PARADEEP PORT CARTOGRAPHY

A Report

Submitted in partial fulfilment of the requirements
For the degree of

Bachelor of Technology
In
Civil Engineering

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CERTIFICATE

This is to certify that the thesis entitled **"PARADEEP PORT CARTOGRAPHY"** submitted by (Name- RANJITA SETHI (1901298061) , SUBHASHREE BAL(1901298068), AKASH KUMAR SWAIN (2021298003), BISWA RANJAN DAS (2021298009))in partial fulfilment of the requirements for the award of **Bachelor of Technology Degree** in **Civil Engineering** at Gandhi Institute For Technology, Bhubaneswar is an authentic work carried out by him under my supervision and guidance.

To the best of our knowledge, the matter embodied in this Project Report has not been submitted to any other University/Institute for the award of any Degree or Diploma.

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DECLARATION

We declare that this project report titled **"paradeep port cartography"** submitted in partial fulfilment of the degree of B.Tech in civil engineering is a record of original work carried out by us under the supervision of
Asst. prof Chitrabhanu sahoo and has not forward the basis for the award of any other degree or diploma , in this or any other institutions or university , in keeping with the ethical practice in reporting scientific information , due acknowledgement have been made wherever the findings of others have been cited.

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ABSTRACT

Cartography is an art, science and technology of creating maps together with their study as scientific documents. Maps are graphic representation of geographical environment. Map-making process is a series of information transformation, each of which has the power to alter the appearance of final product. The fundamental function of a map is to bring into view. All maps are concerned with two elements of reality namely location and attribute. From these two basic elements any relationship can be formed which depends on the purpose of map.

Creating a map depend largely on the intended use. Depending upon the purpose, maps can be classified into general reference maps; and thematic features like roads , rivers , political boundaries etc. Thematic maps concentrate on the distribution of a single and multiple attributes or the relationship among several attributes. Thematic maps tell about the theme. A simple example for a thematic map is a map used for weather forecasting.

Traditional surveying methods, which are used for cartography. Are laborious and time consuming. Also the accuracy of traditional methods is low.

Cartography is in the midst of a revolution in technology. This revolution is referred to as digital cartography. It is caused by widespread use of electronics and computers in the field of cartography. Increasing use of cartographic products in another factor for this revolution. The application of geo graphic information science (GIS) continues to grow as a global research tool for understanding the world around us. Cartography is the process of making maps , has benefited greatly from advancements in GIS technology in recent years.

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ABBREBITATION

GIS – GEOGRAPHICAL INFORMATION SYSTEN

SI – SATELLITE IMAGE

IOT – INTERNET OF THINGS

UTM – UNIVERSAL TREANSVERSE MERCATOR

RC-REDUCE COST

MIS-MOUNTAIN INFORMATION SYSTEM

ICA-INTERNATIONAL CARTOGRAPHIC ASSOCIATION

RD-RASTER DATA

VD-VECTOR DATA

CHAPTER I

INTRODUCTION

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INTRODUCTION

Paradeep is one of the Major Ports of India and late Sri Biju Pattnaik, the then Chief Minister of Orissa, is the founder father of Paradeep Port. Pt. Jawaharlal Nehru, the then Prime Minister of India, laid the foundation stone of the Port on 3rd January 1962 near the Confluence of river Mahanadi and Bay of Bengal. Government of India took over the management of the Port from the Government of Orissa on 1st June 1965. INS "INVESTIGATOR" had the privilege of maiden berthing in the Port on the 12th March, 1966.

The Port was declared open by Mr. Peter Stambolic, Prime Minister of Yugoslavia on the same day. Government of India declared Paradip as the Eighth Major Port of India on 18th April 1966 making it the FIRST MAJOR PORT in the East Coast commissioned after independence. The Port of Paradip, an autonomous body under the Major Port Trusts Act, 1963 functioning under Ministry of Shipping is administered by a Board of Trustees set up by the Government of India headed by the Chairman, PPT. The trustees are nominated by Government of India from various users of the Port such as shippers, ship owners; Government Departments concerned and also port labour. The day - to - day administration is carried out under general supervision and control of the Chairman, assisted by the Deputy Chairman and other departmental heads.

Paradeep also spelled Paradeep (originally Paradeep, also spelled Paradwip), is a major seaport city and municipality, 53 km (33 mi) from Jagatsinghpur city in Jagatsinghpur district of Odisha, India. Paradeep Municipality was constituted as an NAC on 27 September 1979 and converted into a Municipality on 12 December 2002.[3] Paradeep (210 15’ 55-44" N 806 40’ 34-62" E) is the main outlet and inlet of the seaborne trade of the eastern port. It also signalled the economic development of the state, giving impetus to trade and commerce. It has become the gateway of Odisha to the International community.

Paradeep has become a hub of industrial activities. Industries like IFFCO, Paradeep Phosphates Limited, CARGILL, IOCL, BPCL, HPCL, Carbon, etc. have been established here. From an administrative viewpoint, Paradeep N.A.C. was constituted vide H & U.D. Department Notification No. 31169, dated 27 September 1979, and became functional with effect from 18 September 1980. Subsequently, Paradeep N.A.C. was upgraded to Municipality under section 424 of the Odisha Municipal Act. 1950 vide H. & U.D. Dept. Notification no. 47302/HUD, dated 12 December 2002. The municipality comprises five Revenue Villages, namely Udachandrapur, Chauliapalanda, Sandhakuda, Bijayachandrapur, and Bhitaragarh. Given the increasing population and industrialisation, a proposal to include 15 villages i.e. Paradeep, Garh, Niharuni, Niharuni Kandha, Chouki Matha, Udayabata, Nimidiha, Kotakula, Rangiagarh, Nua Sandhakud, Musadiha, Musadiha Jangle, Boitarkuda, and Nuagarh has been sent to state H. & U.D. Department on 11 October 2007 and District Collector, Jagatsinghpur for inclusion. Paradeep is 94 km (58 mi) from Cuttack and 125 km (78 mi) from Bhubaneswar. Biju Patnaik International Airport is the nearest and only operational commercial airport to reach Paradeep.

During the early 17th century, Paradeep and its adjoining areas were connected to Cuttack through the Mahanadi river and its branches. Transportation of goods from rural areas to Cuttack was done through waterways via Dhamara and Pattamundai, though slowly discontinued due to silting of the river bed. In 1819, the British constructed a sort of harbour north of the present Paradip site then called False Point. In 1862, the East India Irrigation Company explored the potential of Paradeep for the transportation of rice from the area. The importance of Paradeep grew during the great famine of 1866 when it was used as the main entry point for importing food materials to the famine-struck area.

Inaguration of Paradeep Port :

During the early post-independence period, a minor port came into existence at Paradeep in 1958 through the efforts of the State Government. Subsequently, the Government decided to construct a major port there. The foundation stone for Paradeep Port was laid on 3 January 1962 by the former prime minister of India Pandit Jawaharlal Nehru, then Prime Minister of India. On completion in 1965, the port was taken over by the Government of India and was declared open on 12 March 1966. Paradeep Port was declared the eighth major port of India and the first major deep sea port on the east coast commissioned after independence. The Paradeep Port Trust came into being in 1967 for the development and management of the Port.

The Port of Paradeep is the primary port in Odisha, and one of the largest on India's east coast. The port handled over 100 million tonnes of cargo in 2017–2018. Thermal coal and iron ore are major commodities that transit the port.[8] Located on the Bay of Bengal at a latitude of 20° 55.44' N and a longitude of 86°34.62' E, the port is built on an artificial harbour with ships accessing the port via man-made lagoons. Former Chief Minister of Odisha Biju Pattnaik, an aviator, and a freedom fighter spearheaded the port's establishment.

Storage area :

55,000 m2 (590,000 sq. ft) of a concrete paved area near the berth. Storage area secured & protected. Capacity to store about 1000 TEUs (20 ft).

Equipment's available :

One Mobile crane of 75MT capacity (Port). Two 50 MT mobile cranes & one 20 MT forklift (private). Adequate trailers to handle TEUs and FEUs (private).

Facility :

Berthing priority for container vessels. Hence, nil waiting 50% Concession in both vessel & cargo-related charges for container vessels. Harbor Mobile cranes at berths to handle containers. In house stuffing / destuffing facility. Siding facility for Rail handling of containers, one RO-RO jetty, single point mooring

Container Traffic :

2010-11 Import of 1084 empty TEUs. Export of 2443 TEUs laden container with 61361ton.

Industry :

Indian Oil has established a major oil refinery with an installed capacity of 15 million tonnes per year at Paradeep. Other major industries in the area include:

Paradeep Phosphates Limited, a fertilizer company height

Paradeep Plastic Park Limited

IFFCO- Fertilizer Plant

Essar Steel's Pellet plant

Indian Oil marketing terminal

Bharat Petroleum Corp. Ltd. - marketing terminal

Hindustan Petroleum Corp. Ltd. - marketing terminal.

Cargill's edible oil plant

Indian Oil Corporation Limited IOCL

Skol Breweries Ltd, (Unit- East Coast Brewery)

Paradip is emerging as a major industrial hub with several upcoming steel plants including a US$12 billion plant being developed by POSCO of South Korea. In addition, alumina refineries, thermal power plants, and a petrochemical complex are under development.

Paradeep has been identified for development as one of the six major Petroleum, Chemicals, and Petrochemicals Investment Regions (PCPIRs) in India, along the lines of Pudong in China, Rotterdam in Europe and Houston in North America. The Paradeep PCPIR has identified an investment potential of US$68.84 billion, spread over 284 square kilometres (110 sq. mt) in the area.

Demographics :

As of 2001 India census,[10] As of 2001, Paradip had a population of 73,633. Males constituted 58% of the population and females 42%, due to rapid migration of young industrial workers to the area. Paradeep has an average literacy rate of 73%, higher than the national average of 59.5%: male literacy is 79%, and female literacy is 65%. 12% of the population is under 6 years of age.

Public works departments benefit by geo-enabling in the following ways:

Facilitates Operational Planning :

An enterprise-wide geographic information system facilitates instant access to data and allows easy sharing of information across departments making it easy to meet the growing community needs. It geo references every piece of information, allowing users to organize their assets and inventory without any limitations. An important feature of GIS is its ability to compare infrastructure investment against the service life of assets. It converts old datasets into geo-enabled information which can be accessed by multiple users at any anytime from any device.

Offers Real-Time Access to Information :

With real-time access to mission-critical information, it becomes easy to analyze the big picture and understand the relationship between disparate chunks of information to make informed decisions. With a GIS, it is easy to stay updated on multiple projects and track their progress from time to time. Whether you need to search a specific hydrant or identify the water lines that need immediate replacements, a GIS allows you to easy access any data in an instant. It saves you time and ensures that you take the right decisions at every level.

Improves Transparency and Decision Making :

Transparency is crucial to running an efficient, productive and accountable enterprise and it entails much more than just sharing information to all the stakeholders. It is important that everyone involved in a specific project understands the information and is able to analyze it before arriving at any conclusions. Public works departments manage big infrastructure projects that are executed by a team of internal and external decision makers who work in close collaboration. GIS eliminates the time and effort spent on translating project knowledge by ensuring that every internal and external team member uses the same tool to interpret the same information in real-time. This strengthens the understanding of everyone who is working on the project from field technicians to facility managers.

Reduces Costs :

With GIS, the field staff can gather information remotely and also exchange data throughout the enterprise. With a centralized database that accurately tracks asset condition across locations, field crew can service work requests on the go. From generating digital work orders and locating assets that need repairs to tracking inventory and closing work orders, GIS can help you save a lot of your time and effort by eliminating the need to generate prints, record inputs , prepare manual reports, review daily PM schedules, plot routes using paper maps, and pick up daily assignments. The implementation of GIS automates routine tasks to help you save thousands of dollars spent on repairs, replacements and preventive maintenance.

Enhances Responsiveness :

When integrated with facility maintenance software, GIS gives you a geographic advantage that boosts work efficiency, helps you stay productive and enables you to quickly respond to emergencies. Its data accuracy and accessibility shorten disaster response times and enhance customer service. Without a GIS, technicians waste a lot of time identifying issues, searching for information stored in files and folders and running between the field and the office. GIS enables your crew to proactively handle all the problems and import data on the spot from an ESRI GIS database. Users can also create reports and keep them organized according to classes and subclasses. If your enterprise has separate databases, it is also possible to create multiple domains.

Improves Resource and Asset Management :

Designed to overcome the flaws and shortcomings of old school processes and procedures, a GIS organizes geographic data so that field technicians can easily view any information related to inspections, maintenance, repairs and replacements. When every section within the enterprise can easily share and access data, productivity is enhanced. The location-based tracking feature of a GIS, offers an end-to-end view of all the assets spread across a facility. Even if the assets are distributed across the entire city, such as water distribution pipes, it enables users to trace and share location data accurately which enhances the efficiency of the maintenance crew and reduces the troubleshooting time. With instant access to information on-the-go, it becomes easy to update data and identify issues on the spot. With proactive inspections and timely maintenance of assets, public works departments can improve decision making, maximize returns on investment, reduce repair and replacement costs, save time, and increase accuracy.

NEXGEN Asset Management facilitates efficient and effective management of assets and infrastructure while ensuring complete adherence to regulatory requirements. Designed by professional engineers, it addresses all your asset management goals including risk management, resource allocation, condition assessment, preventive maintenance and lifecycle planning. Contact us to leverage the benefits of deploying public works software and improve community satisfaction while saving both time and resources.

CHAPTER II

REVIEW OF LITERATURE

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REVIEW OF LITERATURE

1. The potential of user-generated cartography: a case study of the open streetmap project and manchester mapping party

Perkins, C. and Dodge

Collaborative approaches based upon volunteered input into shared Internet-based resources are beginning to offer a radical and new alterative to more traditional mapping. This paper explores the potential of one of the most developed of these ???open??? maps, in a case study of the Open Street Map project and of the practices deployed during a ???mapping party??? in Manchester .The successes and weaknesses of the Manchester weekend are discussed and it is concluded that the democratising and social potential of the new medium is already being realised.

Keyword(s)

Manchester; Mapping parties; Open mapping; OpenStreetMap; User-generated cartography

2. Towards an integrated cartographic mountain information system (MIS)

Lorenz Hurni Ionuţ Iosifescu-Enescu Institute of Cartography, ETH Zurich (Switzerland)

The first intention of the proposed paper is to evaluate the cartographic modelling and visualisation demands of the user community with respect to broad range of spatial, mountain-related applications. It is obvious that the different branches require specific techniques and technologies and that the printed map plays only a minor role and is replaced by distributed information systems with a multifunctional interface. Following this assessment, a basic infrastructure (adaptable toolbox) allowing the processing of such thematic data will be presented, with emphasis on the cartographic visualisation, interaction and publication. The toolbox will be demonstrated by an application developed at the Institute of Cartography of ETH Zurich. This Internet-based Metadata Information System allows access to datasets about potential multi-hazards and multi-risks in an Alpine valley in Switzerland. This development could finally lead to the establishment of integrated Mountain Information Systems (MIS).

3. The Realization of ICA Commission Projects on Planetary Cartography

Kira B. Shingareva Related information

Moscow State University for Geodesy and Cartography/Moscow/Russia

, Jim Zimbelman Related information

Smithsonian Institution/Washington/DC/USA

, Manfred F. Buchroithner Related information

Dresden University of Technology/Dresden/Germany

, Henrik I. Hargitai Related information

The International Cartographic Association (ICA) Commission on Planetary Cartography was officially established on the basis of the ICA Planetary Cartography Working Group at the ICA Congress in Ottawa in August 1999. Its goal is to develop materials and information intended to aid in the global dissemination of planetary cartographic information. The overall theme of this effort is the harmonization of international planetary cartographic activities. The commission's activities can help especially in those countries not actively involved in on going spacecraft missions, bringing together scientists from diverse backgrounds (planetary science, earth science, cartography) who have not interacted previously, along with map and atlas publishers. The Planetary Cartography Database, the Multilingual Planetary Maps, and the Multilingual Glossary can serve as a reliable resource for cartographers who wish to produce and study planetary maps.

4. The Simplicity of Modern Audio visual Web Cartography

Dennis Edler & **Mark Vetter**

Audio files entered cartography about 25 years ago. Since the mid-1990s, several examples of audio visual maps have been created and published. These maps cover a diverse range of applications. In terms of the sound elements implemented, four characteristic variants were mainly used: abstract sounds/sound sequences, language recordings, and music and recordings/simulations of the real soundscape. To built audio visual maps technically, several tools of animation software solutions were intensively explored. The rising importance of the World Wide Web also increased the demand for new and modern web-based approaches of multimedia cartography. One of the core technologies of the Internet is the programming language JavaScript (JS). The language is often associated with the so-called libraries which are applied programming packages pre-written for particular purposes. In cartography, one of the most popular and widely used JS libraries is leaflet.js. This open-source library is known for its simplicity and, meanwhile, it also supports a straightforward integration of multimedia content, such as audio files. It also teams up with HTML5 and CSS3. This paper intends to give a workflow focused on how to create individual audio visual web mapping applications based on the contemporary options offered by leaflet.js.

5. Design of intelligent system in cartography

Jan Brus; Dobesova Zdena; Jaromir Kanok; Vilem Pechanec

There is an intensive using of information technologies in many branches of human activity nowadays. Software designers and developers are stimulated by positive results and success information technologies. Many new functions are arising in most software products used in geographical information systems and digital cartography too. For many users of this software, it is very valuable possibility to design graphic outputs and map design. There are two ways how to eliminate the problem of the insufficient knowledge of cartographic rules. The first way is education in cartography, but this is time-consuming. Second way is making application, which allows design correct maps and allows spreading of knowledge. This application can create map either automatically or with interactive activities of the user. Automatically generated maps cannot fully substitute professional maps, but expert system for cartography is useful for students and other users in the process of map making. The expert system both leads in correct creation of map both explain rules of cartography. Design of intelligent web based application for cartography is described in this article.

CHAPTER III

USES OF CARTOGRAPHY

CARTOGRAPHY USING GIS.

Cartography, the art of creating maps, deals with interpreted data. A cartographer, or map-maker creates a visual hierarchy when he or she decides how features appear on a map to illustrate data. Map making can be both subjective or objective-but its goal is always the visualizing of data with some spatial dimension.

GIS is a model of such data in a computer environment. Using GIS, we can simplify, focus or generalize information in maps. It is possible to build layers into the maps until they become "thick" with data. With new map making platforms that can include multimedia and annotation, the map has become a storytelling tool.

In this module, you, the students, will be in charge of investigations. The materials here will introduce you to some basic cartography, via GIS platforms that can quickly get you started making digital maps

HISTORY OF GIS

A Geographic Information System (GIS) is a software package that helping to digitize the world around us. Digital maps and location-based information helps government agencies, businesses and even people like us keep up with the changing pace pf the world around us.

A Geographic Information System(GIS) is a system of computer applications that can be used to display, manipulate and analyse spatially varied information from multiple sources all in one place.

Most often the data sets used in a GIS are categorized into multiple categories for easier storage and use each data set that a GIS can support is divided into two main parts: graphical(spatial) information and tabular(attribute)information.

Raster imagery can lose quality and become blurred when scaled. However, vector data is scalable to any size without losing any integrity.

Discrete data is usually vector based and has specific information located at specific points with gaps in between.

On the other hand, continuous data is usually raster-based and no gaps are present. Anywhere within the domain of a raster, there will be information.

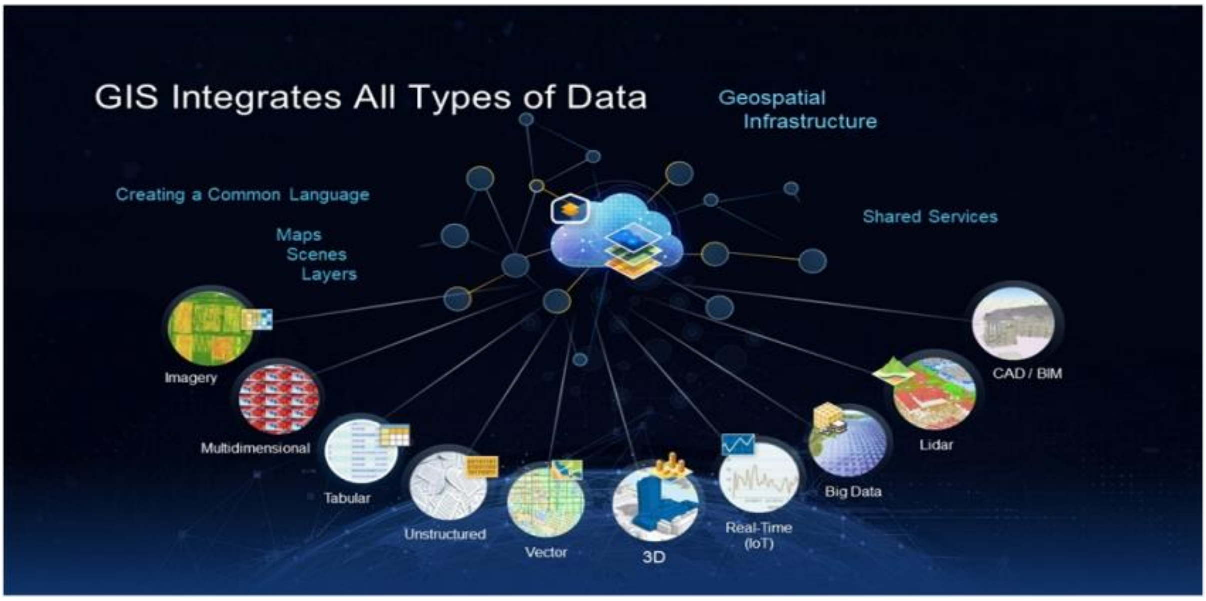

Fig.1 GIS integrate all types of data

FUNCTIONS OF GIS:

Data collection- It is a technique in which the information on various map attributes, facilities, assets, and organizational data are digitized, organized and captured on a target GIS system in appropriate layers.

- **Data storing, processing & analysis-** These are the techniques which is normally performed by a computer. The processing includes retrieving, transforming, or classification of information. The Collection, manipulation, and processing of collected data for the required use is known as data processing. Hence, in GIS one can Store data, Query data and analyse data.

- **Output production -** Output is the final product of any processing and analysis. The most common form of output from a GIS is a map. On the other hand, the non-cartographic forms of GIS output are tables and charts containing spatial and non-spatial attribute information.

COMPONENTS OF GIS

Fig.2 component of GIS

USER- It is the most important part of a GIS. An user define and develop the procedures used by GIS. It can overcome Shortcoming of the other 4 elements (data, software, hardware, procedure)

Fig3. Ground truth data collection **Fig4. Data storing, processing and analysis**

- **Data-** Data is the information used within a GIS Since a GIS often incorporates data from multiple sources, its accuracy defines the quality of the GIS. GIS quality determines the types of questions and problems that may be asked of the GIS. Mainly two types of data are used in GIS that are:
  vector data: A representation of the world using points, lines, and polygons. Vector models are useful for storing data that has discrete boundaries, such as country borders, land parcels, and streets.

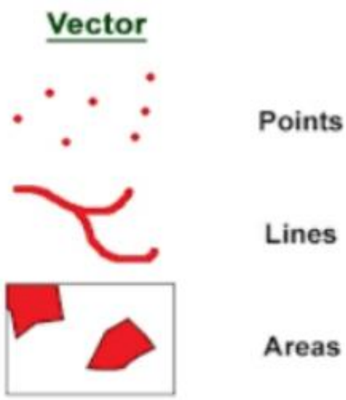

Fig5. Vector data

Raster data: A representation of the world as a surface divided into a regular grid of cells. Raster models are useful for storing data that varies continuously, as in an aerial photograph, a satellite image, a surface of chemical concentrations, or an elevation surface.

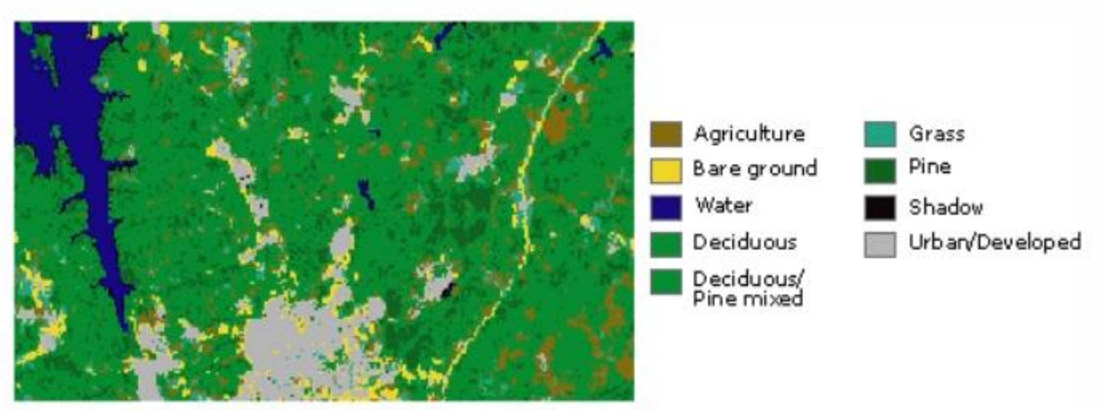

Fig6. Raster data

- **Software**

It encompasses not only to the GIS package, but all the software used for databases, drawings, statistics, and imaging. The functionality of the software used to manage the GIS determines the type of problems that the GIS may be used to solve. The software used must match the needs and skills of the end user. Popular GIS based software are:

1. Vector based GIS- ArcGIS (ESRI) , ArcView, MapInfo
2. Raster based GIS- Erdas Imagine (Leica), ENVI (RSI), ILWIS (ITC),IDRISI (Clark Univ.)

- **Hardware**

The type of hardware determines, to an extent, the speed at which a GIS will operate. Additionally, it may influence the type of software used. To a small degree, it may influence the types/personalities of the people working with the GIS.

APPLICATIONS

1. Mapping: GIS can be used to provide a visual interpretation of data. Google Maps is an excellent example of a web-based GIS mapping solution that people use for everyday navigation purposes. However, smart mapping technology has significantly advanced and is used in products like Nobel's Geo-Viewer, which gives cities, municipalities and private industry an in-depth look at electric and water district assets in the field.

2. Telecom and Network Services:

Organizations can incorporate geographic data into their complex network design, optimization, planning, and maintenance activities. This data enhances telecom processes through better customer-relationship management and location services.

3. Accident Analysis and Hot Spot Analysis:

GIS data helps to identify accident locations, and road networks can be optimized using data intelligence. This intelligence helps to improve road safety measures and allows better traffic management.

4. **Urban planning:**

GIS data analyses urban growth and the direction of expansion. When appropriately applied, it can discover new sites for further development, considering various factors that are necessary for successful building.

5.Transportation Planning:

GIS data is commonly used for managing transportation issues. With the addition of environmental and topical data in a GIS platform, companies can plan for a new road or rail route.

6. Environmental Impact Analysis:

Data gathered via GIS applications is vital for conserving natural resources and protecting the environment. Impact statements assess the magnitude of human impact on the environment, which GIS integration helps indicate.

7. Agricultural Applications:

GIS data helps create more efficient farming techniques, alongside analyzing soil data in an advanced fashion. This can increase food production in different parts of the world.

8. Disaster Management and Mitigation

Efficient GIS systems protect the environment and are developed to assist risk and disaster management.

9. Navigation

Web-based navigation maps use GIS data to provide the public with useful information. Web maps are regularly updated per GIS information and are used consistently in everyday life.

10. Flood damage estimation

Governments use GIS data to map flood risk areas and can use the information to coordinate relief efforts.

11. Natural Resources Management

With the help of GIS information, forests can be adequately maintained and managed. It is especially crucial for the allocation and geographic distribution of water, one of the more critical environmental constituents.

12. Banking

Banking has evolved to become market-driven, and a bank's success depends mainly on its ability to provide customer-driven services. GIS data plays an essential role in planning, organizing, and decision making in the banking industry.

13. Taxation

GIS data helps solve taxation problems and maximize government income. It is used for building permits and engineering and offers a system for managing property tax on a geographic basis.

14. Surveying

Surveying involves measuring the location of objects on earth, and more organizations are using Global Navigation Satellite Systems (GNSS) for this function. This data incorporated into a GIS system can estimate area and prepare digital maps.

15. Geology

Geologists use GIS data to analyse soil, assess seismic information, and create 3D displays of geographic features. It can also be used to analyse rock characteristics, and identify the best location for different functions

16. Assets Management and Maintenance

GIS data helps organizations become more efficient with finite resources. With an understanding of the population at risk, planners can allocate resources more efficiently.

17. Planning and Community Development

GIS data helps us understand and meet global challenges. As GIS technology rapidly advances, there are various innovative applications in the planning sector. GIS tools can be used to integrate geographic intelligence into planning processes, and have the potential to change how we think and behave.

18. Dairy Industry

The dairy industry uses GIS data for distribution, production, and identifying the location of shops. It is a useful tool for planning in the field of dairy farm management and allows for better decision making.

- Mapping. ...
- Telecom and Network Services. ...
- Accident Analysis and Hot Spot Analysis. ...
- Urban planning. ...
- Transportation Planning. ...
- Environmental Impact Analysis. ...
- Agricultural Applications. ...
- Disaster Management and Mitigation

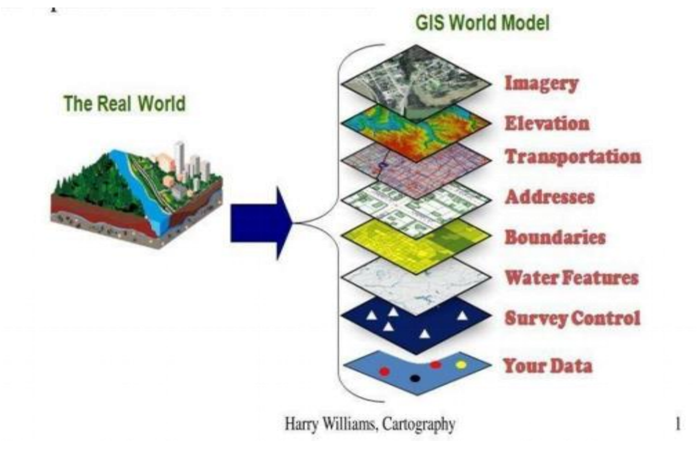

Fig.7 harry Williams cartography

CARTOGRAPHY USING REMOTE SENSING

Remote sensing is important in cartography because it enables cartographers to a mass large amounts of data more efficiently.

Advantages of Remote Sensing are:

- Remote sensing has come a long way in recent years and is an impressive surveying technique with many different advantages.
- Remote Sensing Technology can survey large and inaccessible areas.
- Remote sensing is a fast process. Sensors used to measure light reflections from surfaces are mounted to an aircraft, drone or even a satellite. This positioning of the sensors allows them. to cover a large area in a short time. By surveying from the air, remote sensors are also able to scan and create maps of inaccessible areas.
- Remote Sensing data can have a wide range of uses.
- Once remote sensors have collected data, it can be used and analyzed multiple times for different applications.
- For example, data might be collected by remote sensors to survey a site for construction. However, the same information could also be used to analyze and plan new roads. Or, data collected from forests to monitor the risk of wildfires could also be used to monitor biodiversity.
- Remote sensing technology like LIDAR collects point cloud data, which until recently was hard to process. But now this data can be quickly and easily analysed with point cloud software. Software such as TOPODOT can automatically extract topographic features from point cloud data in a matter of moments.
- As data is analysed in a laboratory using software, this limits the work needed in the field. Small teams can carry out surveys and analysis post-scan.

- Remote Sensing doesn't disturb people or the environment

- Remote sensors measure reflected light either natural sunlight or a light pulse. This light is harmless to objects, vegetation, and people, so remote sensing does not disrupt the scanned environment. So it is perfect for surveying built-up areas as there is no need to close roads, and cities can go about business as usual.

PROCESS

Data to be used

Satellite imagery: Images of the Earth taken from artificial satellites orbiting the planet. Important for GIS and remote sensing. Remote sensing: Studying an object or location without making physical contact with it. They are essentially the eyes in the sky. These images reassure forecasters to the behaviour of the atmosphere as they give a clear, concise, and accurate representation of how events are unfolding.

Fig.8 satellite image

Authenticated boundary

For modernization of land records system in the country, a modified programme, viz., the National Land Records Modernization Programme (NLRMP) a Centrally Sponsored Scheme, was formulated by merging two Centrally-sponsored schemes of Computerization of Land Records (CLR) and Strengthening of Revenue Administration and Updating of Land Records (SRA&ULR) and was approved by the Cabinet.

Google earth engine

Google Earth is a computer program, formerly known as Keyhole EarthViewer, that renders a 3D representation of Earth based primarily on satellite imagery. Google Earth provides search capabilities and the ability to pan, zoom, rotate, and tilt the view of the Earth. It also offers tools for creating new data and a growing set of layers of data, such as volcanoes and terrain, that reside on Google's servers, and can be displayed in the view.

Software

ArcGIS is a geographic information system (GIS) for working with maps and geographic information maintained by the Environmental Systems Research Institute (Esri). The system provides an infrastructure for making maps and geographic information available throughout an organization, across a community, and openly on the Web.

We can use it for viewing and editing spatial data in two dimensions and creating two-dimensional maps .We can also use it for viewing and editing three-dimensional spatial data in a local projected view. It provides tools for the creation of map and spatial data used in GIS, including the ability of editing geodatabase files and data, multiuser geodatabase editing, versioning, raster data editing and vectorization, advanced vector data editing.

Fig9. Image of Google earth

Fig10. Image of ARC GIS

<u>Methodology Flow Chart</u>

Methodology Flow Chart

CHAPTER IV

ANALYSIS

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ANALYSIS

LAYER EXTRACTION FROM AREA OF INTREST

Digitization is the most important technique of data and storage in a GIS but is expensive and time consuming. Map making has been one of the most important achievements for humankind as it was because of this humankind was able to spread throughout the globe. New lands were discovered and inhabited and in all these activities the role of maps cannot be underestimated. Thus, for ages maps have been used to portray the surface of the earth on to a paper. But while viewing the maps, one generally tends to forget that each line or point depicted on the map actually represents a considerable area on the surface of earth. Thus, if lines present on the maps are not presented accurately, it means that a large area of land becomes disputed. Now we have an age of digital revolution. Right from digital movies and digital music to digital information, the internet has played a major role in accelerating this digital revolution. Maps have become a part of this digital revolution and internet mapping is the ‘in’ thing now. The main issue of discussion is the ways and means of depiction of maps in digital form and the probable reasons for the occurrence of such errors in the process.

All the digitization was done using PCS (UTM Zone 45N) to extract the features present in study area like road, water body, locations, industrial setups so that we can perform various analysis upon those data for our study.

Universal Transverse Mercator (UTM)

•UTM projection is used to define horizontal, positions world-wide by dividing the surface of the Earth into 6ozones, each mapped by the Transverse Mercator projection with a central meridian in the center of the zone.

•UTM zone numbers designate 6 degree longitudinal strips extending from 80 degrees South latitude to 84 degrees North latitude.

STUDY AREA BOUNDARY

Study area boundary with satellite imagery as base layer.

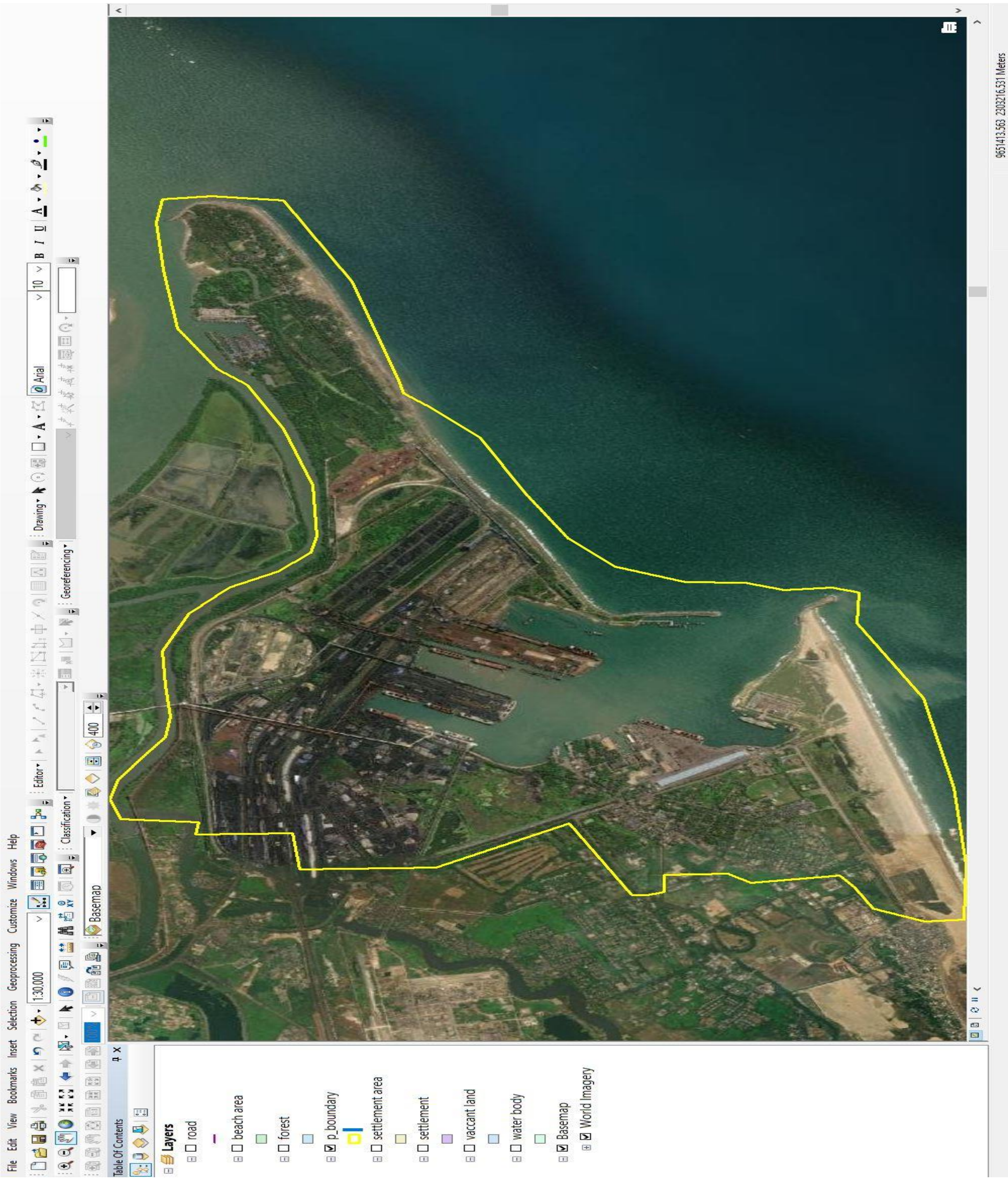

Fig.11: STUDY AREA BOUNDARY

SATELLITE IMAGENARY OF STUDY AREA

IMPORTANT SITES IN PARADEEP PORT AREA

All the important sites shown in vector format across the study area.

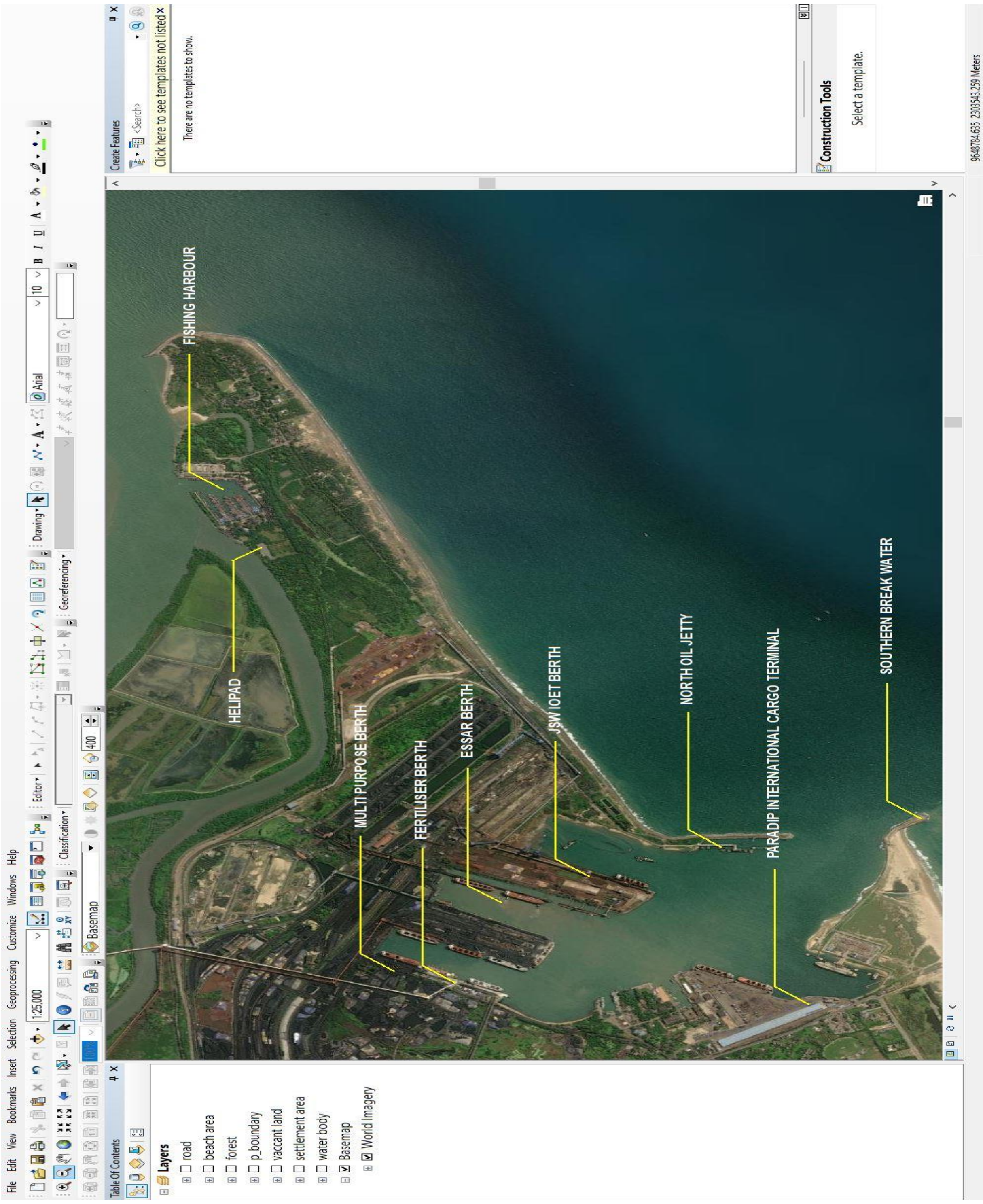

Fig.12 : IMPORTANT SITES WITH IN STUDY AREA

ROAD NETWORK ON SATELLITE IMAGE

Road network distribution on satellite raster imagery.

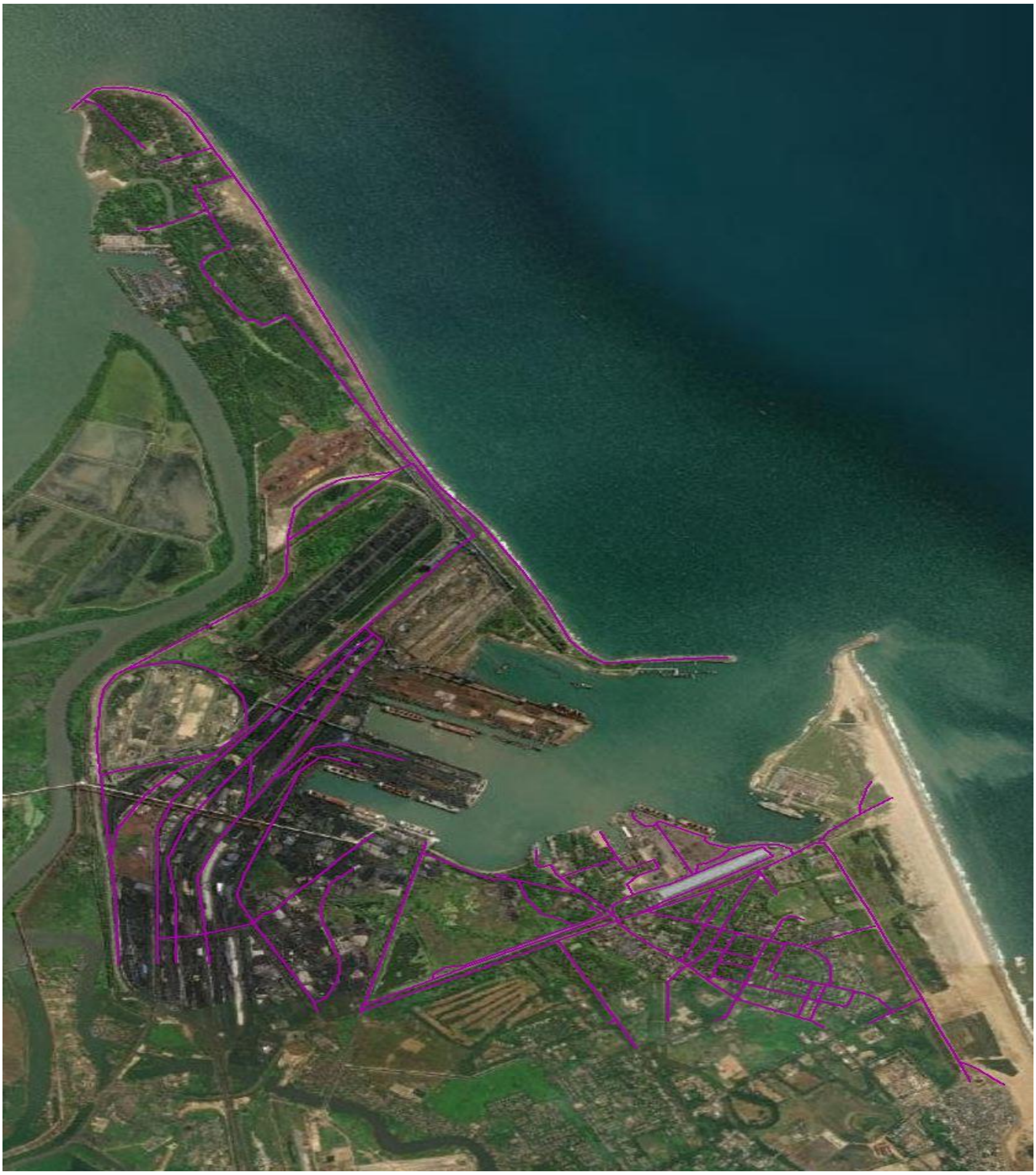

Fig.13 : ROAD NETWORK ON SATELLITE IMAGE

VECTOR FORMAT OF ROAD NETWORK

Labelling the road network length on vector data set.

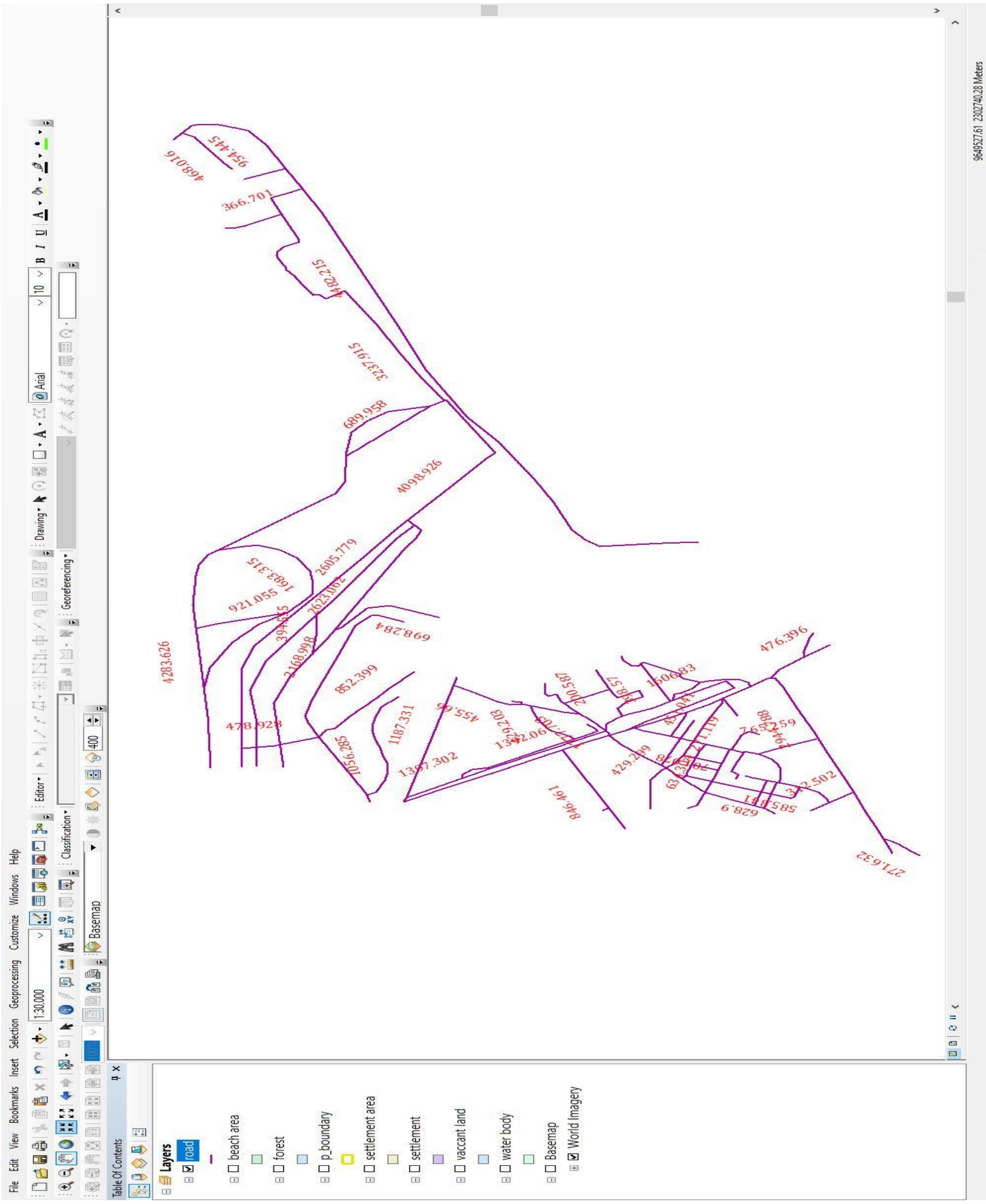

Fig.14: VECTOR FORMAT OF ROAD NETWORK

FOREST COVER ON SATELLITE

Concentrated tree cover extraction from satellite image.

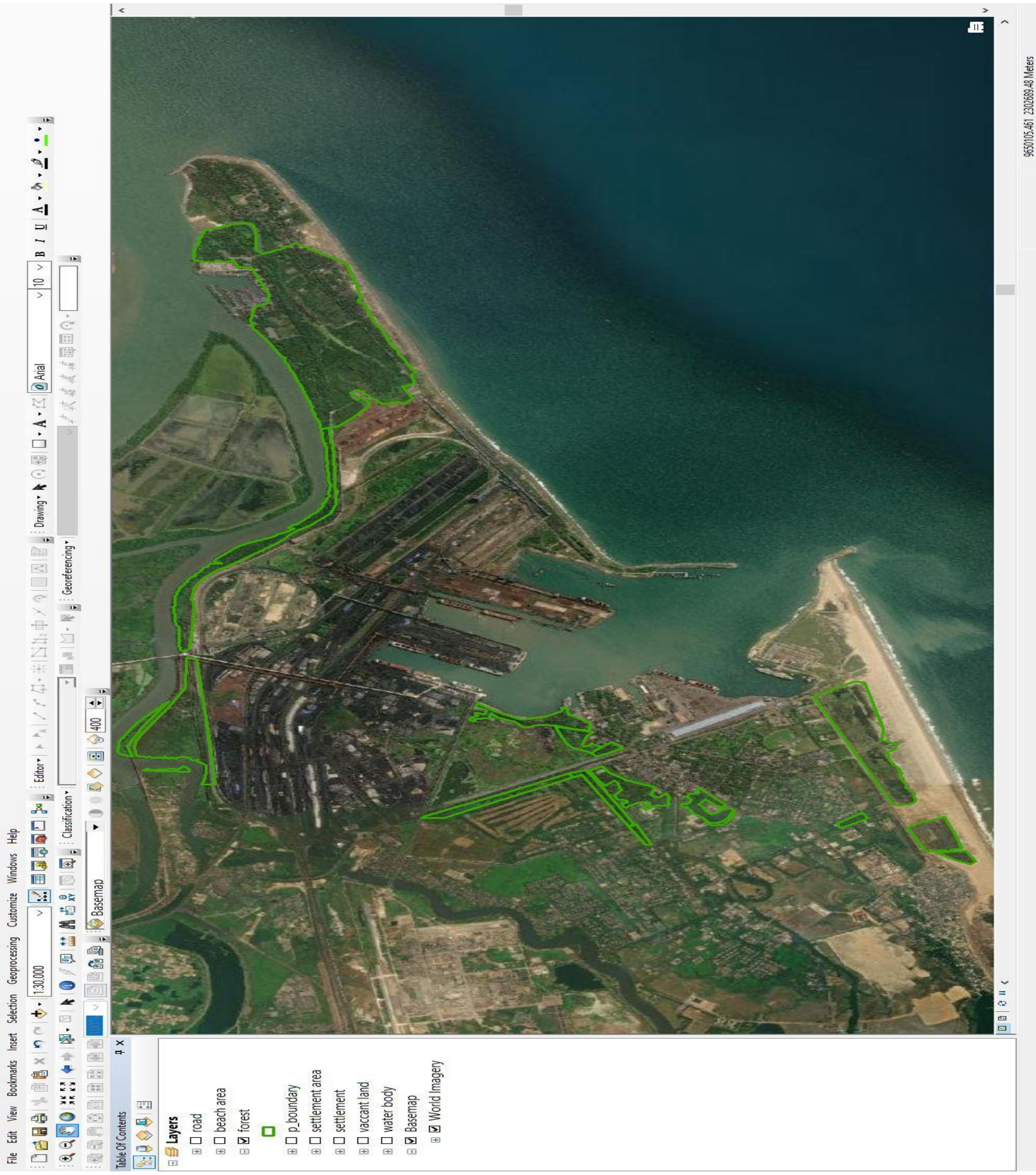

Fig.15: FOREST COVER ON SATELLITE

VECTOR FORMAT OF FOREST AREA

Labelling the calculated area of tree cover region insides study area.

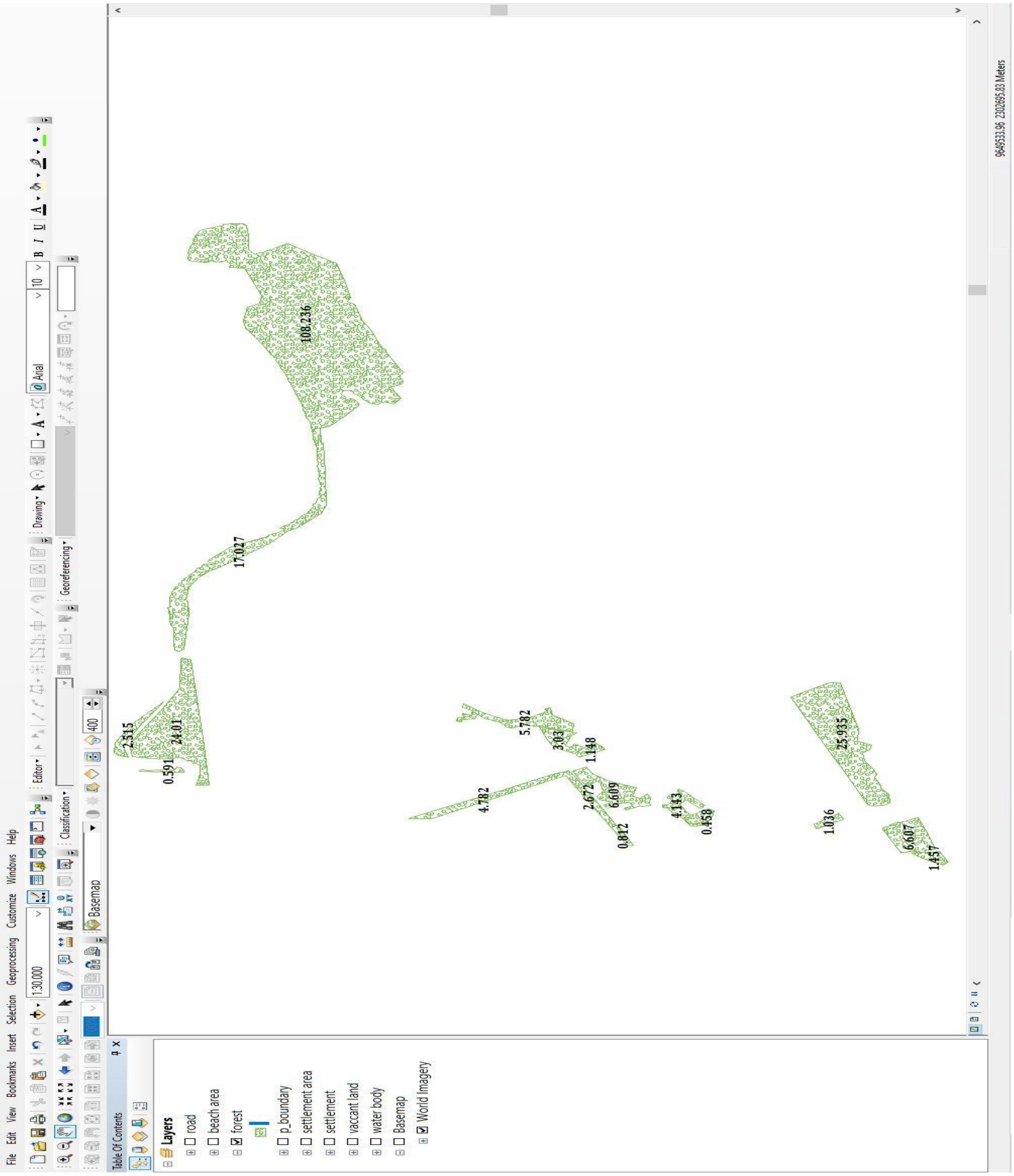

Fig.16: VECTOR FORMAT OF FOREST COVER

INDURSTRIAL AND RESIDENTIAL SETTLEMENT

Industrial and residential settlement digitized from satellite image.

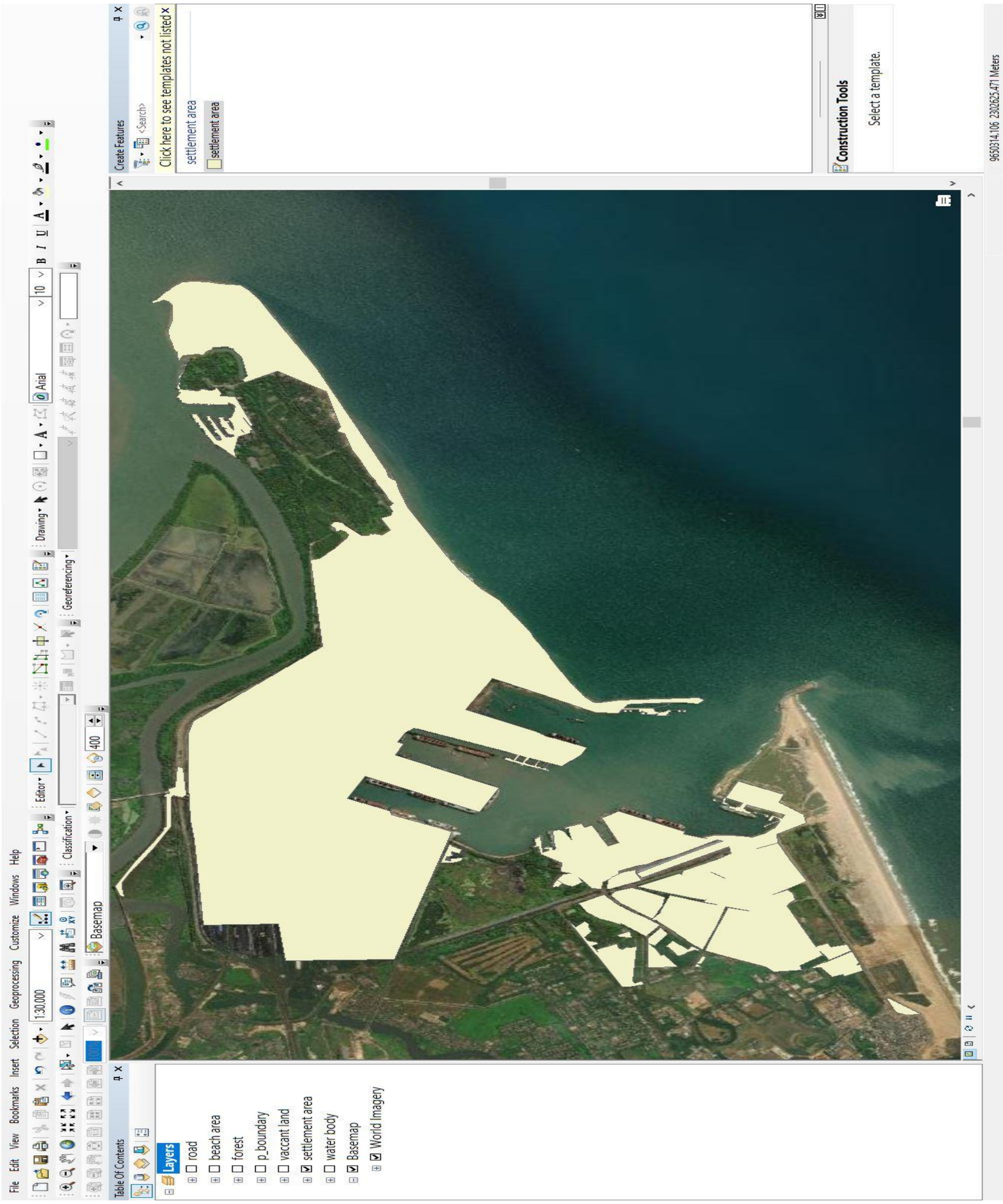

Fig.17: INDUSTRIAL AND RESIDENRIAL SETTLEMENT

VECTOR FORMAT OF INDUSTRY AND RESIDENSIAL SETTLEMENT

Labelization of settlement area.

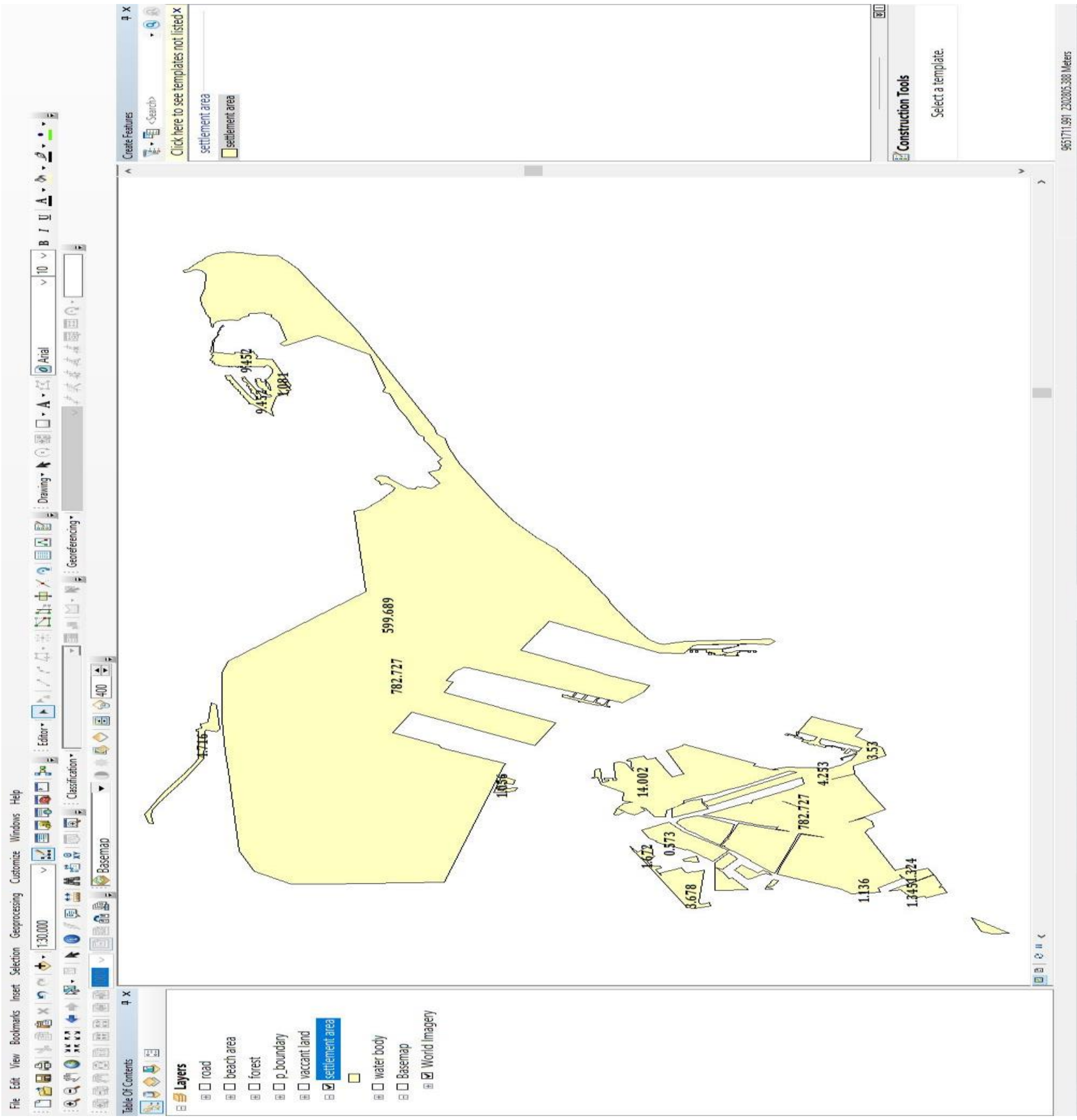

Fig.18: VECTOR FORMAT OF INDUSTRY AND RESIDENTIAL SETTLEMENT

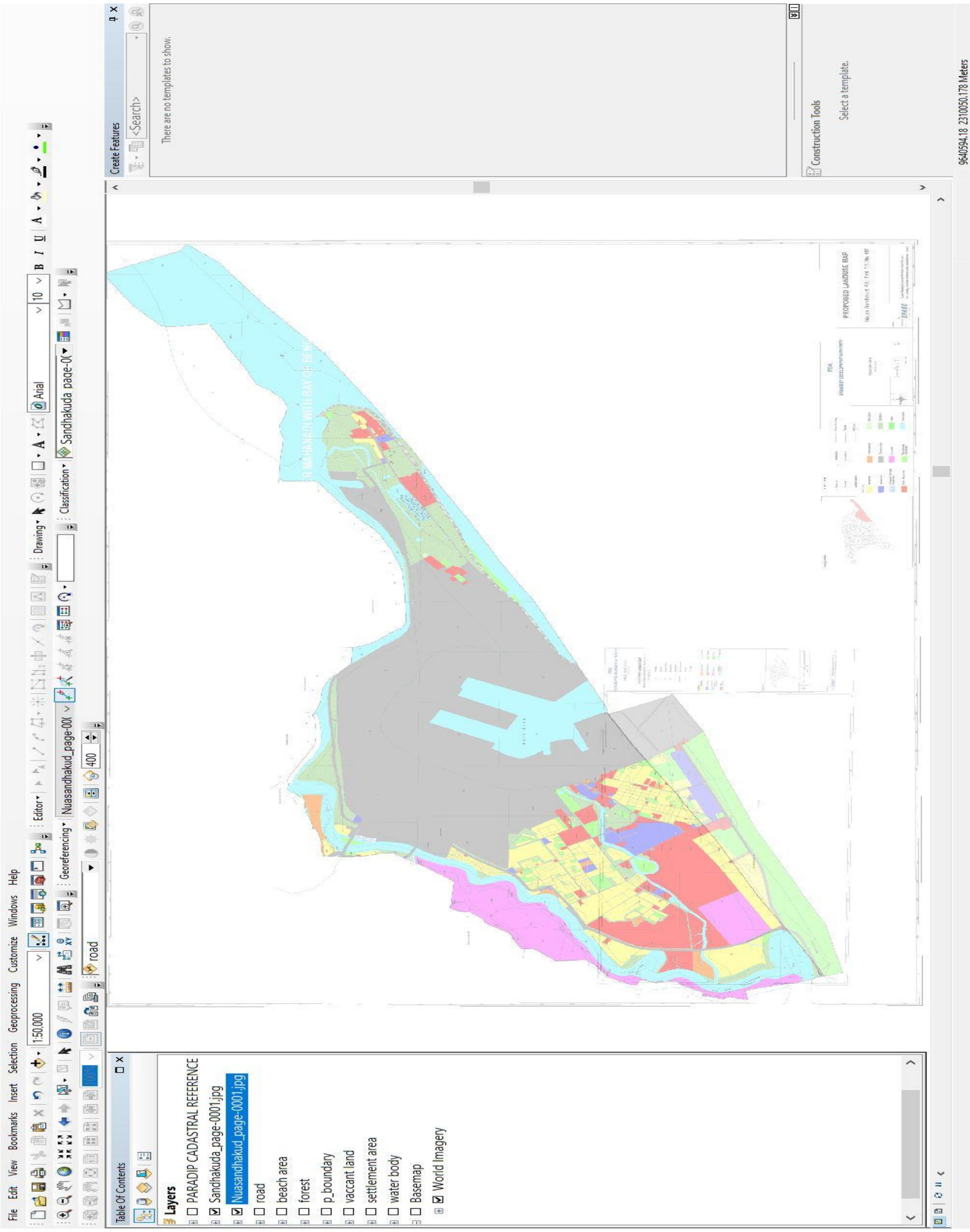

FIG.19: CADASTRAL MAP REFERANCING

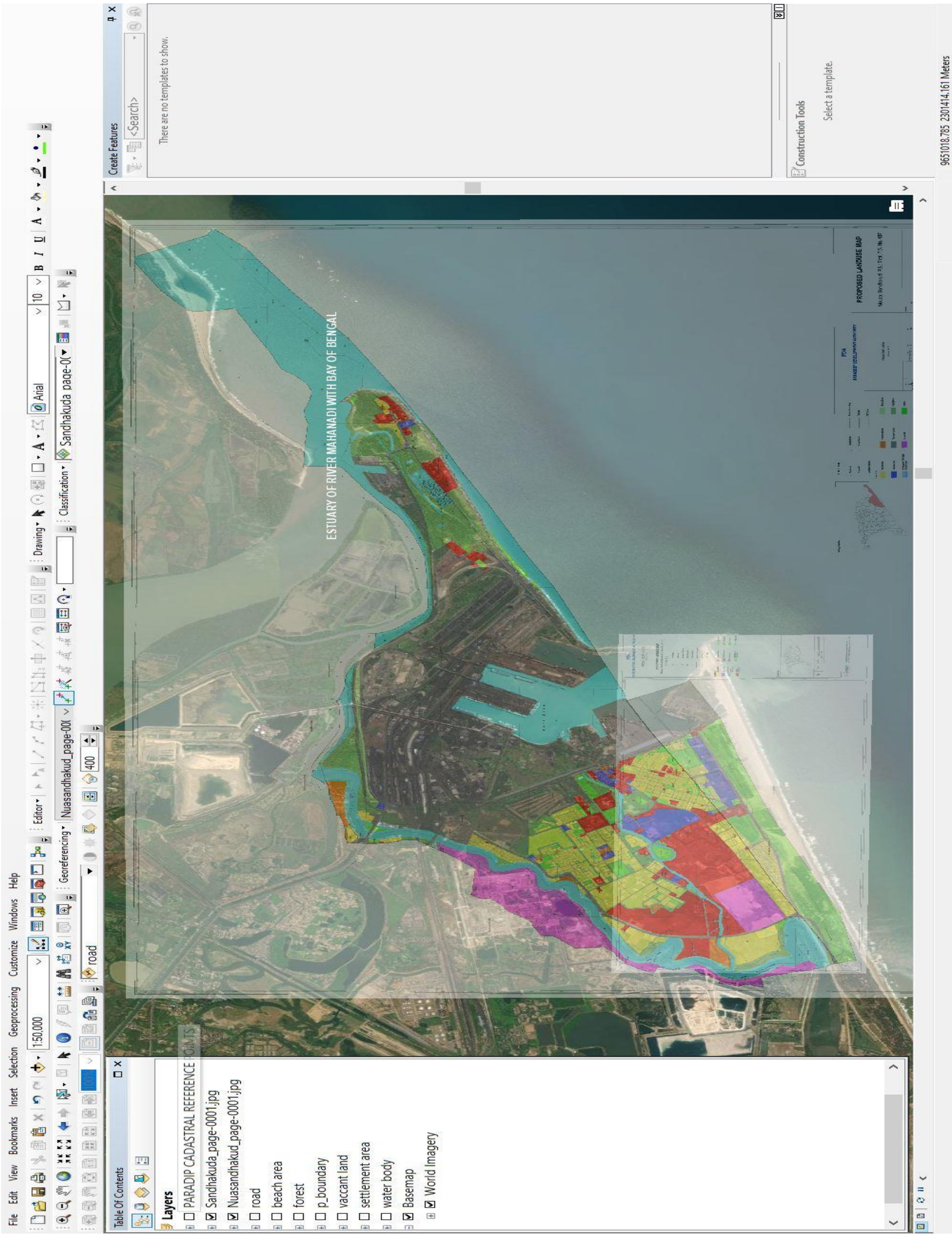

FIG.20:CADASTRAL MAP REFERANCING WITH SATELLITE IMAGE

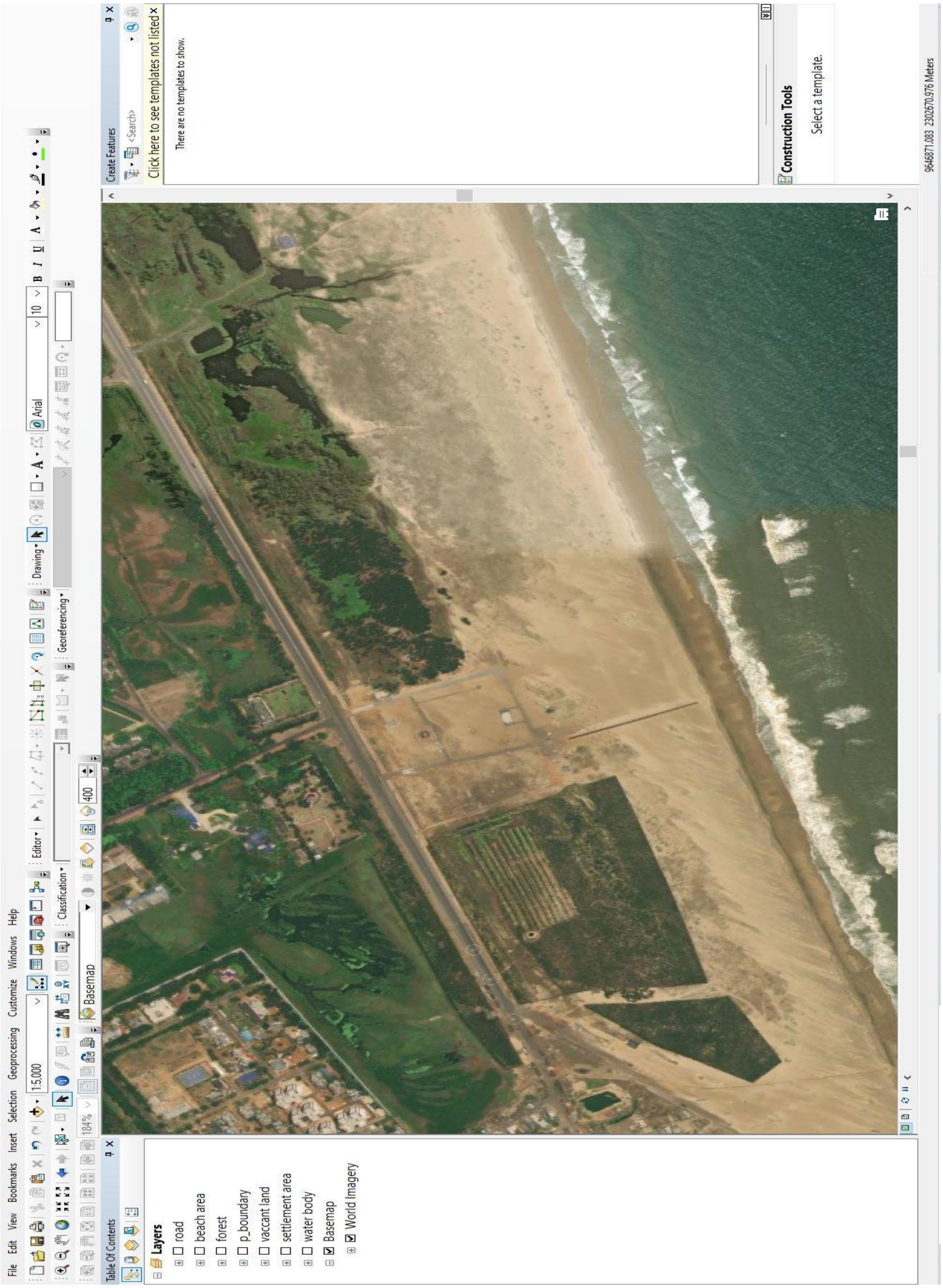

Fig.21: BIJU MAIDAN AND PARADEEP SEA BEACH.

ATTRIBUTE TABLE

Attribute data are the information linked to the geographic features (spatial data) that describe features. That is, attribute data are the “[n]on-graphic information associated with a point, line, or area elements in a GIS.”
Attributes Or Properties

•Labels affixed to data points, lines, Or polygons.
•Used to describe the feature that you want to map.
•Can include text or numeric descriptors: i.e. nominal, ordinal, or interval/ratio data types.

•Must be careful in how the different data types are integrated and used – dangerous to mix and match.

Attribute tables are the data tables specifically associated with vector or raster files. We use them to understand, query, organize, and symbolize the layers in our maps. While the structure of attributes tables are similar to data tables (they even view the same in the software), they are a unique item when compared to non-spatial data tables.

Calculate Geometry Attributes (Data Management)

Adds information to a feature's attribute fields representing the spatial or geometric characteristics and location of each feature, such as length or area and x-, y-, z-coordinates, and m-values.

Usage

- Length and area calculations will be in the units of the input features' coordinate system unless different units are selected in the **Length Unit** and **Area Unit** parameters. If the **Coordinate System** parameter is specified, the length and area calculations will be in the units of that coordinate system unless different units are specified in the **Length Unit** and **Area Unit** parameters.
- The geodesic length and area properties use a shape-preserving algorithm. This produces highly accurate results that are not biased by an assumption

that the input line or polygon features are constructed with geodesic arcs between the vertices, which is the assumption regarding traditional geodesic length and area.

- If the input features have a selection, only the selected features will have values calculated in the added fields; all other features will maintain their existing value

GEOMETRICAL CALCULATIONS FOR THE STUDY AREA BOUNDARY USING GEOMETRICAL CALCULATION TOOL

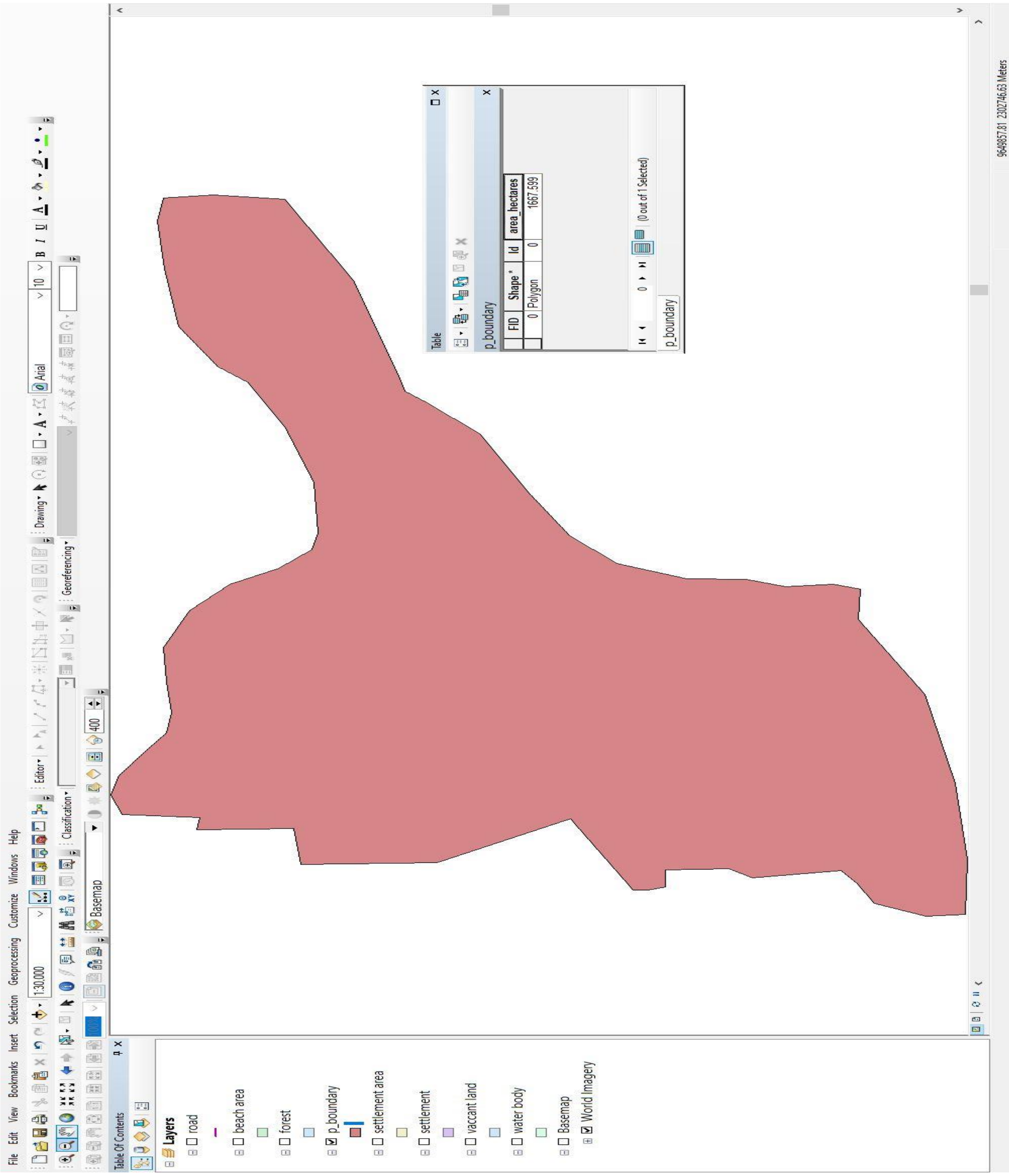

Fig.22: GEOMETRICAL CALCULATION OF STUDY AREA ON VECTOR DATA SET

GEOMETRICAL CALVULATION FOR THE ROAD NETWORK LENGTH

Calculation of road network length based on raster data set.

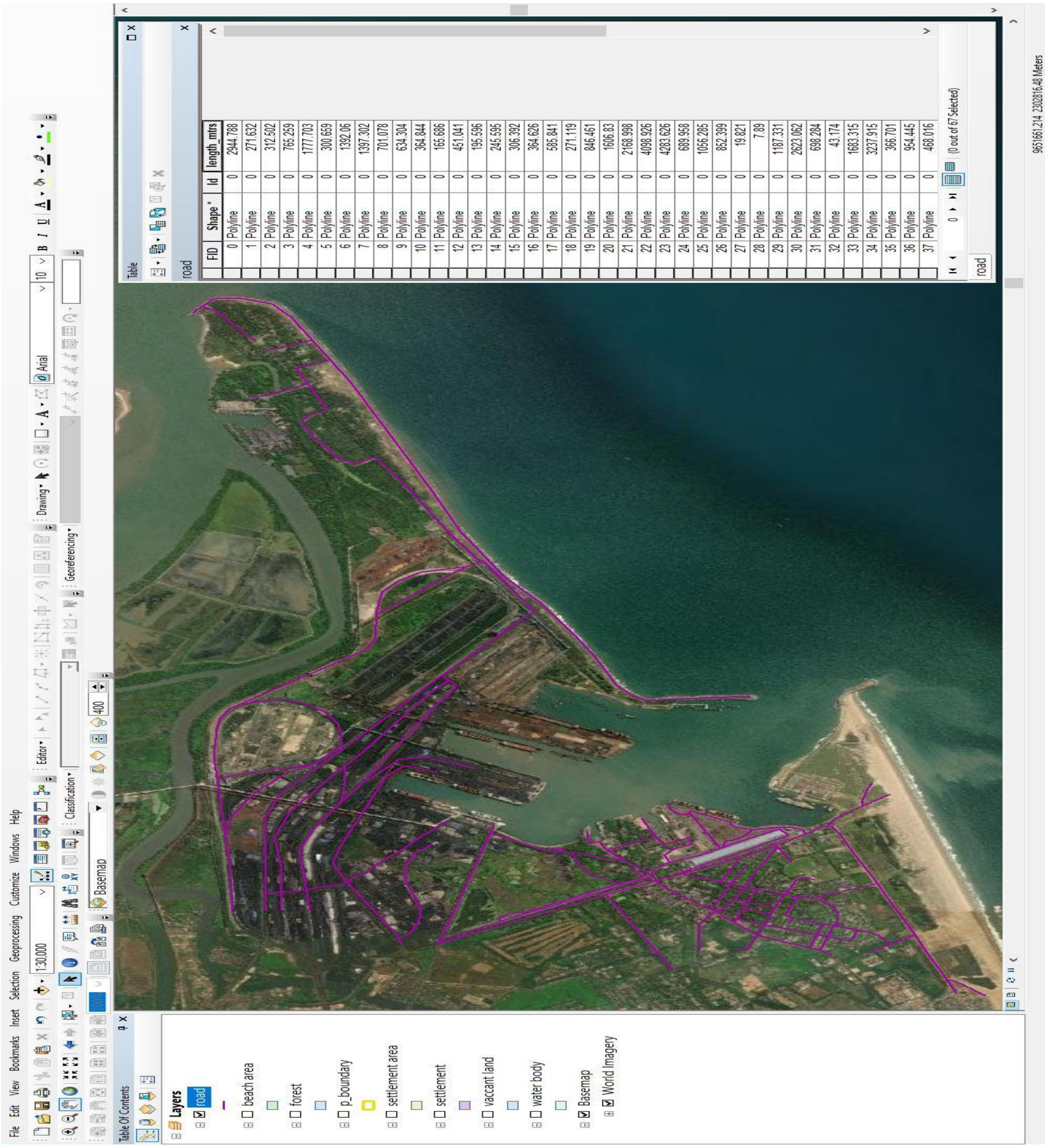

Fig.23: ROAD NETWORK LENGTH

GEOMETRICAL CALCULATION OF CONCENTRATED TREE

Fig.24: AREA CALCULATION OF FOREST AREA

Fig.25: MAP SHOWING THE SATELLITE IMAGERY OF STUDY AREA

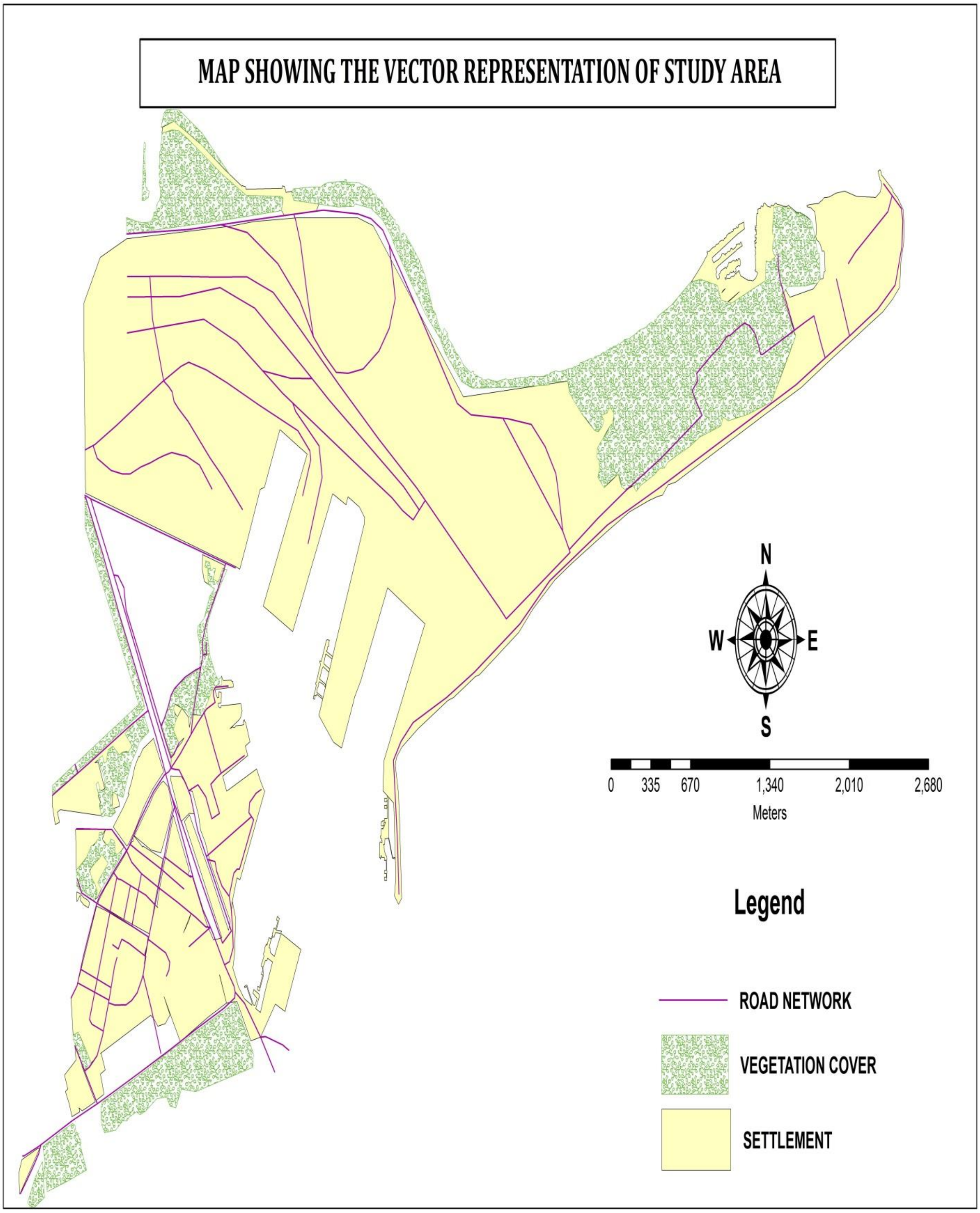

Fig.26: MAP SHOWING THE VECTOR REPRESENTATION OF STUDY AREA

CHAPTER V

CONCLUSION

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CONCLUSION

Cartographic Mapping is central to many things we do as individuals and as groups. Throughout this study, we've seen the ways in which people have used maps for thousands of years, and indeed, it's likely that they were using maps in times before we had evidence in the form of clay tablets or wall drawings. Today, mapping is a large and growing sector of the economy as well as an important social, cultural, and political phenomenon. Mapping is also important for lifelong learning. Spatial thinking skills are used in many fields, careers, and pastimes. The National Research Council report "Learning to Think Spatially" emphasizes that "with advances in computing technologies and the increasing availability of spatial data, spatial thinking will play a significant role in the information-based economy of the twenty-first century." Mapping and related technologies and societal practices are the foundation of spatial thinking.

Maps are useful in part because they allow us to see large areas of the world that we otherwise wouldn't be able to see on our own, whether it be the bus lines on the next block or the entirety of the earth. Maps are helpful because they can present a variety of complex social and environmental information in a way that is easy to interpret. Maps can demonstrate basic spatial relationships and highlight features of interest, but they can also provide information on things that cannot be directly observed even if one were standing in the mapped location. For instance, maps allow us to 'see' invisible phenomena such as mineral deposits below the ground, pollutants in the air, and the day's pollen count. Many of our maps are reference maps, generalist views depicting one world that essentially stores and displays a variety of features for a variety of uses. In contrast, thematic maps high light specific themes, be it the fastest route to work or the best places to eat.

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