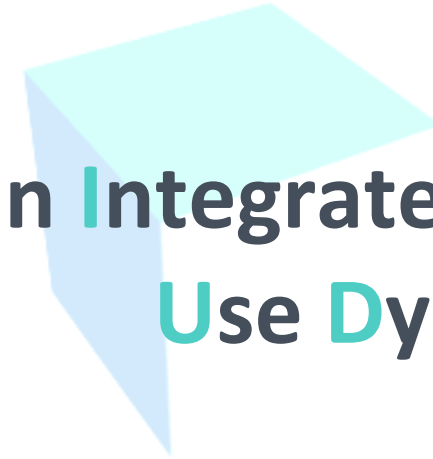


# Building Urban Integrated Land Use Dynamics



1.

# Project Brief

Base for Ideation

Project Ideation

Issues & Solution

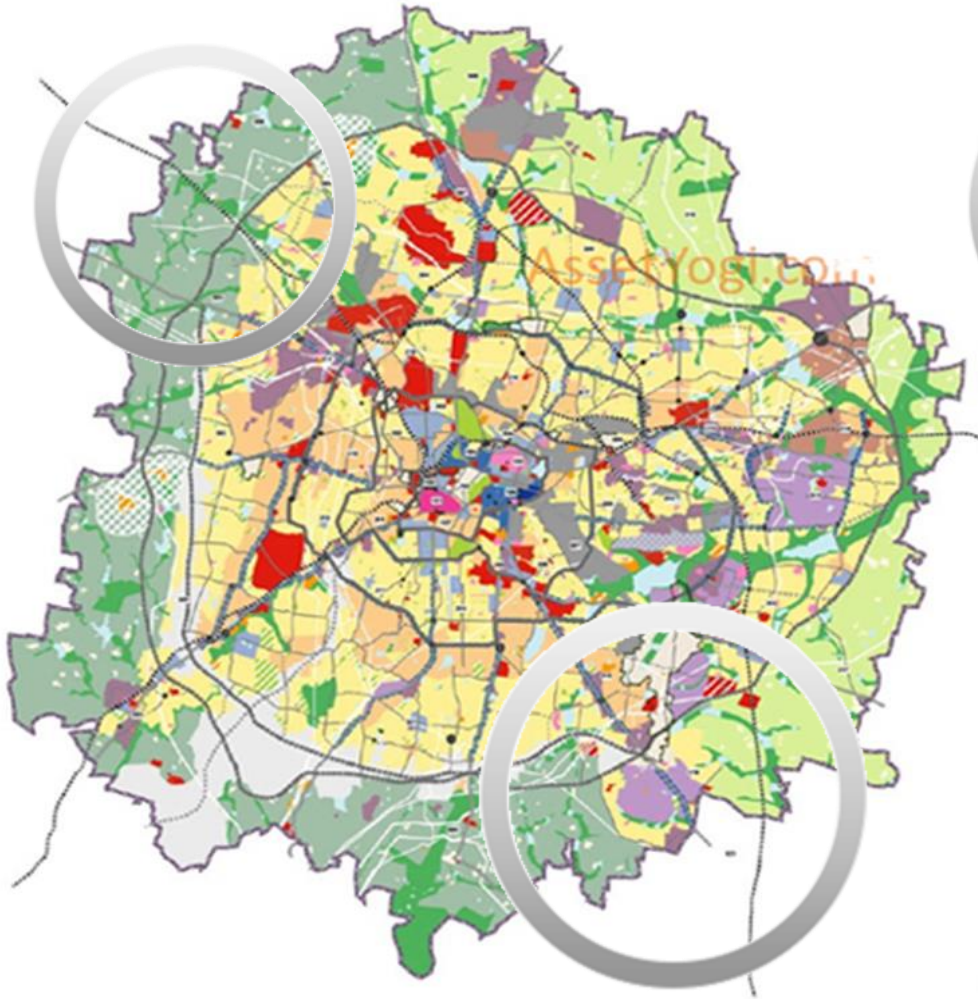
City selection

Project Development

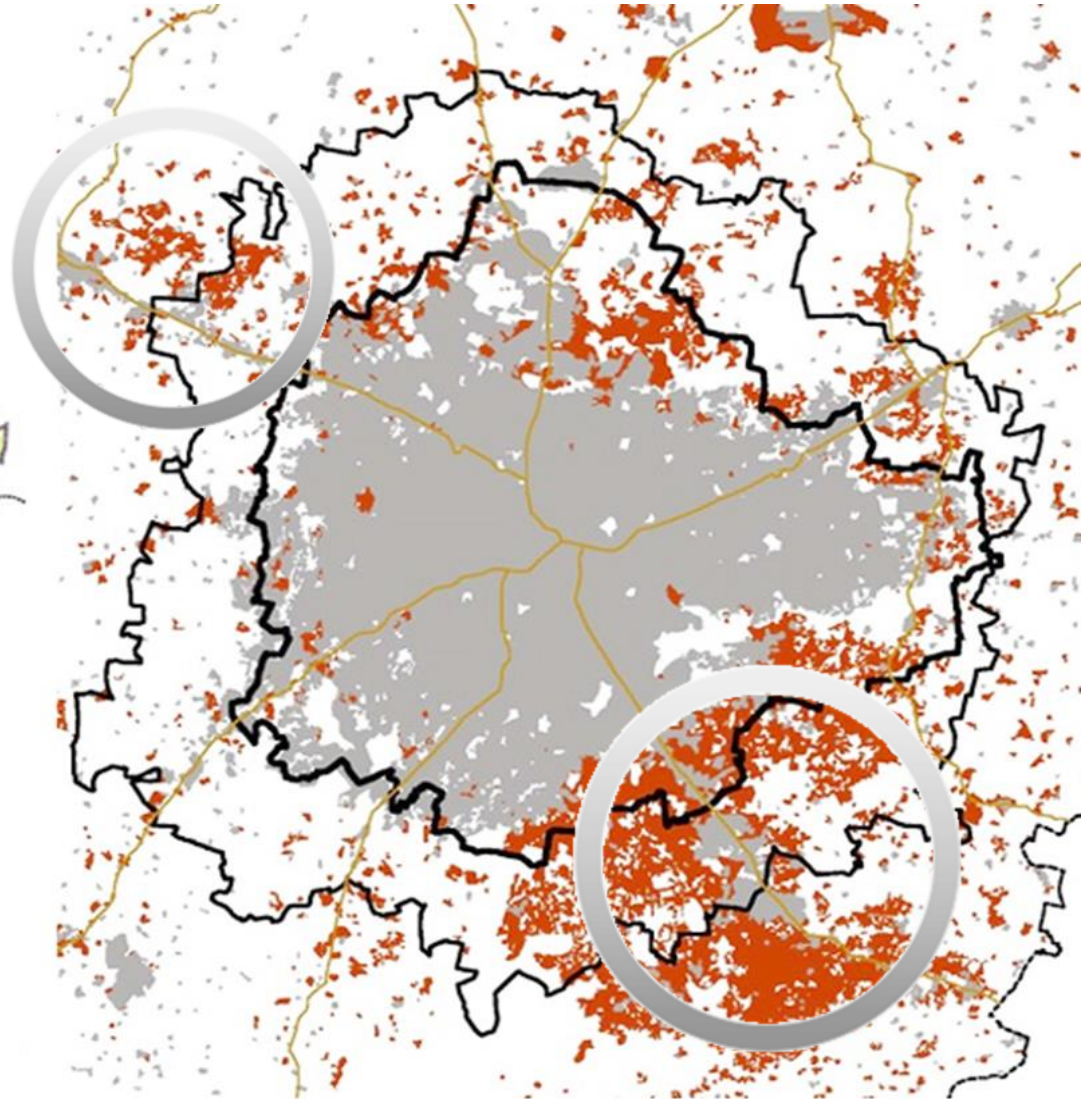
Engagements

Methodology

# Unattended growth (Bangalore city)

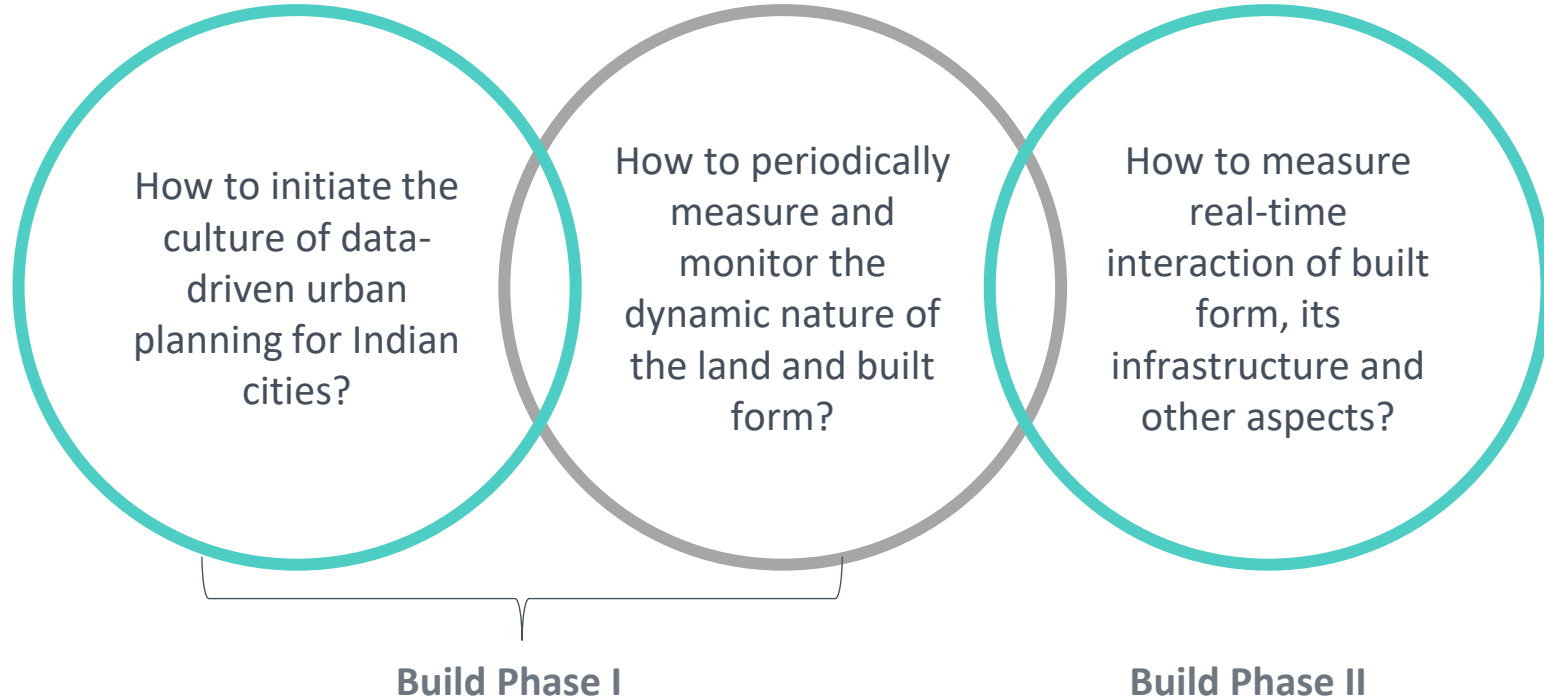


Bangalore Master Plan- 2015



Increase in Urban area till 2012

## Project Ideation :



- The idea was to **initiate the process of data-driven urban planning**, which can further act as a lighthouse for other Data matured cities.
- All of them intend to develop an indigenous digital tool and thereby laying the foundation stone of not just culture of data-driven urban planning along with taking a step towards becoming **'Atma Nirbar'** in the Urban ecosystem.

## Issues Identified :

- Land use planning process is **static** and only happens when a statutory plan is prepared.
- Updating of land use is **cost intensive** and time consuming as it involves physical survey.
- Multiple departments work in silos thus datasets have specific **or marginal use**.
- **Data mismatch** regarding built use. (In some commercial buildings, electricity charges are collected as per commercial slab but water charges are collected as per residential slab).
- Traditional land use plans show **gross land use** and not plot level land use.

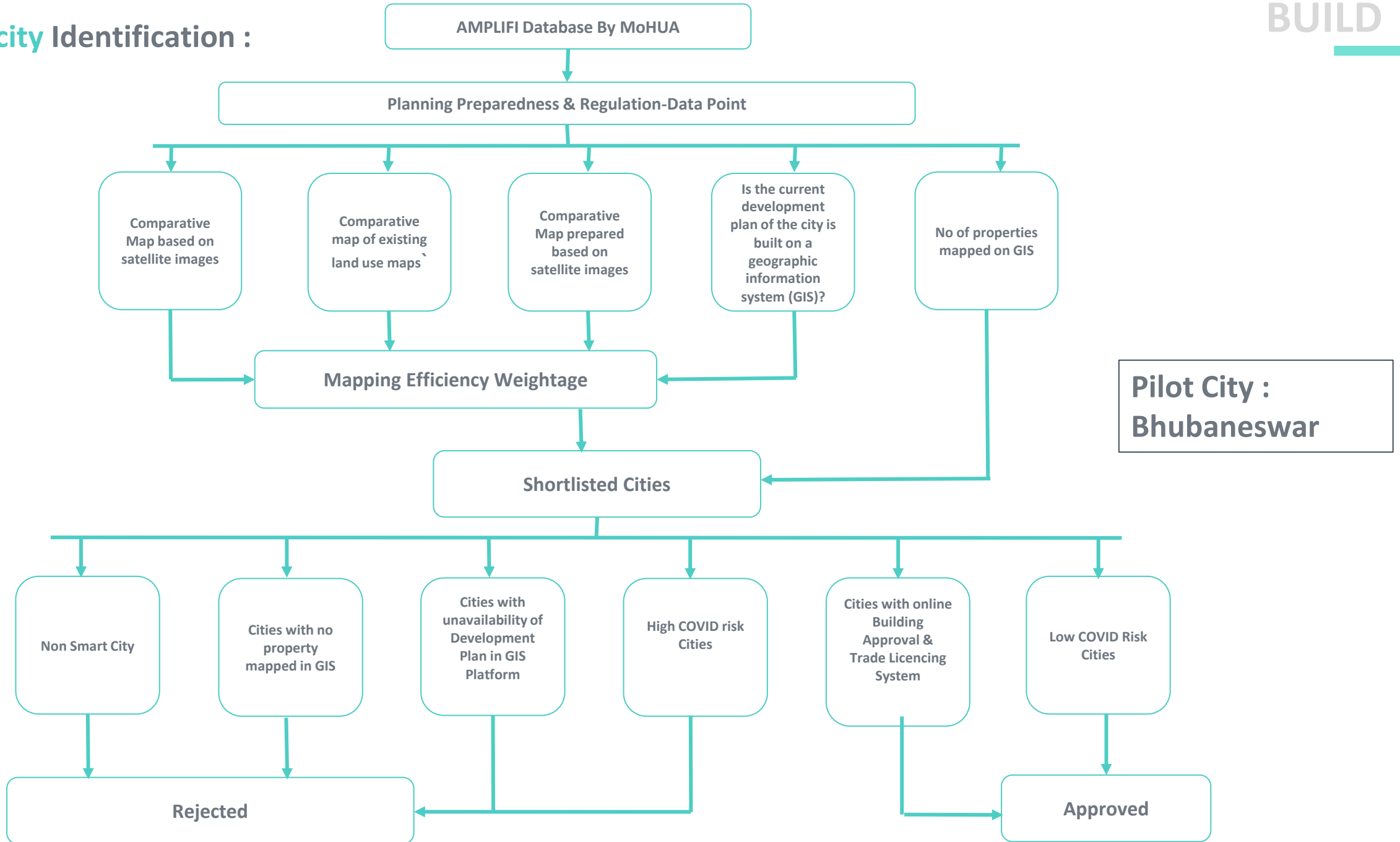
## Proposed Solution :

**BUILD PHASE I** - To create a dashboard by capturing & integrating multiple datasets from various organizations to produce a dynamic, interactive and evidence based land use model.



**BUILD PHASE II** - To develop a tool for assessing the impact of a project on different parameters (physical infrastructure, traffic and transportation, environment) analyze its feasibility and thereby enabling ULB's to make informed decision making.

# Pilot city Identification :



## Project Development :

### Pre Pilot



- Understood aspects of Land use and land cover.
- Studied the National Urban Information System (NUIS)
- Documented the methods of capturing land use data and how they are updated periodically.
- Reviewed the Amrut Master Plan guidelines (Land use).
- Conducted Interview with the experts working on GIS based Master Plans.

### Pilot stage



- Identification of city specific problem.
- Understanding the data handling mechanism in the city.
- Understanding the utility of project w.r.t Bhubaneswar city.
- Streamlining the project idea in conjunction to city specific needs.
- Checking of data availability and data collection.
- Preparation of FR-TR for the project & meeting CEO for product development.

### Deployment Stage



- Identifying the adaptive land use change in the city for the Pilot ward.
- Conducting engagement meetings with stakeholders to use the product during pilot.
- Identifying the gray areas in city through heatmap for enabling better revenue collection.

### Post Pilot

- Taking the reviews of pilot from city officials, NIUA, other stakeholders and polishing the product.
- Create SOP for the final modified product.
- Hosting the Product in city platform and branding through MoHUA platform.



## Engagements Made:



### Authorities

- Meeting with **BSCL** officials to make API's for trade license datasets.
- Meeting with **BDA officials** for existing land use map.
- Meeting with **GM, Technology** for filtering datasets uploaded for IUDX.
- Meeting with the **Odisha e-Municipality** officials filter the datasets for issue of trade license based on built use.
- Met with the Executive Engineer, **WATCO** and involved the data cell of WATCO to filter the datasets of revenue based on different types of uses.

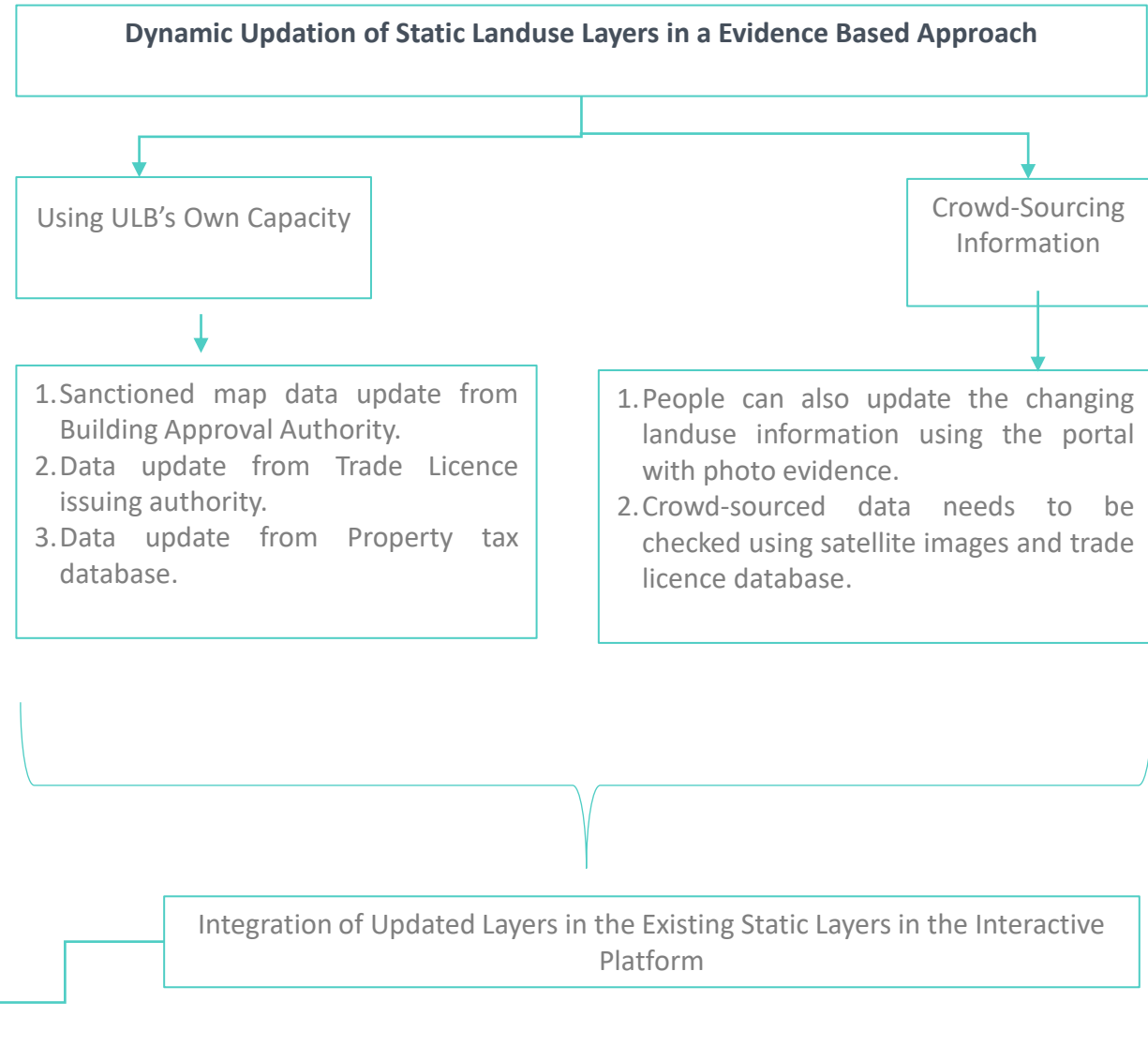
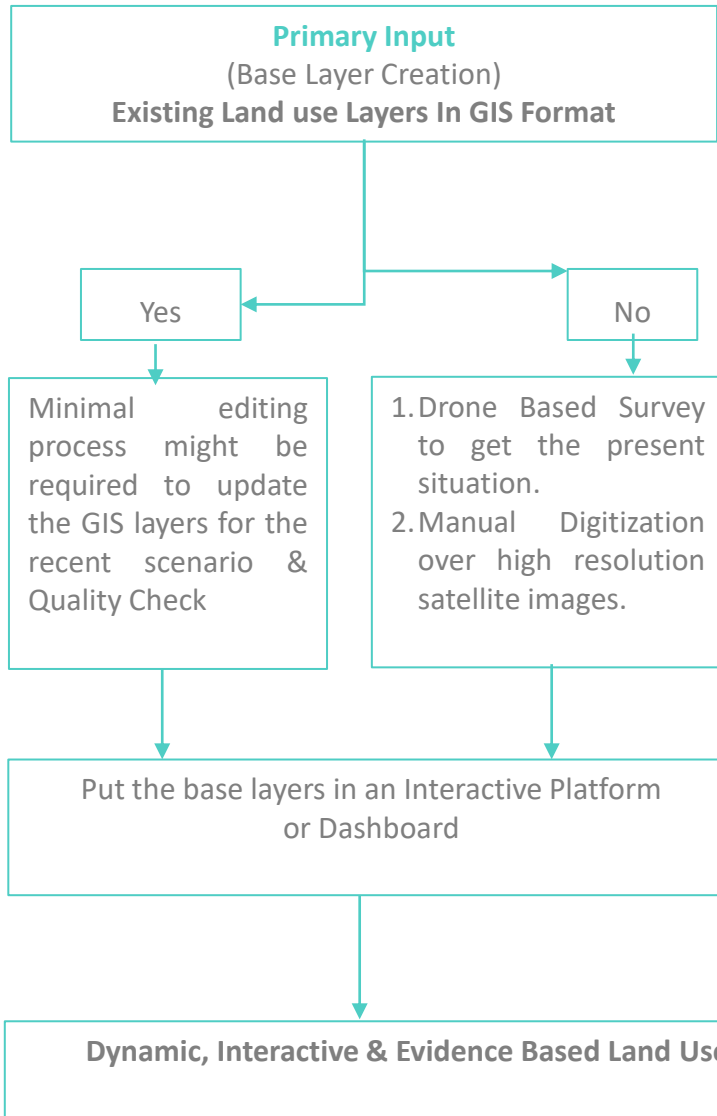


### Consultants

- Meeting with **Honeywell** to filter shapefiles of Web GIS for Bhubaneswar.
- Meeting with **IBI Group** for shapefiles of Bhubaneswar.
- Meeting with **Transerve Technologies** and **GIZ** to collect datasets for built forms.



# Project Methodology:



# 2.

# Product Development

- Project objectives & Users
  - Public dashboard
  - Admin dashboard
  - Test case
  - Project pilot
  - Project benefits
  - Scalability



## Dashboard Objectives

The objective of BUILD dash board are:

1. Enable the city administrators for decision making based on **updated land use plan & built use information**.
2. Enable public to view the **plot level information, land use and register their grievance**.



## Target Users

**Government end user** - local government department, agency, or other entity performing governmental functions; including governmental research institutions, governmental corporations.

**Public end user** – Individuals/citizens that access the dashboard to get relevant information.

**Academia end user** – Researchers, students, academicians that access the dashboard to get relevant information.

**Private sector/Urban thinktanks**– Organizations that work in urban domain that access the dashboard to get relevant information.



**BUILD**

Building Urban Integrated LandUse Dynamics

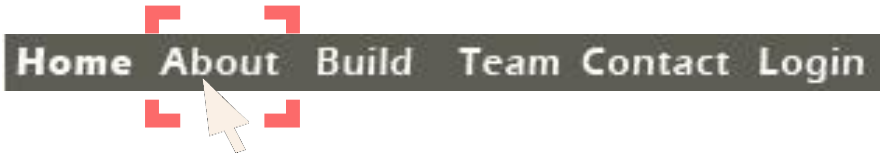
[Home](#) [About](#) [Build](#) [Team](#) [Contact](#) [Login](#)

# BUILD: BUILDING URBAN INTEGRATED LANDUSE DYNAMICS

A longstanding ambition to change the static approach of urban land use planning into evidence-based data-driven dynamic land-use planning aiming to achieve real-time changes in urban land-use and to build a relationship between urban infrastructure with the change in the urban landuse

The [Home screen](#) is the default landing screen reached after the user has accessed into the Web Portal and displays general project graphics. From the Home screen, the user can see a overview of the items that will be available to them and can click through to display corresponding details. The Home screen contains different tabs depending on the viewing requirement – [About](#), [Build](#), [Team](#), [Contact](#), [Login](#).

## Dashboard Home page



The **About tab** opens a screen in which displays the overview of the project along with the detailed aim, objective and relevance of the project in urban scenario. It also provides insights on the type of analysis that can be made with the dashboard data including the interpretation.



The **Build tab** has two sections in the dropdown menu i.e., '**Dynamic land use**' and '**Infrastructure Assessment**'. This tab has the major sections of the project which can be view individually and with a click on either of the sections the user gets directed to the specific dashboard which allows certain specific functions on the screen.

# Public Dashboard

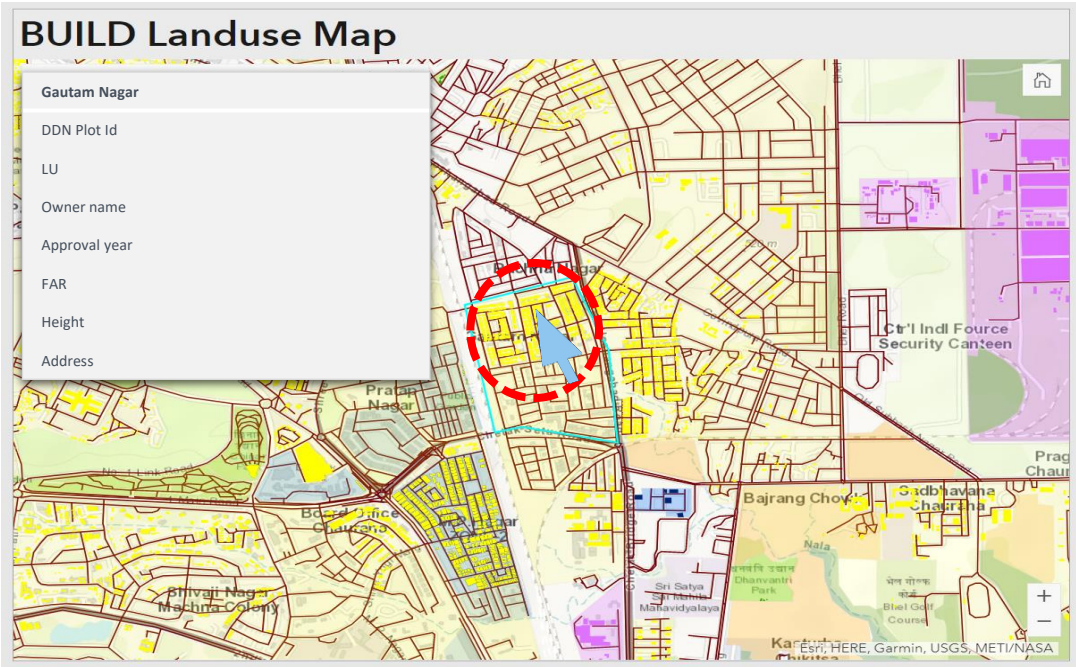


The **Dynamic land use** section lands into the dashboard which displays the real time updated land use of Bhubaneswar city along with legends. It also displays two other screens showing location wise tread license and building approval issued.

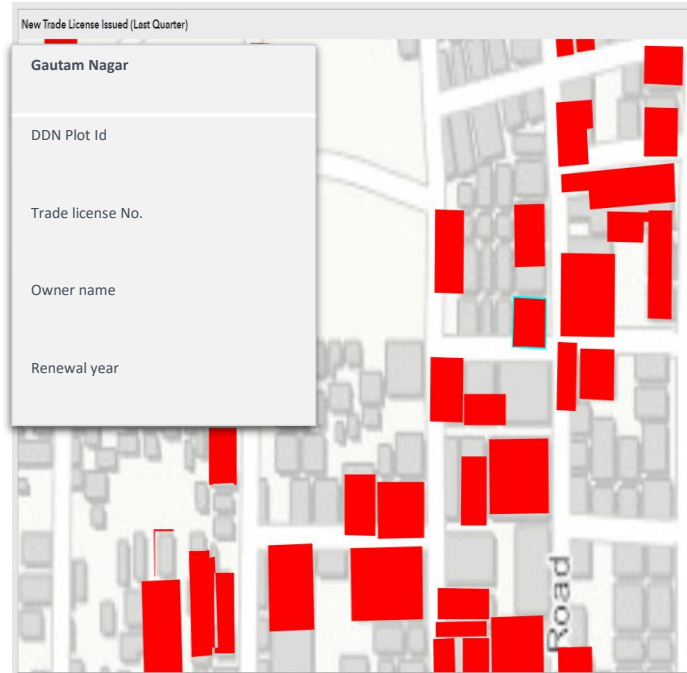


The user can also view individually either of the 3 screens with the maximize tab displayed on each of the screen.

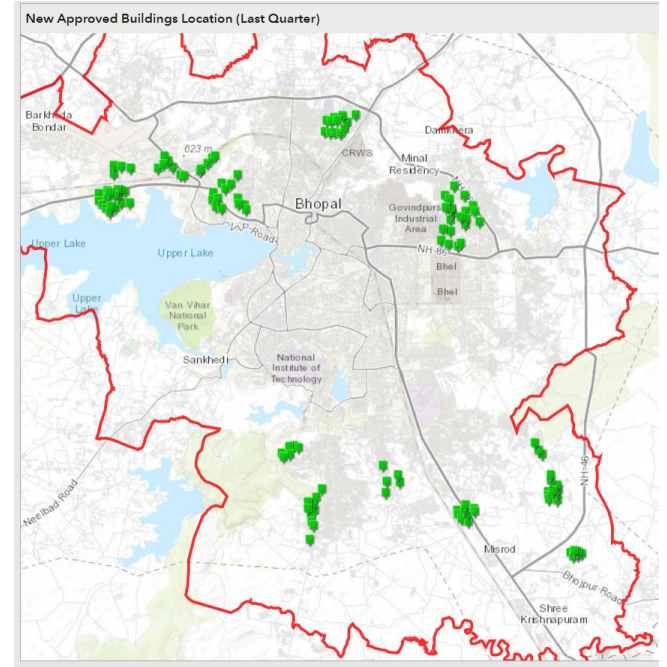
Public Dashboard



On the land use display screen, the user can click on any plot to view the fields of information attached to the plot such as plot ID (which shall be linked to the **DDN plot ID** in future), current land use of the plot, name of the area, building approval information (owner name, approved year, FAR, permissible height, complete address).



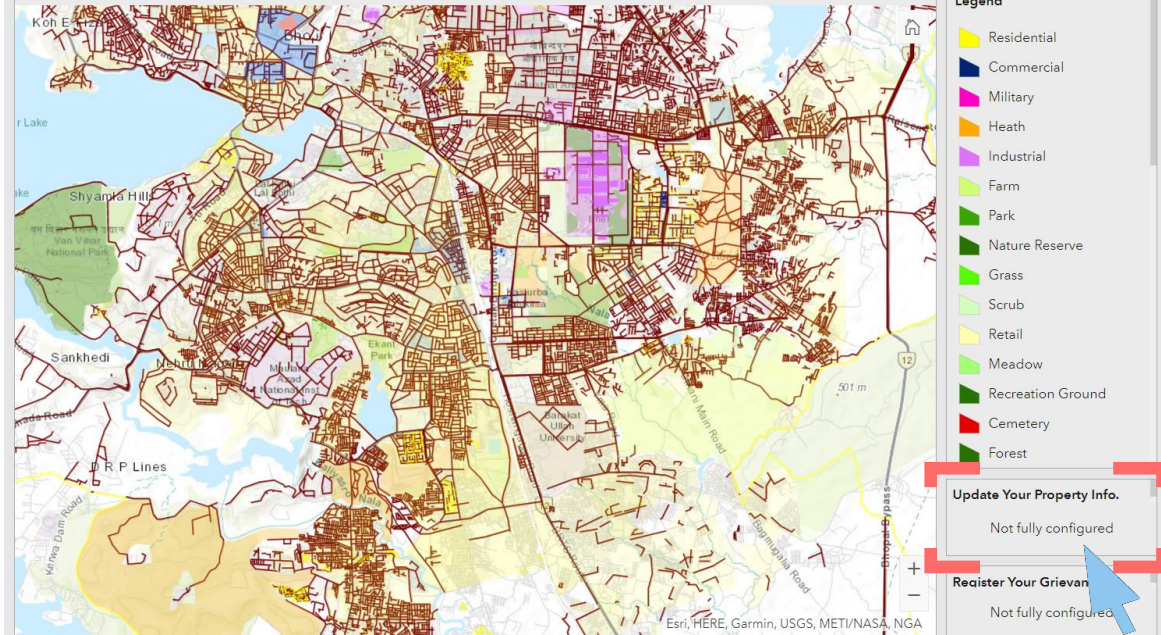
On the **New Trade license screen**, the user can click on any plot highlighted to view the details of trade license.



On the **New approved buildings screen**, the user can click on any plot highlighted to view the details of approvals.

# Public Dashboard

## BUILD Landuse Map



On the **land use display screen**, the user can click on Update property tab which enables them to update the fields such new land use, built use in the floors, additional floor area built. Once the user enters the Plot ID (which shall be linked to the DDN plot ID in future), the plot shall get highlighted on map and information (plot no., owner name, plot area will appear and all other fields shall be updated.

### Update your property

Enter your Plot ID

Your answer

Approved plot level land use

Choose ▼

New land use

Choose ▼

Activity in ground floor

Choose ▼

Additional floor constructed beyond approved floors

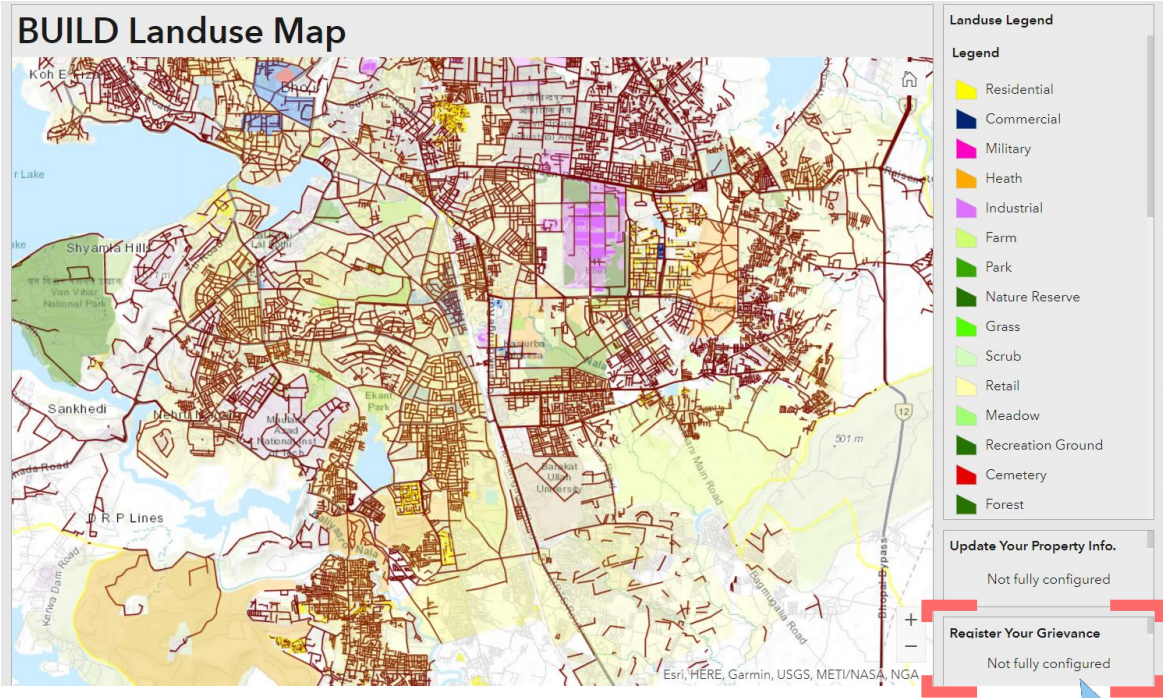
Choose ▼

Area of additional floor

Your answer



Public Dashboard



On the **land use display screen**, the user can click on Register your grievance to file complaint (information updating, approval, trade license) and report the non-conforming land use, establishment without trade license, building deviations). The page will be redirected to the grievance portal on Bhubaneswar me portal.

Name \*

Mobile \*

Email

Select Grievance Type \*  
 -- Select --  
 -- Select --  
 Suggestion  
 Complaint  
 Report

Category \*  
 Building Plan Approval-Planning

Sub Category \*  
 --Select--

Enter your Complaint / Suggestion

Upload complaint related image/document  
 Choose File No file chosen  
 (jpeg, jpg, png ,pdf,doc,docx file only and max size 5 MB)

500 characters left

Save & Continue >

## Admin Dashboard

Home About Build Team Contact Login

The **'Team tab'** displays the screen with information about the team members and Smart city SPV who are involved in the project.

Home About Build Team Contact Login

The **'Contact tab'** displays the screen with the contact information of Bhubaneswar Smart city Limited SPV along with the location map.

Home About Build Team Contact Login

The **'Login tab'** displays the screen which requires Admin login credentials which once entered will redirect to the restricted use dashboard. It can be accessed by Smart city officials to enable decision making through monitoring.

**Build Admin Portal**

Instructions for user login:

- Please follow the process given below.  
Enter valid User Id or verified mobile number.  
Enter valid Password.  
Enter valid verification code as given in captcha image.  
Verification code is case sensitive.  
Click on Login button
- Once you login with valid credential, you will be redirected to your Dashboard, where multiple action.

**Admin Login**

Enter Use ID/Mobile No.

Password

Enter Captch *A07N6*

Login

# Dashboard Landing page (Admin)

No of Total Property

286597

No of Trade Licence Issued ( 2021 - 22)

96598

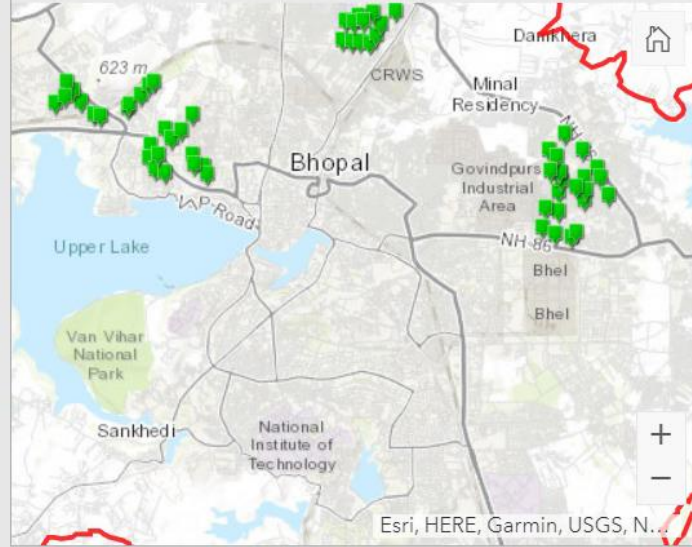
No of New Approved Buildings ( 2021 - 22)

598

No of Properties that Changed It's Landuse Type ( 2021-22)

66571

Location of the Registered Grivences (Last Quarter)



No. of Registered Grivences ( Last Quarter)

263

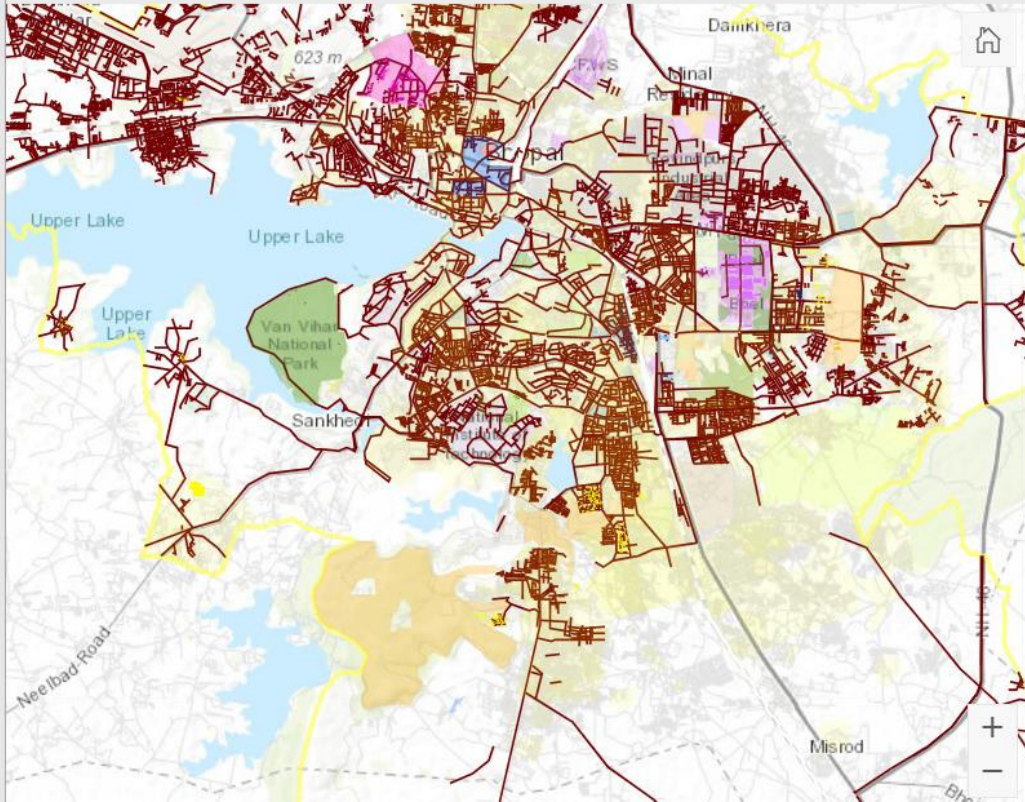
Resolved

180

Pending

83

Location of Properties that Changed It's Landuse Type ( 2021 - 22 )



Revenue generated from Property holding tax, Trade Licence and BPAS

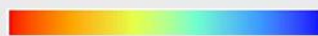
₹71,05,69,000

Legend

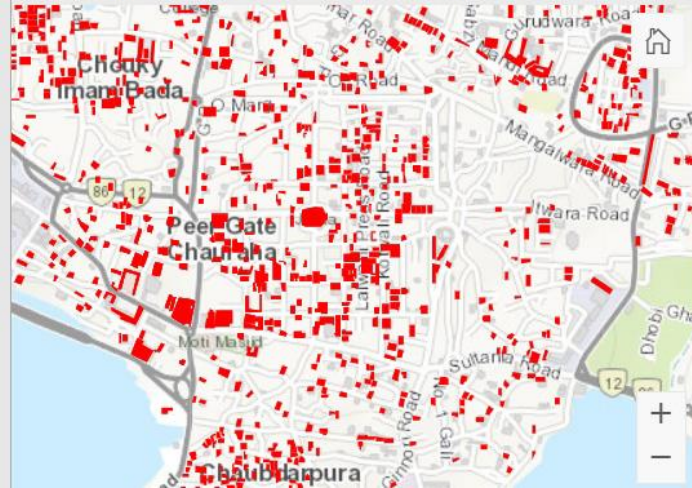
- Residential to Commercial
- Residential to Mixed Use
- Open Space to Commercial
- Commercial to Mixed Use
- Commercial to Public/Semi Public
- Open Space to Residential

Showing Change of Landuse Type

Heatmap



Location of the Self Updated Properties (Last Quarter)



No of Self Updated Properties ( Last Quarter)

125

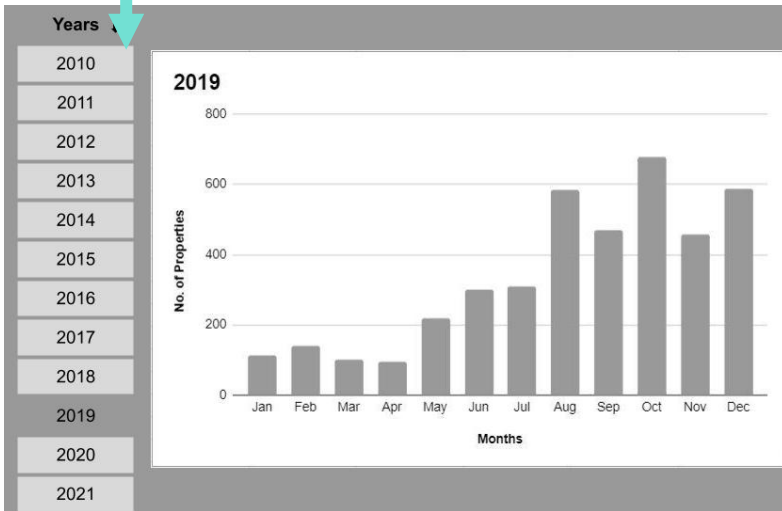
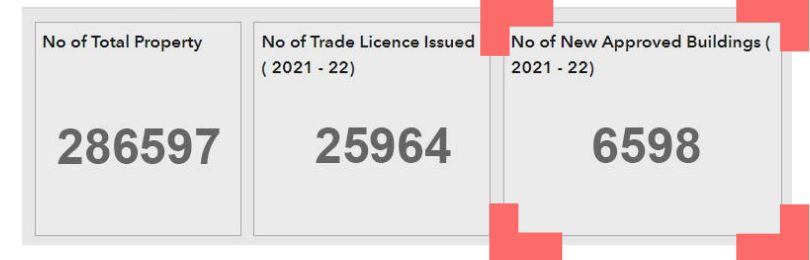
Verified & Updated

80

Pending

45

## Dashboard Landing page (Admin)



The 'No. of Trade license' displays total trade license in the city in numeric value and with a click it displays a bar graph showing month wise number of trade license issued in a year.

The 'No. of New Approved Buildings' tab displays total approved building in the city in numeric value and with a click it displays a bar graph showing month wise number of building approved in a year.

The 'No. of Property' tab displays total properties in the city in numeric value and with a click it displays a bar graph showing month wise number of properties in a year.

## Dashboard Landing page (Admin)

No of Properties that Changed It's Landuse Type ( 2021-22)

9657

The 'No. of properties that changed its type' displays the changed properties in numeric value and with a click it displays a legend showing conversion type such as 'residential to commercial, residential to mixed use, residential to institutional.

**Property Track Report**

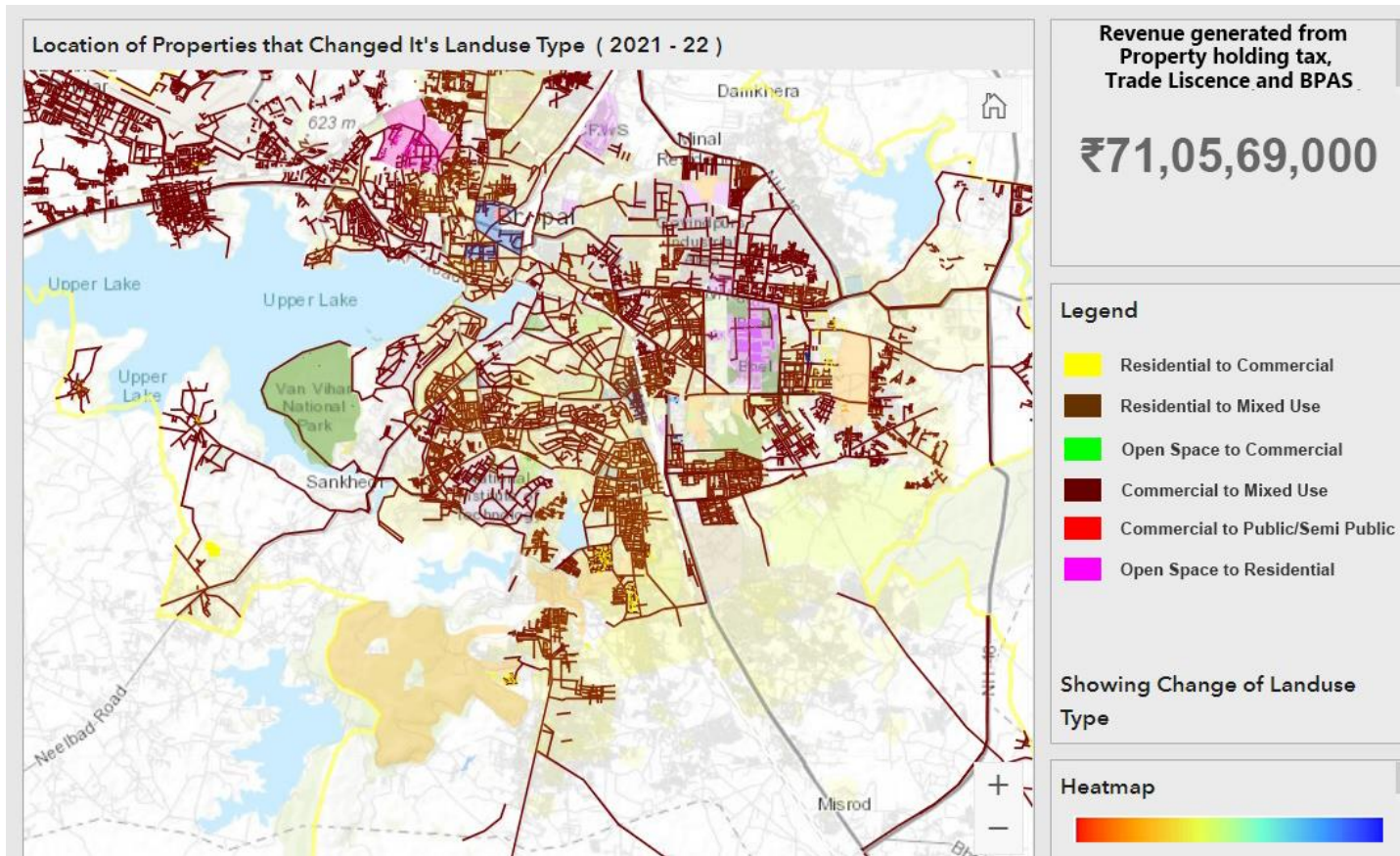
Ward No. ▾ LAND USE TYPE Period From ▾ To ▾ From ▾ To ▾ **GENERATE REPORT**

Sl.No.	Plot ID/DDN No.	Address	Owner Name		

The no. of properties that changed its land use type also generates a report that is useful for monitoring of specific areas to update the revenue or tax collection mechanism with the change in use. This will enable efficiency in monitoring specific grey areas in case of trade license, water bills, electricity bills, property tax.

## Dashboard Landing page (Admin)

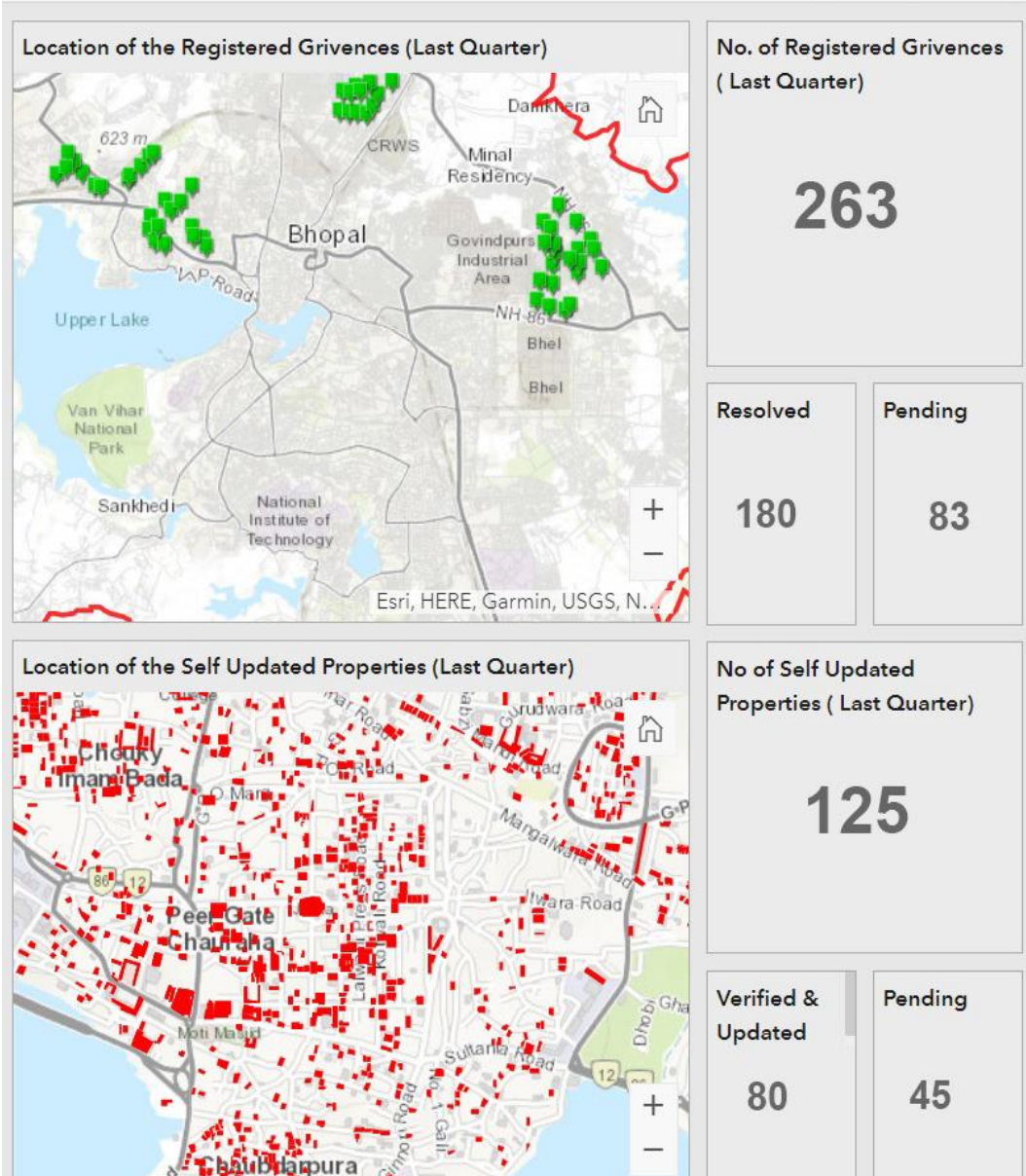
The **‘Revenue generated from trade license’** displays revenue generated from issuing trade license in the current year which gets updated with new addition.



The **‘Legend’** displays the nature of land use change that has occurred over a time period along with the number of properties in each category.

The **‘Heatmap’** displays the will generate a map showing the areas with rapid change in land use which along the report could be used to pinpoint verification for trade license and other taxes/charges that are based on land use.

## Dashboard Landing page (Admin)



The **'No. of Registered grievances'** displays the locations of different grievances raised and also generates a report for the same to track down the resolved and pending cases to act upon.

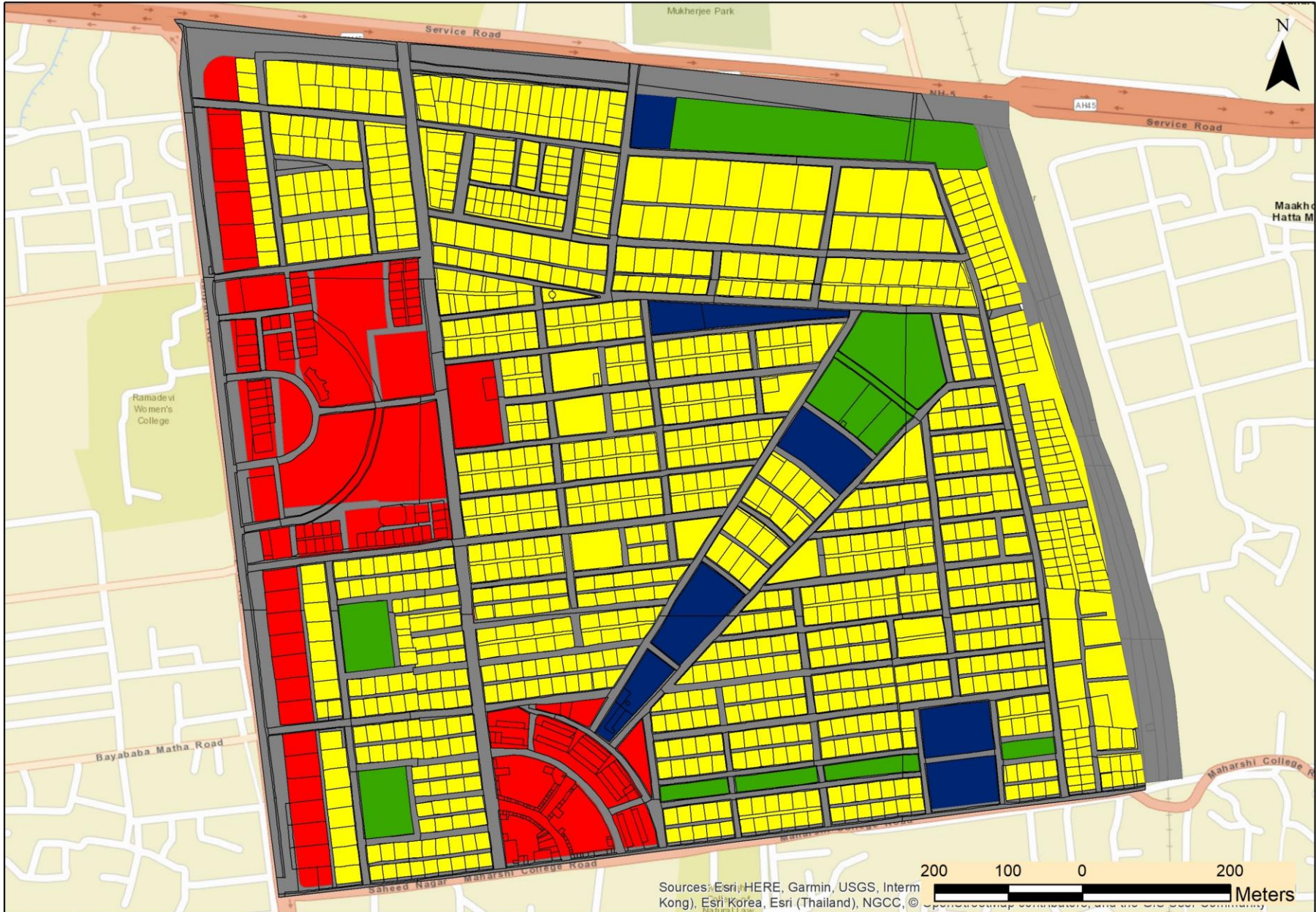
The **'Resolved & Pending'** tab displays the numeric values of cases that are resolved and pending.

The **'No. of self updated Properties'** displays spatially the locations of properties that have applied for self updating through the tab in Public viewing screen (quarterly). This information once verified by the officials can be marked as verified and updated.

The **'Verified and Pending'** tab displays the numeric values of properties that are verified and which are pending for verification.

# Test case for Ward No. 30 (Proposed Land use in CDP 2030)

The team has prepared test case to guide the likely outcome of subsequent wards in the city regarding land use.



## Legend

- Residential
- Commercial
- Public & Semi-Public
- Open Space
- Transportation

Sources: Esri, HERE, Garmin, USGS, Intermap, Swire, GeoBridges, Esri Korea, Esri (Thailand), NGCC, © Esri and its licensors, and the user community.



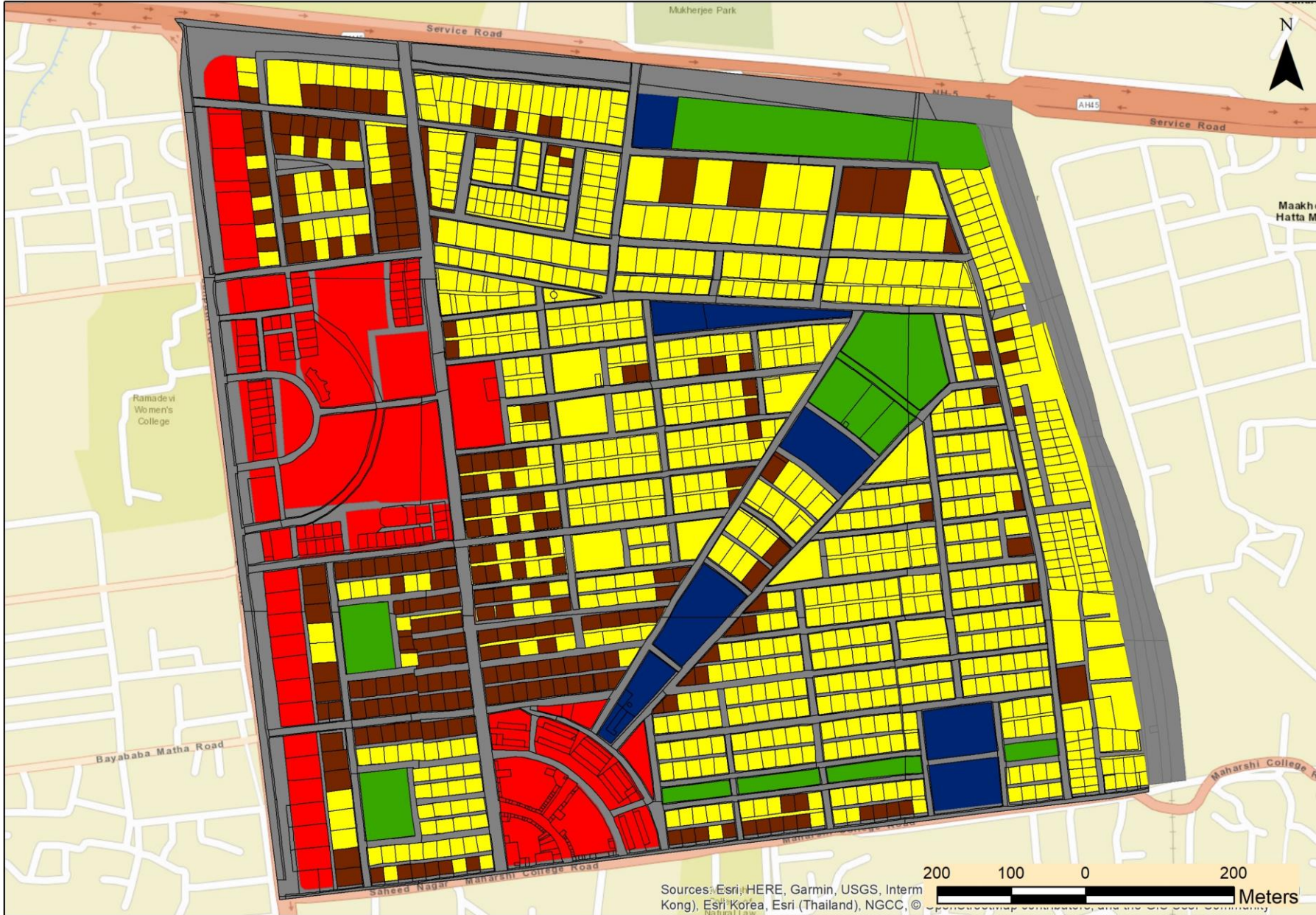
# Test case for Ward No. 30 (Plots with Trade license)



## Legend

 Trade license

# Pilot for Ward No. 30 (Present land use from Trade license & BPAS)



**Mixed Use Zone**

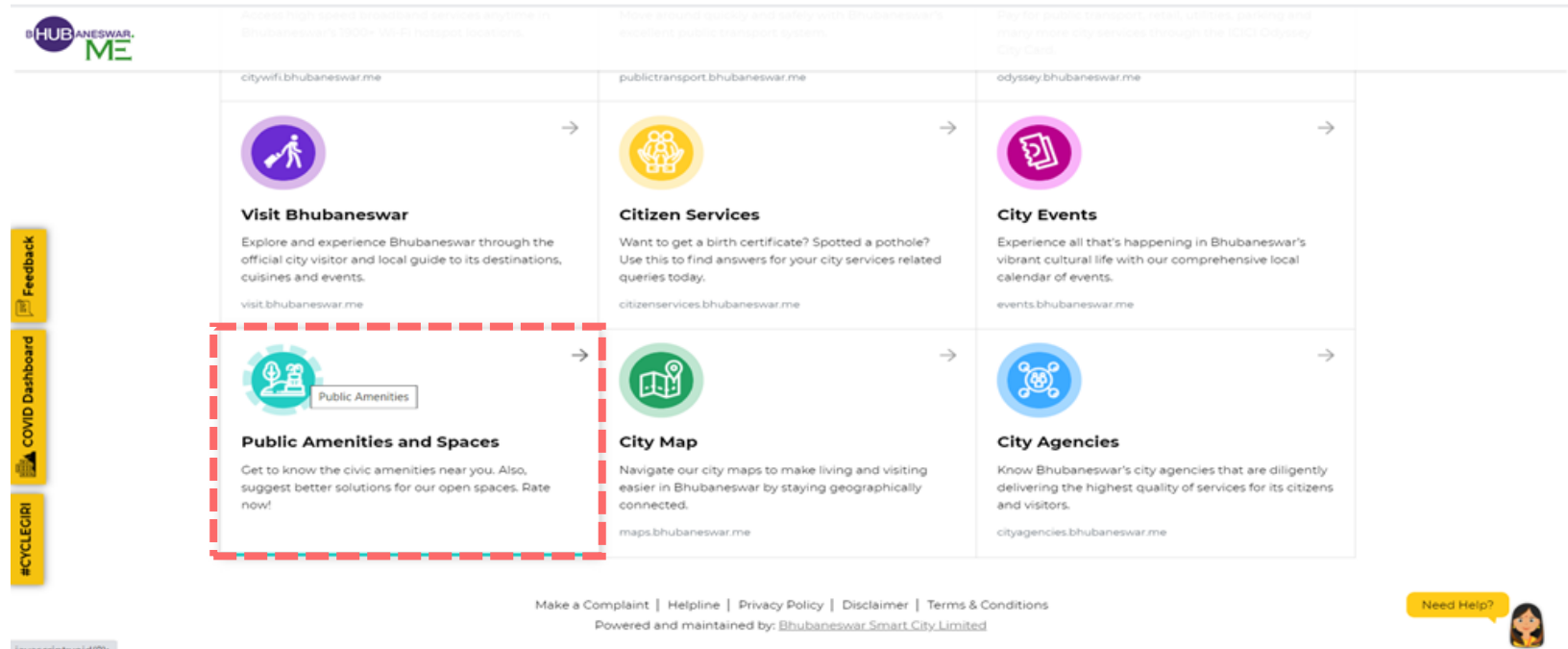
(Deviation Zone/ Organically Developing Zones)

## Legend

- Residential
- Mixed Use Zone**
- Commercial
- Public & Semi-Public
- Open Space
- Transportation

Sources: Esri, HERE, Garmin, USGS, Intermap, Esri Korea, Esri (Thailand), NGCC, © OpenStreetMap contributors, and the GIS User Community

## Project Pilot:



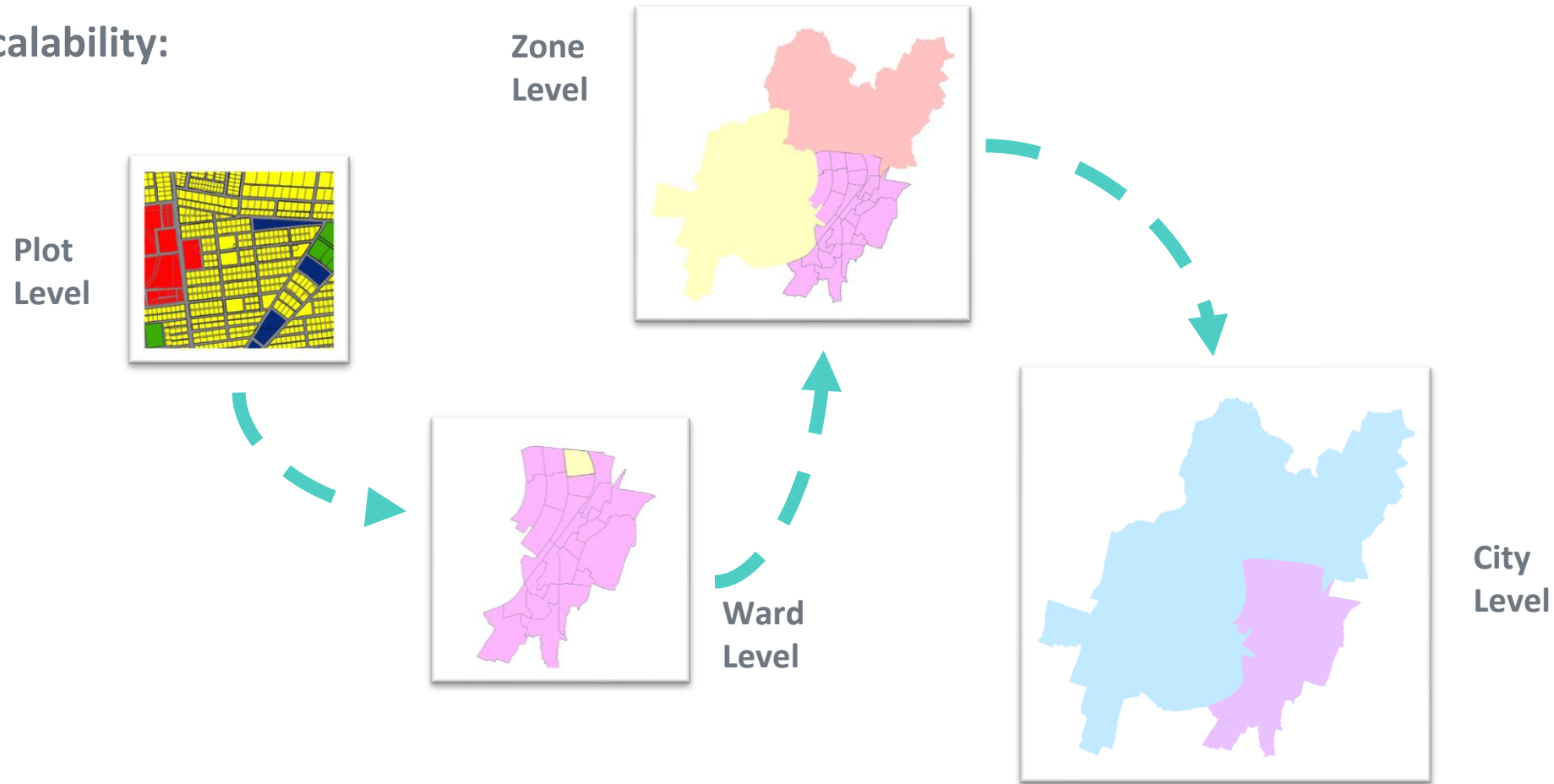
- Dashboard will be launched by the SPV to run the pilot with a tab on the Bhubaneswar Me Portal which will redirect to the BUILD page created in open source.
- The pilot will run for at least 15 days.
- For the purpose of testing groups will be assigned within SPV, BDA, BMC to view and record comments.
- Feedback will be collected once the pilot period is over to review and overcome shortfalls.

**\*\*The SPV has initiated the product development process and Honeywell-MSI-CSM is currently preparing the dashboard.**

## Project Benefits:

- Get an **updated land use base map** required for any physical planning process.
- It will enable them to **identify grey areas in city** in terms of trade license issue and other revenues which are based on land use, which can further boost the municipal revenue.
- Enable the ULB's to **identify the rapidly expanding areas** within a city for planning interventions.
- Create a **single platform for data sharing** by multiple departments to enable them to maintain data in uniform format.
- Land use change will enable WATCO & other Stakeholders to identify plots with changing land use to **check appropriate revenue collection**.
- They see a **potential of data trading** to private entities, research organizations and funding agencies dealing with urban sector projects.

## Project Scalability:



- The product is made in an open source platform that could be replicated in other cities with city specific inputs following the Standard Operating Procedure (SOP).
- The product shows granular plot level land use information which is then augmented at ward, zonal and city level to derive a holistic information for decision making. It can be further scaled up by value addition in Build 2.0.

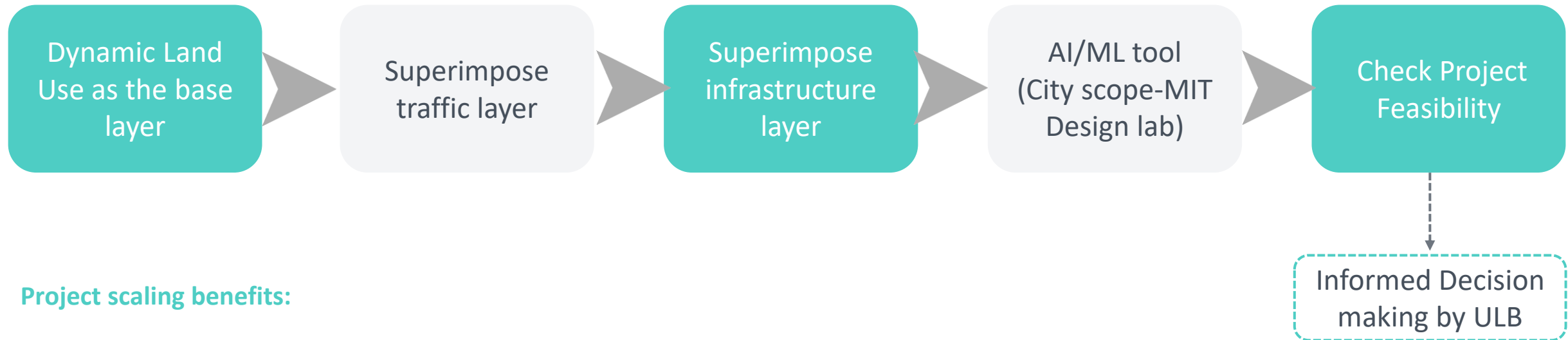
3.

**BUILD 2.0**

Build 2.0  
Project challenges  
Meeting the officials  
Team

## Build 2.0 : Value addition to Build 1.0

To develop a tool for **assessing the impact** of a project on different parameters (physical infrastructure, traffic and transportation, environment) analyze its **feasibility** and thereby enabling ULB's to make **informed decision making**.



### Project scaling benefits:

- This will provide opportunity for Urban Planners to **practice stimulations** and further anticipate the impacts of various Urban Development programs to facilitate an informed decision. Adoption of such modern tools possesses a significant potential to enable the city to act more **sustainably and strategically**, whereas augmenting the inclusion aspect in the planning process.
- If we could test everything in a virtual model before implementing, it would **lower costs and the chances of failing** in the real world. Testing and prototyping can improve a city's resilience dramatically.

## Project Challenges:

- Connecting the Nodal officer was difficult and deployment date was delayed.
- Decoding and Procurement of built use information was difficult.
- There is a gap between the CDP land use and the existing land use upon field survey.
- The dataset of trade license, property holding tax and BPAS is not having uniform format.
- There is address mismatch in the dataset of BPAS and trade license for an individual plot.
- Infrastructure dataset is segregated and unstructured, in many case it is maintained in paper format.
- Infrastructure dataset are maintained by different agencies and even the format of maintaining the dataset is different from one department to another.



Meeting the officials:



# Social Media Coverage (Tweet by BSCL) :

**iscf** Ministry of Housing and Urban Affairs  
**Smart City**  
**Ministry of Housing and Urban Affairs** Government of India  
**NIUA** National Institute of Urban Affairs  
**BHUBANESWAR Smart**  
**BUILD**

## Under the India Smart City Fellow Program Team Build

(Building Urban Integrated Land use Dynamics)

**Joydip Datta**  
Geographer & GIS Expert

**Pritam Patnaik**  
Architect & Environmental Planner

**Jash Goswami**  
Civil Engineer & Infrastructure Planner

**Archit Nishant**  
Architect & Urban Planner

### Developing a dynamic land-use model for Bhubaneswar to analyze & monitor the change in land use in real time

1 3 15

**Smart Bhubaneswar** @BSCL\_BBSR

Under the India Smart Cities Fellowship Program, Team BUILD(Building Urban Integrated Land Use Dynamics) is developing a dynamic land-use model for Bhubaneswar to help the administration in analyzing & monitoring the change in land use in real-time with the help of a digital tool

5:34 PM · Mar 4, 2021 · Twitter Web App


3 Retweets 15 Likes


**Smart Bhubanes...** · 15h

Replying to @BSCL\_BBSR


It will help the administration to undertake data-driven urban planning to ensure the sustainable and equitable growth of the city. Citizens can also get benefits while buying plots by tracking the usability of the plots with the help of this tool.



# Social Media Coverage (Facebook & Instagram by BSCL) :







 Search Facebook

 **Bhubaneswar - Smart City**  
30 mins · 🌐





Under the India Smart Cities Fellowship Program, Team BUILD (Building Urban Integrated Land Use Dynamics) is developing a dynamic land-use model for Bhubaneswar City to help the administration in analyzing & monitoring the change in land use in real-time with the help of a digital tool. It will help the administration to undertake data-driven urban planning to ensure sustainable and equitable growth of the city. Citizens can also get benefits while buying plots by tracking the usability of the plots with the help of this tool.

 Search

**Under the India Smart City Fellow Program  
Team Build**  
(Building Urban Integrated Land use Dynamics)


**Joydip Datta**  
Geographer & GIS Expert


**Pritam Patnaik**  
Architect & Environmental Planner

**Jash Goswami**  
Civil Engineer & Infrastructure Planner

**Archit Nishant**  
Architect & Urban Planner

**Developing a dynamic land-use model  
for Bhubaneswar  
to analyze & monitor the change  
in land use in real time**

 **smartcitybhubaneswar** • Follow

 **smartcitybhubaneswar** Under the India Smart Cities Fellowship Program, Team BUILD (Building Urban Integrated Land Use Dynamics) is developing a dynamic land-use model for Bhubaneswar City to help the administration in analyzing & monitoring the change in land use in real-time with the help of a digital tool. It will help the administration to undertake data-driven urban planning to ensure sustainable and equitable growth of the city. Citizens can also get benefits while buying plots by tracking the usability of the plots with the help of this tool.

#smartcity #landuse #landuseplanning

👍 🗨️ 📌

24 likes  
28 MINUTES AGO

Log in to like or comment.

Meet the Team:



**Joydip Datta**  
Geographer & GIS Expert



**Pritam Patnaik**  
Architect & Environmental Planner



**Jash Goswami**  
Civil Engineer & Urban  
Planner



**Archit Nishant**  
Architect & Urban Planner

**External Mentor:**  
Dr.Saswat Bandyopadhyay  
Professor - CEPT University

**Internal Mentor:**  
Nilesh Rajadhyaksha & Kanak Tiwari  
Project Coordinator MPD 2041, NIUA

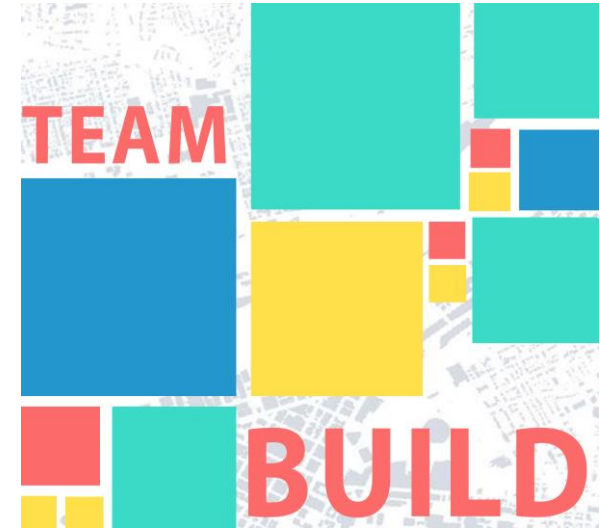
## For more information



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Thank You