

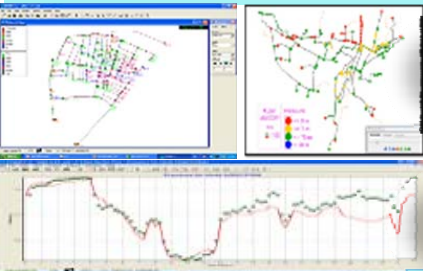
Innovation in Water Technology for Sustainable Water Management – An EPC perspective



August 22, 2019



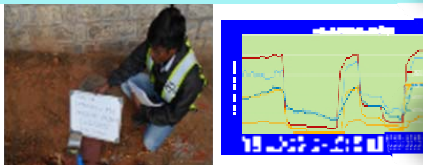
(1) Types of Surveys



(4) Network Modeling



(6) Installation of temporary Flow meter



(9) Pressure Zero Test(PZT)

L&T – An overview

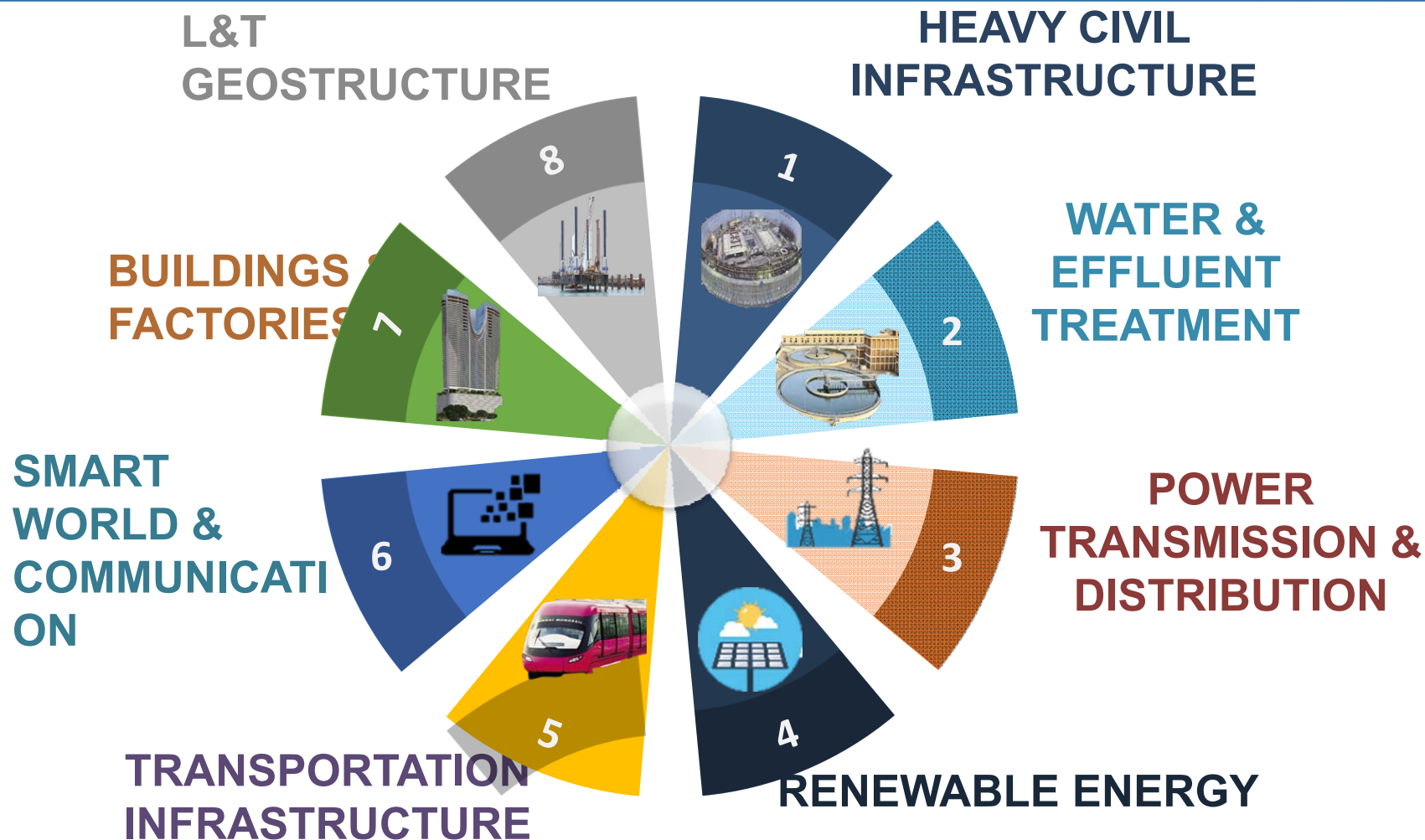
Need for Technology in Water Management

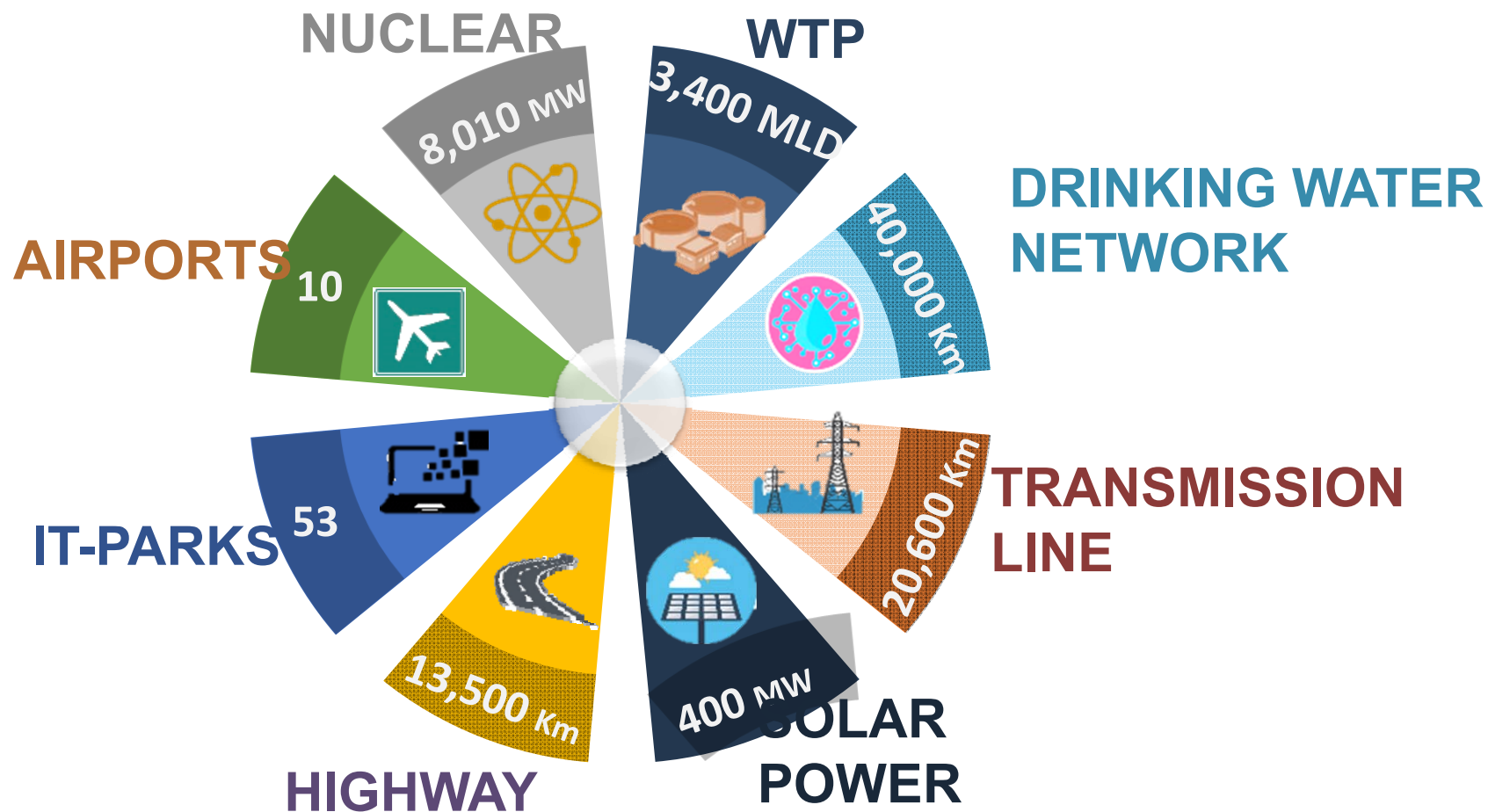
Status on Asset management & Service delivery

Case study – Bangalore UFW Reduction

Challenges faced during implementation

Solutions through technology innovations

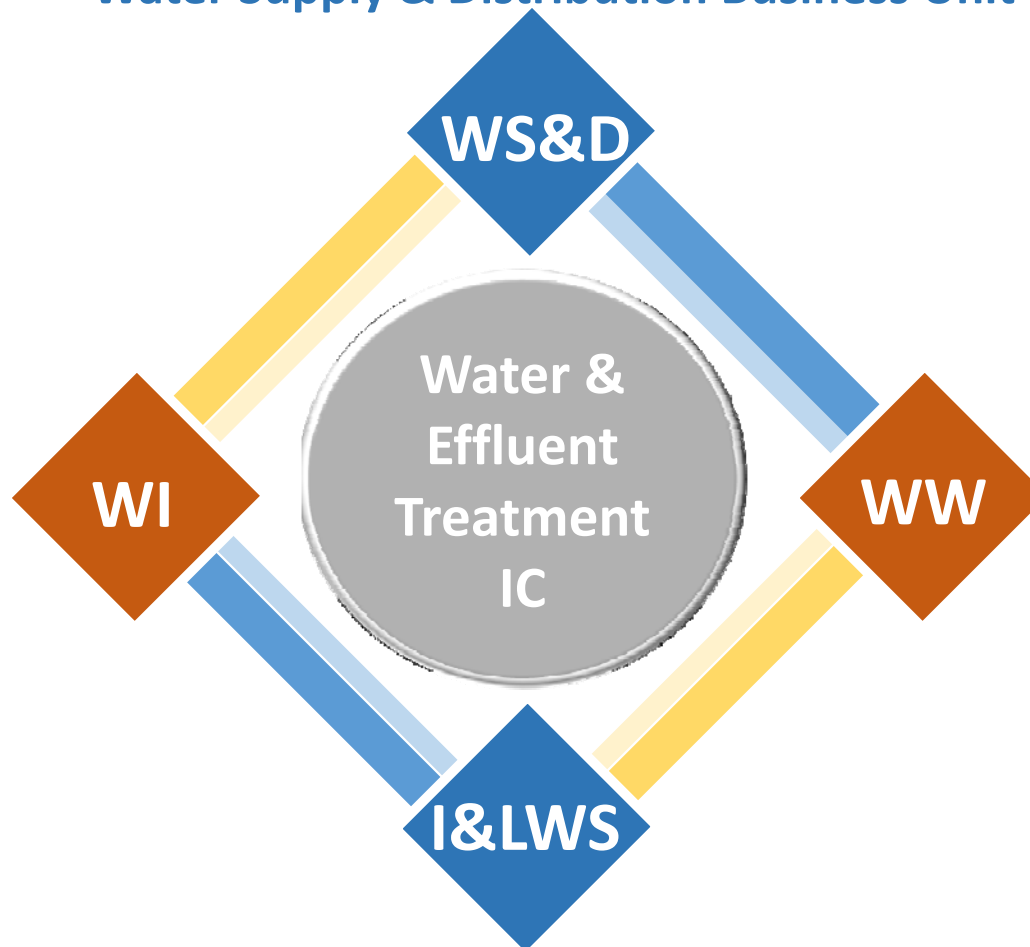






Water Supply & Distribution Business Unit

**Water
International
Business Unit**



**Waste Water
Business Unit**

Industrial & Large Water Systems Business Unit



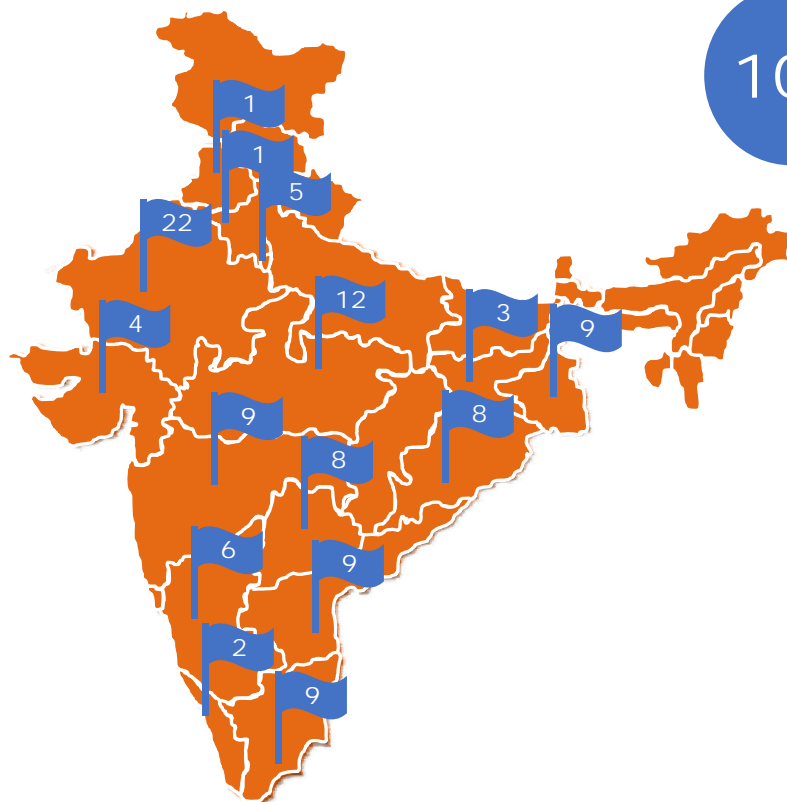


17

States

108

Projects

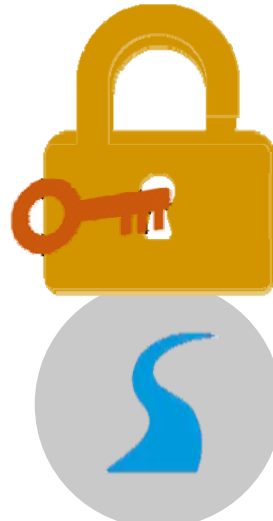


WATER SUPPLY & DISTRIBUTION BUSINESS UNIT

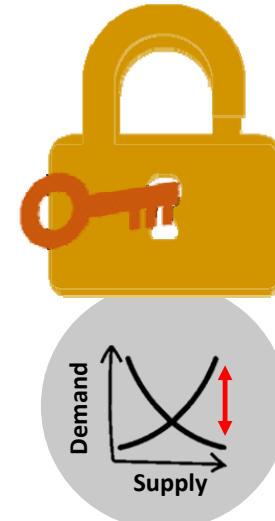
Diligent Water Management



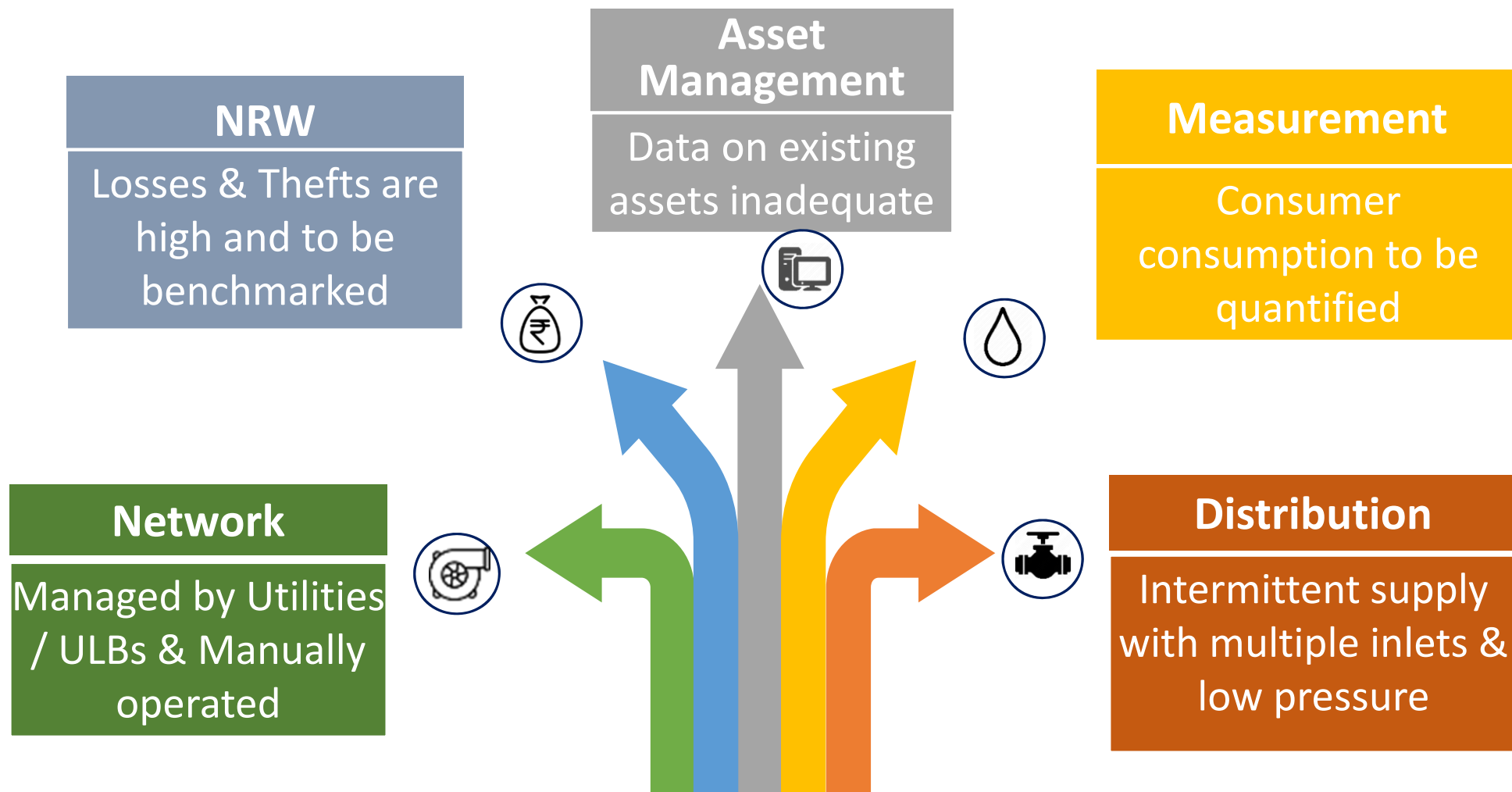
**Limited Water
Availability**



**Depleting
Water Sources**



**Increasing Supply-
Demand Gap**





Source: TOI dated Feb 16, 2018



The Annual Water Lost in Annual deficit transmission for 2016-17 is 1200 million litres every day

- 3.00 billion
- 2.62 billion



66%
Revenue deficit
recovery

Revenue generated
through water charges
□ 5.54 billion

33% Revenue increase



UFW Reduction and Distribution improvements for D2A and D2B water zones in Bangalore city



Bangalore Water Supply & Sewerage Board



UFW vs NRW

LARSEN & TOUBRO

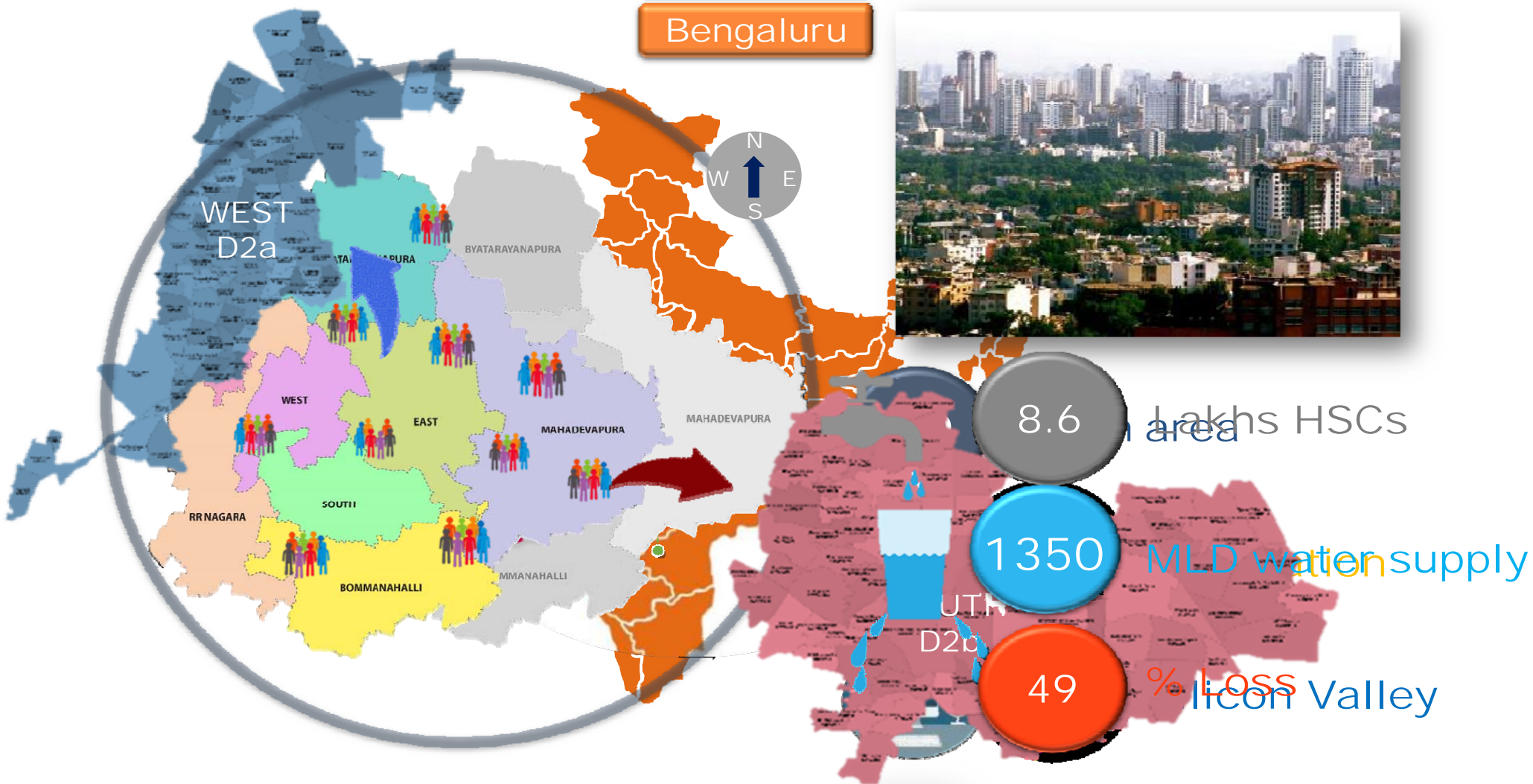
System Input Volume	Authorized Consumption	Billed Authorized Consumption	Billed Metered Consumption (including exported)	Billed Consumption	Revenue Water	
			Billed Unmetered Consumption			
		Unbilled Authorized Consumption	Unbilled Metered Consumption	Unbilled Consumption	Non-Revenue Water (NRW)	
			Unbilled Unmetered Consumption			
	Water Losses	Apparent Losses	Unauthorized Consumption	Unaccounted For Water (UFW)		
			Customer Metering Inaccuracy			
			Data Handling Error			
		Real Losses	Leakage on Transmission & Distribution Mains			
			Leakage & Over Flow at Water Storage Tanks			
			Leakage on Service Connections up to the Point of Metering			



Project area

LARSEN & TOUBRO

Bengaluru

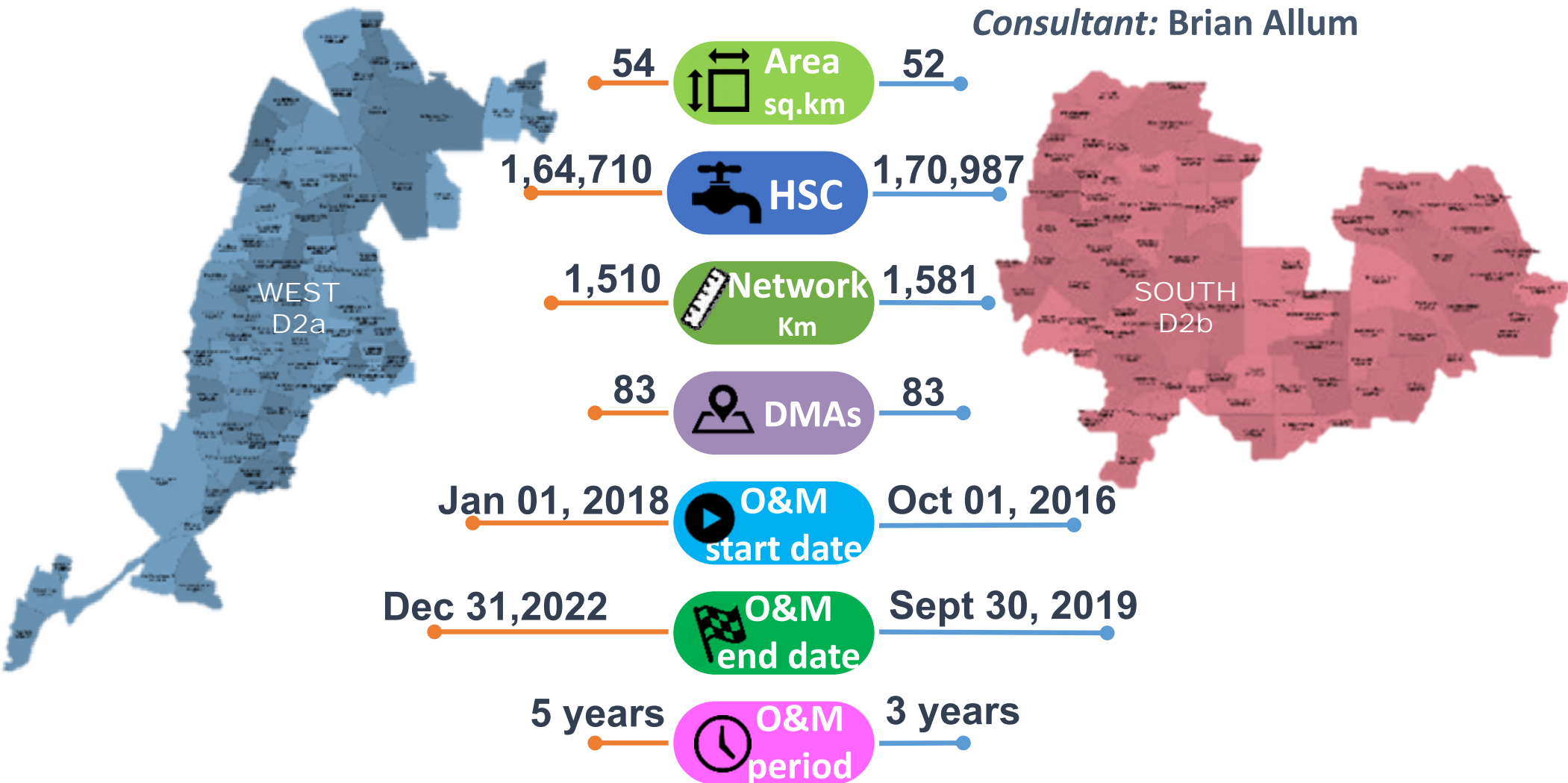




Contract scope D2a & D2b

LARSEN & TOUBRO

Consultant: Brian Allum





Key takeaways

LARSEN & TOUBRO

Enhanced consumer satisfaction through better service delivery

01

Improved revenue and bill generation for BWSSB

03

Improved customer service through adequate pressure & better water quality

05

Diligent investment planning by BWSSB on asset management

07

Reduced operational cost for BWSSB through network management & UFW reduction

02

Eliminated illegal connections & streamlined metering

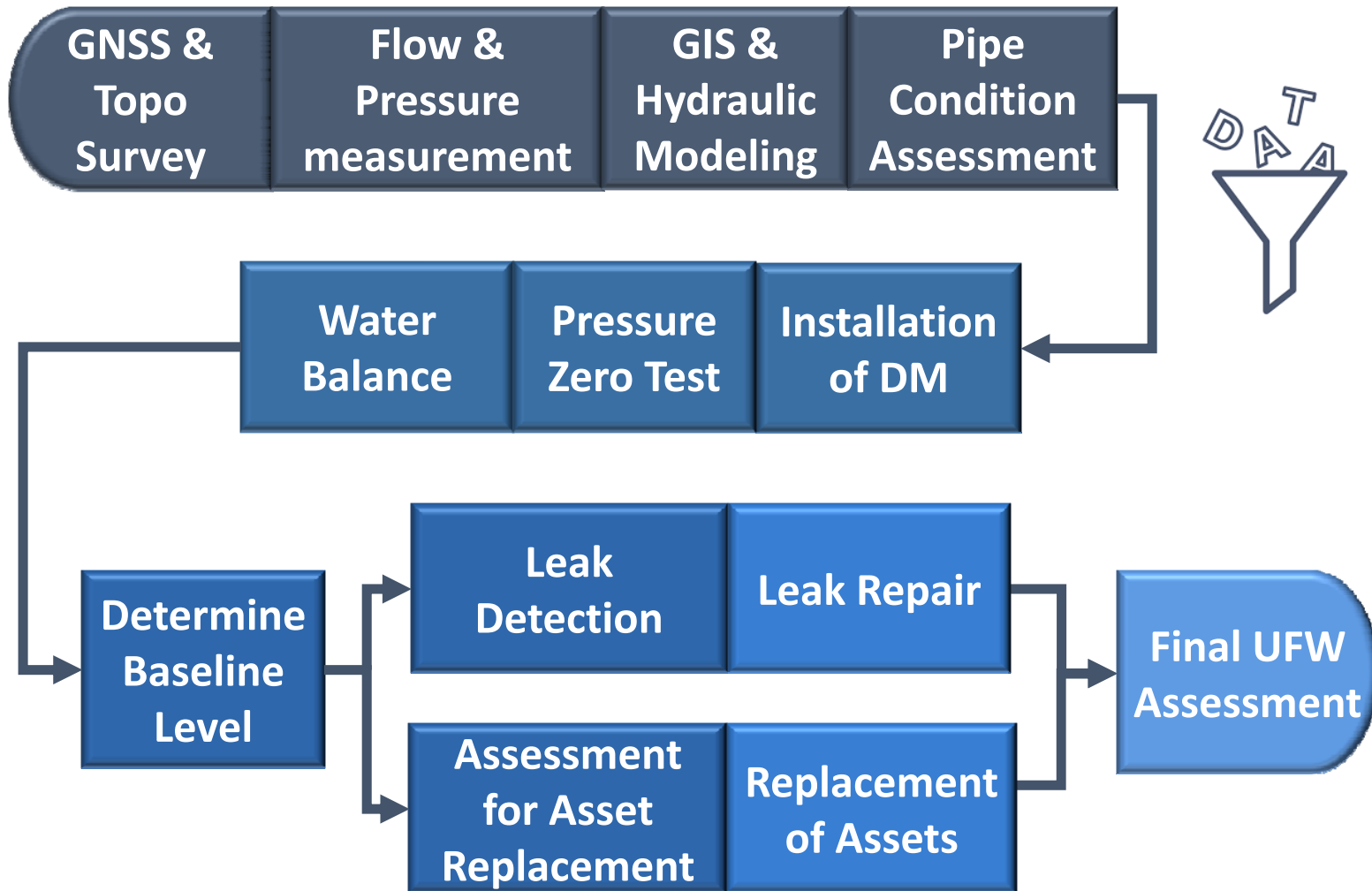
04

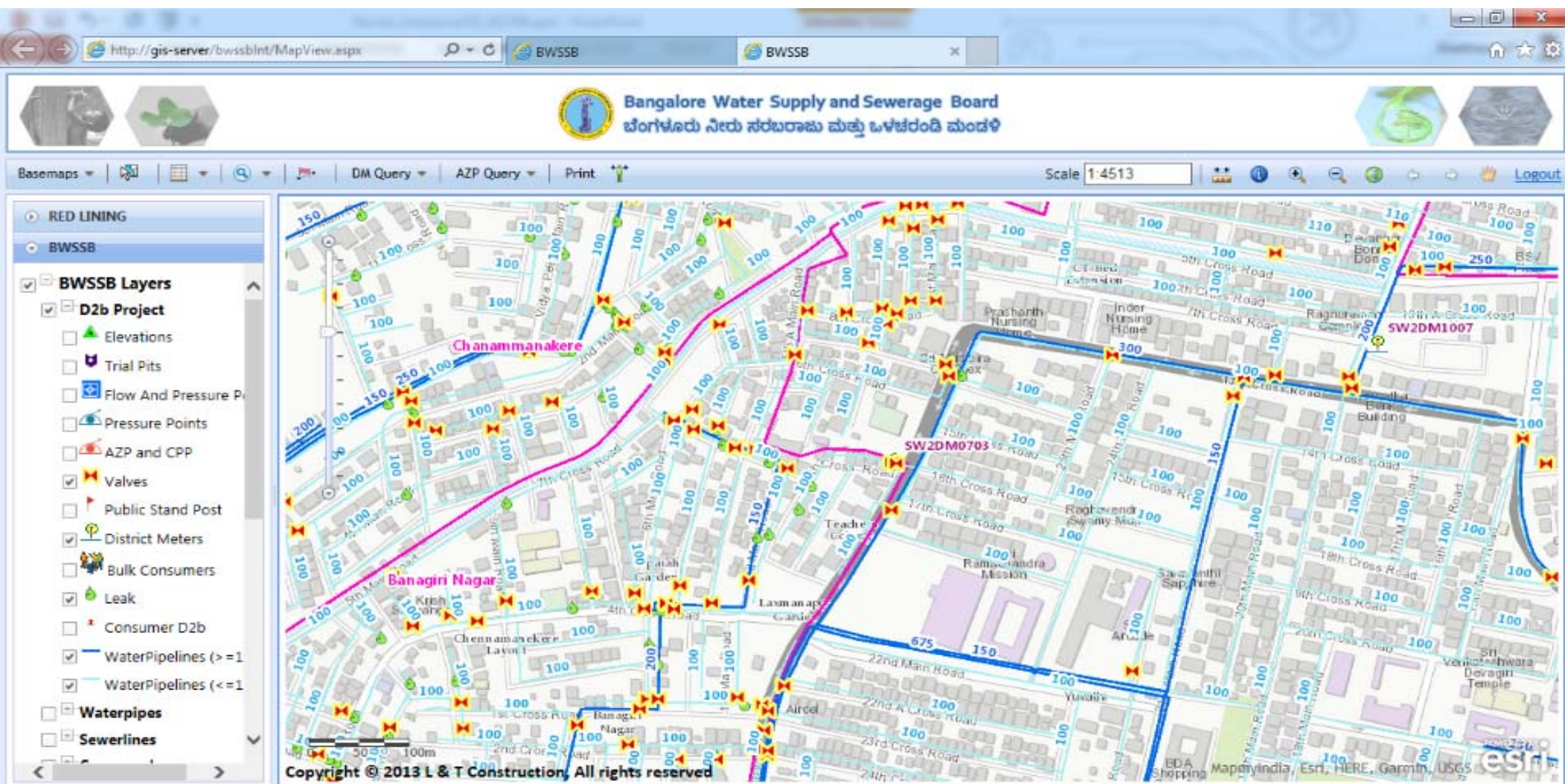
Better accountability of water by consumers (pay for water consumed)

06

Deployment of customised technology and O&M practices

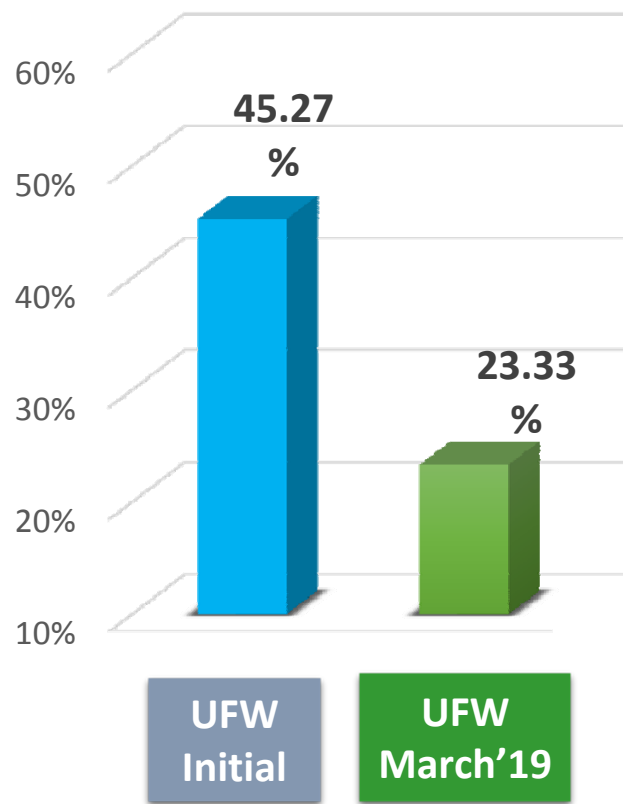
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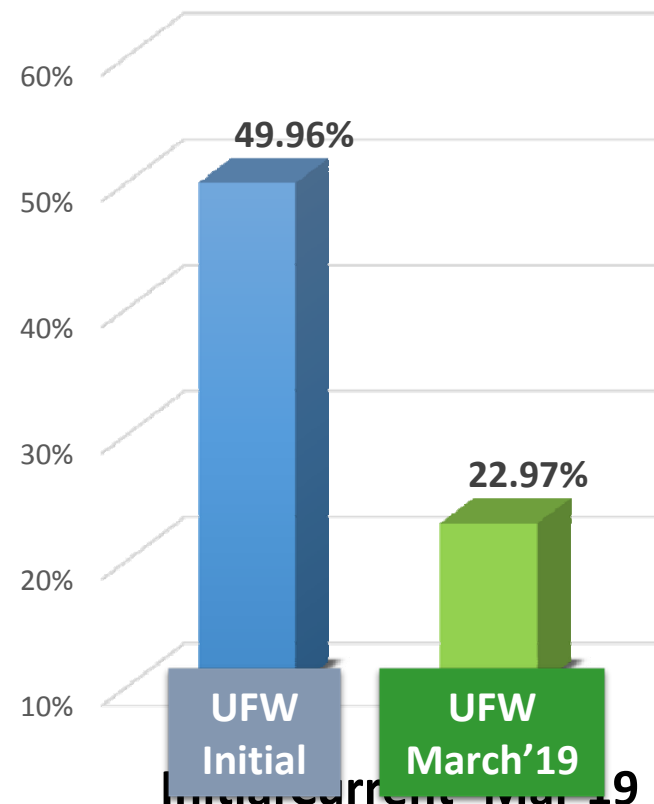




D2a

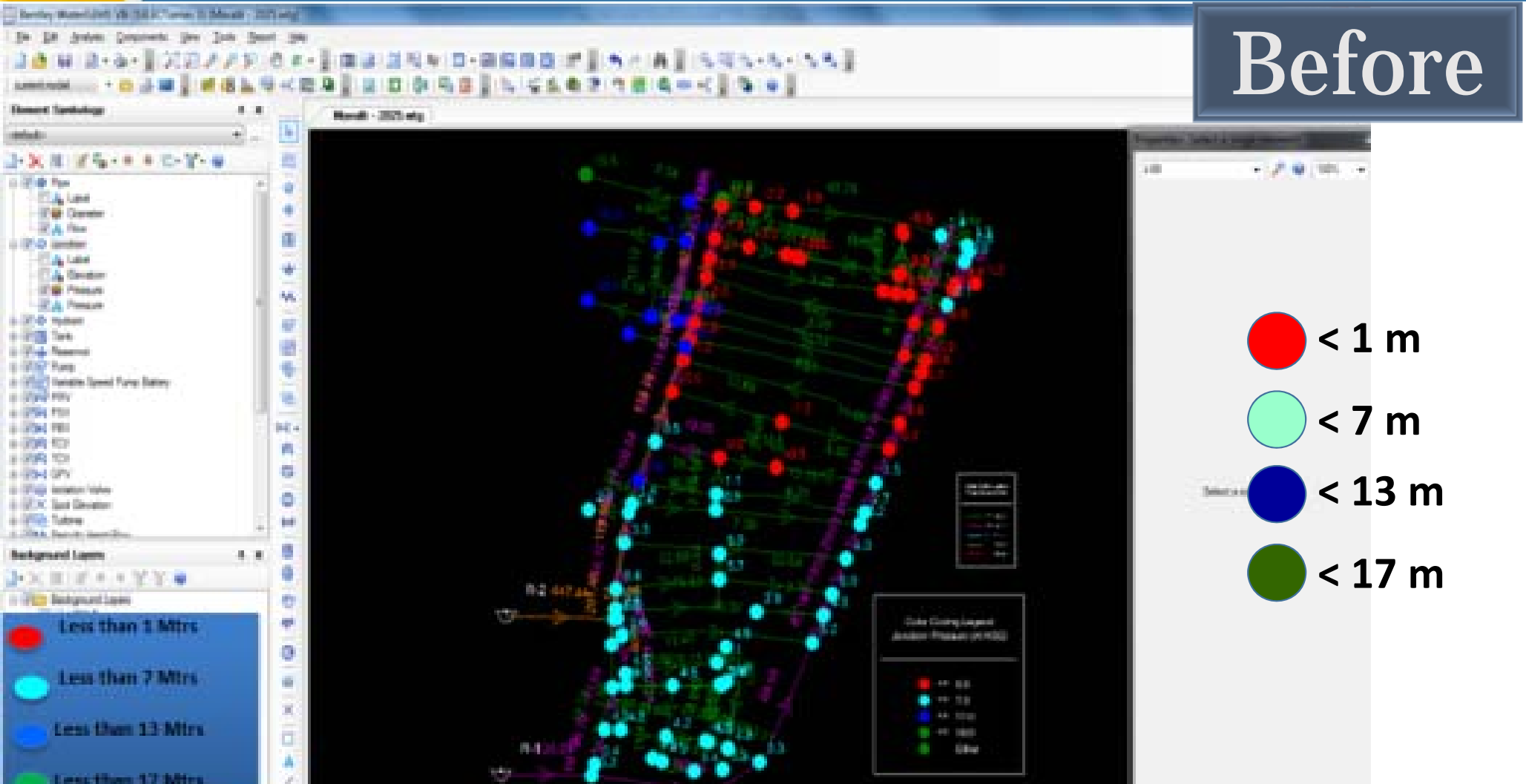


D2b



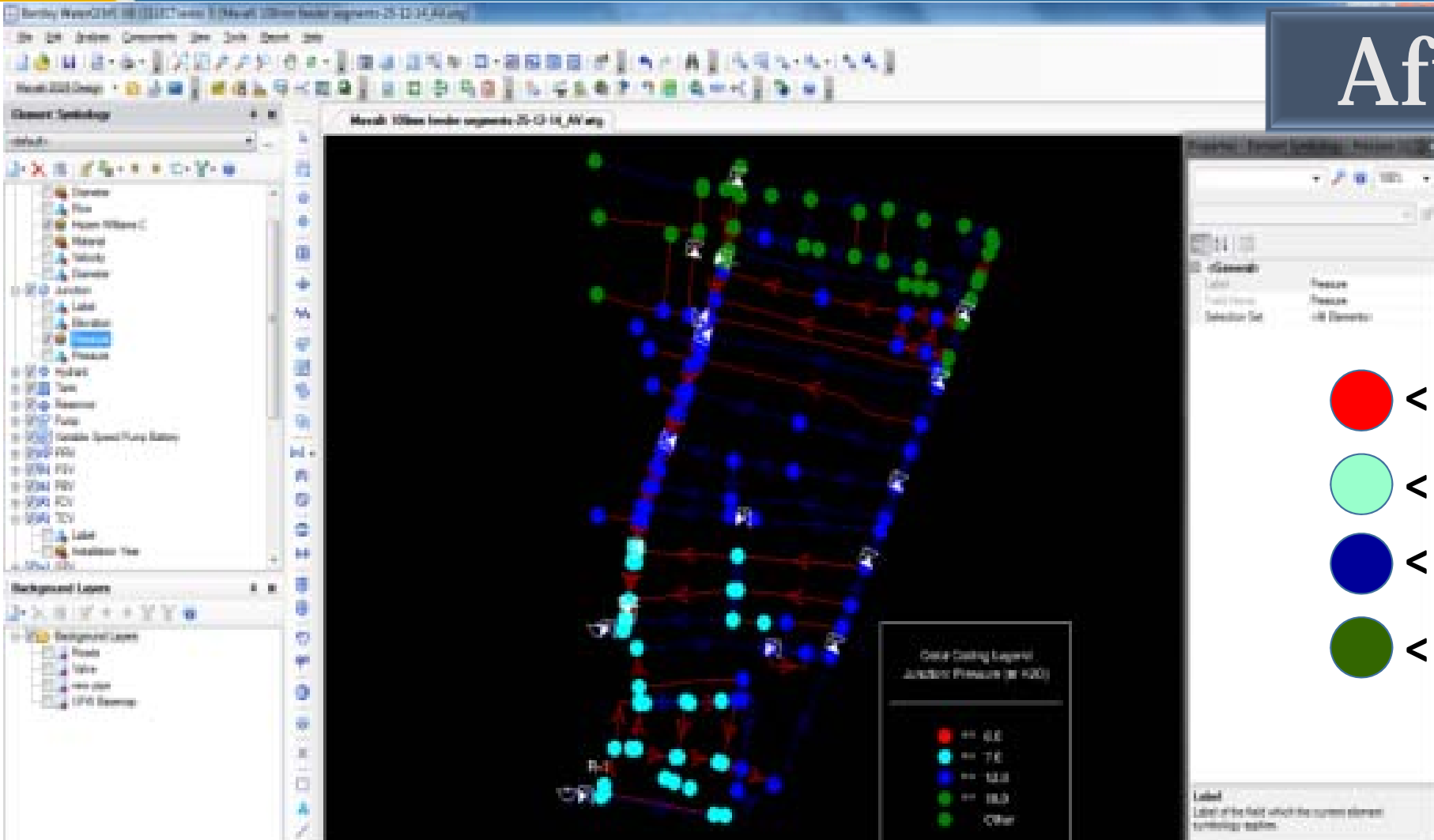


Before





After

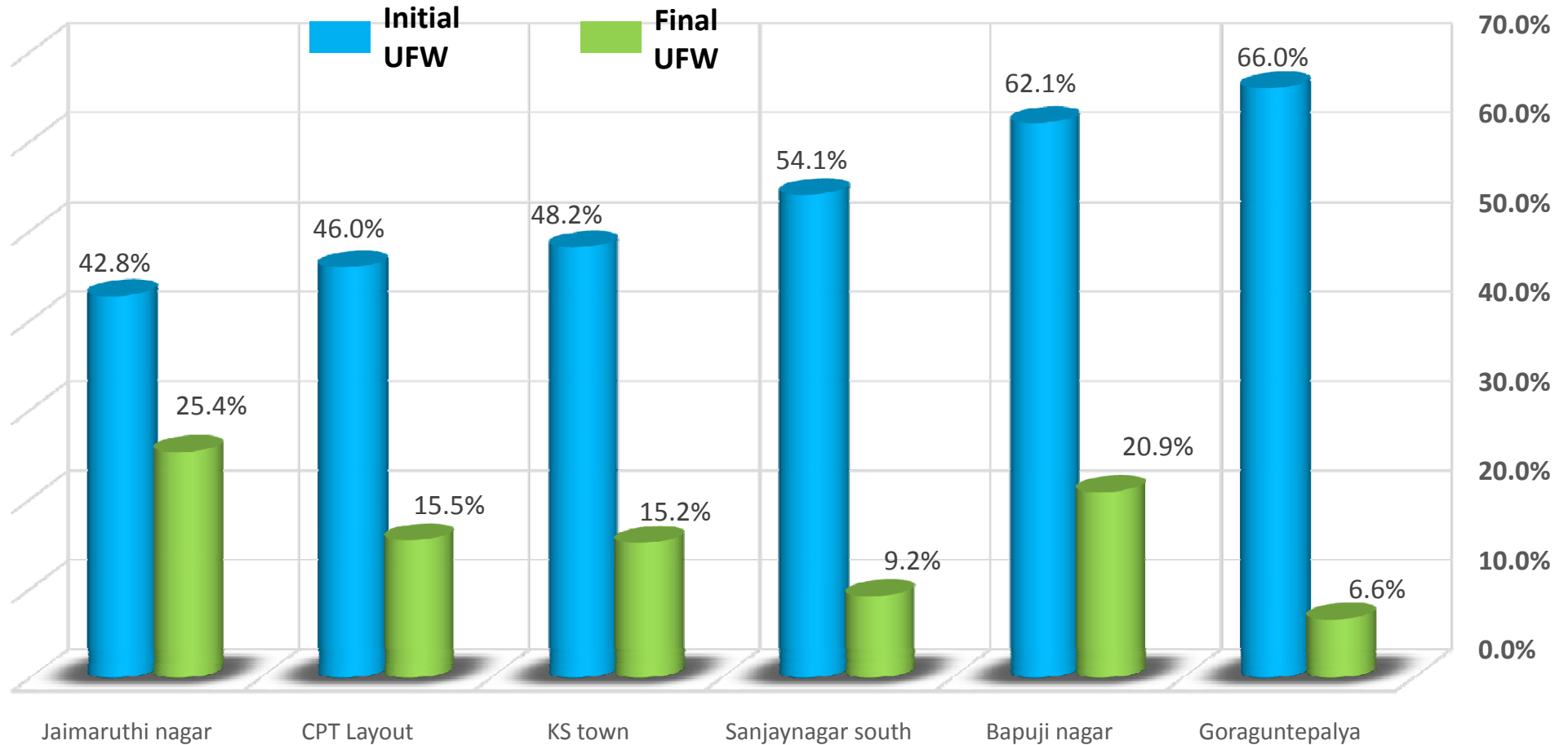


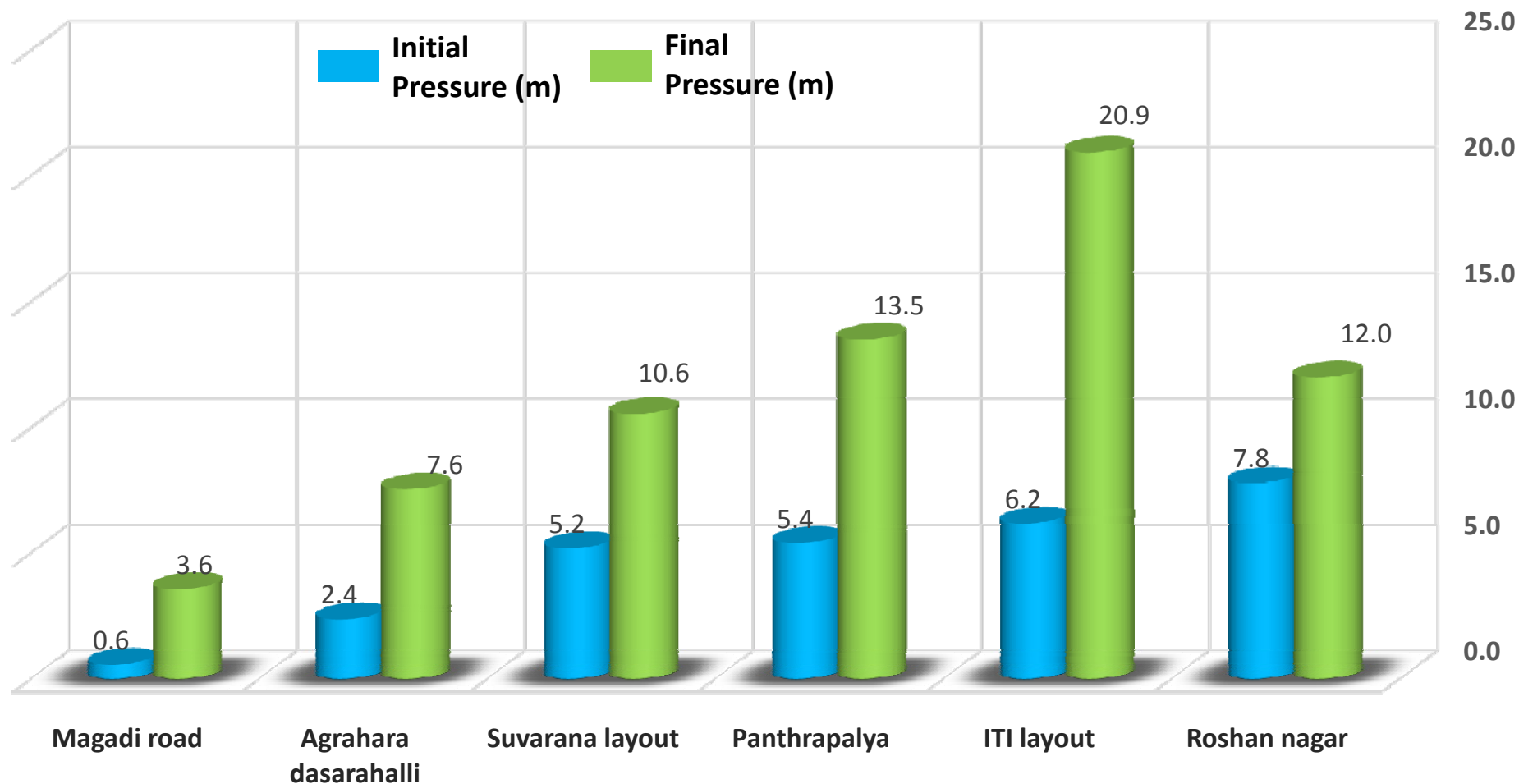
- < 1 m
- < 7 m
- < 13 m
- < 17 m



D2a UFW Reduction

LARSEN & TOUBRO

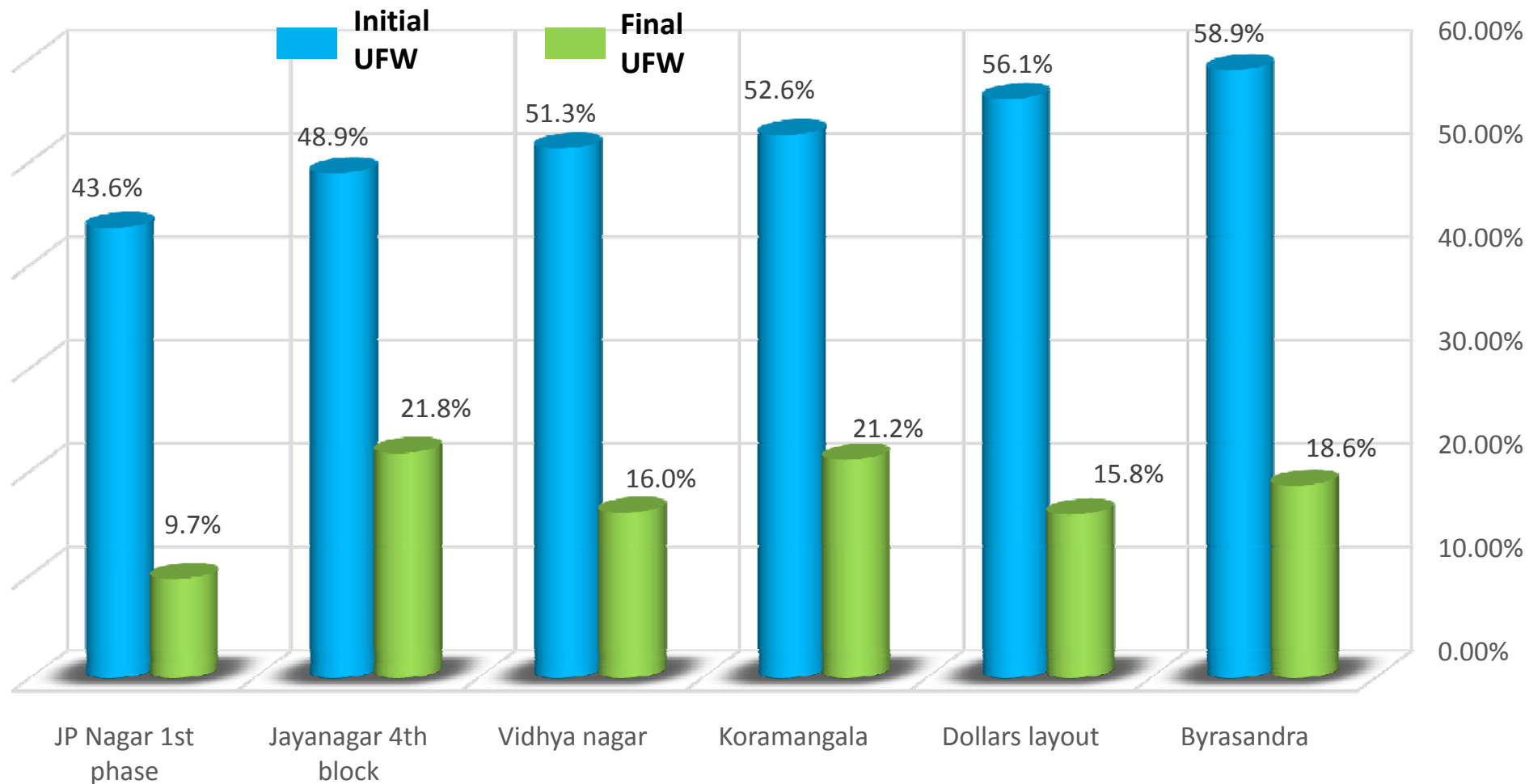






D2b UFW Reduction

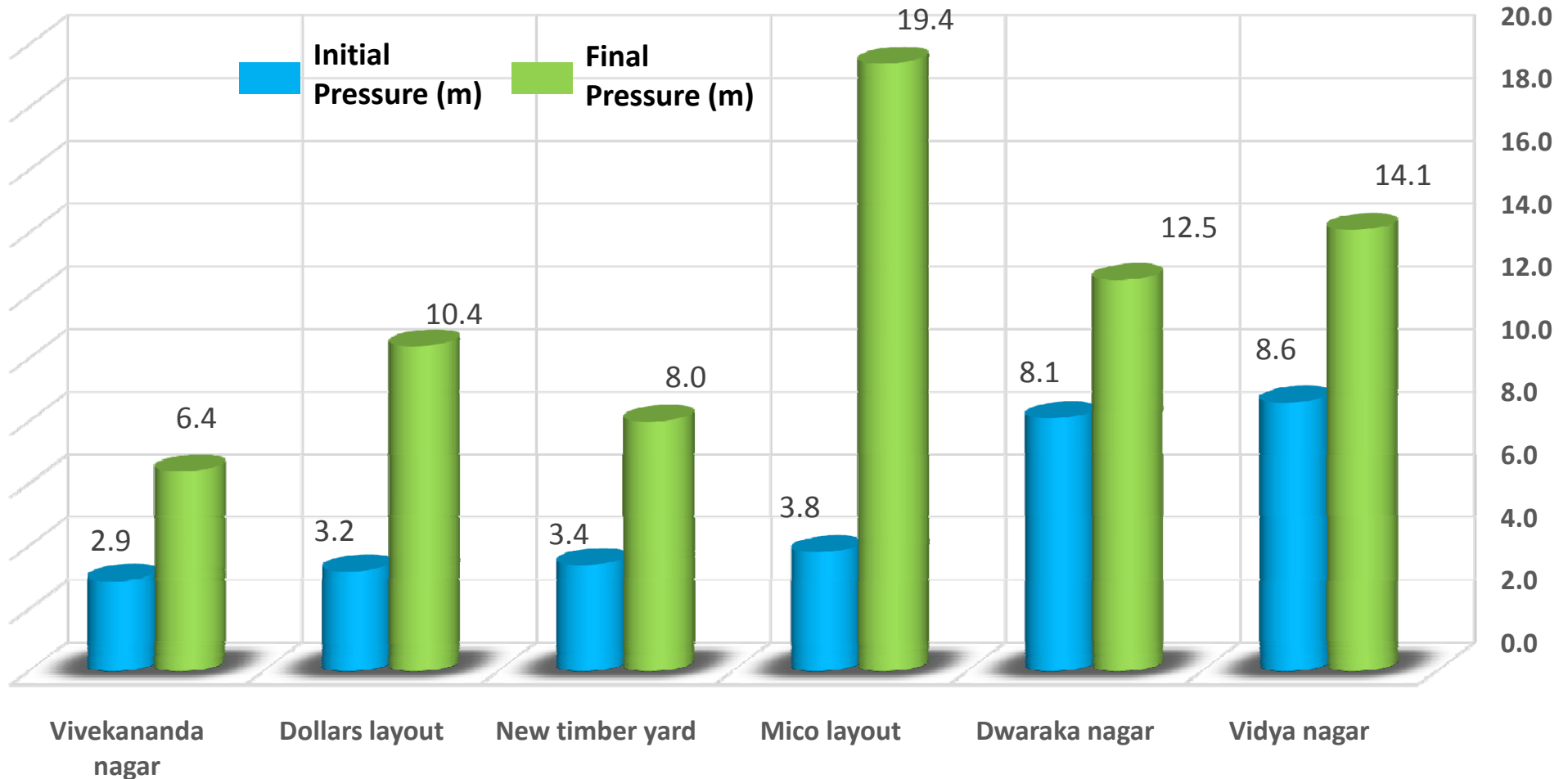
LARSEN & TOUBRO





D2b – Pressure Improvement

LARSEN & TOUBRO



Pipeline leakages



Leaky Valves



Illegal
Connection



CI 100 mm
pipe condition



5/18/2019

The Economic Times - Bangalore | 30/01/2019 | 5

BWSSB Reduces Water Loss by 10%

Navveen.Menezes@timesgroup.com

Bengaluru: The amount of unaccounted for water (UfW), which was nearly half of that supplied to the city from river Cauvery, has come down by 10%. The Bengaluru Water and Sewerage Board (BWSSB) — after investing about ₹587 crore over the last five years — claims to have brought down the extent of “water loss” from about 49% in 2012-13 to about 38% in 2018-19.

“Reducing UfW is one of our priorities as we are creating infrastructure in the new areas of Bengaluru. Our plan is to pump the water saved from the core area to the newer areas in the near future,” Tushar Girinath, BWSSB chairman, told ET. “As water consumption is set to grow, we are doing everything possible to reduce UfW to 37% by 2019-end and to 35% in 2020.”

The chairman gave the ₹15-crore increase in the monthly collection of water bills as an example for the reduction in water loss. “We used to collect ₹90 crore a month in 2016. Our collection from water bills comes to about ₹115 crore now,” he said.

The key contributor to the reduction in ‘water loss’ is BWSSB’s

₹587-crore UfW project. The project, which was taken up on three of the total six zones in core area, involved identifying water leakages, rehabilitating pipes and replacing meters, etc. While the BWSSB had set a target to achieve 16% UfW, the contractors could reduce “water loss” only up to 25-26%.

“We will not make full payment to the contractors, L&T (two projects) and SPML Infra, as they did not meet our target,” Kemparamaiah, engineer-in-chief at BWSSB, said. He said the BWSSB has taken up another ₹200-crore project for similar (above-mentioned) works in a few areas where the water infrastructure is old.

Water expert and retired BWSSB engineer MN Thippeswamy said there should be a third-party audit to probe the quality of work being undertaken to reduce water loss. “Since all these figures on UfW are given by the BWSSB, it needs to be verified by a third party,” he said. He said the increase in water bill should not be attributed to reduction in “water loss” as water bill has many factors, including pro-rata charges levied on customers for constructing additional floors.

“A number of cities, including Jamshedpur, have shown how water loss can be reduced significantly,”

Unaccounted for Water (UfW)

Zones	Contractor	Project cost	UfW in 2012-13	UfW in 2018-19
South (areas such as Jay-anagar, Basavanagudi, Banashankari, etc)	L&T (52)	₹138 crore	49%	26%
Central (areas such as Avenue Road, High Grounds, Gandhinagar)	SPML Infra - JV (26.5)	₹101 crore	51%	26%
West (areas such as West of Ch, Basavaveshwaranagar, Rajajinagar, etc)	L&T (54)	₹284 crore	49%	25%

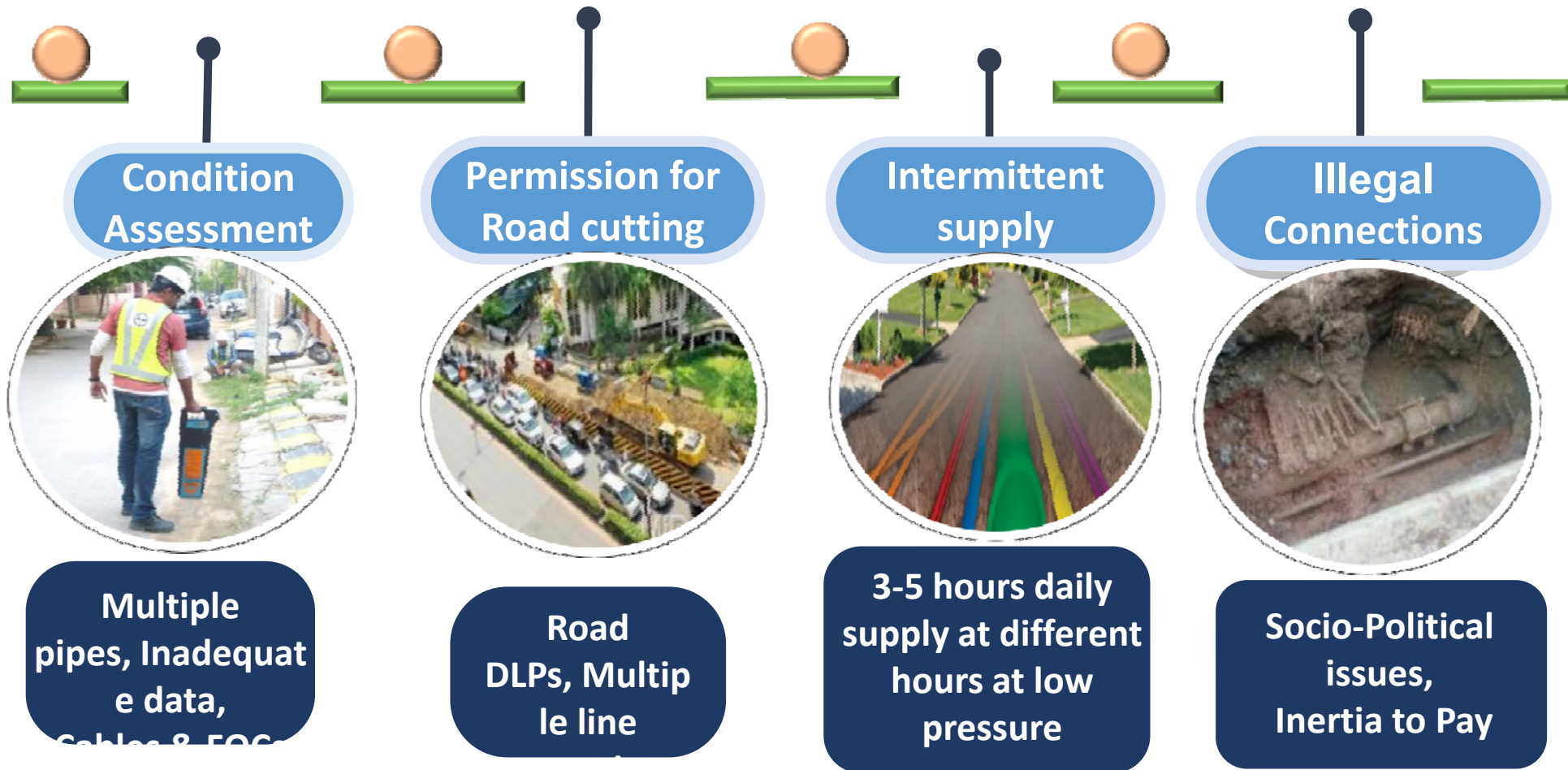
Factors Resulting In Unaccounted for Water

- **Water leakages** in service connections
- **Dysfunctional or non-functional** customer Meters
- **Illegal Connections**
- **Legitimate but unbilled** consumers mainly due to poverty

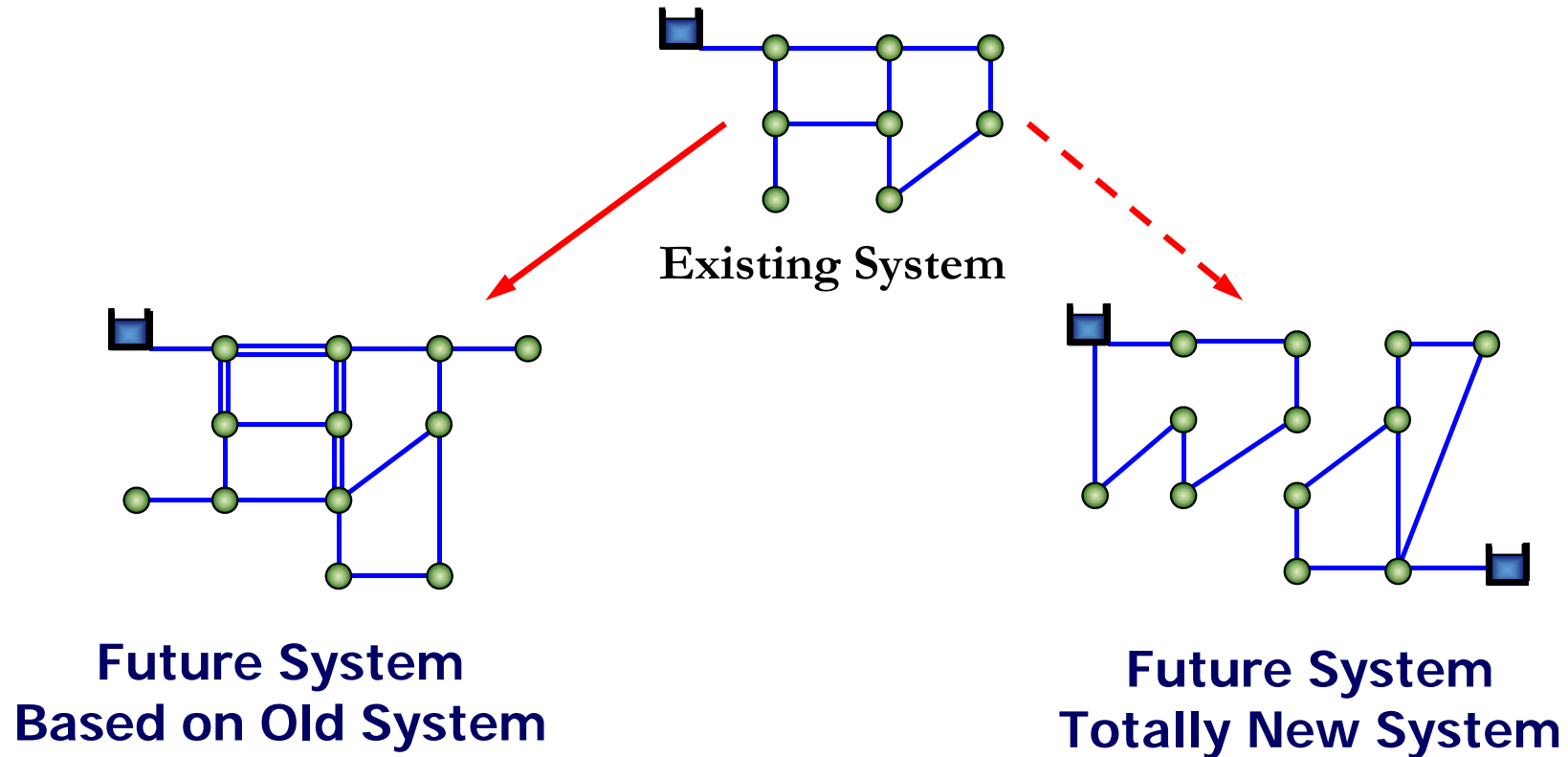
Thippeswamy said. “The UfW in Jamshedpur is about 9%, while water loss in Singapore and Tokyo is just 4%. What BWSSB has achieved is not enough, given that Bengaluru’s popu-

lation is increasing rapidly,” he said.

Water conservation expert S Vishwanath, however, said the BWSSB should not arbitrarily invest on reducing UfW, keeping Singapore or any other developed country as its target. “UfW projects involve digging up roads, causing traffic disruption and ultimately making people suffer. There are multiple reasons for the reduction in UfW. The BWSSB might be losing revenue from water leakage but it recharges groundwater,” he said. The BWSSB, he said, should make public the breakup of UfW to understand how much of it accounts for leakage, theft or other reasons.



How do we transition from A to B





Unmetered

- Flat rate tariffs
- Consumption not quantified
- Billing not justified
- Funding constraints



MultiJet Meters

- Manual Reading
- Time consuming
- Meter Inaccuracies
- Human error
- Can be tampered



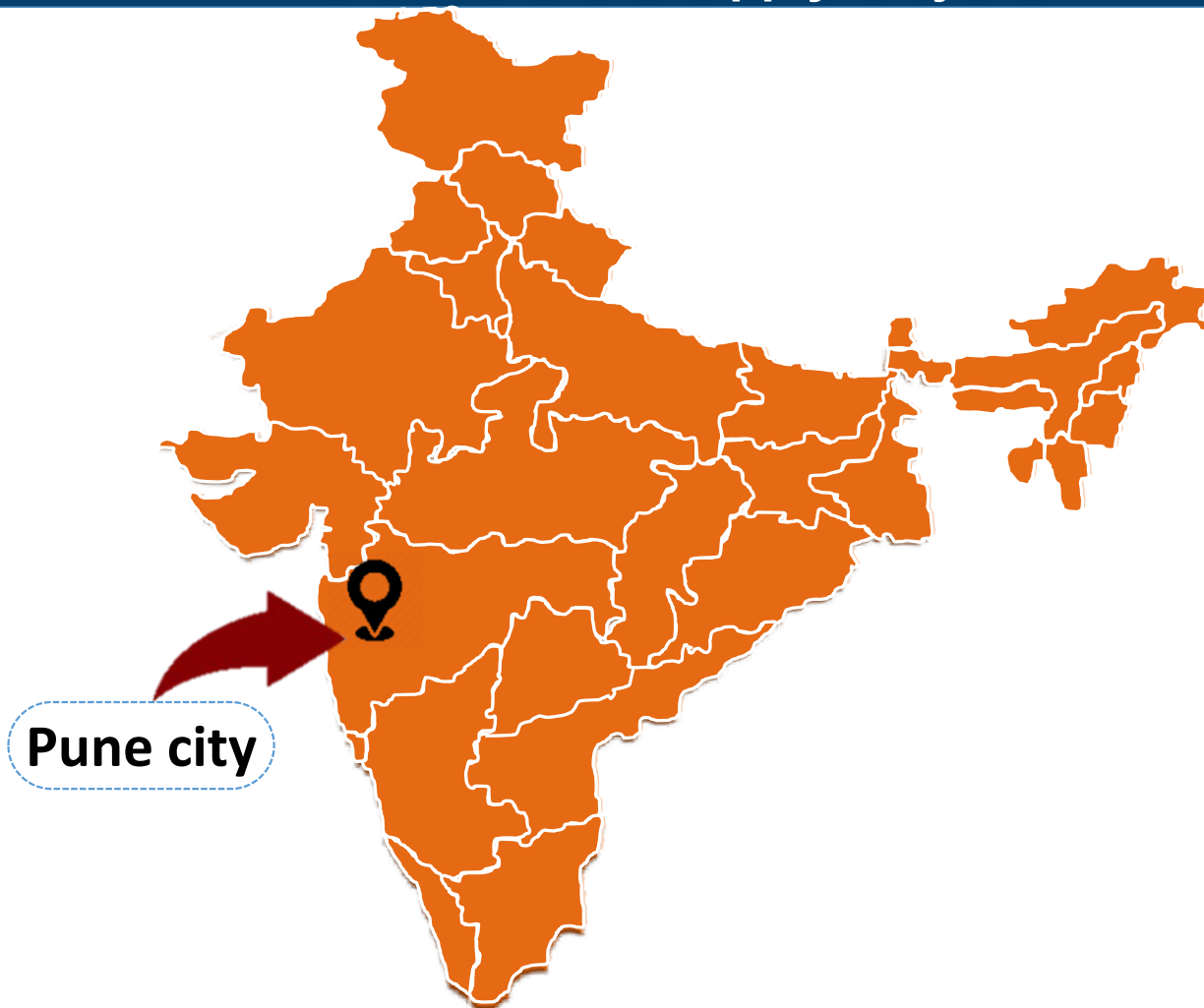
AMR Meters

- Wireless transmission
- Handheld receiver
- Walk-by / Drive-by data collection



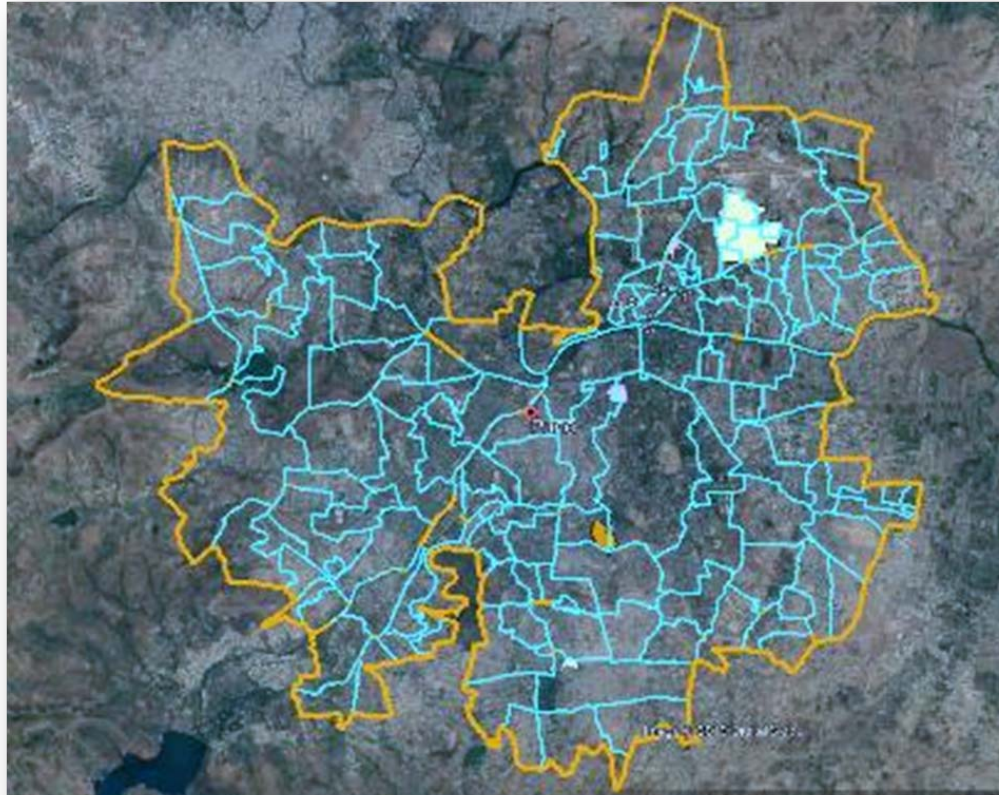
AMI Meters

- Real time data (daily/hourly)
- Two way communication, Fixed Network
- Customer friendly
- Quick response





PUNE

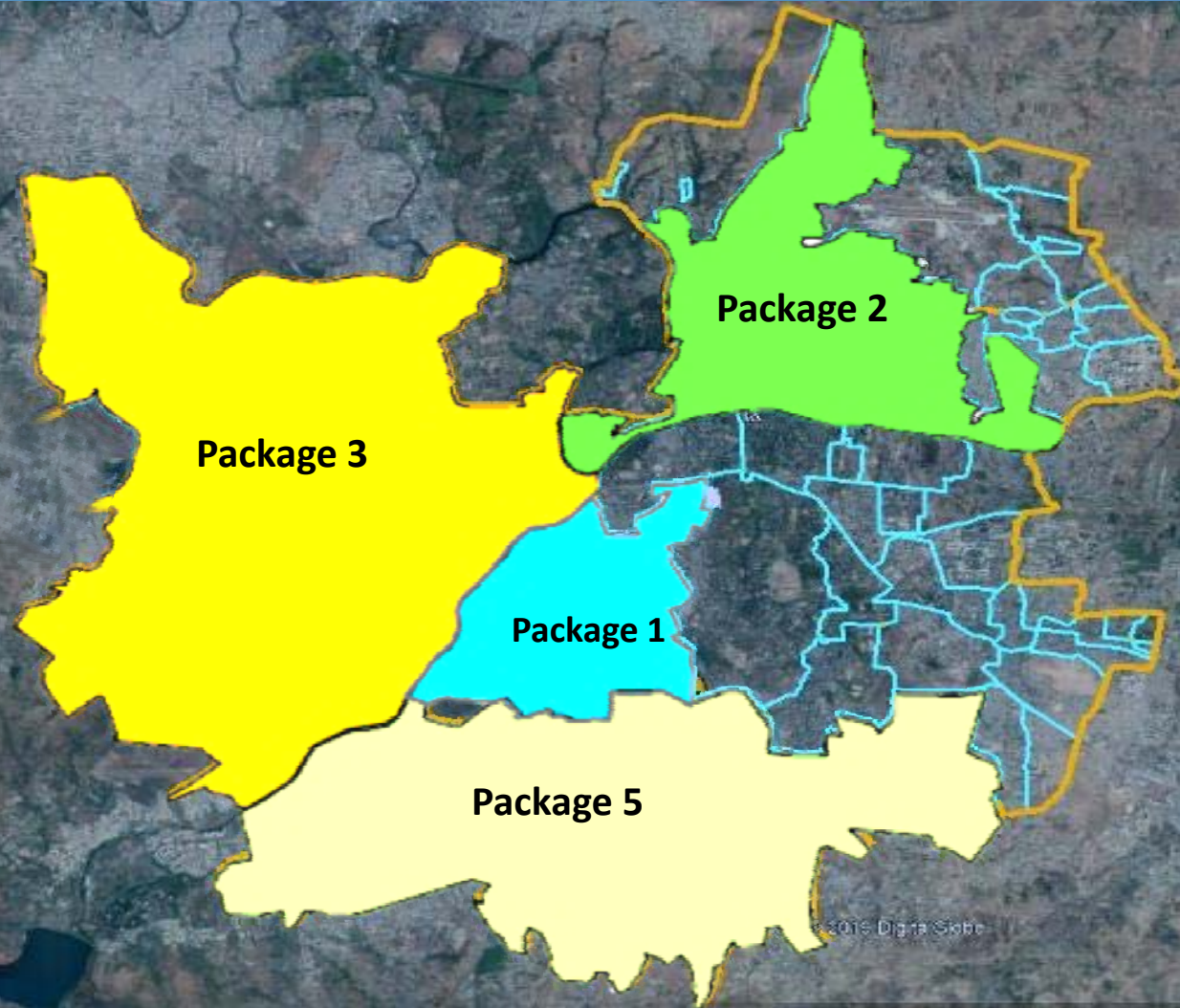


331 sq.km area

6.7 Million population



Oxford of the East





2012 2013 2014 2015 2016 2017 2018 2019



Pressure Transient Analysis



Web-based Leak Detection



Pressure, Flow & Noise Sensors



Darwin Calibrator
Pipe Renewal Planner



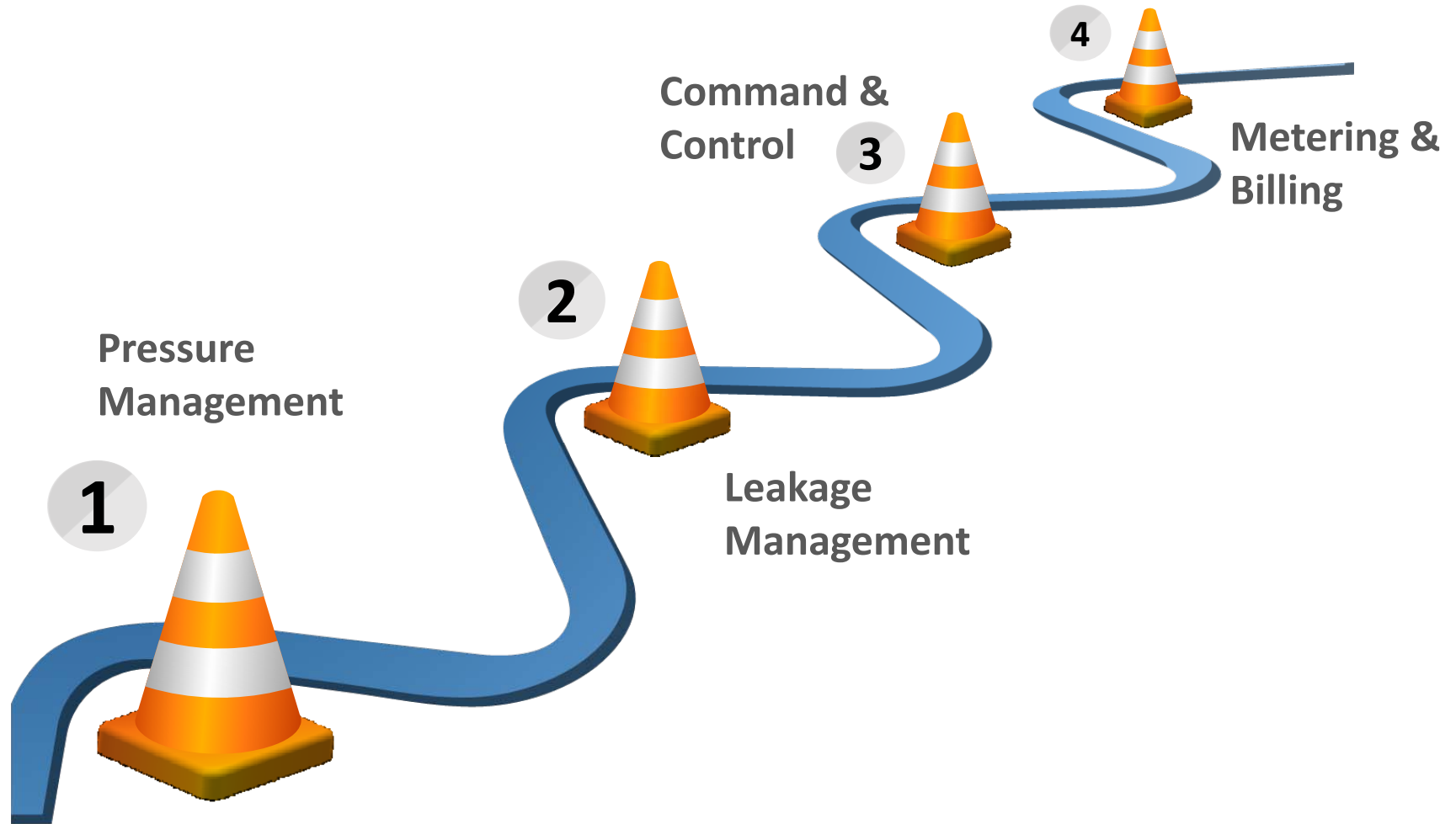
Online leak detection

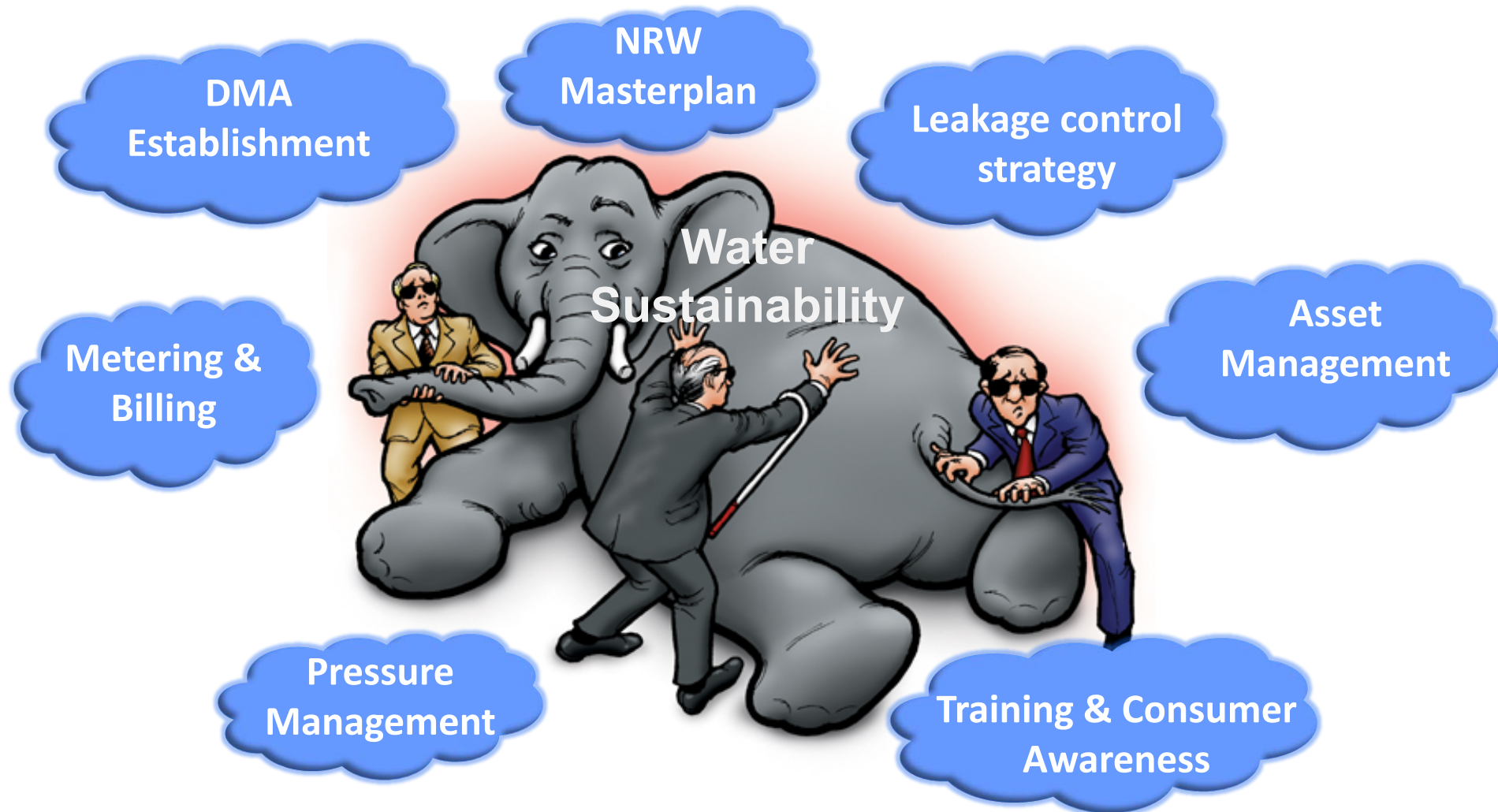


Synthetic Aperture Radar
Satellite Image Acquisition



In-line Crawlers: Imaging,
IR & Sonar Sensors





*Thank
you*

