



BBMP –A GIS Transformation

“ On going Journey *of BBMP* Towards Making itself
as GIS enabled Smarter City”

By :

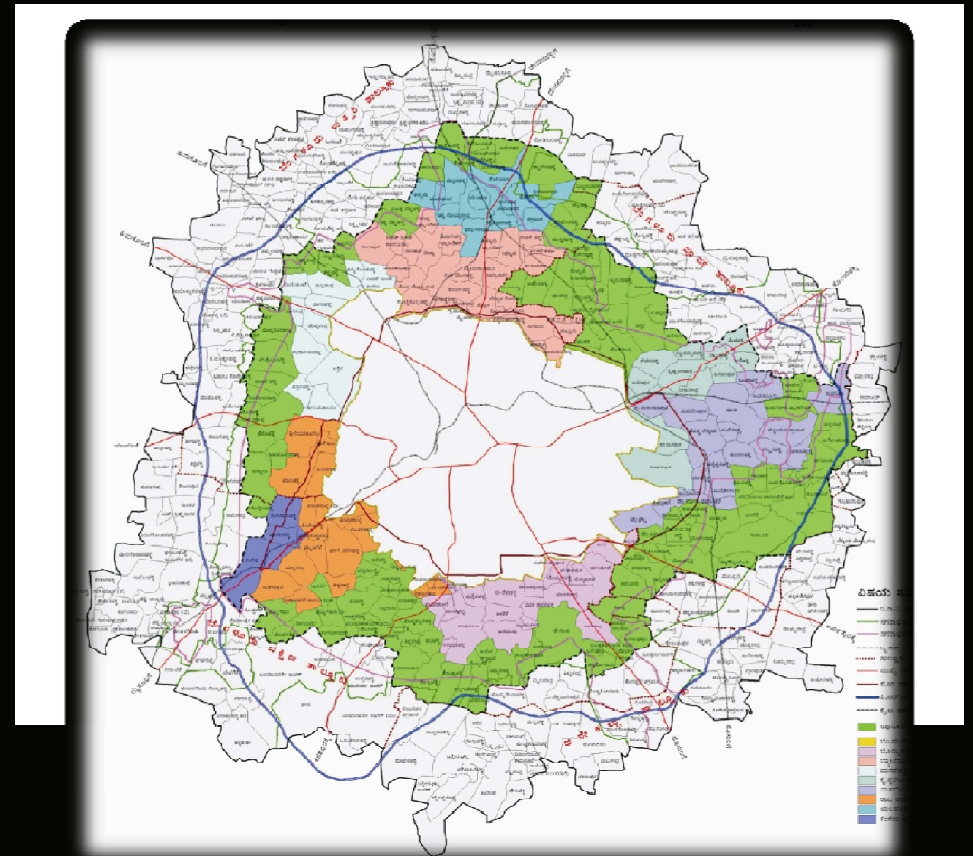
SHESHADRI T , Advisor , IT BBMP , Bangalore .



Bangalore - An Overview

Bangalore – The IT City Of India

2011 Census Population of BBMP	8.5 millions
Present Area	793.47 Sq. kms
Water Consumption	910 MLD
Garbage Generation / Day	4000 MF
Budget	1672 us \$ Millions
Number of Roads	92,878
	Length: 13,940 Kms



Bruhat Bangalore Mahanagar Palike (BBMP) - Goals & Initiatives

Our Goals

- Providing all citizens with basic essential services, to their satisfaction
- Developing sustainable and effective city infrastructure
- Involving citizens in the planning and maintenance of the infrastructure and services in their local area
- Enhancing process transparency and accountability for swift services to the citizens
- Reducing Costs

Priority Sectors Chosen For Reforms

- Infrastructure
- E-governance
- Financial reforms
- Basic services
- Administration
- Environment

GIS Story in BBMP

GIS was initiated with the following objectives

- Identifying and categorizing the urban land use
- Urban planning using digital data
- Deriving property size and building density
- Planning road maintenance based on width and condition
- Determining the slope of the terrain for storm water drains
- Estimation of dwelling units for various house hold types
- Use of digital maps for vehicle tracking system to monitor solid waste management

BBMP – E- governance is working with the following process model

Data Collection and Capturing

Process Monitoring

Process Re Engineering

Managing for optimal results

Aligning With the Changing World

Our World is becoming - INSTRUMENTED, INTER CONNECTED & INTELLIGENT

BBMP undertook the following fundamental processes to achieve the above objectives:

- Data Collection
- Data Integration
- Comparison of Historical Data with real time data
- Deployment of Data Modeling and Business Analytics Systems to enable Management to make better-informed and smarter decisions

Role Of GIS

GIS in BBMP is not an application or system

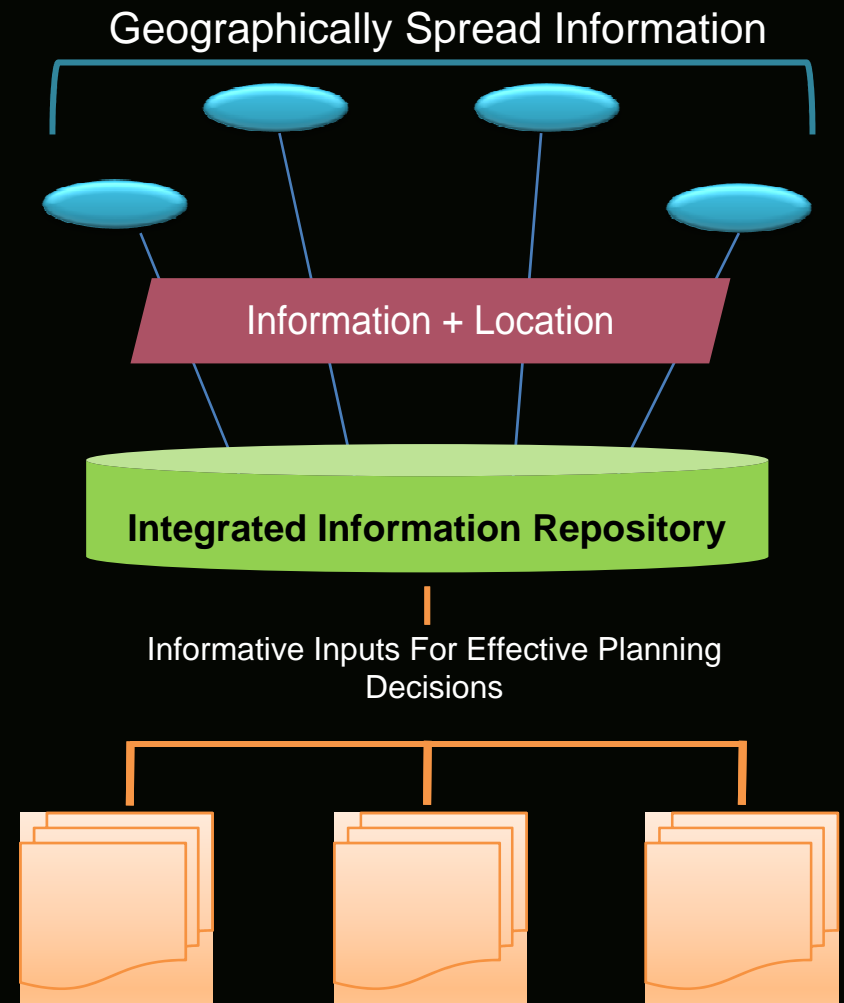
But it is platform for all applications and
systems

All systems and applications

converge on GIS platform

Why GIS

- Effective planning calls for a lot of information
- “Geography” is often a very important characteristic of this information –e.g. it is critical to know ‘where’ an accident has happened in order to service the same with the nearest available resources
- Indian Cities have always felt the need to know the “where” aspect of the huge information that they have to deal with (on account of the vast expanse of land and large population)
- Such information, in an integrated format, could be utilized effectively for various planning processes



BBMP therefore believed GIS could become a fundamental component of Bangalore's planning and developmental infrastructure, providing visibility into various aspects of the economic , governance and development process, making it a back bone of a truly smart city



Process followed

Use satellite digital map of BBMP a

Generate vector map from the above information

Plot the vector maps on to A0 paper along with list of property & identifications

Use the physical map to identify the properties

Physically verify all the properties, and update/ Correct the base map

Mark the individual property on to the map along with legend sheet.



PROPERTY MAPPING AND INFORMATION SYSTEM

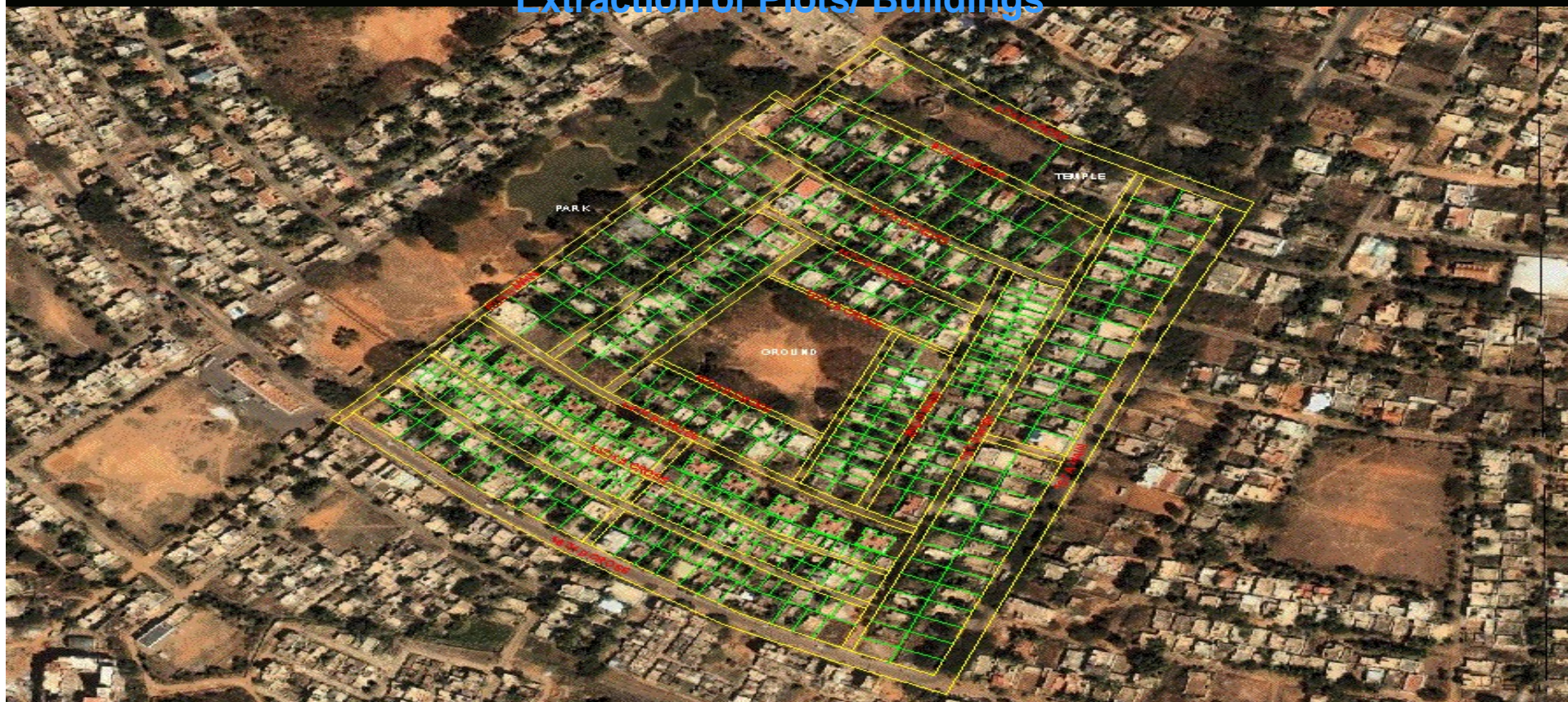
High Resolution Satellite Image



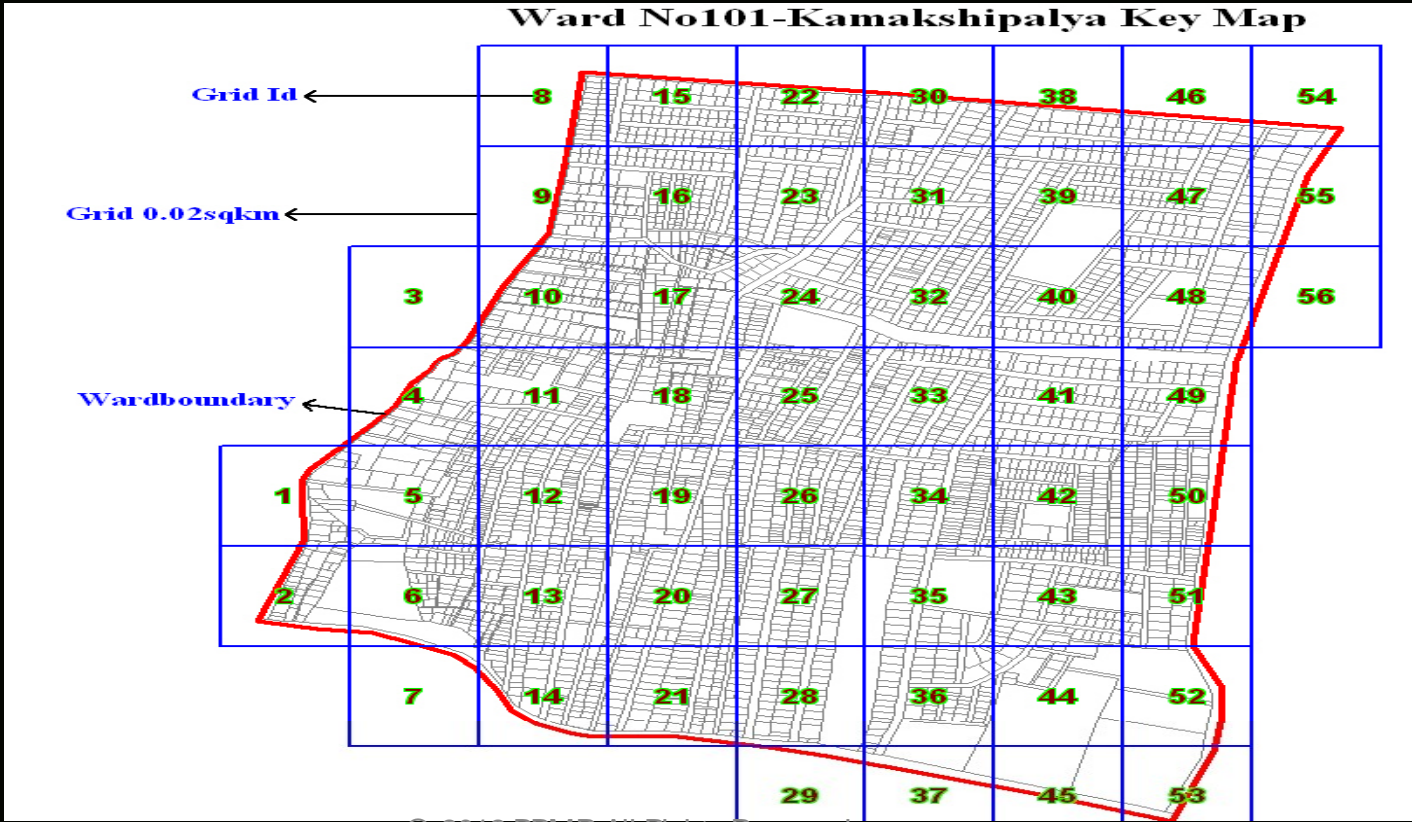


PROPERTY MAPPING AND INFORMATION SYSTEM

Extraction of Plots/ Buildings



Ward Wise Grids



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GIS Information Layers

- Properties whose taxes have been paid
- Properties whose taxes have not been paid
- Properties which are not in tax net.
- Apartments and Sub sites
- Roads
- Lakes
- Parks
- Open plots
- Railway Lines
- Help Centre, Ward and Zone Boundaries.
- Ward wise and Zone Wise maps



Objectives of new GIS project for Property tax system for BBMP (for 800 Sq. km.) initiated in 2008 -2009

- o Identify all properties in the BBMP area.
- ✓ To Assign **Unique Property Identification Number (PID)** to every property with their details in the BBMP Jurisdiction.
- ✓ Additionally Properties that are in the Tax net are corrected to have an accurate information on its Site Dimensions, Built up area, Land Use and classification whether Owner occupied or Tenanted to maximise the tax base.
- ✓ Prepare GIS framework for integrated and interconnected platform for all other services such as with Trade licenses, Grievance Redressal , Automated building Plan approval , Project Mgmt etc..

Assigning PID to Properties:

- ✓ For this first all streets in BBMP were identified classified and numbered (Unique)
- ✓ Then assign unique numbers for properties with combination of ward number , street number and street wise municipal number..

PID (Property Identification Number)

- All Properties need to be assigned a Property Identification (PID). PID number needs to be unique for each and every property.
- PID number is a combination of
Ward Number + street number + Plot no.

032 - W024 - 256

Streets:

- Identify all streets within a Ward Boundary.
- Number the streets from West to East and Assign even numbers.
- Number the streets from North to south and assign Odd Numbers.

Properties:

- Assign Property numbers from north to South or West to East
- Assign Even Numbers to Properties on the left
- Assign Odd Numbers to properties on Right.

Year Wise Tax Collection

Property Tax Collected (In Crores)

2007-08

448.00

2008-09

625.61

2009-10

566.01

2010-11

1029.25

2011-12

1209.84

1350.00

2012-13

2013- 2014

1215.00 (target 1500 crores)

(As on feb 05 2014)

GIS based Property Tax Management Benefits

- In 2007-08, number of properties in tax net was **7.4 Lakhs** and collection was 448 crores.
- In 2012-13, with completion of GIS activity total number of properties identified are now **16.2 Lakhs** and the property tax collection has increased to 1350 crores
- For 2013-14, the property tax collected is **1205 crores (as on 05 Feb 2014)** with target of **1500 crores** for the current financial year.

Cont..

Bruhat Bengaluru Mahanagara Palike iGIS

Home **Gis** Corporate Portal Register PdfSearch MIS Reports Search Administration Change Password Logout About Us

Zones West Wards 64-Rajamahall Guttahalli Map

Legend

Layers

- Base Layer Group
- BBMP Boundry
- Ward Boundry
- Landmarks
- AreaNames
- Roads
 - Highway
 - Major Road
 - Minor Road
- Waterbody
- Subsites
- Apartments
- Plots
 - Paid in TaxNet
 - Not Paid in TaxNet
 - Paid not in TaxNet
 - Not Paid Not in Taxnet

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Internet 105%

Cont..

Bruhat Bengaluru Mahanagara Palike IGIS

Home **Gis** Corporate Portal Register PdfSearch MIS Reports Search Administration Change Password Logout About Us

Zones West Wards 64-Rajamahal Guttahalli Map

GIS Property Info

GISNo	24140322016
Application No	1149455
PID	S-78-9
Plot No	U/93
Khatha No	
Survey No	
Site Area	
BuiltUp Area	
Ward No	64
Ward Name	Rajamahal Guttahalli
Zone	West
Approx Dim	15X8
Floors	G+2
Usage	RE
Help Point	W9-Suhindranagar, 10th Cross
Add Remarks	

77.58095, 12.99922

Cont

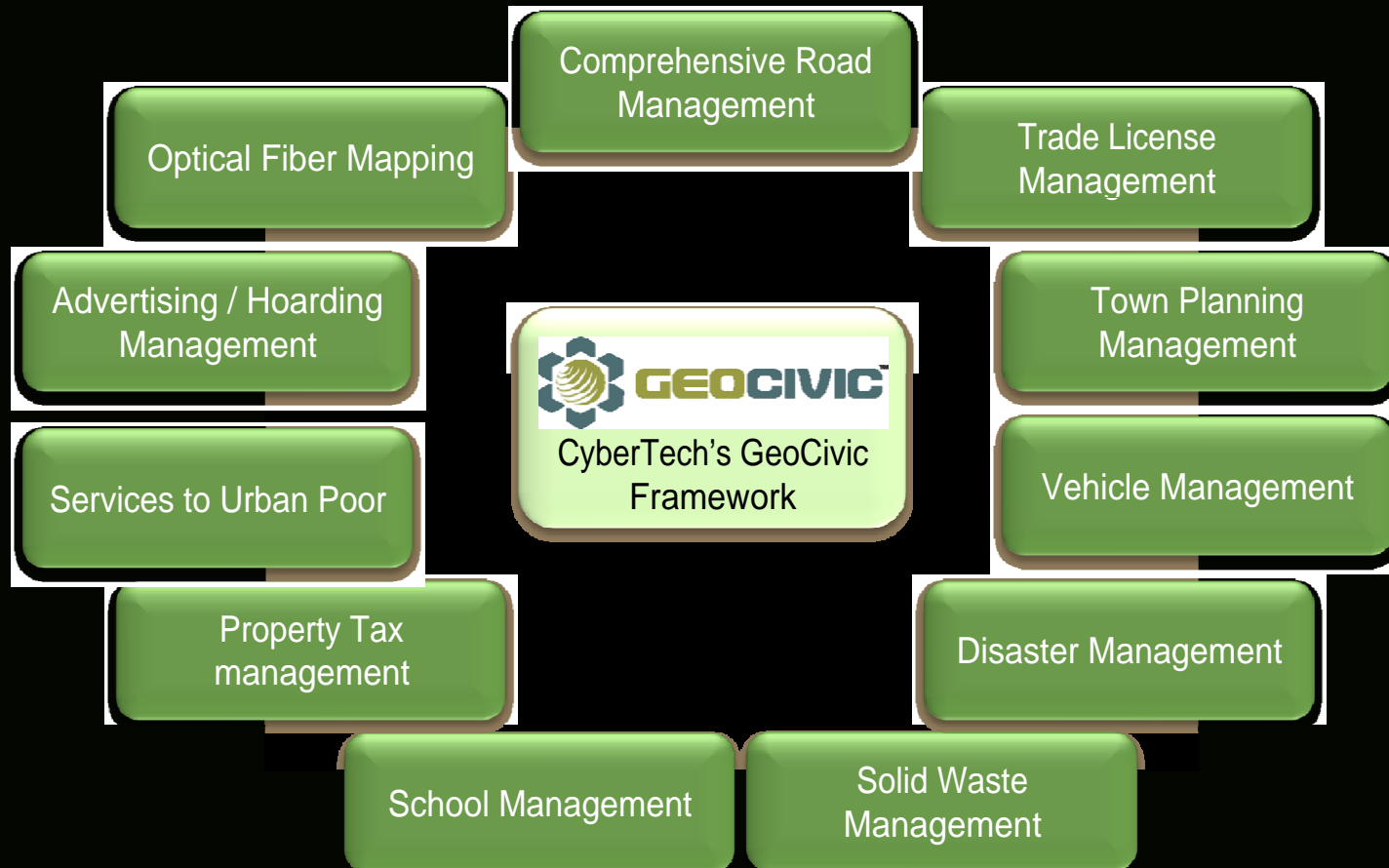
The image shows a GIS application interface. The background is a map of the Rajamahal Guttahalli area in Bengaluru, India. The map displays various streets, blocks, and landmarks. A popup window titled 'Taxnet Details' is overlaid on the map, showing information for a specific property. The popup window has a dropdown menu with the value '1149455'. Below the dropdown is a table with two columns: 'Name' and 'Value'. The table contains the following data:

Name	Value
APPLICATION NO	1149455
BUILTUP AREA	700
CCName	W9-Suhindranagar, 10th Cross
OWNER NAME	PERISWAMY AND MURGESH
PAID DATE	26-11-2009
PID/KHATA/SURVEY	5-78-9//
PROPERTY NO.	9
SITE AREA	750
STREECODE	78
STREETNAME	6TH CROSS ROAD MARUTHI BADA...
TOTAL TAX	1609

The map also shows a scale bar (50m / 200ft) and a coordinate pair (77.57845, 12.98994) at the bottom right of the map area.

BBMP's GIS Transformation –
Powered by CyberTech's GeoCivic Framework

GeoCivic Functional Architecture



GeoCivic® Key Applications

GeoCivic® Property Tax Management

- Property Information Integration
- Property Assessment
- Property Modification
- Property Tax Collection
- Notice Generation
- Bill Generation
- Advanced GIS & MIS Reporting
- Online Tax Information & Payment

GeoCivic® Public Health Management

- Health Information Integration
- Disease Prevention & Control
- Health Inventory Management
- Health Emergency Tracking & Control
- Advanced GIS & MIS Reporting
- Interactive Citizen Services

GeoCivic® Public Safety Management

- Information Integration
- Vulnerability Assessment
- Critical Infrastructure Protection
- Threat Analysis
- Natural Disaster Management
- Advanced GIS & MIS Reporting
- Online Citizen Information Interface

GeoCivic® Road Infrastructure Management

- Road Information Integration
- Road Work Management
- Road Cutting Approval Management
- Road History Update & Maintenance
- Optical Fiber Monitoring & Tracking
- Advanced GIS & MIS Reporting

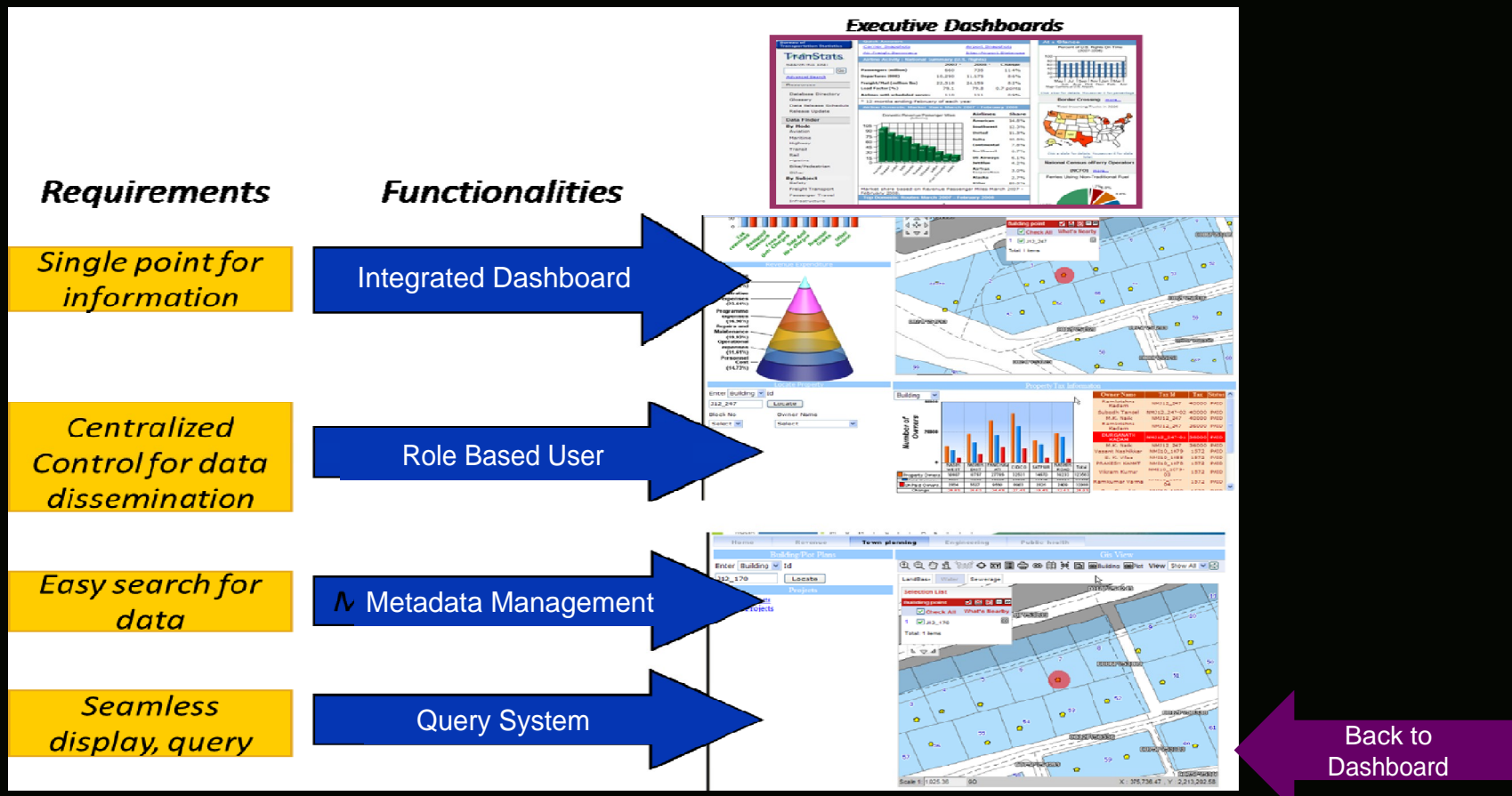
GeoCivic® Citizen Complaint Redressal

- Municipal Problem Reporting
- Complaint Redressal
- Escalation Matrix
- Advanced GIS & MIS Reporting
- Online Feedback

GeoCivic® Solid Waste Management

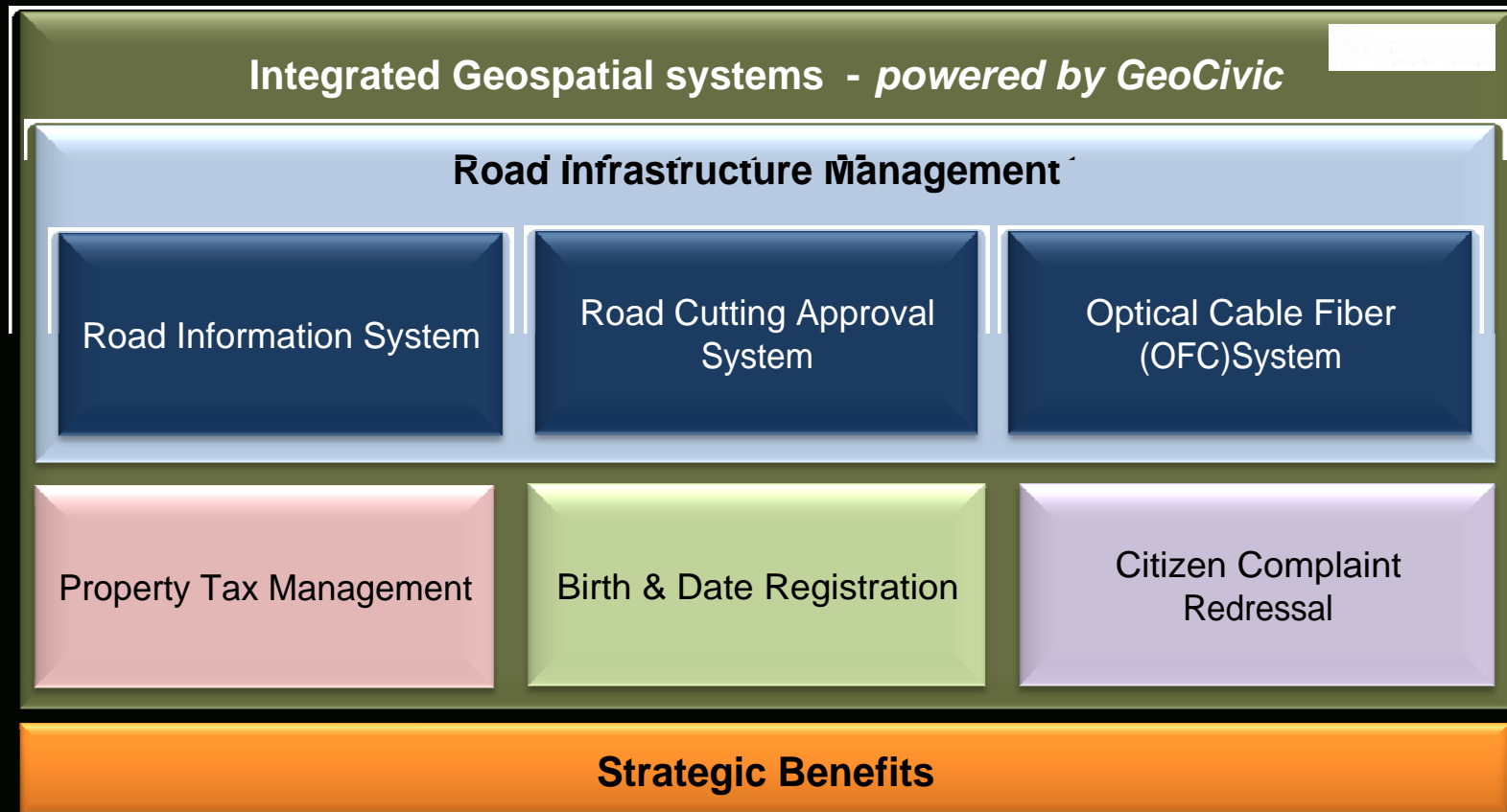
- Solid Waste Estimation & Bin Allocation
- Solid Waste Collection with Real-time Vehicle Tracking
- Solid Waste Disposal with Site Selection
- Citizen Interface
- Advanced MIS & GIS Reporting

Seamless Communication and Functioning Across Departments



Geospatial Fusion Powered By GeoCivic
GIS-based Integrated and workflow systems for BBMP

Integrated Geospatial Platform



Road Information System

System helped BBMP better manage its huge expanse of road network (nearly 12500 kms) by providing a more organized management of geographically spread road information

- Centralized, dynamic registration of accurate spatial and linear locations of road assets, thus enabling easy recording and modification of data
- Advanced, android based mobile applications to facilitate real time information capture from the field
- Advanced thematic maps, to help officials in more efficient planning and predictive road maintenance
- Easy tracking of road asset history, maintaining a record of all road works
- Elimination of duplicate/redundant road works/contracts, thus preventing wastage of time and money
- Facility to capture the future work associated with road works, footpath and drain, along with past history

GeoCivic Road Infrastructure Management

Module 2: Road Infrastructure Management

Road History – Road Work Report

The screenshot displays the BBMP GIS Portal interface. The top navigation bar includes the logo, the text "BBMP GIS PORTAL A MAPPING PLATFORM FOR GOVERNMENT", a search bar, and the user name "Welcome aed7002". Below the navigation bar, there are dropdown menus for "Area of Interest" with values "DASARAHALLI", "Shettihalli", and "M0001 - Hesai".

The main content area is divided into two sections. On the left is a sidebar with a "Road History" header and a list of reports: "Road Work", "Road Cutting", "Drain Work and Approval", and "Footpath Work". The "Road Work" report is selected. Below the reports list is a "Summary" section.

The right section displays a "Road Work Report" in a browser window. The report is titled "General" and contains the following information:

Zone	Ward Number	Ward Name
DASARAHALLI	1501003012	Shettihalli

Below the general information is a "Road Details" section with the following data:

Street ID	Street Name	Significant Landmark
W0021		

Sengmnt No.	Measure Segment Length	Type Of Road	Other Road Type
12/S-W0021/S4550		167	0

Existing Surface	Other Existing Surface	Road Condition	Payment	Distress	Other Payment	Distress

At the bottom of the report is a section for "Kerb Chainages".

The browser window title is "http://localhost:10048/Reports/RoadWorkReport.aspx - Windows Internet Explorer provided by Cybertech S...". The browser address bar shows "1 of 2 ?" and "100%". The browser window also displays a map on the right side, showing the location of the report area. The map is powered by Esri and Cybertech.

Module 2: Road Infrastructure Management Contd.

Road Cutting Request Det

BBMP GIS PORTAL
A MAPPING PLATFORM FOR GOVERNMENT

Work Assigned

Welcome EE

Application ID	Status	Web Application	Mobile	Field Verification	Cost Estimation	Action
F636438	Approved by AEE	Hyperlink	Hyperlink	Hyperlink	Hyperlink	<input type="button" value="Forward"/> <input type="button" value="Reject"/>

Module 2: Road Infrastructure Management Contd.

Road Cutting Workflow Management

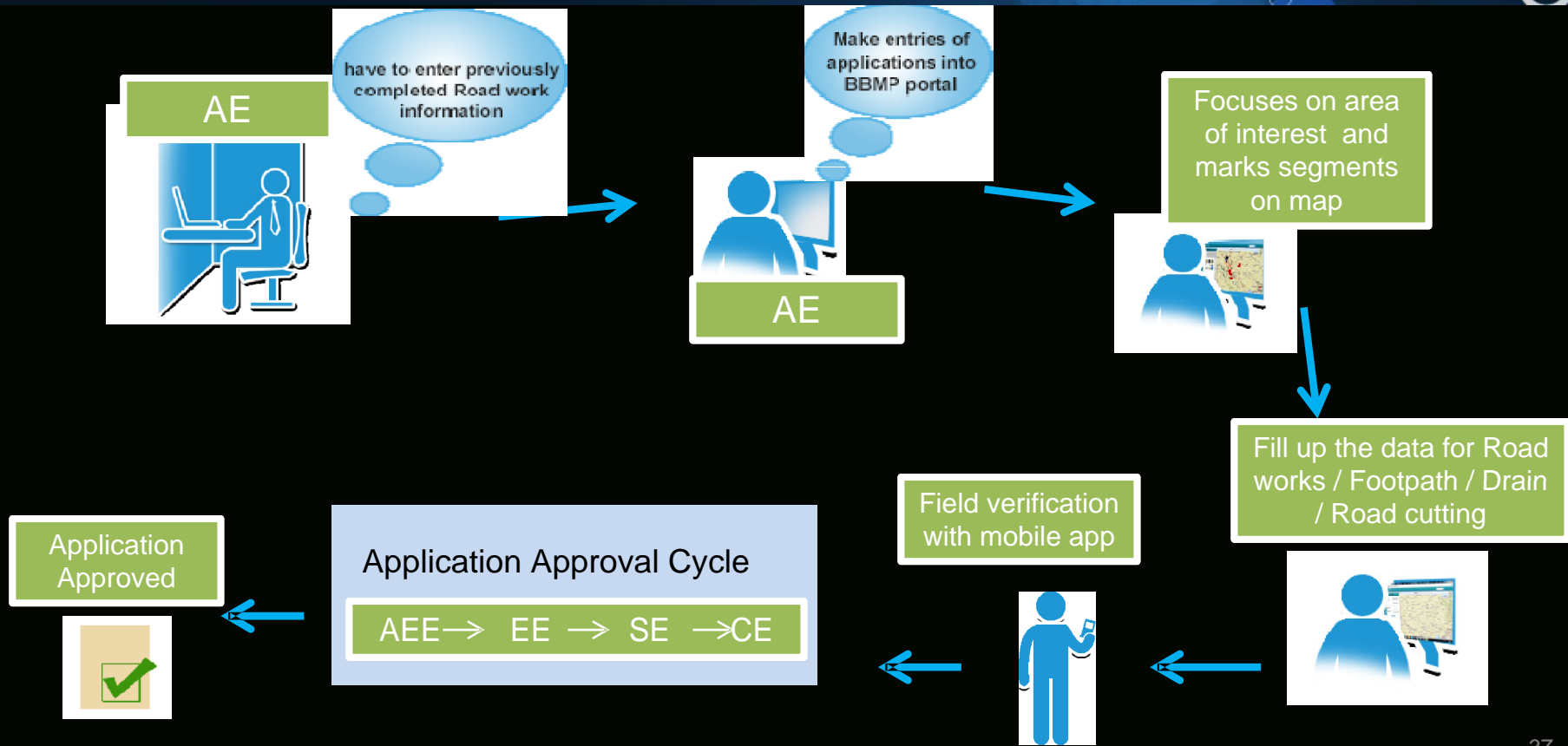
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The main content area features a "Road Cutting Workflow Manager" window. This window has two tabs: "My Pending Tasks" (selected) and "Status of My Applications". It contains a table with the following data:

Module Type	Segment ID	Work Order No.	Pending From	Work Status	Options
Road Cutting	12/S-W0007/S4595		7/4/2013 8:44:17 PM	New Work	View Details Map it
Road Cutting	12/S-W0012/S4600		7/4/2013 9:01:49 PM	New Work	View Details Map it
Road Cutting	12/C-W0012/S4604		7/4/2013 9:23:31 PM	New Work	View Details Map it
Road Cutting	12/S-W0012/S4632		7/5/2013 11:05:14 AM	New Work	View Details Map it

The background shows a map of an urban area with labels like "Junjappa Temple", "Brindhavan Lyt", and "CyberTech". The map is powered by Esri.

Road History Workflow Representation



Road Information System – Sample Screenshots Contd.

The screenshot displays the Road Information System interface. On the left is a vertical sidebar menu with icons and text labels. The main area shows a map with a street grid. A 'Summary' dialog box is open in the foreground, displaying a 'Zone Summary' table. A purple arrow points from the bottom right of the dialog box to the text 'Back to Dashboard'.

Summary

Zone Summary

[Back](#)

Name	Pending	Approved	Rejected
BOMMANAHALLI	6	0	0
DASARAHALLI	17	0	0
EAST	3	0	0
MAHADEVAPURA	3	1	1
RR Nagara	4	0	0
WEST	3	0	0
VELALANKA	10	0	0

[Back to Dashboard](#)

Road Cutting Approval System – Sample Screenshots Contd.

New Road Work

General

Zone	Ward No.	Ward Name
YELAHANKA	1501001002	Chowdeshwari Ward
Street ID	Street Name	Significant Landmark
W0180	NA	Near JMD Hospital
Segment No.	Partial or Full Length of Road(m)	
2/S-W0180/S17780	323	

Work Detail

From	To	Year
Maruti road	Hanuman road	2014
Name of Work	Estimated Amount(Rs.)	Work Detail
Planinng	540000	
Type of Work	Other Work Type	
Rehabilitation		

Save

Module 2: Road Infrastructure Management Contd.

Android Based Mobile Application – For Real Time Information Capture From The Field

Bruhat Bengaluru Mahanagara Palike

High

Length of the Road (in mts)

Photo 1

Photo 2

Photo 3

Satisfactory Non-Satisfactory

Bruhat Bengaluru Mahanagara Palike

BBMP

Segment ID

Image Quality

Drain Condition

Drain

Satisfactory Non-Satisfactory

Bruhat Bengaluru Mahanagara Palike

Application ID

Image Quality

Satisfactory Non-Satisfactory

Percentage of Completion

Street Photo

Footpath Photo

Drain Photo

GeoCivic Complaint Redressal System

Module 3: Complaint Redressal System

Complaint Registration Portal

The screenshot displays the BBMP GIS Portal interface for the Complaint Redressal System. The header includes the logo and text "BBMP GIS PORTAL A MAPPING PLATFORM FOR GOVERNMENT", a search bar, and a user greeting "Welcome sachin".

The main interface is divided into a left sidebar and a central map area. The sidebar contains a "Complaint Redressal" section with the following fields:

- Select Ward: Shettihalli
- Select Area: [Dropdown]
- Status: [Dropdown]
- Register Complaints section:
 - Select Point: [Map icon]
 - Select Type: Sanitation
 - Message: Garbage collected
 - Submit button

The central map area shows a map of an area with numerous yellow exclamation mark icons indicating complaint locations. An "Information" dialog box is overlaid on the map, displaying the message "Complaint added successfully." with an "Ok" button. The map also features navigation controls and a small inset map in the bottom right corner.

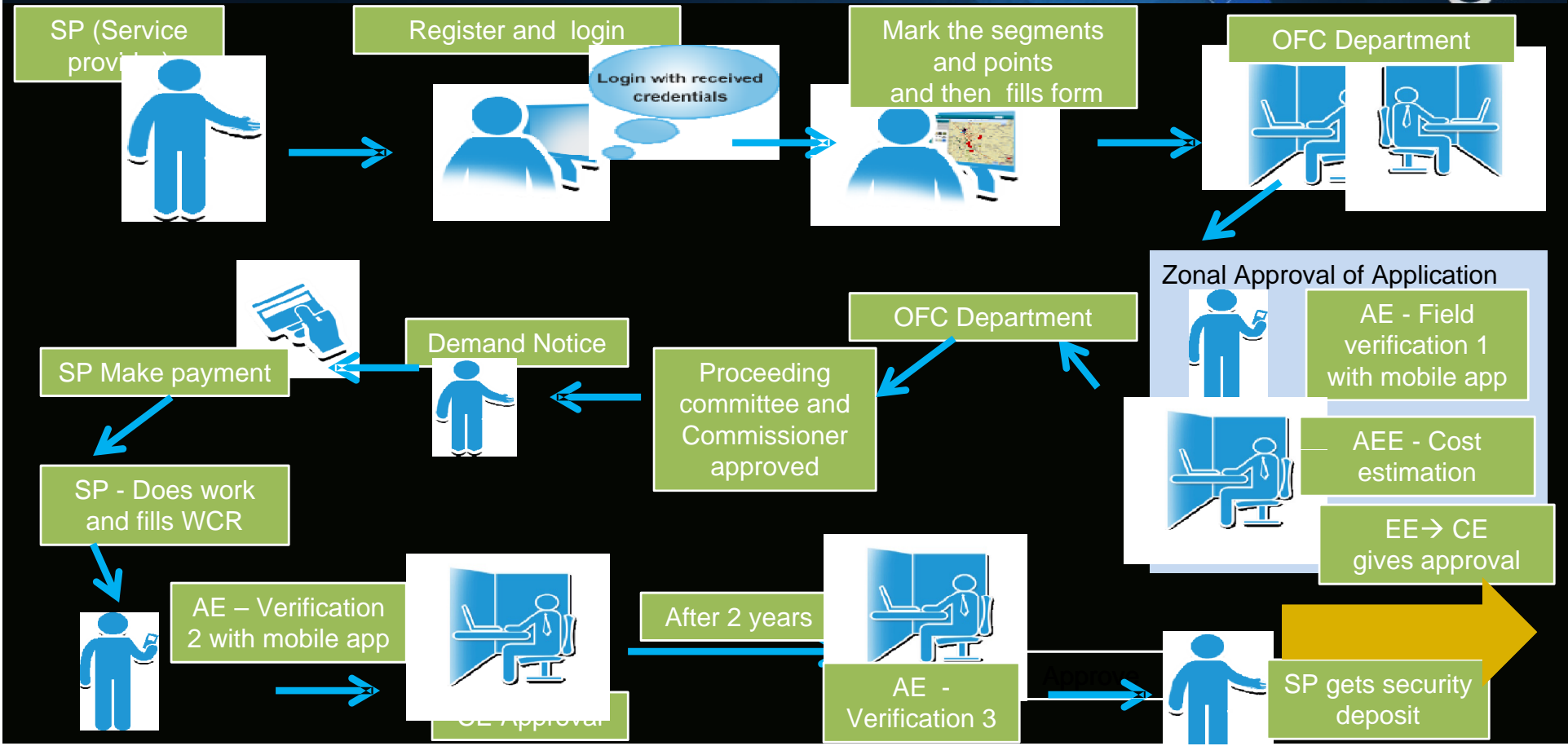
Logos for "GEARED BY CyberTech" and "POWERED BY esri" are visible in the bottom right corner of the map area.

Module 3: Complaint Redressal System Contd.

Auto Generated Email sent to Call Center with Complaint Details



OFC Workflow Representation



Online Payment

e-Payment through Payment Gateway



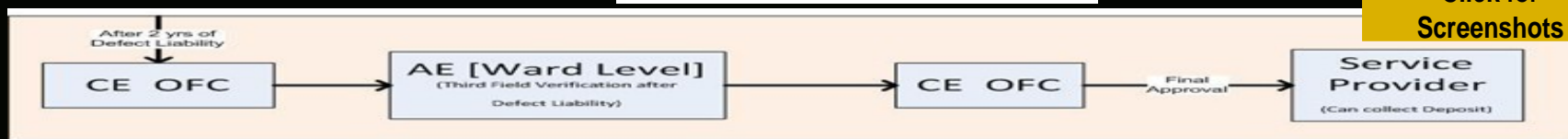
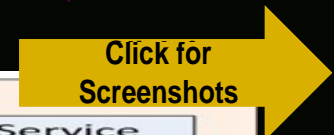
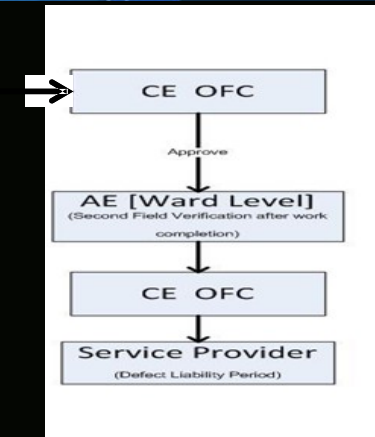
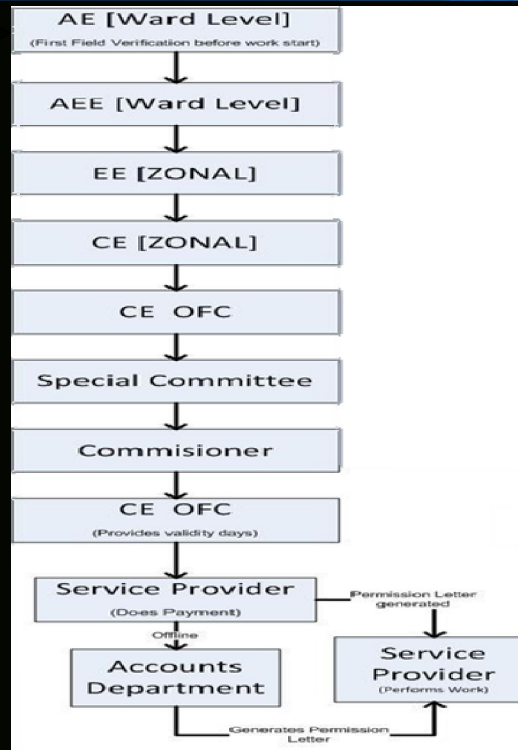
Payment Gateway



Receives the Transaction ID and Receipt from Payment Gateway



OFC Workflow – Block Diagram



OFC Management System – Sample Screenshots

Cost Estimation(AEE-Zonal)

OFC Laying Method

HDD

No. of Ducts

20

Additional Ducts

Length of the road(m)

Rate/(m)

(a) Additional Duct Charges

17

X

44.29

X

Rs. 100

Rs. 75293

No. of Cables

Length of the road(m)

Rate/(m)

(b) Cable Charges

20

X

44.29

X

Rs. 600

Rs. 531480

No. of pits

Rate/pit

(c) Pit Charges

6

X

Rs. 30000

Rs. 180000

Total Charges [(a) + (Greater of (b) and (c))]

Rs. 606773

Security Deposit as per BBMP policy(25% of total cost)

Rs. 151693.25

Net amount payable by service provider

Rs. 758466.25



OFC Management System – Sample Screenshots Contd.

The screenshot displays the BBMP GIS Portal interface for OFC management. The header includes the logo and text "BBMP GIS PORTAL A MAPPING PLATFORM FOR GOVERNMENT". The user is logged in as "Welcome ceofc01". The main content area shows a map with a grid of plots. A vertical line labeled "W-67-07" is highlighted in red, indicating a selected OFC. The map also shows other roads like "W0705 7th Main Rd", "W0711", and "W0713". The left sidebar contains a navigation menu with options: "History Data", "My Desk Manager", and "Summary". Below these are buttons for "Edit", "Save", "Cancel", "Undo", and "Delete". The top right corner has a search bar, a "Clear All" button, and a "Basemap" button. The bottom right corner features a "Result Panel" button and logos for "CyberTech" and "esri". A yellow arrow points to the right at the bottom of the interface.

OFC Management System – Sample Screenshots Contd.

Work Completion Report

Work Completion Report (Service Provider)

OFC Laying Method

HDD

Length of the road(m)

37.41

No. of pits

4

No. of Ducts

0

No Of road Crossings

0

Average Width(m)

0

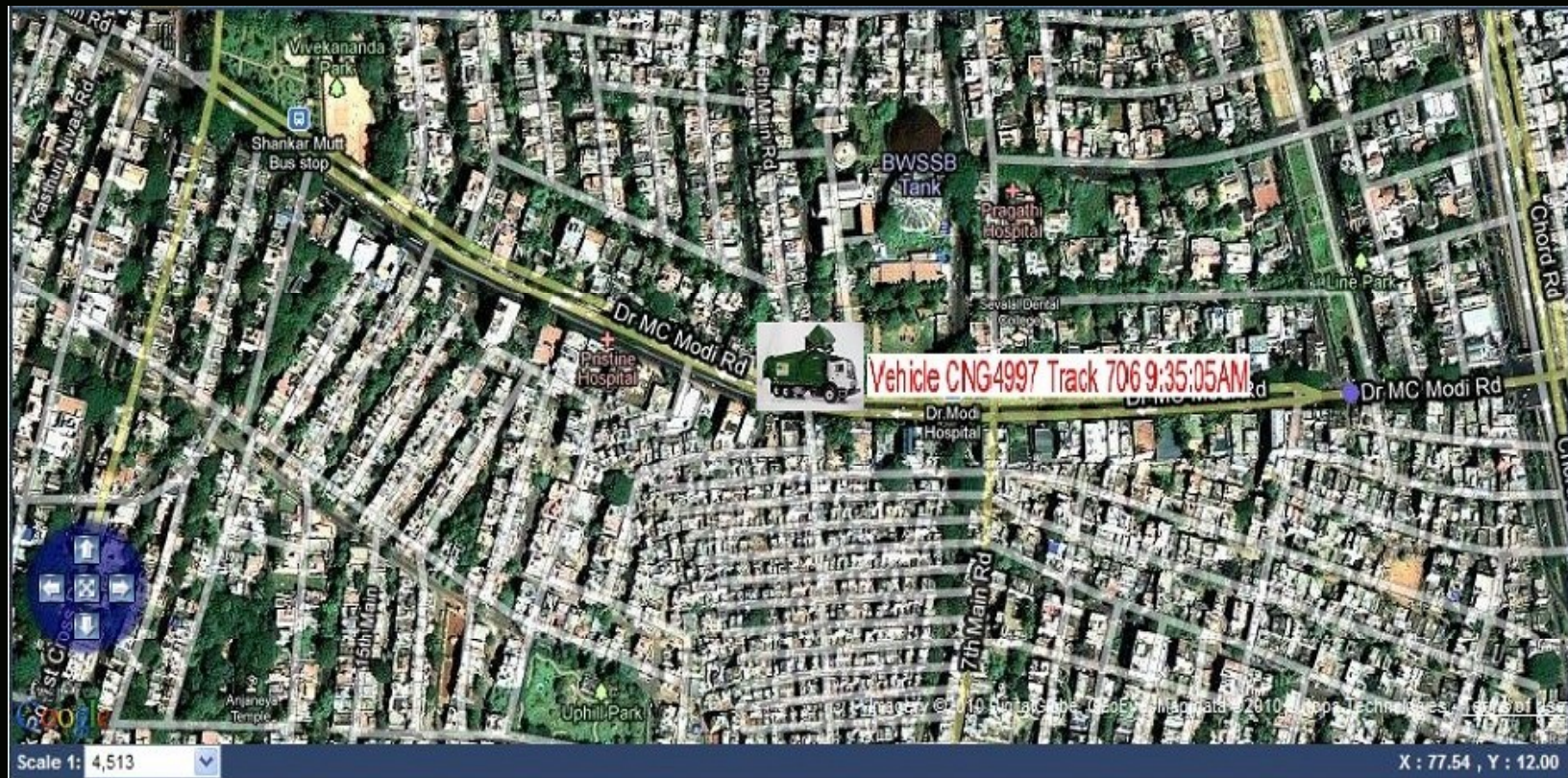
No. of Cables

0

Back to
Dashboard

Module 4: Solid Waste Management

Vehicle Tracking - Solid Waste Management



- **Geo Civic based work flow systems managements benefits**
- **1. Optical fiber cable license Management - Rs.750 Crores, additional income**
- **2. Road history and Road cutting process management - Savings of Rs. 150 crores**
- **(with 10 %savings aim)**
- **3. Integrated GIS based GIS dashboard intelligent decision support systems for smart Governance.**

BBMP GIS based e-Governance Initiatives - Recognitions

- Received the International award from the World e-Governance Organization of cities and local governments in November 2012.
<http://awards.we-gov.org/> Category: Efficiency
Best e-Government Prize - GIS Based Property Tax System –Bangalore, India
- Recognition from the Ministry of Urban Development, Government of India for replication of the BBMP module in other ULB.
- Excellent Geo Spatial Application GISbased Property tax management system by Geo spatial forum in 2014.

Continuously Striving to make Bangalore – Smart GIS City



Thank You