

# National Geospatial Infrastructure and its Impact on Urban Development



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# Tamil Nadu Geographical Information System (TN-GIS)

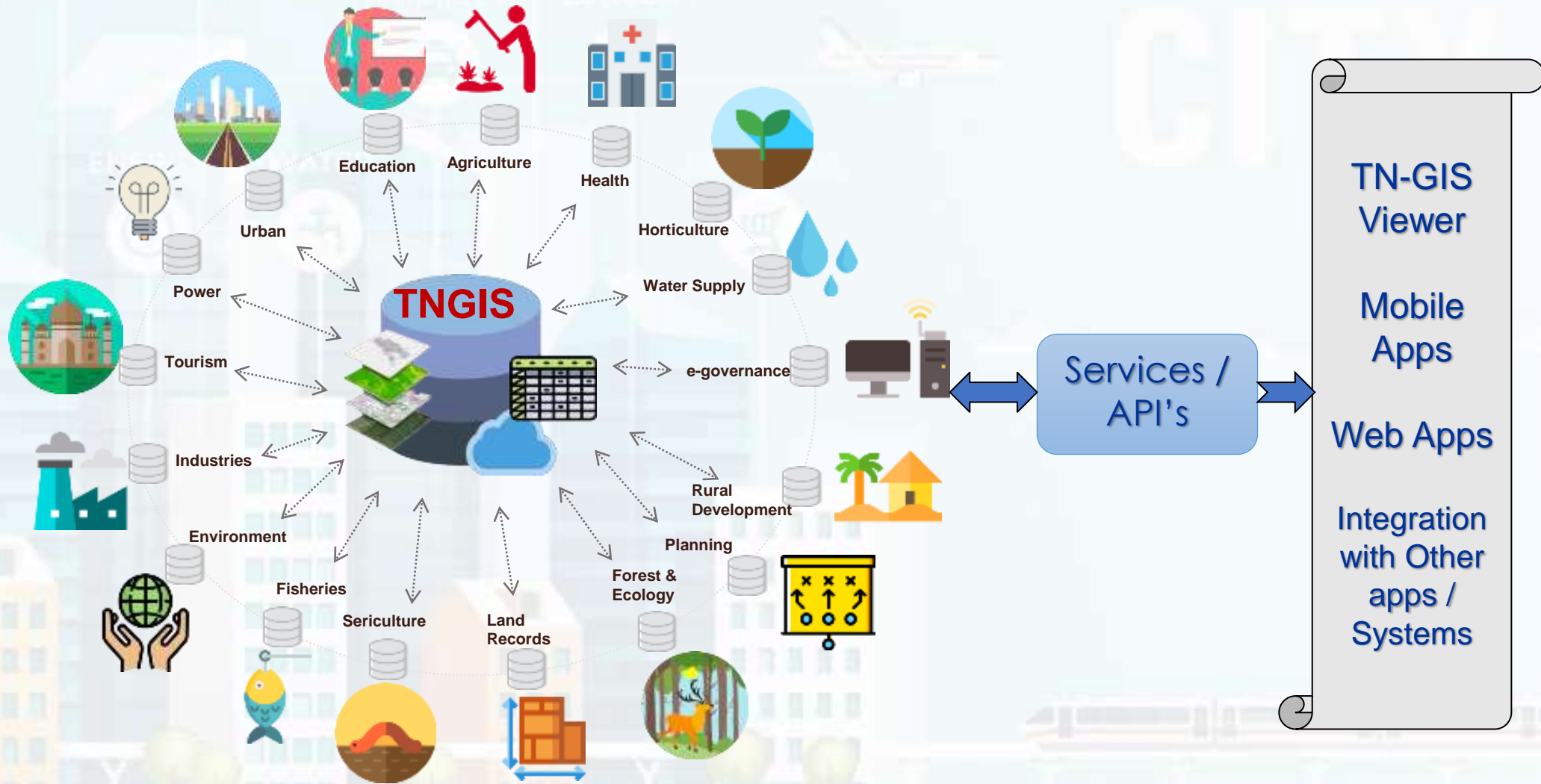
- TNGIS – Aggregator and Common Repository of Spatial Data of the State.
- Data creation / updation and data sharing –by respective department.
- Spatial Data to be Shared across all departments

## **Services by TNGIS**

- Visualisation of spatial layers and Analysis using TNGIS developed tools
- Access of published Map Services for accessing in external applications – other departments
- Download of boundaries (administrative or jurisdictional boundary of dept)
- Information Extraction from spatial data through the API's – To Other Departments



# TN-GIS Conceptual Framework

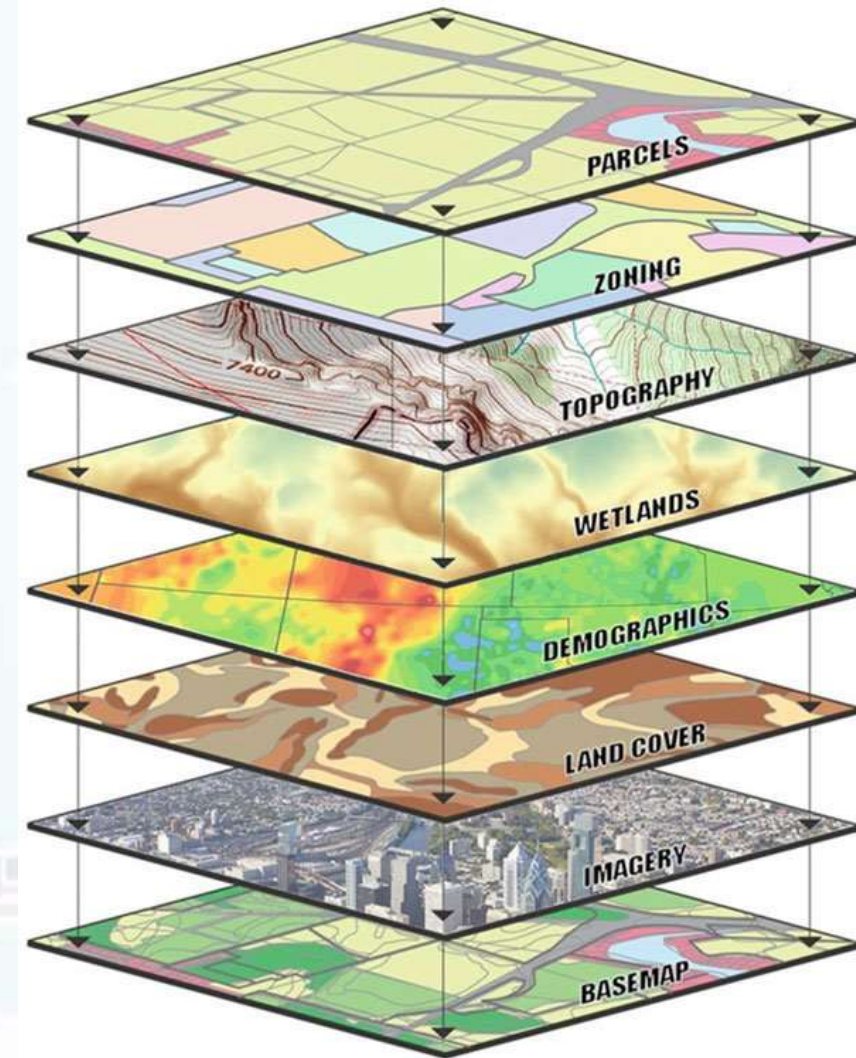


TN Spatial Database: Exchange via Direct DB access / Services





# TN-GIS-Initiatives



# Crop Survey Mobile Application – Map View and Survey No /Sub Division



- Selected Survey / Sub division number will automatically get zoomed to the centre of screen and highlighted





# Power of Geospatial Infrastructure

Revolutionizing the way we plan, design and Manage Cities

Harnessing the latest advancements in Technology

Create smart and sustainable infrastructure to enhance Livability, improve Connectivity and Optimize resource allocation.

Mapping out Transportation networks, Monitoring environmental impacts etc

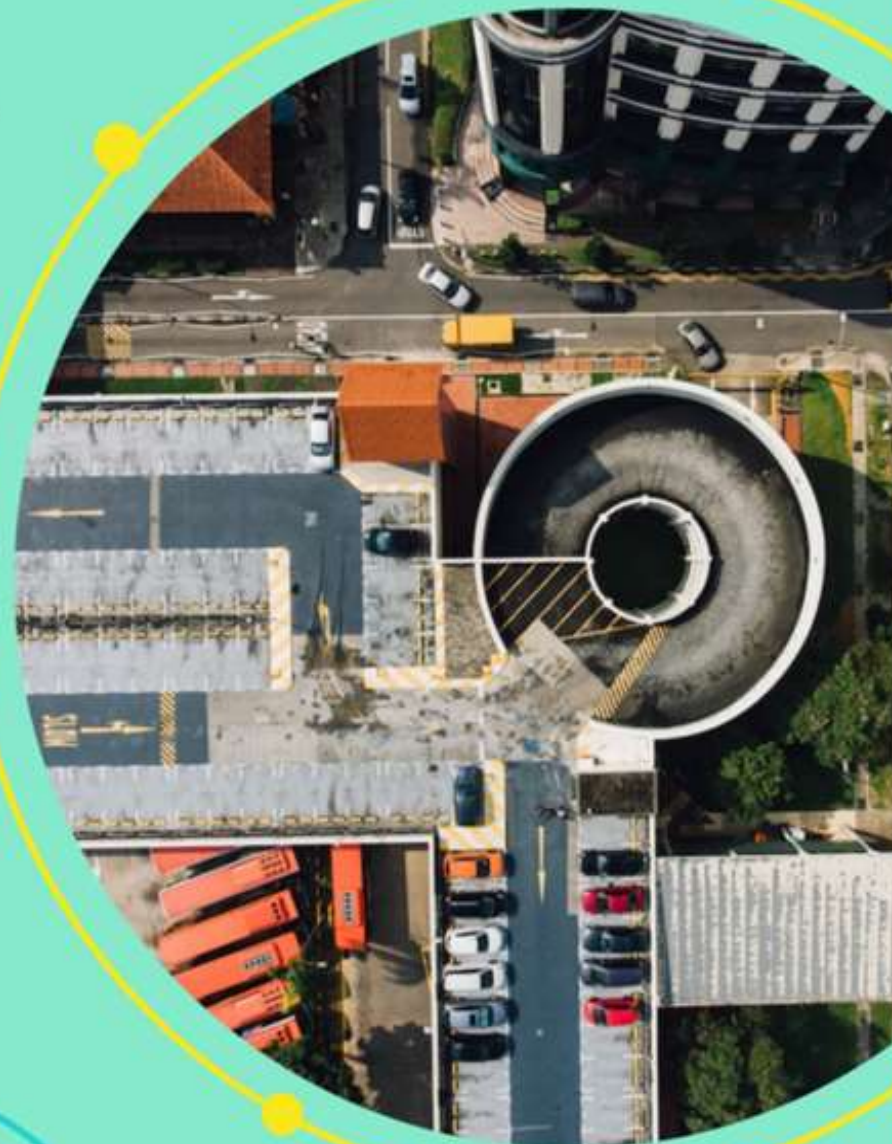
Role of Geospatial Data in shaping the cities of Tomorrow

Geospatial Infrastructure is the foundation for enabling efficient urban Planning, Creating Smarter Cities, Improving public services and enhancing overall urban sustainability



# Role of Geospatial Infrastructure in Urban Planning

Geospatial infrastructure plays a pivotal role in urban planning by providing accurate and real-time data about the city's physical and social aspects. It enables planners to make informed decisions regarding land use, transportation networks, and resource allocation. By integrating geospatial technologies, urban areas can become more efficient, sustainable, and resilient, paving the way for smarter cities that cater to the needs of their residents.







# Geospatial Infrastructure Projects-TNGIS & Tamil Nadu Governments Initiatives

- 
- Utilize Advanced Mapping Techniques
  - Data Analytics, AI/ML
  - Visualization techniques to create smarter and Sustainable Cities
  - Optimizing transportation networks
  - Enhancing Disaster response and Mitigation plans
  - Digitising the Utility Services and facilities for the public







# Initiatives for Urban Infrastructure Development- Greater Chennai Corporation

“Preparation of Base map,

Door to Door Survey using Geo-spatial Technology

Property Mapping & Utility Mapping

# IMAGERY - DRONE



# SATELLITE

Satellite imagery used for “No-Fly Zones” due to restrictions on Drone flying



426 points in  
GCC Area



200 GCP points



# Utility Mapping and Feature list



S. No	FEATURES	GEOMETRY
1	Street lights	Point
2	High mast street lights	Point
3	Pillar box	Point
4	Transformer	Point
5	Storm water drain	Line
6	Manhole	Point
7	Storm water drain inlet /chute pipe	Point
8	Rain water harvesting structure	Point
9	Garbage bins	Point
10	Open defecation areas	Polygon
11	Toilets on the road (e, bio, namma toilet)	Point
12	Street/roads	Line
13	Bus stop/shelters	Point
14	Bus terminus	Polygon
15	Medians	Polygon
16	Footpaths	Polygon
17	Zebra crossing	Polygon
18	Speed breakers	Line
19	Gantry sign boards	Point
20	Street name board	Point
21	Parking stretch	Polygon

S. No	FEATURES	GEOMETRY
22	Road side parks	Polygon
23	Trees	Point
24	Traffic island	Polygon
25	Bridges	Point
26	Culvert	Line
27	Flyover / grade separators / road over bridges	Polygon
28	Vehicular subways / road under bridge	Line
29	Pedestrian subway	Polygon
30	Pedestrian foot over bridge	Polygon
31	Foot bridge	Polygon
32	Hand pumps on the road side	Point
33	Water tanks on the road side	Point
34	Public taps on the road side	Point
35	Traffic signals	Point
36	CCTV - (only police stabilizer)	Point
37	Traffic sign board	Point
38	Bore well on the road side	Point
39	Police booth	Point
40	Railway station	Point
41	Permanent bunk shop	Point
42	Place of worship on the road	Point

UTILITY SERVICES - DATA MODEL	
<b>1) STREET LIGHTS</b>	
1. Road Geo ID	
2. Road/Street Name	
3. Zone	
4. Ward	
5. Location	
6. Pole ID	
7. Location/Position of post	(Centre median / Road side)
8. Foundation type	(Conventional / Concrete Pedestal)
9. Height of the post	(6m/7m/8m/9m/11m)
10. Post type-Material	(Concrete/Galvanized Iron/EL Post)
11. Type of fixture	(Sodium/LED)
12. Type of brackets	(Arch / Straight)
13. No. of Bracket	(Single/Double Bracket/Triple/Quadruple)
14. Hoarding availability	(Yes/No)
<b>Future Updation</b>	
1. Wattage of the fixture	
2. Make of the fixture	
3. Size of the cable	
4. No of cable TV wire running	
5. Whether cable TV wire is running if have - tag (Detail) or non-tag	
6. Any distraction for visibility	
7. Advertisement hoardings	
8. Last painted date	
9. Age / Date of post erection	
10. Date of Installation/Reinstallation	
11. Service from which pillar box	
12. Source of Energy	
13. Length of Bracket	





# Property Survey and GIS Integration Output - Sample



Property Tax



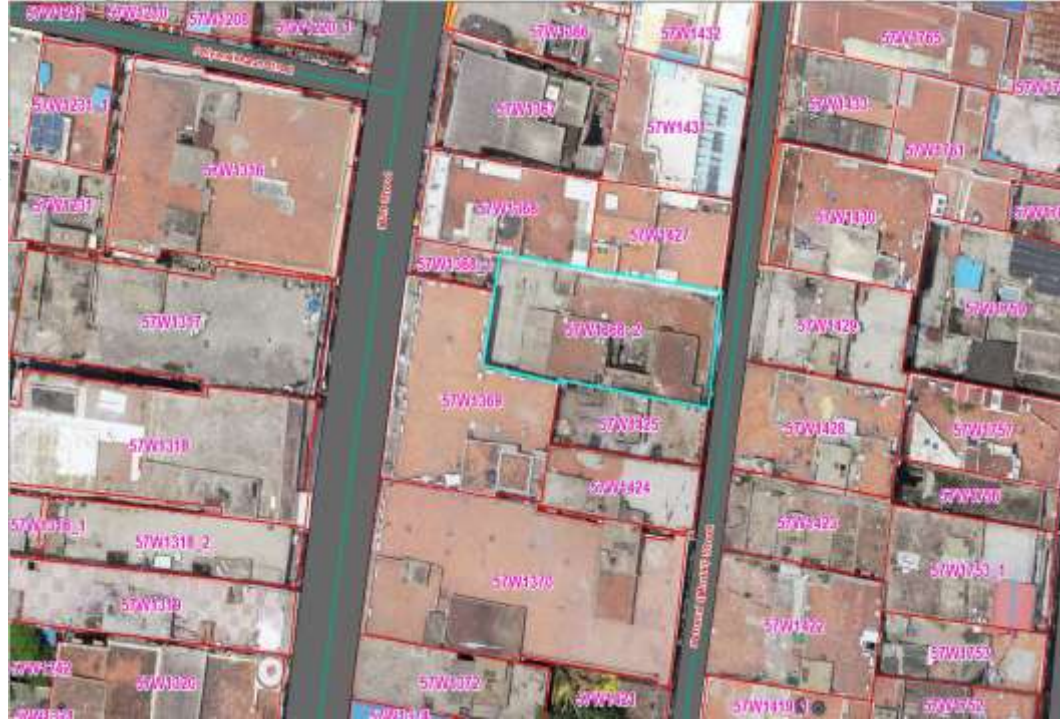
Company Tax



Professional Tax



Trade License



ZoneNumber	WardNumber	RoadId*	RoadName_StreetName	GCCGISID*	DOOR_OLD_NO	DOOR_NEW_NO	PROPERTY_TAX_ID
005	057	13608	Perumal (Mudali) Street	57W1368_2	64	52	12425

ZONE	WARD	STREET_DESCRIPTION	PROPERTY_TAX_ID	DARASHAW_GIS_ID*	DOOR_OLD_NO	DOOR_NEW_NO	BILL_NO
ZONE05	WARD 057	Perumal (Mudali) Street	12425	57W1368_2	64	52	05-057-05275-000

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Courtesy-Greater Chennai Corporation





# USE CASES - UTILITIES

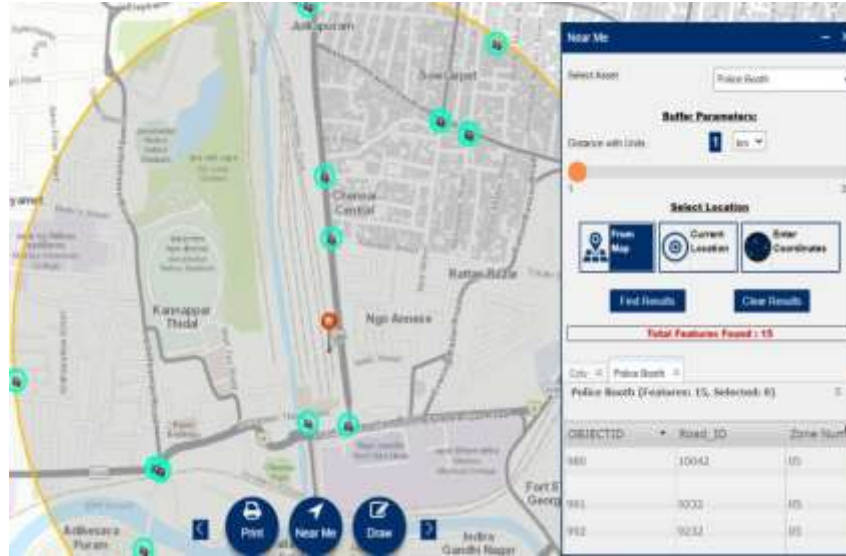
## DASH BOARD



## STREET LIGHT - DARK AREA



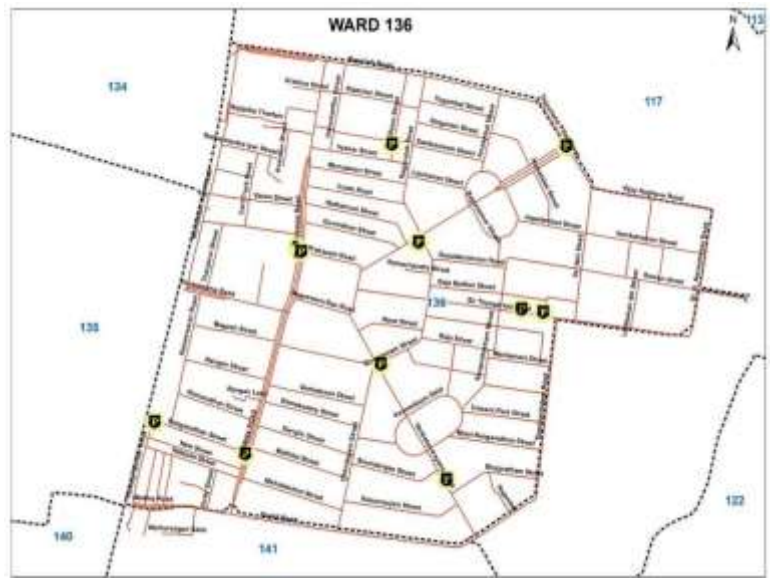
## NEAR ME



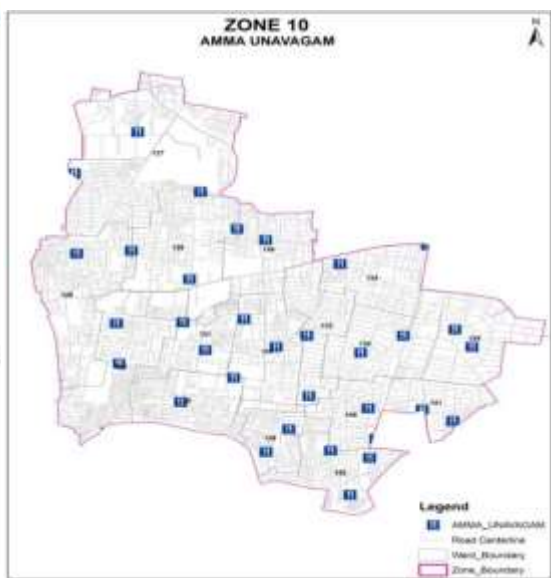
## HEALTH SERVICE CENTERS



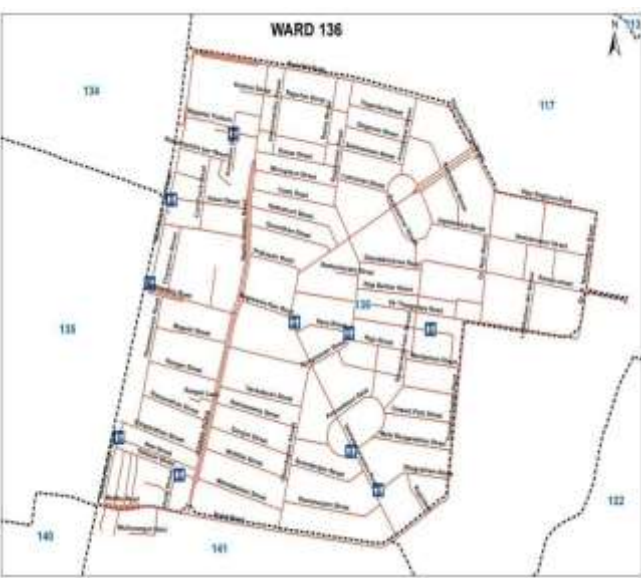
## POLICE BOOTHS



## AMMA UNAVAGAM (CANTEEN)



## PUBLIC CONVENIENCES





## Digital Chennai Project

- Digital Chennai project is envisaged to strengthen institutions in their delivery of sustainable spatial planning and urban mobility in Chennai Metropolitan Area (CMA).
- Two components of Digital Chennai are:

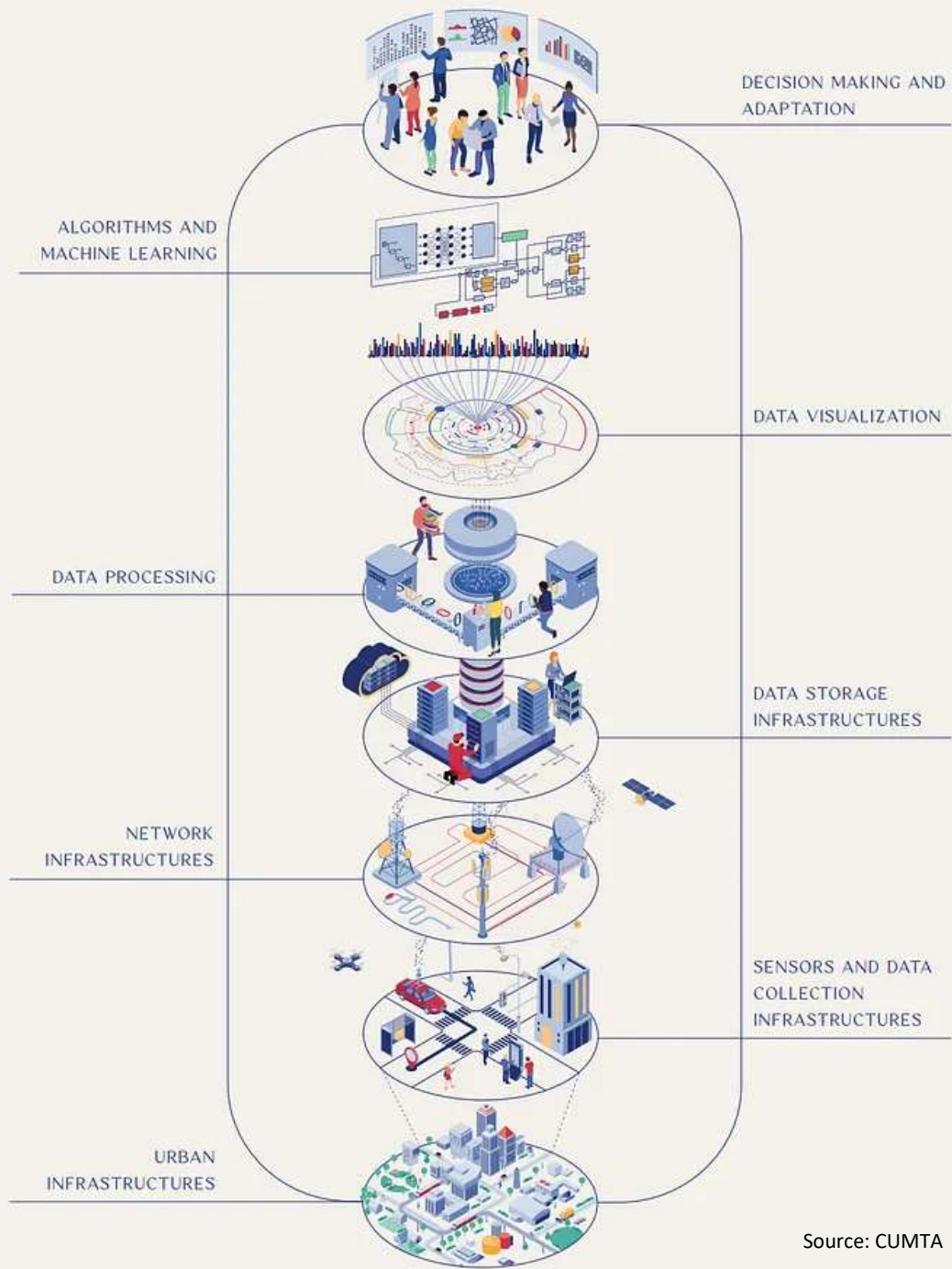
Integrated Urban Data Exchange Platform (IUDXP) will comprise a platform that is able to integrate, store and share spatial and non-spatial data through a single data portal; and provide modular analytics that combine and analyze the data for a comprehensive tracking of city service performance.

Urban Project Planning and Management (UPPM) tool will facilitate conceptualizing, planning, management, coordination, supervision, and monitoring of multi-agency urban projects in CMA area.





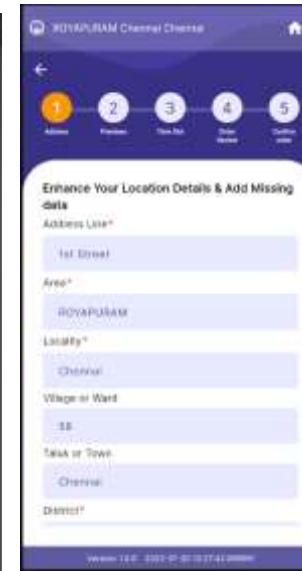
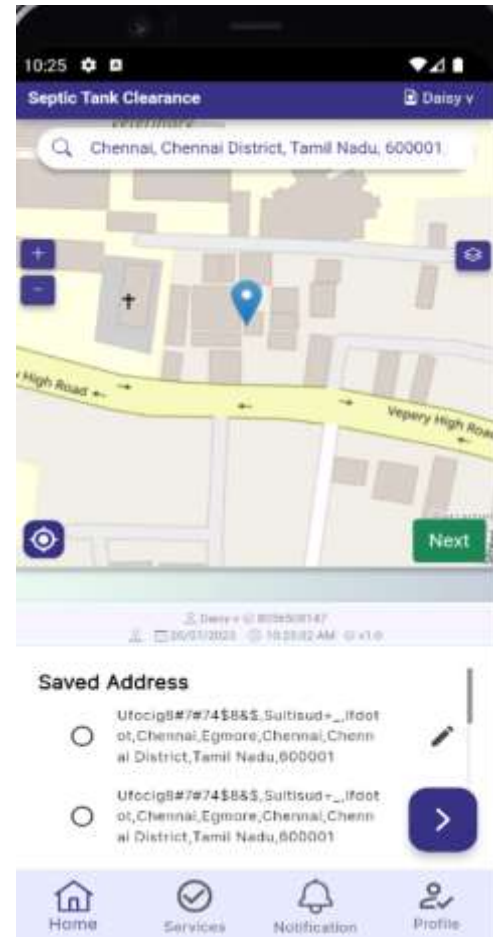
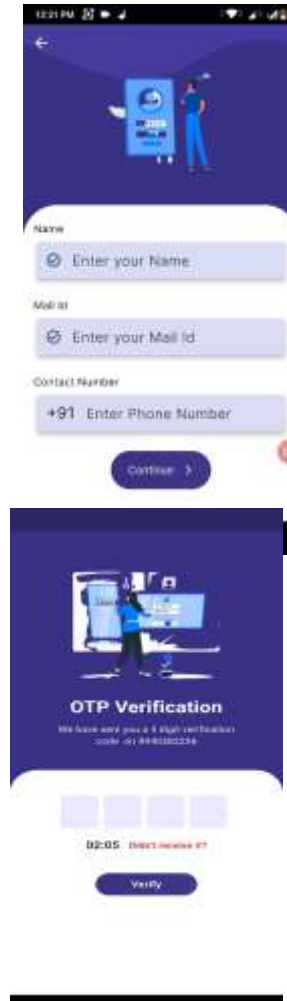
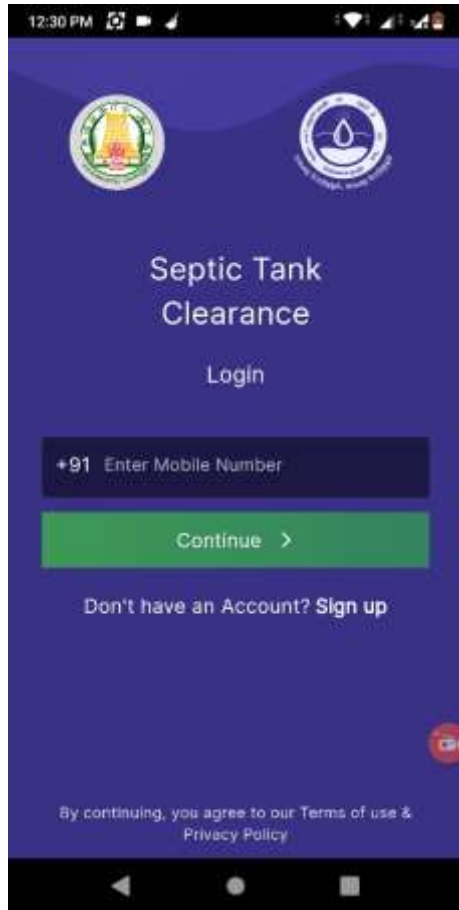
# Components of Digital Chennai Platform



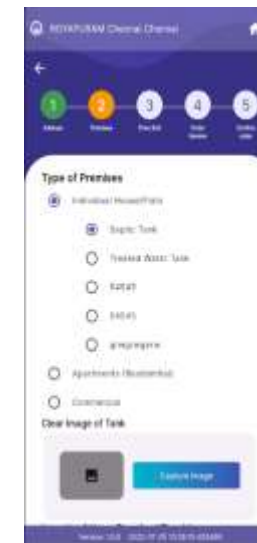
Source: CUMTA

Layers in the Digital Model	Systems within each Layer
<b>Data Collection Layer</b>	<p><b>APIs, IoT and Sensor Wireless Network:</b> Network of IoT devices and sensors placed throughout the city to collect real-time data on environmental conditions, traffic, air quality, and more.</p> <p><b>Data Collection System:</b> Gathers data from various sources ensuring continuous flow of real-time or near-real-time data to keep the digital model updated.</p>
<b>Data Processing &amp; Integration Layer</b>	<p><b>Data Integration System:</b> Processes and standardizes this diverse data, ensuring interoperability.</p>
<b>Data Visualization Layer</b>	<p><b>Geospatial Information System (GIS) 3D Modeling and Rendering engine:</b> Creating and rendering the 3D representation of the city - realistic and interactive.</p>
<b>Simulation and Analytics Layer</b>	<p><b>Artificial Intelligence (AI) and Machine Learning (ML) System:</b> AI and ML are integrated to enable the digital model to learn from data, recognize patterns, and make predictions.</p> <p><b>Simulation and Analytics System:</b> Perform various analyses, simulations, and predictive modeling. It can simulate traffic flow, energy consumption, environmental impacts, and other aspects of the urban environment.</p>
<b>Decision Support Layer</b>	<p><b>Access control, User Interface Layer:</b> Allows users, such as city planners and decision-makers, to interact with the digital model.</p> <p>It provides tools for querying, exploring, and visualizing data and simulation results.</p>

# Consumer App for Septic Tank Clearance

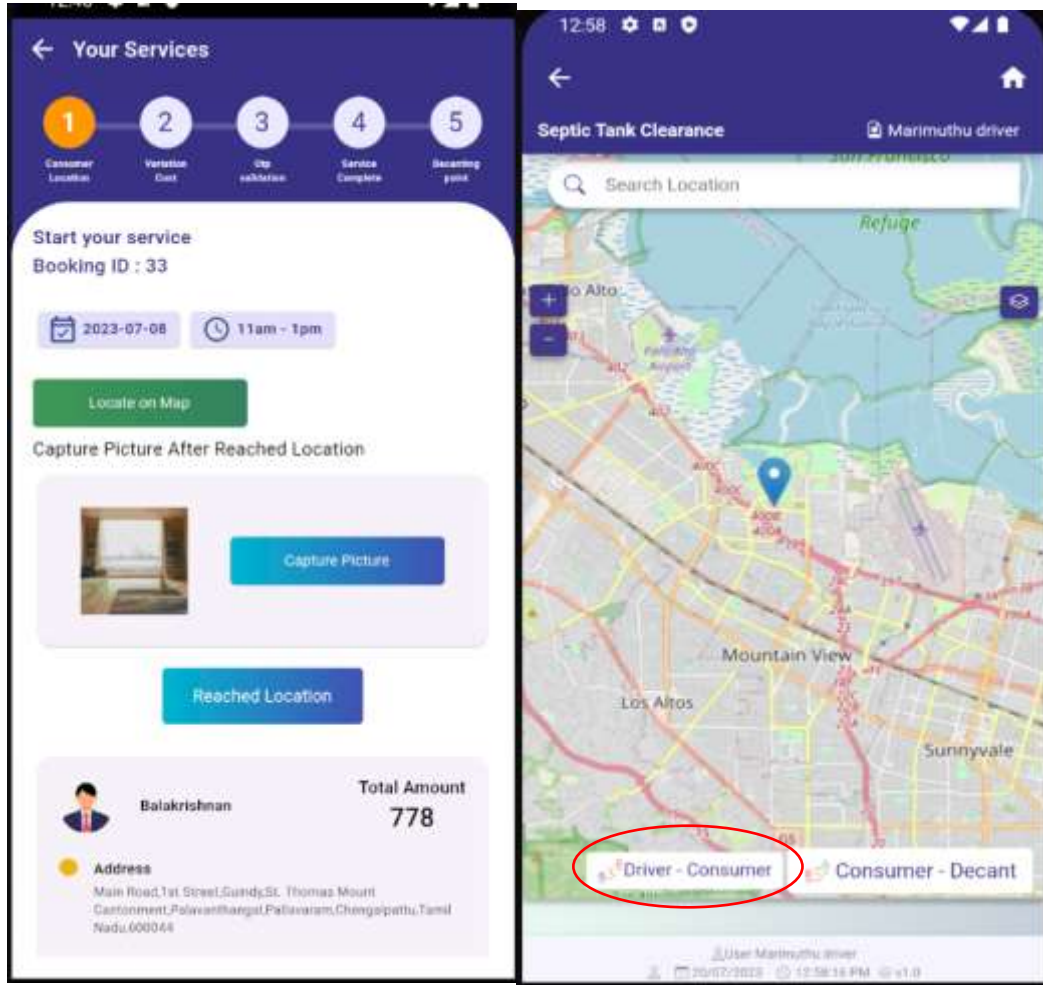


- A consumer has to register his name, valid Email ID and mobile number on first time registration.
- Once registered he can use his mobile number to login.
- A OTP verification is used to login the application.
- For consumer to operator the application location must be enabled.



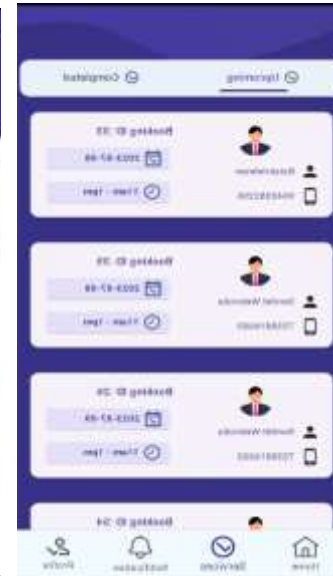


# Driver App for Septic Tank Clearance



- The driver view the booking order and use the locate on map button to view the consumer location in map.
- The driver to consumer button on the map is used to get the route.

- An order is completed for the driver only when the vehicle is decanted.



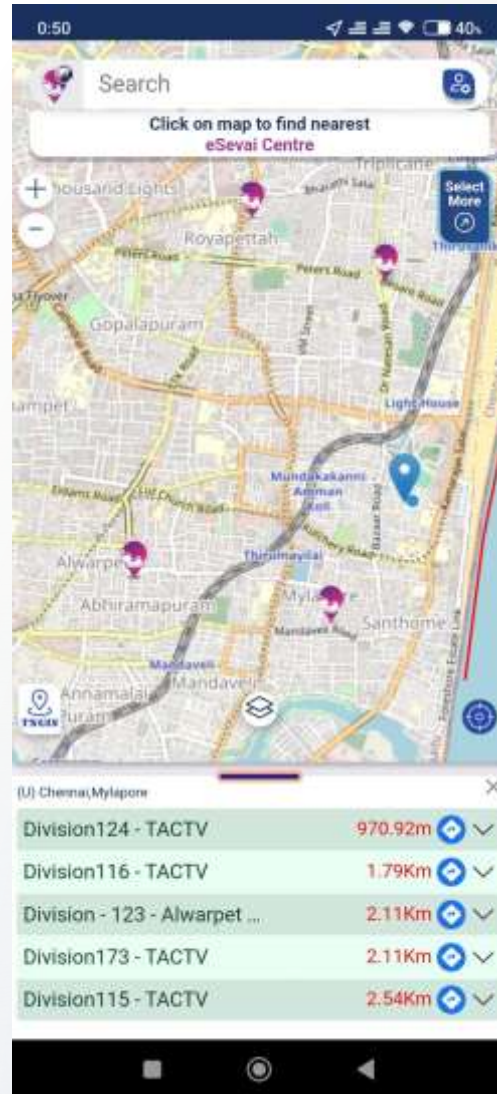


## Initiatives for Urban Infrastructure Development-Facilities for the Public



**முகவரி**  
Location Based Service

Powered by  
Tamil Nadu e-Governance Agency



0:50

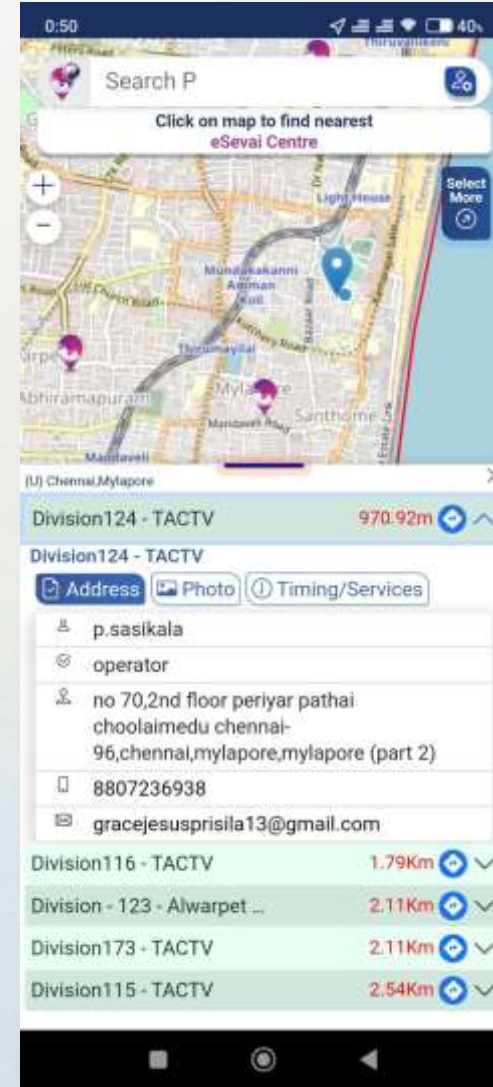
Search

Click on map to find nearest eSevai Centre

Select More

(U) Chennai, Mylapore

Division124 - TACTV	970.92m
Division116 - TACTV	1.79Km
Division - 123 - Alwarpet ...	2.11Km
Division173 - TACTV	2.11Km
Division115 - TACTV	2.54Km



0:50

Search P

Click on map to find nearest eSevai Centre

Select More

(U) Chennai, Mylapore

Division124 - TACTV 970.92m

Division124 - TACTV

Address Photo Timing/Services

p.sasikala

operator

no 70,2nd floor periyar pathai  
choolaimedu chennai-  
96,chennai,mylapore,mylapore (part 2)

8807236938

gracejesusprisila13@gmail.com

Division116 - TACTV 1.79Km

Division - 123 - Alwarpet ... 2.11Km

Division173 - TACTV 2.11Km

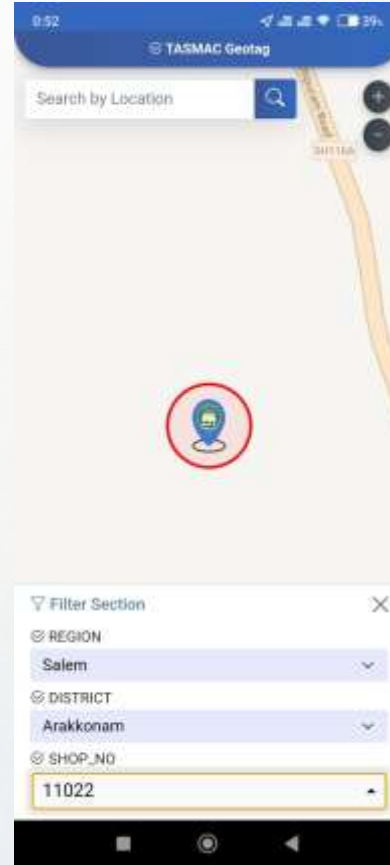
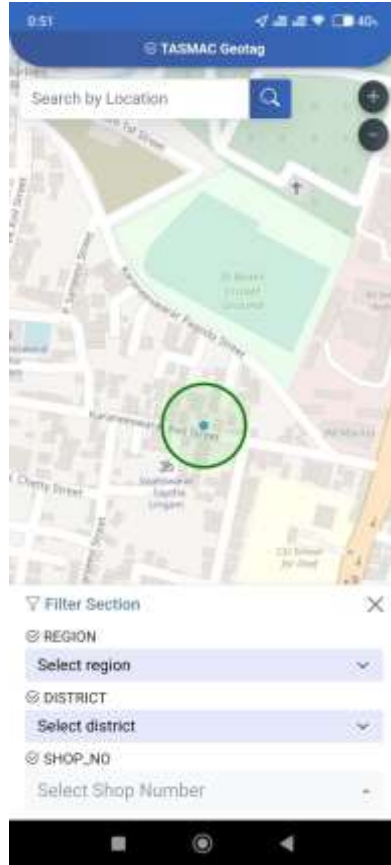
Division115 - TACTV 2.54Km

Mobile APP -To Locate the Nearby Government/Public Facilities available for the Public





## Initiatives for Urban Infrastructure Development-Facilities for Data Capture

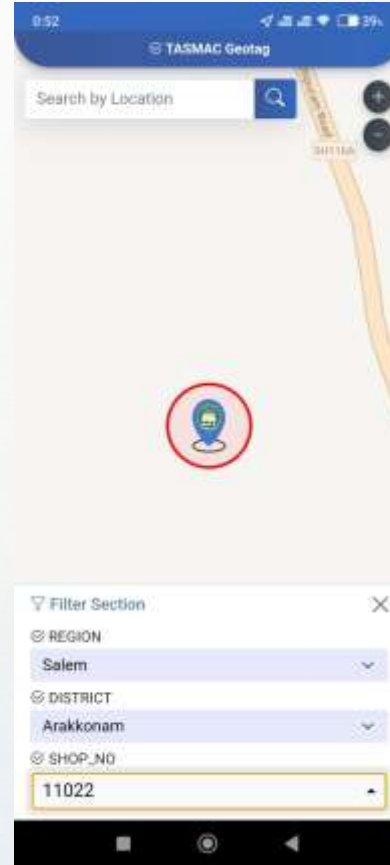
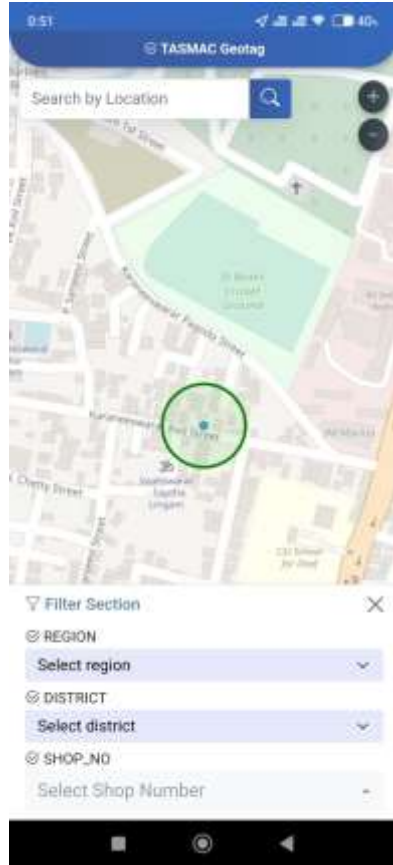


Generic Geo Tagging Mobile APP -To capture the exact Location details of Nearby Assets/Facilities

Can be Customised based on department request / Requirements



## Initiatives for Urban Infrastructure Development-Facilities for Data Capture



Generic Geo Tagging Mobile APP -To capture the exact Location details of Nearby Assets/Facilities

Can be Customised based on department request / Requirements





# Benefits of Geospatial Infrastructure in urban development

Combined Mobility Plan can be created which includes

- Optimization of Transportation Networks
- Reduce Traffic Congestion
- Improve overall mobility

Easy Access of Public to the Utilities / Facilities

Enhanced disaster response, Accurate, faster and effective emergency management

Facilitate smarter decision-making

Enabling more sustainable, resilient and livable cities for the future





## Futuristic Action Plans for Geospatial Infrastructure

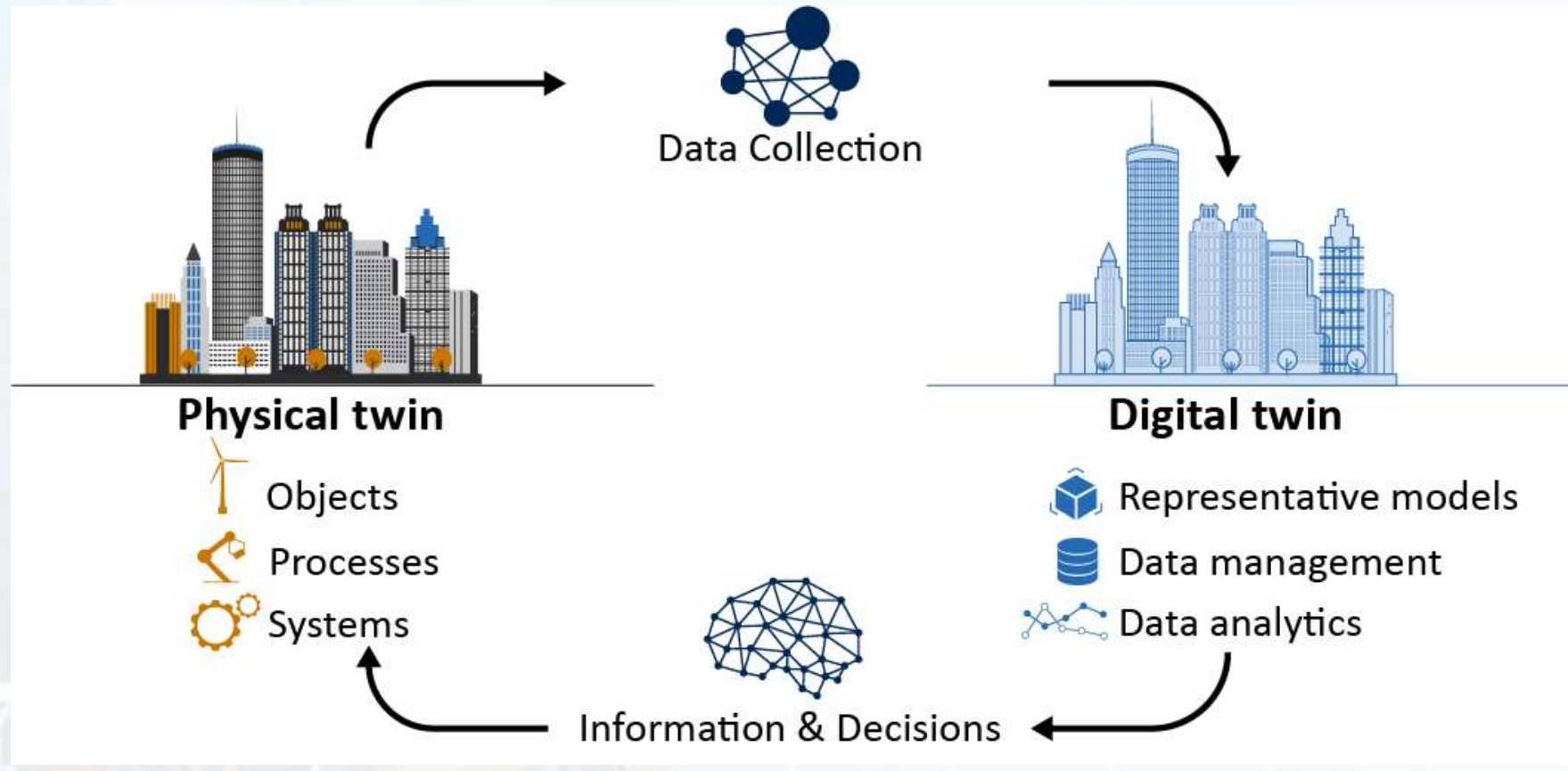
- Artificial Intelligence & Machine Learning based Geospatial data Analysis
- Internet of Things (IoT) devices and Sensors based Data Collection on Large scale, Leading to more efficient and Sustainable urban infrastructure.
- Installed in Subways in Chennai to monitor the rise in the water logging during rains/ Cyclones
- IOT fitted Garbage bins to detect the bins about to fill and notify Sanitation Workers



# Futuristic Action Plans for TNGIS

## Digital Twins

Digital twins — which involve **constructing digital models of a city's terrain, buildings, and infrastructure, as well as simulating parameters like jobs, deliveries, traffic, and pollution** provide urban planners with both a deep look at their city's inner workings and an idea of how a change might play out.





An aerial photograph of a wide, multi-lane city street. The street is filled with traffic, including cars, taxis, and motorcycles. On the left side, there is a large, modern white building with a curved facade. The right side of the street is lined with parked cars and a large, open area that appears to be a market or a public square, with many people and stalls. The text "Thank You" is overlaid in the center of the image in a blue, bold font with a white outline. The overall scene is a busy urban environment.

**Thank You**