CASE STUDY

ArcGIS Enabling Evidence-based Decision-making at Lucknow Development Authority

Client
Lucknow Development Authority

Industry
Urban

Project
Urban Vista Lucknow; A comprehensive GIS Portal

Organization Profile
The Lucknow Development Authority (LDA) is a statutory body established under the Uttar Pradesh Urban Planning and Development Act, 1973, tasked with planning and overseeing the city's structured development. Its mandate includes land acquisition and development, housing and infrastructure projects, enforcement of zoning and building regulations, and implementing the city's master plan. Its core functions include:

- Formulating and implementing the Master Plan for urban growth.
- Developing housing schemes and planned neighborhoods.
- Land acquisition and management.
- Infrastructure provisioning and public amenity creation.
- Enforcement of land-use and construction norms.

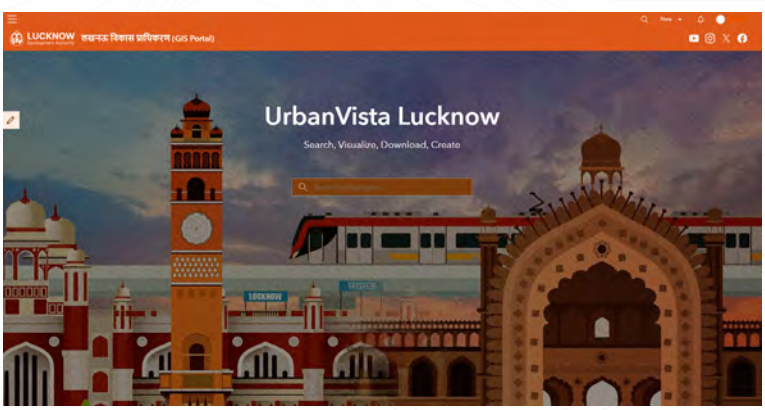
LDA works to balance sustainable urban growth, affordable housing, and civic infrastructure enhancement as Lucknow expands.

Website
www.ldalucknow.in

Project Summary
The GIS-based Governance Model used by Lucknow Development Authority is one of the best practices that highlights how the use GIS can lead to effective outcomes in urban planning, development and management.

Urban Vista Lucknow, built on ArcGIS technology (a leading geographic information system framework for mapping and spatial analysis) enables LDA planners, government officials, and the public to view, query, and access authoritative spatial data tied to land parcels, road networks, utilities, and city master plan maps. The system consolidates disparate land and planning information into a single, interactive GIS interface to support evidence-based decision making across urban planning functions. ArcGIS integrates spatial layers with attribute metadata to manage, analyze, and display urban development information.

The portal presents a synoptic view of existing landuse and the Master Plan of Lucknow. There are a series of Web Apps and maps pertaining to Cadastral Land, Property Allotment, Nazool land and Master Plan projects. It involves satellite image-based interpretation of landuse and change detection on plot layouts. There are also Mobile Apps for data collection about Projects and Nazool Land. There are also public apps, such as, for Parks and Monuments.



Challenges
Before GIS and digital mapping tools were integrated into its planning workflow, LDA faced several operational and governance challenges:

Fragmented Land and Planning Data: Landuse maps, land records, ownership details, zoning classifications, and infrastructure layouts were stored across multiple departments in LDA. There was no single system to view the data. This hampered quick, reliable access for planning and approvals. A single source of truth was missing.

Limited Transparency and Accessibility: Property buyers and applicants lacked access to verified land-use and master plan information online, leading to confusion and fraudulent transactions where plots were misrepresented (e.g., green belt/road land marketed as residential). The absence of an easy, authoritative land-use verification system fuelled disputes and mistrust.

Manual Processes and Inefficient Governance: Workflow processes, including land allotments, application tracking, map approvals, and NOC issuance, were largely manual or relied on ERP systems. This led to long waiting times (often months) for approvals, several office visits, and a lot of paperwork for applicants, bottlenecks, and inconsistent decision-making due to the lack of a centralized spatial context. These constraints increased administrative burden and lowered responsiveness in urban planning operations.

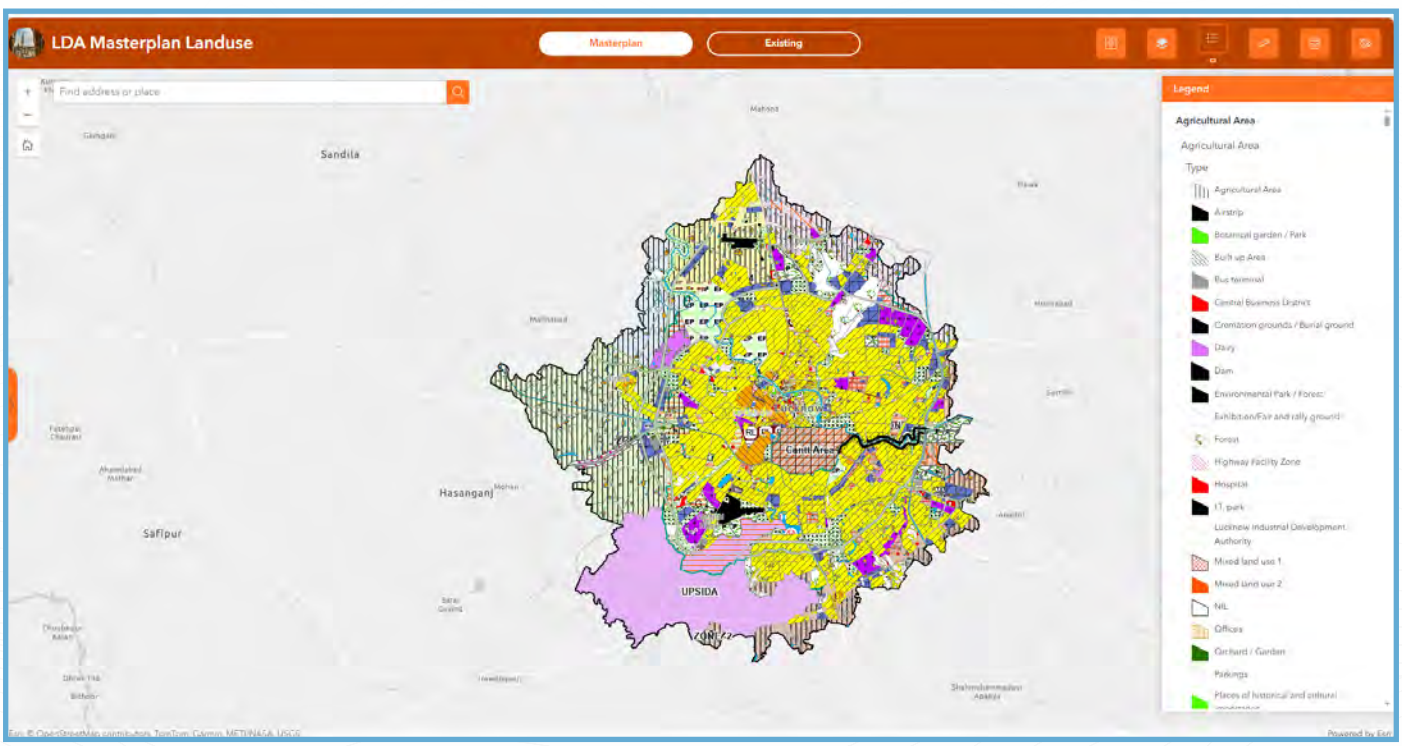
The Solution

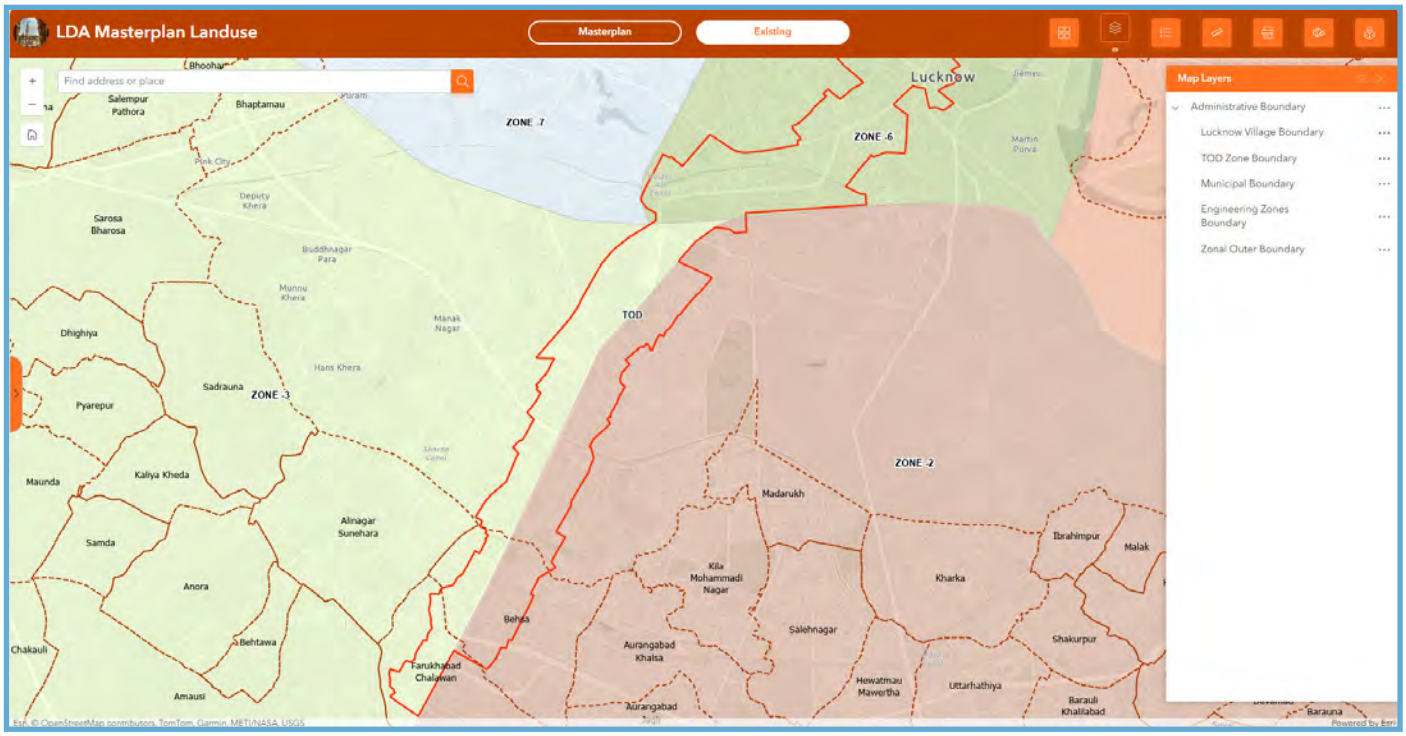
Esri India's holistic solution efficiently resolved the challenges faced by LDA through a single window-enabled GIS portal.

The following measures were taken to address the challenges:

Data Model Design: Implementation of a robust data model for structured data management and seamless integration with the existing ERP system for Property Status Update.

Data Publishing: Smooth transition of existing data from the conventional system of GIS to the Single Window Web GIS to bring the existing Landuse, Master Plan, Masterplan Projects, Nazool Land, Cadastral maps, all georeferenced at one single portal.





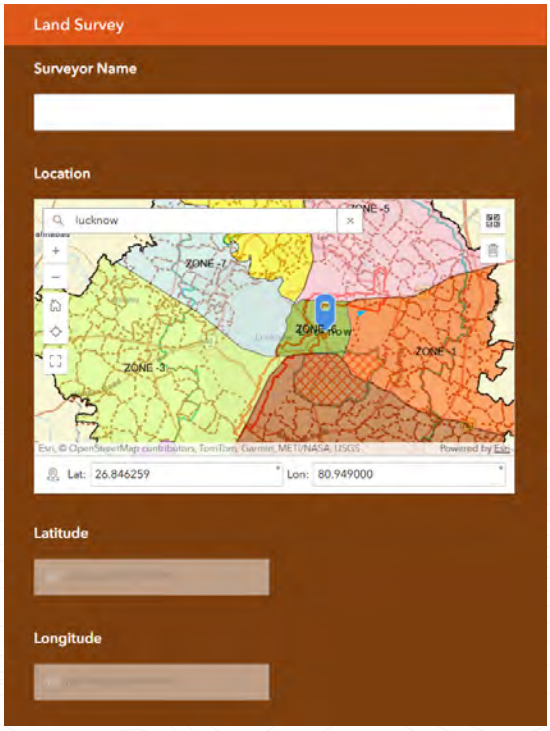
Data Preparation/Publishing: Facilitation of accurate data preparation and publishing, ensuring data reliability within the GIS framework.

Web Application Development: Creation of intuitive web applications for simplified access and visualization of geospatial data, streamlining monitoring and management of land use and assets of LDA.

Mobile App for Survey: Integration of a mobile application for Geotagging of projects and Nazool Land, enabling efficient data collection and real-time updates for urban management. Dashboards: Development of interactive dashboards offering stakeholders comprehensive insights and real-time updates on various operational aspects, fostering data-driven decision-making.

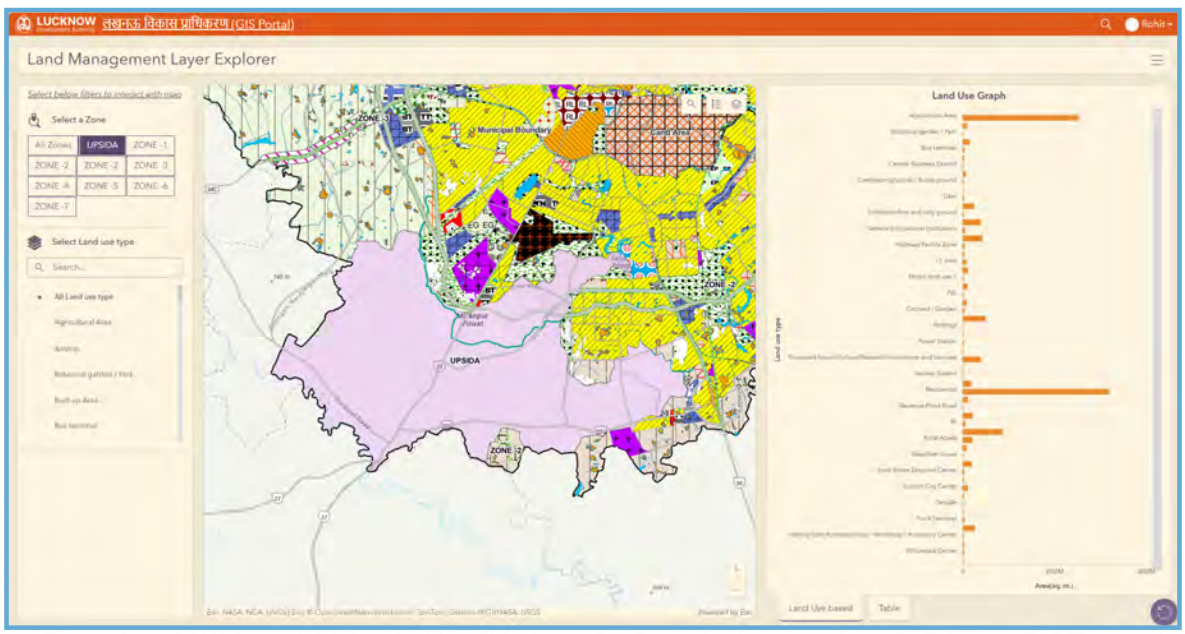
Integration with ERP: This includes integrating ERP APIs, enabling the department to embed property allotment data into Layout Files.

User-Level Training on Developed Applications: Conducting comprehensive training sessions for users to ensure proficiency in utilizing the newly developed applications, fostering self-sufficiency, and promoting the widespread adoption of the GIS platform within the organization.

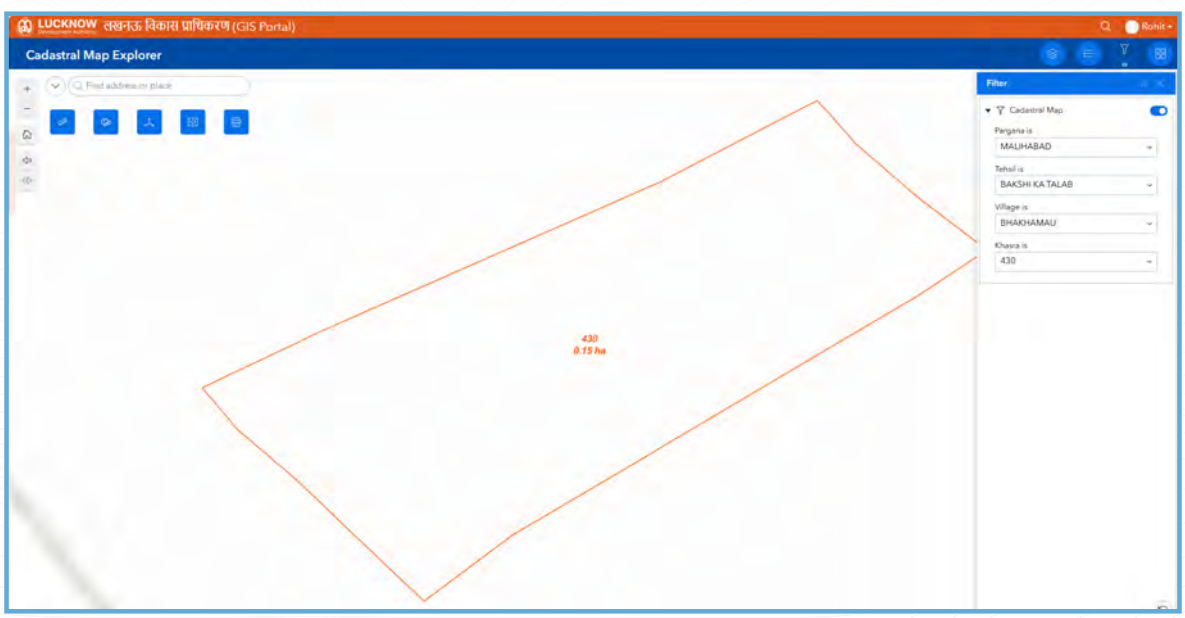


The solution includes a suite of web applications:

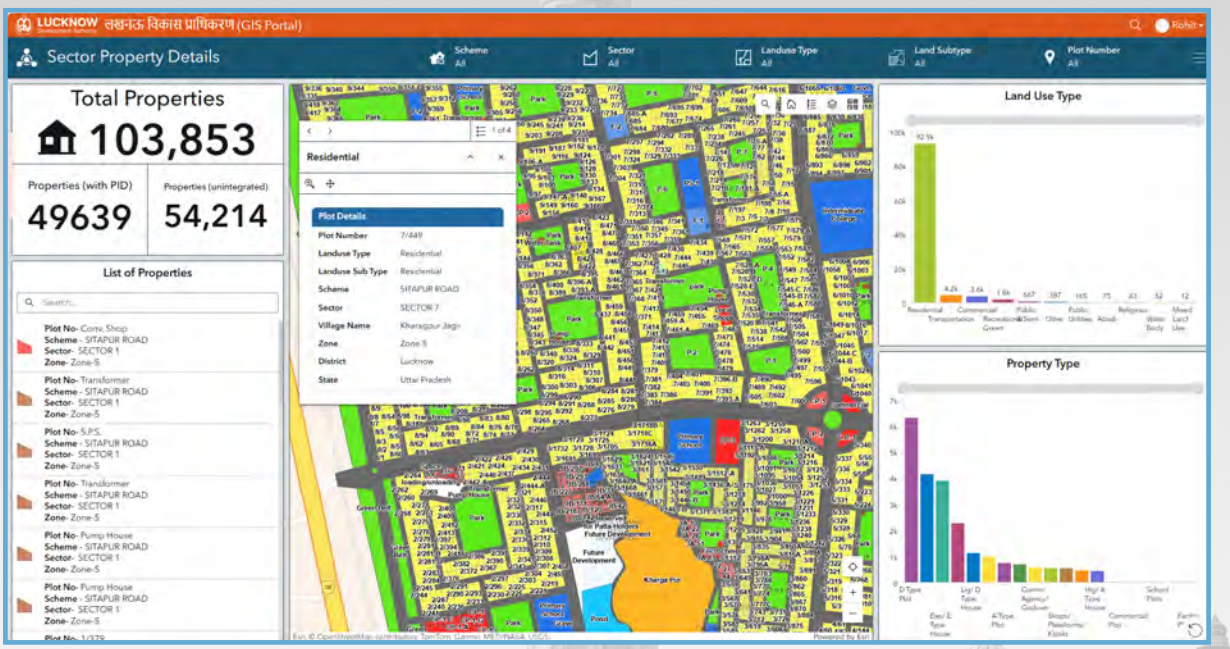
- Land Management Layer Explorer, a Dashboard for selecting types of landuse in different zones.
- Cadastral Map Explorer with the query to filter out individual parcel-level details.
- Sector Explorer with Integration with Property ERP for updated data about the plots.
- Nazool Land Explorer with maps of Nazool land published on the Web App.
- Park Locator for Parks under LDA.
- Monument Explorer with details of historical monuments in Lucknow, projects in LDA with geotagging, and the details of each project undertaken in Lucknow by LDA.
- Imagery Web Apps involving change detection through WayBack Imageries of Esri, whereby the Changes in Layout Maps over the years can be visualized.
- Sentinel 2 Land Cover Explorer showing the urban growth of Lucknow over the years.



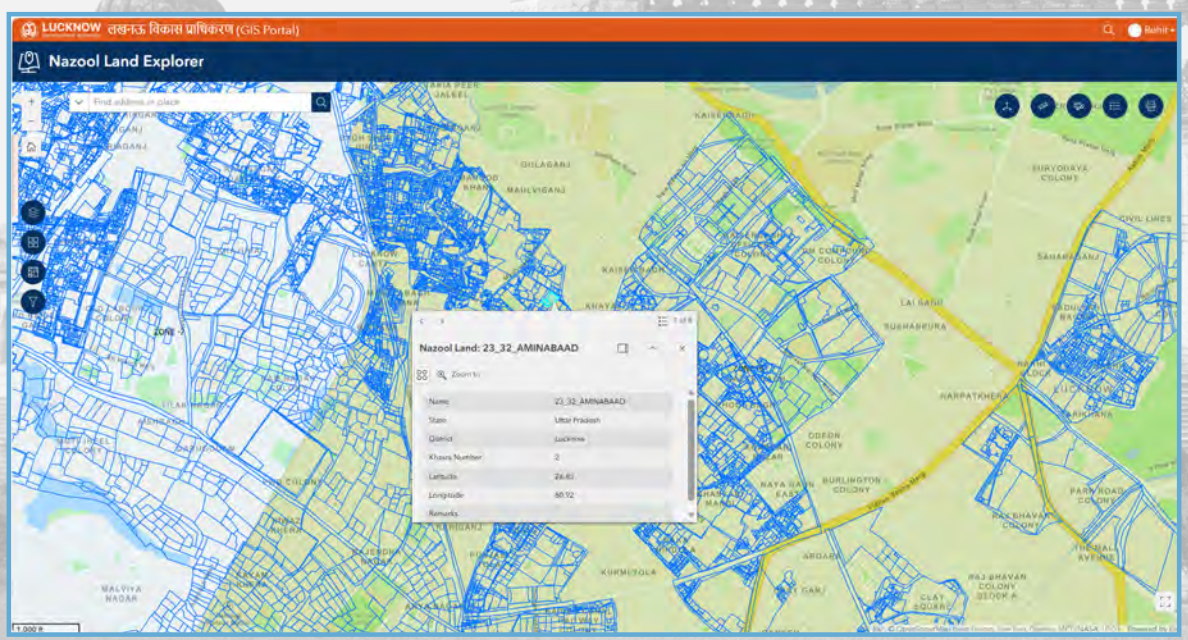
Land Management Explorer



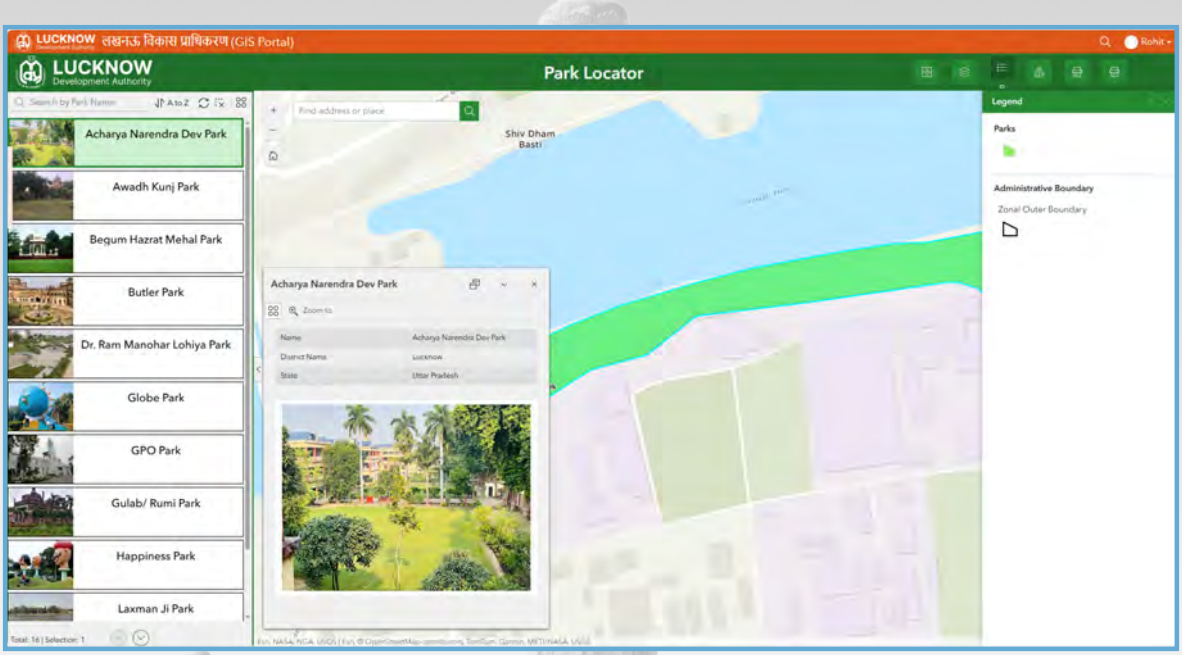
Cadastral Map Explorer



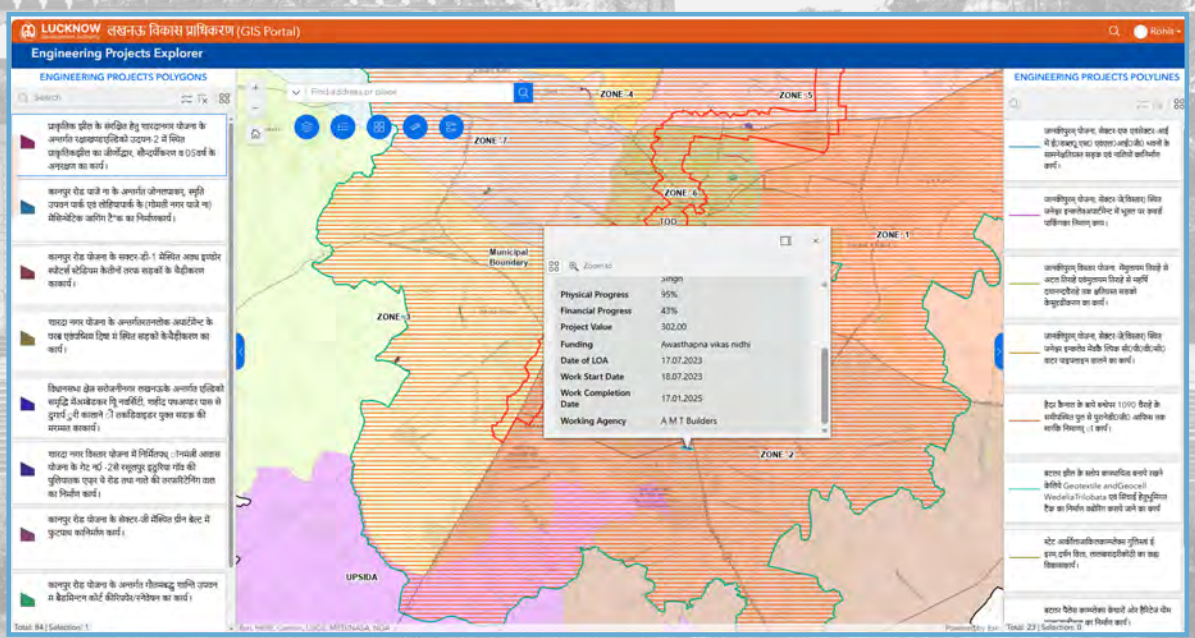
Sector Explorer



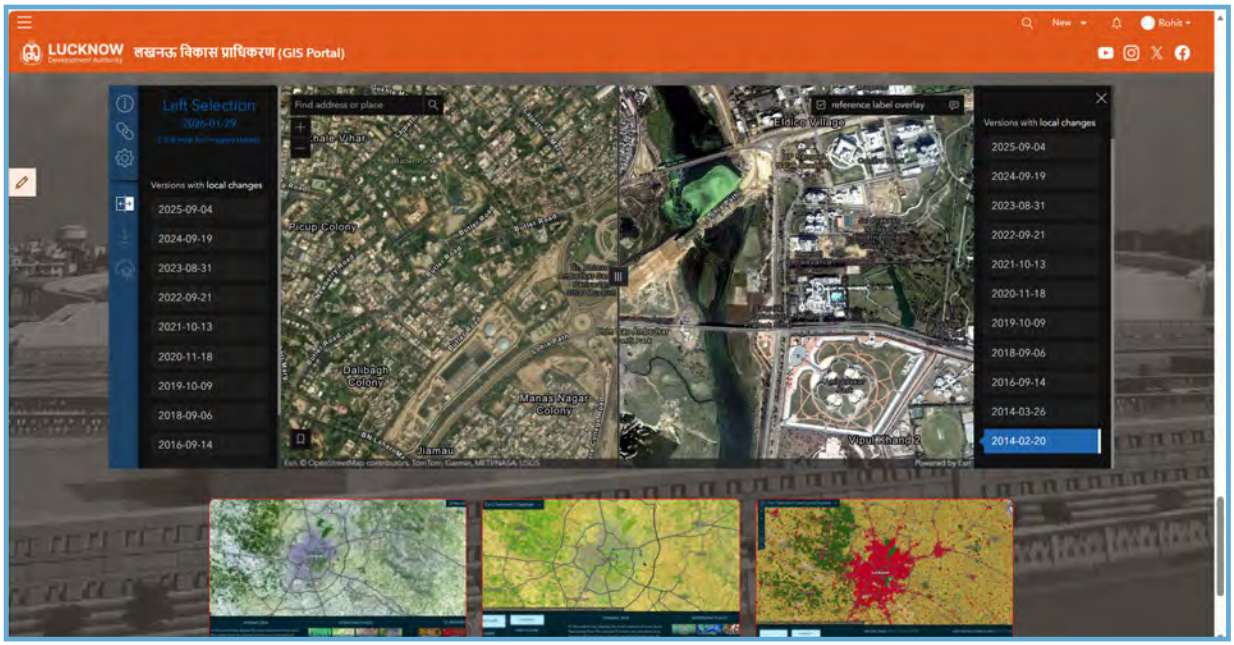
Nazool Land Explorer



Park Locator



Engineering Projects Explorer



Change Detection

These web applications have collectively contributed to the overall efficiency and transparency of the LDA's operations, promoting enhanced service delivery and streamlined administrative processes. They have enabled LDA to expand public outreach capabilities and gain a comprehensive visualization of existing landuse and Master Plan landuses on a single platform.

Benefits

Visualization of LDA's Planning, Engineering, Lands, and Properties data: The GIS solution enables visualization of LDA's planning, engineering, land, and property data in a single location, with metadata on a comprehensive GIS map, incorporating essential geodata for enhanced spatial analysis and informed decision-making.

Integration with Online Applications: The system's integration with various online applications enables the display of thematic maps, providing updated status information for projects in LDA, ensuring transparency and streamlined workflows. The integration with ERP ensures that updated information on the properties allotted by LDA is continuously available.

Simplified Information Management: The GIS tool simplifies the overall process of compiling, handling, manipulating, interpreting, and distributing information for the department, fostering improved data management and operational efficiency.

Enhanced Communication and Decision-Making: The strengthened communication and decision-making systems facilitated by the GIS solution promote better collaboration among stakeholders, leading to more informed and effective decision-making processes within the LDA.

Streamlined Resource Management: The sourced information through the GIS platform significantly eases day-to-day resource management, providing valuable insights for efficient resource allocation and utilization, thereby improving operational efficacy and resource optimization.

> “Urban Vista Lucknow, built on ArcGIS, has helped us to bring land, infrastructure, and planning intelligence together on a single platform. This, in turn, has enabled transparent, data-driven decisions across urban planning functions within LDA.”
>
> **- Shri. Prathamesh Kumar, IAS, Vice Chairman, Lucknow Development Authority**