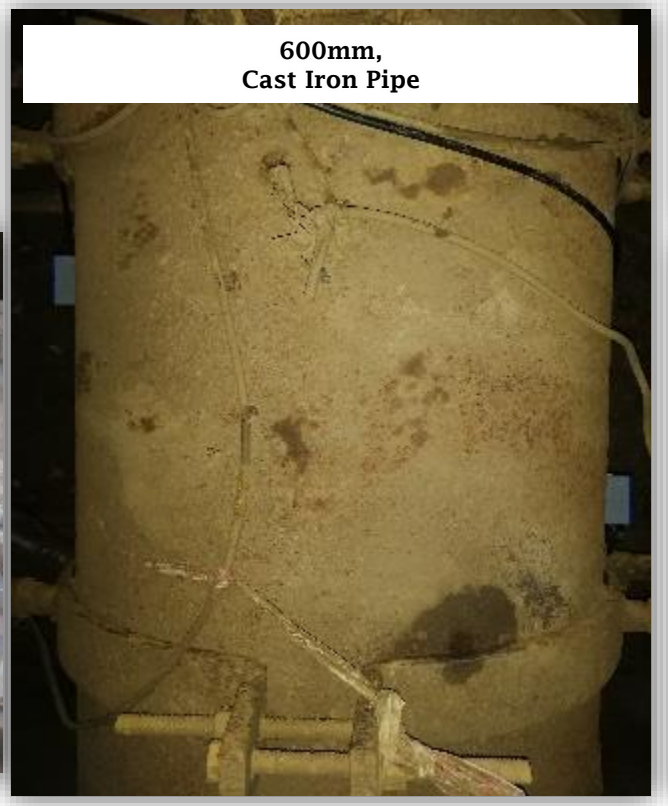
CASE STUDY 10 @ Municipal Water Network In Bangalore City

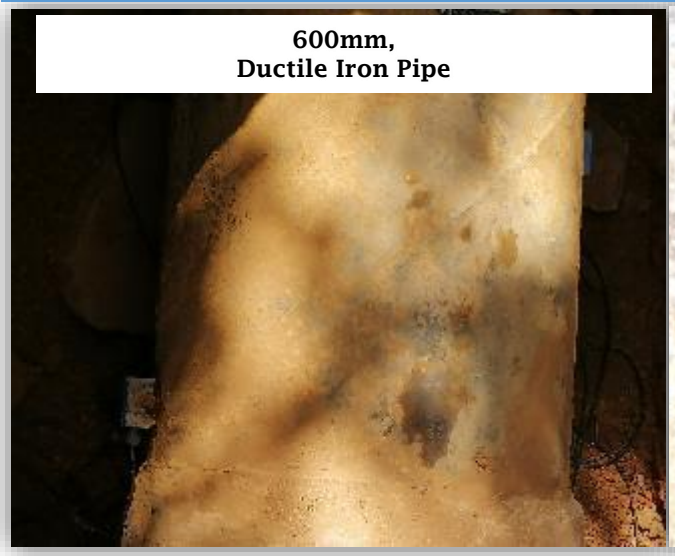
- Measurements were carried out at a total of 8 locations for a duration of 24 hrs each.
- The measured points were main supply lines.
- The purpose of the flow measurement study was to verify performance of existing flow meters.



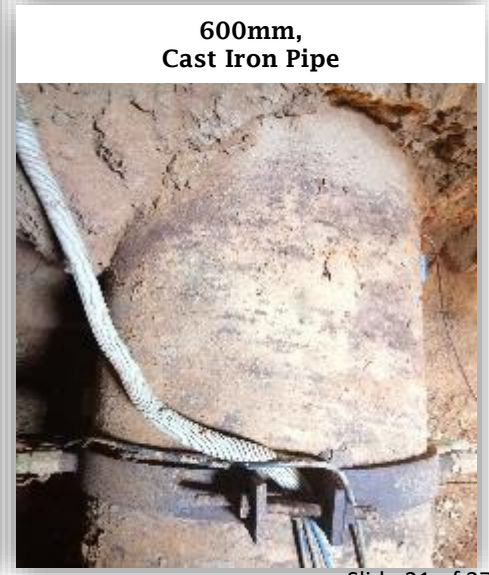
Typical graphical representation of flow data


600mm,
Cast Iron Pipe


600mm,
Cast Iron Pipe


600mm,
Ductile Iron Pipe


600mm,
Cast Iron Pipe


600mm,
Cast Iron Pipe

CASE STUDY 11 @ Moradabad, UP

PURPOSE

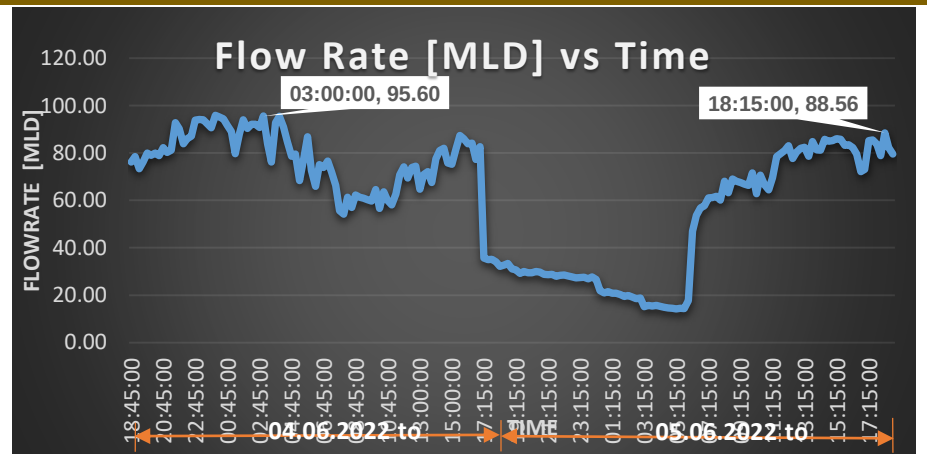
- Wastewater discharges measurement in Open Channel in Moradabad, Uttar Pradesh.

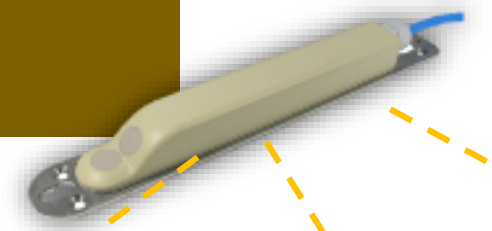
ACTIONS TAKEN

- Wastewater flow measurement for a duration 48 hours at 3 drains.
- Flowrates, flow velocities and levels were tabulated.

RESULTS

- The Total Flow in MLD was recorded.





CASE STUDY 12 @ Mumbai, MH

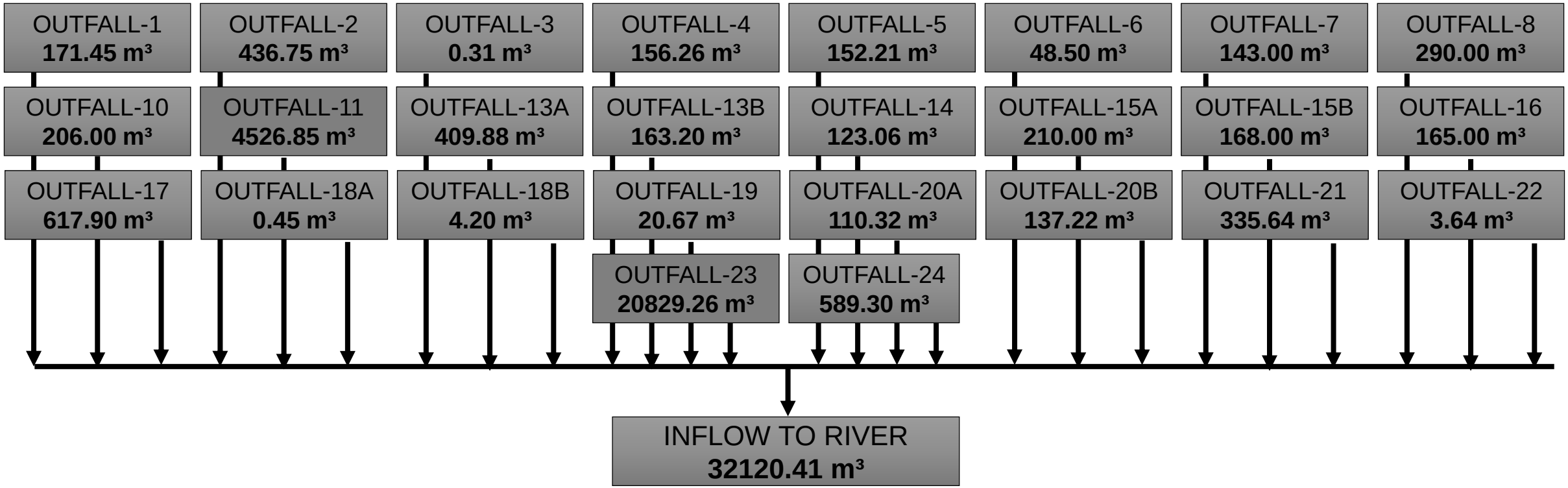
PURPOSE

- Stormwater discharge measurements in Open Channel.

ACTIONS TAKEN

- Stormwater flows measured for a duration 5 hours.
- Flow rates, flow velocities and levels were tabulated.

Glimpse of Measured Data



The audit was carried out for a duration of 24 hours at most locations. Some locations were required to be measured for a duration of 72 hours. Total flow into the river from the outfalls were measured. Measurements were done in pipe lines as well as in channels

Monitoring of Outfalls into River

Web based monitoring

PALLAVARAM FLOWMETER

FLOW TOTAL (m³)			
1:00 AM -	0	1:00 PM -	0
2:00 AM -	0	2:00 PM -	0
3:00 AM -	0	3:00 PM -	0
4:00 AM -	0	4:00 PM -	0
5:00 AM -	0	5:00 PM -	0
6:00 AM -	0	6:00 PM -	0
7:00 AM -	394.6	7:00 PM -	0
8:00 AM -	668.28	8:00 PM -	0
9:00 AM -	1488.69	9:00 PM -	0
10:00 AM -	2319.98	10:00 PM -	0
11:00 AM -	3422.77	11:00 PM -	0
12:00 PM -	0	12:00 AM -	0

FLOW RATE (m³/h) : 230.5

FLOW TOTALIZER (m³) : 3953.5

Tabular, graphical and image visualizations for each site

THANK YOU !

Contact us:
www.aumsystems.com
info@aumsystems.com