



**Implementation of**  
**UDAAN**  
**Integrated GIS enabled**  
**Municipal e-Governance Application (Udaan iMEGA)**  
**Under JNNURM**  
**for**  
**Nanded Waghala City Municipal Corporation**

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**CLIENT:** Nanded Waghala City Municipal Corporation

**LOCATION:** India

### **CLIENT DESCRIPTION**

Nanded Waghala City Municipal Corporation (NWCMC) was established on 26th March 1997, by merging Nanded Municipal Council and adjoining Waghala Municipal Council. The Corporation is constituted under the provisions of Bombay Provincial Municipal Corporations Act, 1949 and is also governed by the provisions of 74th Constitutional Amendments Act 1992 (CAA). In addition to the Waghala Municipal Council, Vasarni Village, Kautha Village, Asarjan Village, Fatehjangpur Village, Asadwan Village and CIDCO and HUDCO colonies areas were merged with the NWCMC:

The total area under the NWCMC jurisdiction is 51.76 Sq.km, (5,176.66 Ha). Nanded City is divided in two parts i.e. Old Nanded (20.62 Sq.km) north of the Godavari river (on the left bank ) and New Nanded (31.14 Sq.km) comprising of Waghala and six other newly merged villages and CIDCO area, south of the Godavari river (on the right bank).

### **NEED FOR E-GOVERNANCE AT NWCMC**

The NWCMC has incited the National E-Governance plan for introduction of IT and e-Governance in the local body with vision and mission of the project to establish people centered, responsive, financially sound, well governed, viable and sustainable municipalities provide a single, easy, secure, integrated, and reliable means of access to municipal information and services in order to provide to continuously improve the quality of service from government to citizen (G2C) and Government to Business (G2B) in Nanded Waghala city.

### **THE KEY OBJECTIVE OF THE PROJECT INCLUDES:**

- Provide Single Window services to citizens on anytime, anywhere basis
- Increase the efficiency and productivity of ULB's
- Provide a single and integrated view of ULB information system across all ULBs in the state
- Provide timely & reliable management information relating to municipal administrator for effective decision making
- Adopt a standards-based approach to enable integrated with related application

### **FOLLOWING ARE THE OBJECTIVE OF THE e-GOVERNANCE MISSION OF THE NWCMC:**

- Integrating the departmental activity with a common application platform
- Improving the Citizen (front end) services and expanding the delivery channels
- Instituting the community system for sustaining and strengthening service delivery

- Establishing Back end system for office management and accounting
- Creating Community Information System
- Handling Standardization of data and quality of legacy data
- Building Integrated Back end database
- Creating Resource Information System and providing developmental services
- Undertaking Capacity Building
- Arriving at Business Delivery Models
- Integration with Other existing modules
- Confirming With Standards
- Integrating the day to day municipal activities with Geospatial insight for better decision support system

### PROJECT SCOPE

To fulfill the above objective following are the defined scope of work:

- Create an integrated design of GIS based model for e-Governance for the Municipal Corporation which can even be replicated by other corporations.
- Design, develop, deploy and maintain various e-governance modules to support the activities of Municipal Corporation
- Create a GIS based map of the city from High resolution Satellite Image and typical GIS survey Methodology and integrate that with the various e-governance modules.
- Provide managed hosting services for storage and processing
- Carry out the BPR and change management including motivational and software user level training for municipal staff and officers on an ongoing basis and conduct software training for municipal staff and officers on an ongoing basis
- Annual Operation and Maintenance for 5 years

### SOLUTION:

We proposed to use a complete new set of application in the open source technology; the data on the legacy system will be migrated via data dictionaries. It will have an e-Governance suite comprising for modules for:

- Birth and death registration
- Payment of property Tax, Municipal Tax, Other Utilities Bills/Services and Management of Utilities that come under the ULBs
  - Property Tax
  - Water Supply
  - Municipal Tax
  - Other utilities Bills/Services

- Citizen Grievance Redressal
- Project Ward Works
- e-Procurement
- Water Supply
- Building Plan approval
- Health
  - Licensing
  - Solid Waste Management
- Financial Accounting
- Personnel Information System

We have a service delivery Portal for access to information, downloading of Forms, online form, submission, online bill submission, grievance management and feedback system.

The executive information through personal dashboard, is created on enterprises platform to provide Business intelligence support by giving quick review of the things, it also provide alerts about pending decisions and have drill down facilities to review work of every allied department of the municipality.

There is a document management system, which facilitates scanning of the documents and generation of work flow management for easier decision support system.

For GIS Mapping of city, high resolution satellite image was procured by NWCMC and the base map was created and updated by field survey using GPS, Rodometer and Compass. It involves the geospatial information related to each property, household, utility, Infrastructure and landuse of the city. These maps and information collected from Household survey are then captured in Enterprises database and linked to the modules of property tax and utility taxes.

The solution also involve Data Center establishment at a three tier where application will be centrally deployed for the access by different department and circle office of Municipality.

Vayam provided complete handholding support to NWCMC through training of the application modules, the future updation, Management in future to the Municipality of Nanded Wahala Municipal Corporation.

## **GIS ENABLEMENT OF E-GOVERNANCE AND ITS BENEFITS**

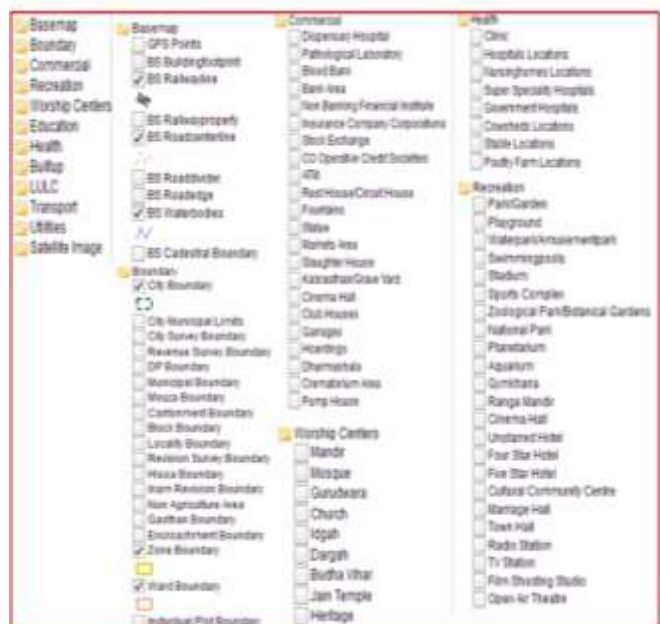
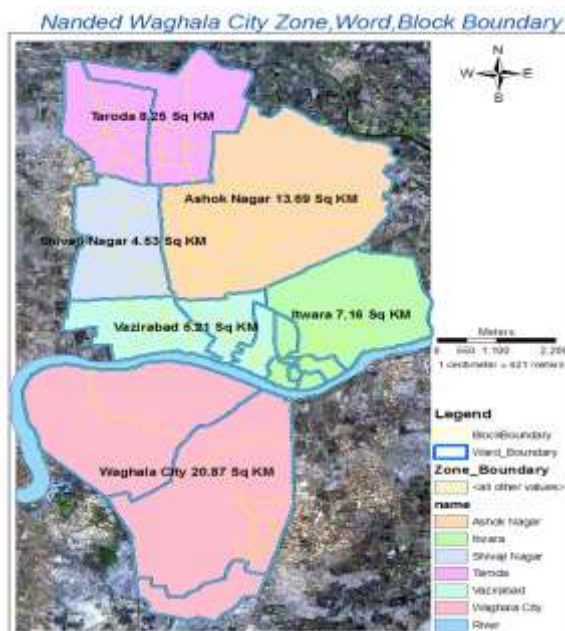
### **Why GIS enabled e-governance for municipalities?**

Municipalities in India are plagued by the acute problem of low tax generation and demand supply gap of municipal services, as they are unaware of “What Lies where?” It is a huge task to manage Property Tax, Birth and Death Registration, Socio Economic Data management and Holding registration.

GIS technology comes to rescue the mess in municipalities through its power of visualization and linking of various records. In GIS the database possesses attributes of each individual property with information such as land owner, co-owner, mailing & permanent address, house style, built year, individual room measurements, compliance with the regulations of the building authorities, public/private utilities mapping to the plot, street characteristics and amenities. Similarly the utility and infrastructure are mapped with attributes like location details, engineering details, flow details, connectivity details.

GIS system provides power of visualization of the assets integrated with its attribute to do spatial analysis of the property and assets through Query and subsequent thematic representation and Custom built reports. This enhances the revenue by property location based tracking of taxes; bring significant level of transparency and efficiency in the working of municipal bodies. The spatial representation also enforces a better decision support system through visual analysis like where the schools and health facilities are required in the city, where parking facilities are clogged, which part of the city has traffic problems due to narrow roads, how the water supply can be optimized to meet the demand in all parts of the city.

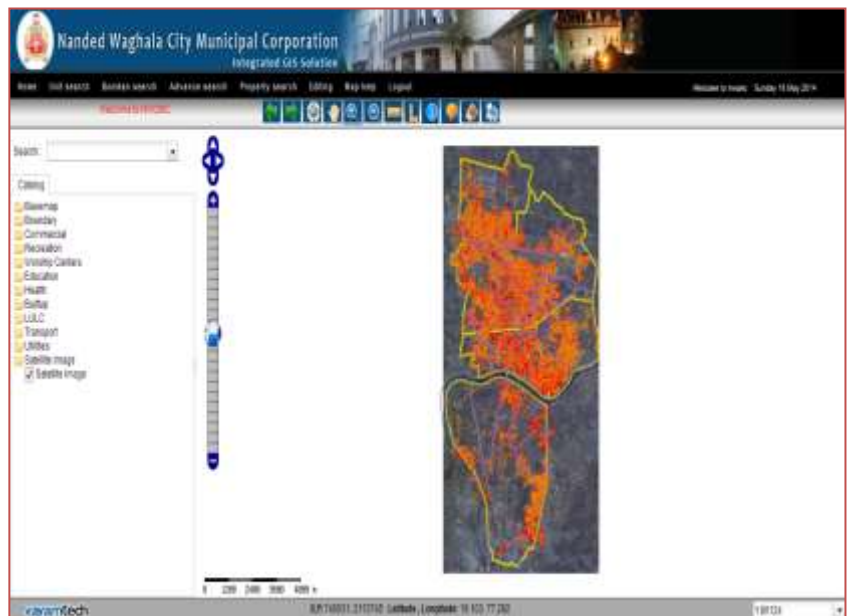
For NWCMC a total of 274 layers have been captured under 11 categories for Management through Spatial information about the city.





**SCOPE OF ACTIVITIES COVERED UNDER THIS PROJECT:**

- Procurement of high resolution pan-sharpened QuickBird / comparable Satellite Images (0.6 Mts Resolution) for the area under NWCMC, to capture buildings / Properties
- Collection of reference maps viz, existing base maps, Revenue maps, SOI Toposheet including municipal zone (existing and proposed)/Tax Zone/ Ward boundary map/utilities area (like water, drainage) approximately covering 60 sq.km
- Evaluation of Input data such as source and reliability, positional accuracy, attribute authenticity, etc.
- Collection of adequate number of (say 2 per sq km) Ground Control Points (GCPs) through Global Positioning System (GPS) survey / from Public Domain
- Post processing of ground control data
- Geo-referencing of satellite imagery using sufficient number of Ground Control Points (GCPs) collected through GPS survey/from Public Domain





- Scanning and geo-referencing of Cadastral (Revenue) and reference Maps;
- Interpretation and digitization of satellite data in the different layers. The digitization process shall include vectorization, symbolization, layering, edge matching, topological integrity, and data base linking;
- Generating of GIS base map using the high resolution satellite images;
- Field verification to update the features, which are not visible on the satellite images;
- Production of draft base map with different layers (e.g. property layer along with unique IDs.);
- Incorporation of tax zone, ward, municipal area, electoral area existing and proposed planning area boundary etc;
- Preparation of final GIS base map incorporating corrections;
- Developing a Web GIS Application for integration with different modules of e-Governance:
  - Property Module
  - Water Tax Module
  - Grievances Module
  - Solid waste Module
  - Assets Management
  - Works Management
  - Trade Licenses

#### **GIS INTEGRATED E-GOVERNANCE:**

We hereby take the case of Property Tax as a sample and describe as to how the GIS integration with property tax has taken place. And how it has provided value added decision support system

**There are two ways to explore into Geospatial data for Property Tax management system: Either it can be entered through e-Governance application or through GIS portal**

**PROPERTY MODULE:** In property module, provision has been made for citizens to enter into e-governance application through his property location over map and pay the Tax; the citizen may spatially locate his property and find its detail in GIS and then can enter into e-governance application to pay the taxes. The citizen may search his property using PIN or Plot Number or Name.

While NWCMC officials select the Property Owner on the basis of:

- Administrative boundary
  - Zone
  - Word
  - Block/Locality
- Property Index Number
- Property tax range selection
- Period Selection

- Who has paid, not paid.

**Nanded Waghala City Municipal Corporation**  
Integrated GIS Solution

Home | Mail search | Basemap search | Advance search | Property search | Editing | Map help | Logout

Welcome to users Sunday 18 May 2014

Search:

Category: Identify

Back to Settings

Property Details(Information)

Pin: 4051106769  
Property No: 443  
Owner Name: शिवाजी / इंदिरा नगर  
Building Name: N/A  
Address: 443, शिवाजी नगर  
Construction Area: 117.00  
Plot Area: 340.00  
No of floors: 1  
Const Type: N/A  
Ward No: 11  
Zone Name: 5  
Property tax  
Water tax  
Grivence

Search by pin/owner name/plot no

Pin: 4051106769 Owner name Plots Submit

Total properties : 1

S.no.	Pin	Plot no	Owner name	Address	Building type	Building name	Floor no	Legal	Plot area	Constructed area	Property tax	Navigation to eGovernance	Map link
1	4051106769	N/A	शिवाजी / इंदिरा नगर	443, शिवाजी नगर	Residential	N/A	1	legal	340.00	117.00	356.00	Property tax Search Ledger	Zoom to map

Print

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**Nanded Waghala City Municipal Corporation**

Home | Mail search | Boolean search

Select layer: Individual plot boundary (Select layer for searching)

Property: Property tax over Operator: + Value: 10

Property tax over 10 AND Property tax under 250

Add to query Clear

Search

Total properties : 158

S.no.	Pin	Plot no	Owner name	Address	Building type	Building name	Floor no	Legal	Plot area	Constructed area	Property tax	Navigation to eGovernance
1	4010103315	N/A	शिवाजी / इंदिरा नगर	677, शांतीनगर	Residential	N/A	3	legal	0.00	0	212.00	Property tax Search Ledger

Print

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### WATER TAX MODULE:

Similarly in Water Tax module the consumer can be directed to access the following:

- a. Water Charges-> Search Connection Page
- b. Water Charges-> Search online receipts
- c. Water Charges-> Search Ledger
- d. Water Charges-> Pay online Page

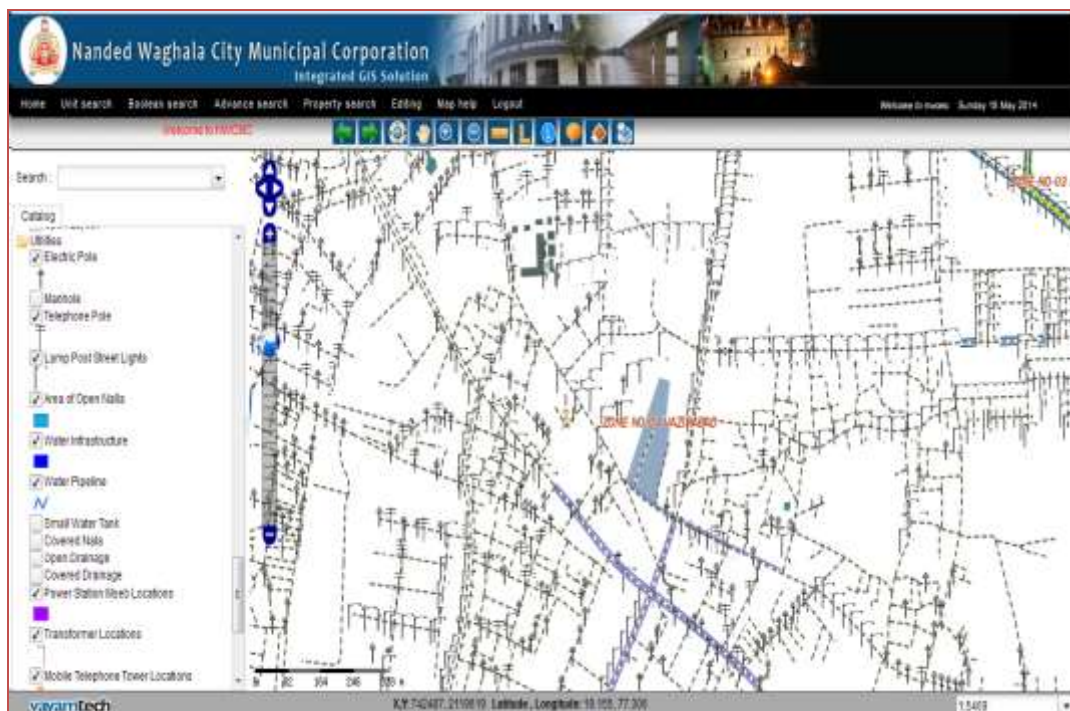
While NWCMC officials can view the following:

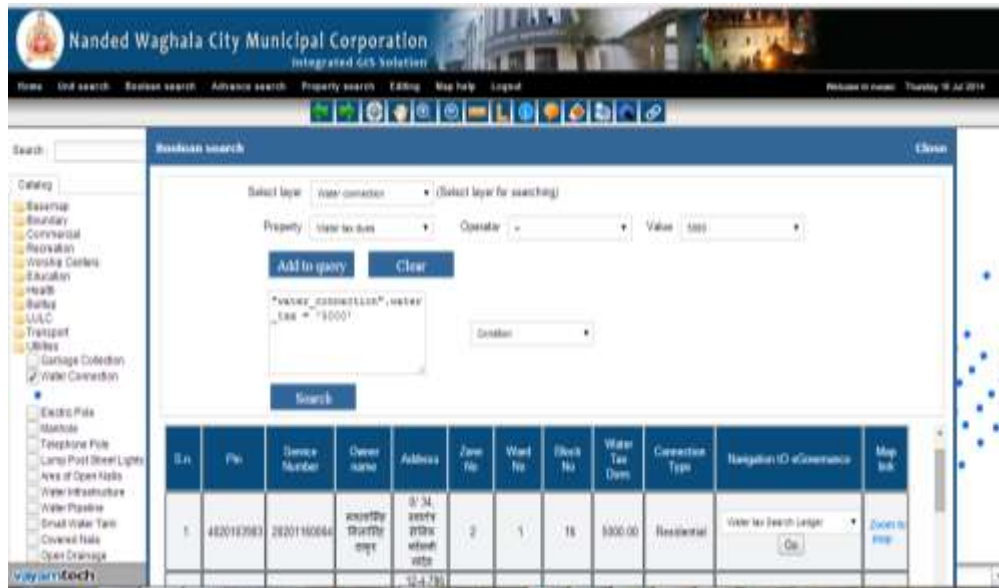
- a. Select the water consumer on the basis of: Administrative boundaries (Zone, Ward, Block/Locality), Property Index Number, Service No, Property Owner, House No.

On the basis of above search criteria the selected Properties integrate with Water Tax Module (database) and highlight the search output (Spatial Highlights) in GIS application and dues report will be populate in tabular Grid consist of:

- Details of Property owner like Name, Address, PIN
- Details of Arrears.

The Map Output will be Range wise Tax Dues, in Particular Period.





## RESULTS AND ANALYSIS:

We have selected the case study of Property and Water Tax as it is the greatest source of revenue generation for any municipal body. After 73<sup>rd</sup> and 74<sup>th</sup> constitutional amendments the local governance bodies were made autonomous bodies with self-support system. Being the major source of income, the major aim of municipalities is tax enhancement.

The case studies of this two module shows that by Integration of GIS with e-governance module can enhance the revenues because it can be represented over the map as to who are the defaulters with their location, details of property and history of default. This helps to ensure the arrear reports to those property owners and enforce payment of property taxes in time.

Also the emergence of spatial pattern gives a representation as to where the trend of defaulters are more, the spatial representation helps to identify the root cause of the problem, whether the problem is political, social, economic or administrative.

## TECHNOLOGY USED

### For GIS

- Operating System: LinuxSUSE
- Database: PostgreSQL 9.2, PostGIS Extn.
- Development framework: PHP
- GIS Web server: Map Server 3.5,GeoMoose

### For eGovernance

- Database: PostgreSQL 9.2
- Development Platform: eJava 1.6
- WebServer: JBoss AS 7

## **BENEFITS OF THE GIS INTEGRATED MUNICIPAL E-GOVERNANCE SYSTEM**

- The advantages of the GIS system is that to provided power of visualization of the assets integrated with its attribute to do spatial analysis of the property and assets through Query and subsequent thematic representation and Custom built reports. This can bring significant cost savings and efficient asset and risk management to Urban Development and associated Government bodies. Thus it gives NWCMC better control over the revenue base and the Asset management. Finally GIS provides Spatial Decision Support System, to visualize and analyze the Property and Utility and enables flexible information formats necessary for decision-making.
- Through the initiative, the NWCMC aims to counter illegal construction and theft of properties.
- Problems such as electricity faults can be tackled more easily as the fault can be traced faster, officials say.
- The number of trees in an area has also been mapped so that greenery can be maintained better.
- Every property has a detail building attribution for building information.

## **BENEFITS TO THE GOVERNMENT**

The State Government and the ULBs would benefit from this project as it would drastically cut down on redundancy and duplication. The processes of data collection, analysis and audit are made easier, Decision making gets expedited and there can be tremendous improvements in specialized areas such as efficiency, transparency, collection of revenue, etc.

Some of Key advantage to State Government and the ULBs are as follow:

- Generation of an efficient MIS for better and fast decision- making faster delivery of services through retrieval of the records from computerized database networked sections within ULBs e-Governance based on sustainable through applying the user charges
- Improvement in efficiency of the employees and reduction in workload.
- Post project evaluation could provide feedback for further improvements
- Better transparency in the delivery system
- Faster processing of files and information resulting in efficient working of the Municipal administration
- Feedback analysis through grievances
- Reducing the interdependency
- A holistic citizen centric approach

## **BENEFITS TO THE CITIZEN**

- The citizen benefits because there is transparency, efficiency and integrity in his dealings with the Government, furthermore, there is ease in information access. Convergence of

services and delivery mechanism for deserving beneficial and vulnerable groups and extending outreach.

- The service delivery is faster to the citizens payment of property Tax, Water bills is online
- Reducing the cost of citizen like travel cost, wages cost etc..
- Reducing the time in availing the services like travelling, waiting time.
- Online status of application Redressing citizen Grievance within a stipulated time frame all Citizen and Business related services at ULBs
- Access to information easily with service delivery counters within reach
- High Level of Convenience
- Facility of payment at convenient points and extended hours
- Negligible Queuing