Spatial Decision Making

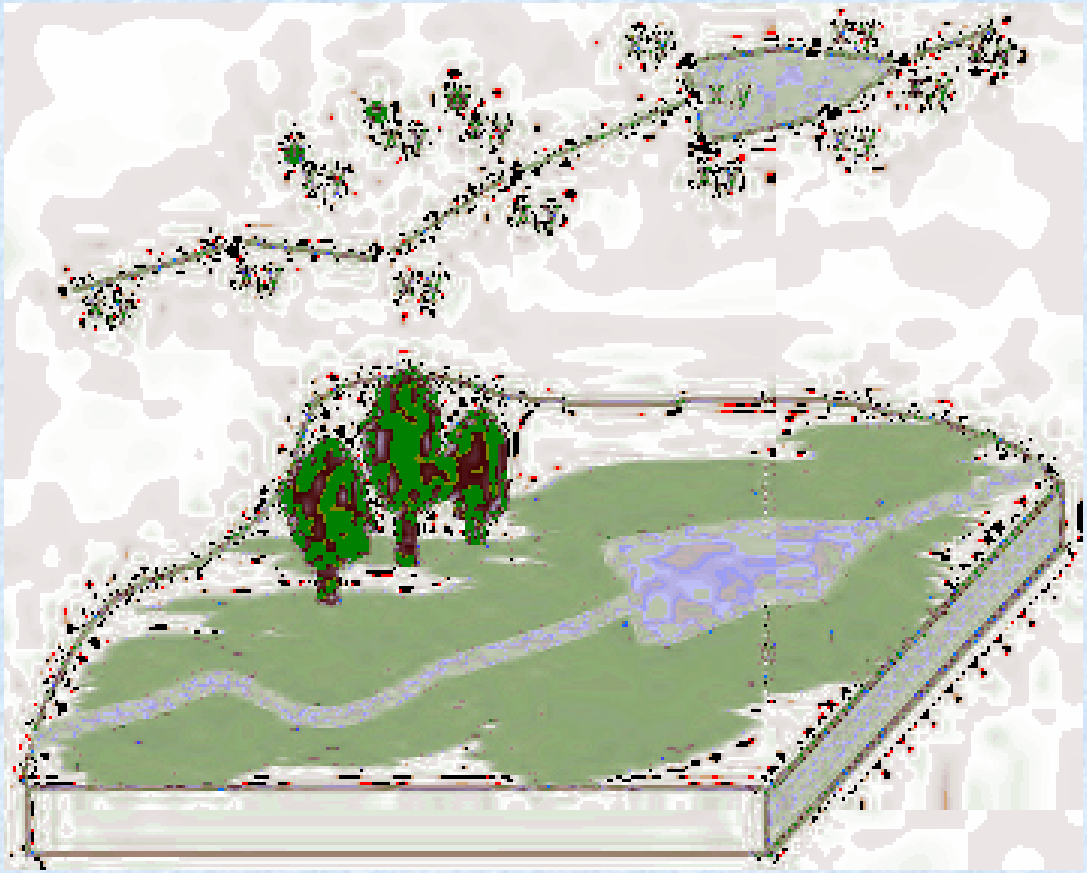
Geospatial Delhi Limited

Spatial Decision Making

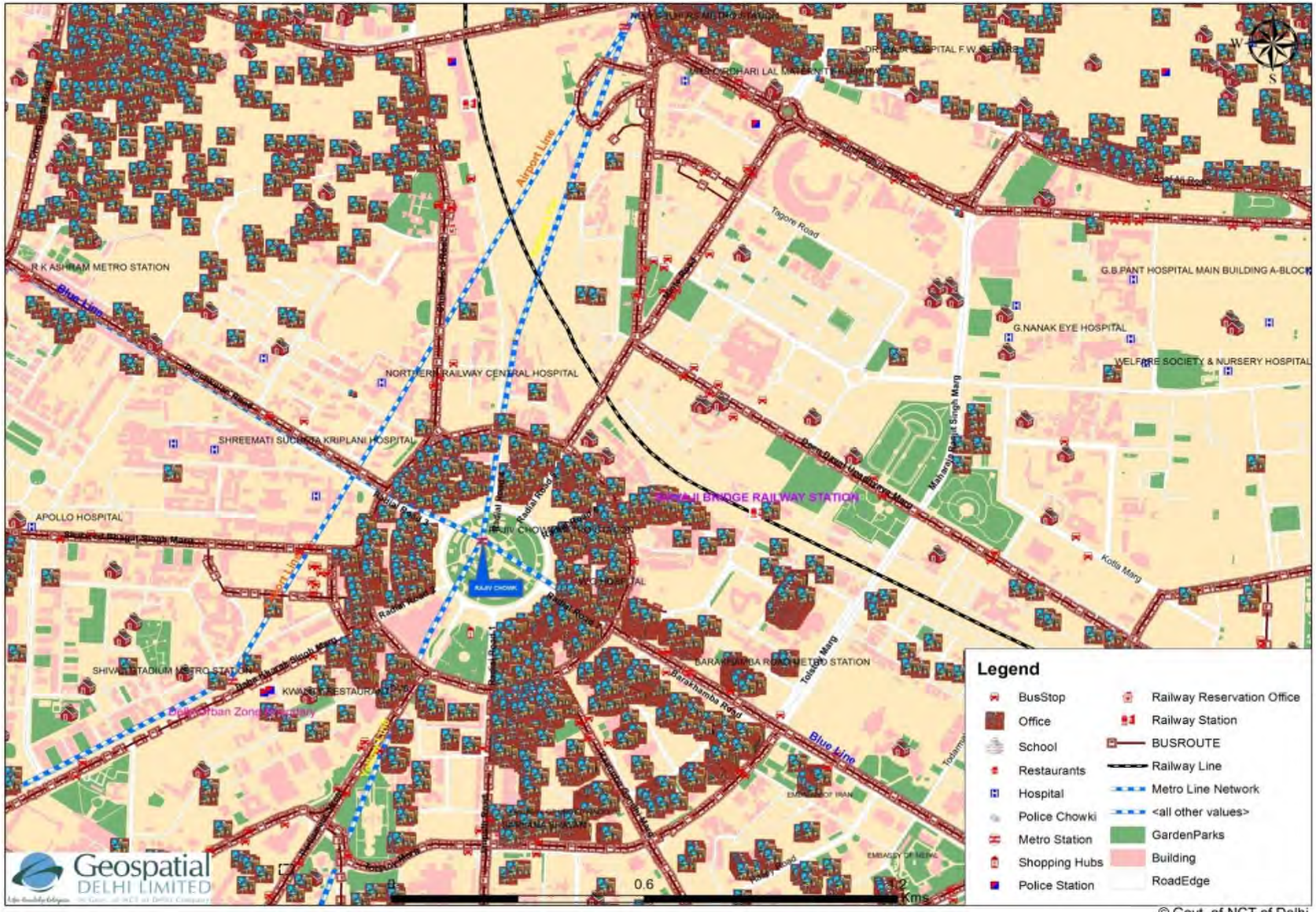
- **Decision Making…**

What is Spatial Data/information?

- Geographical Data
- With reference to Geographical Coordinates (Latitudes & Longitudes)
- Explicit Relations among spatial features



Distribution of Spatial Features



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What is Spatial Decision Making?

- Spatial decision making is an everyday activity, common to individuals and groups based on Geography (Spatial Parameters)

- Companies, government agencies, and other organizations make decisions that have far-reaching effects, and Spatial data affects these decisions.

Why is Spatial Decision Making?

- Applying Spatial information improves the decision-making process by addressing problems in a systematic, analytic, and visual manner.

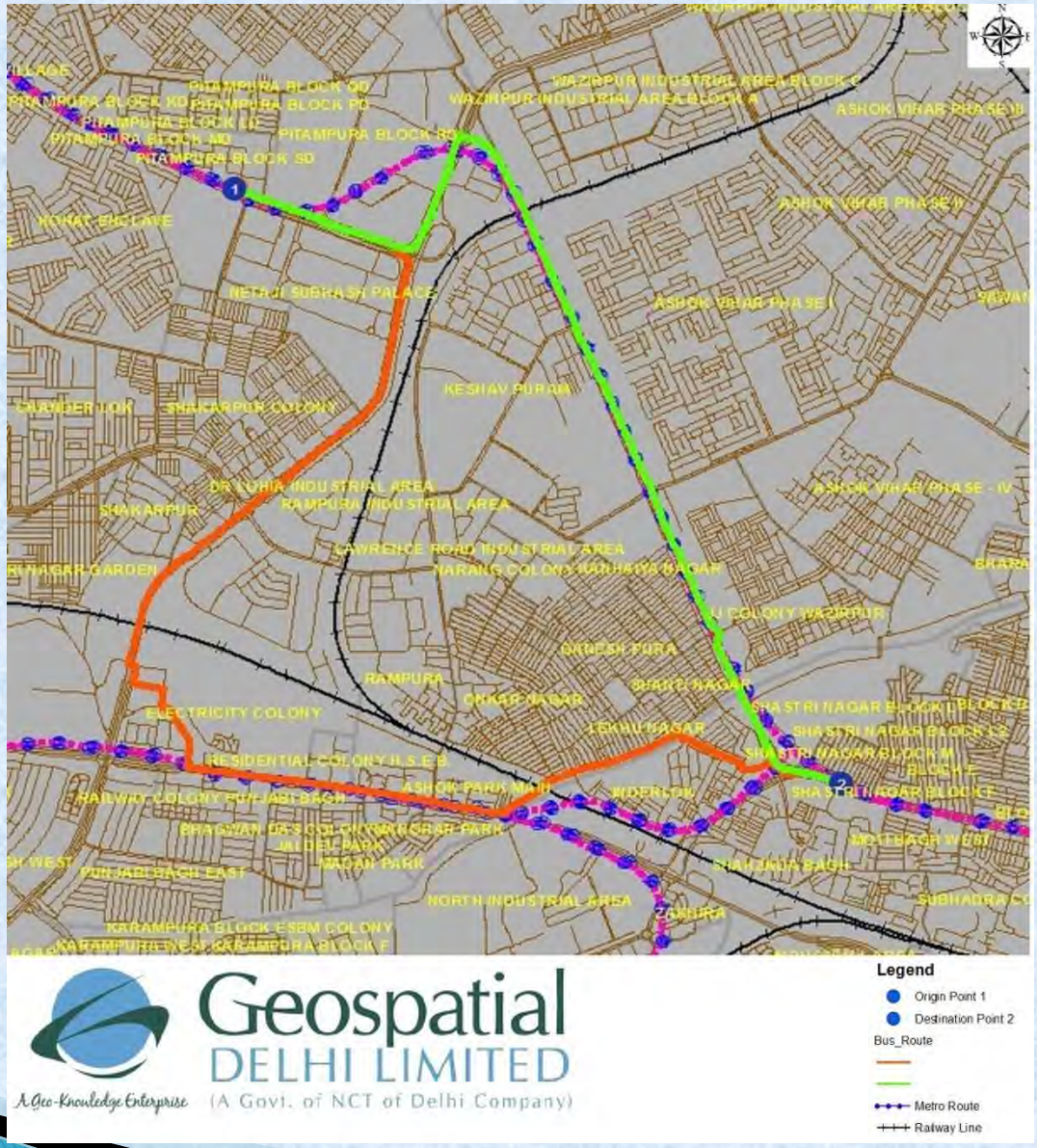
Understanding Spatial Decision Making……

- People take into account the realities of spatial organization when selecting a locale to live, choosing land development strategy, Managing infrastructure or Choosing a route.

- **E.g. Identify shortest path that connects a specified set of points**

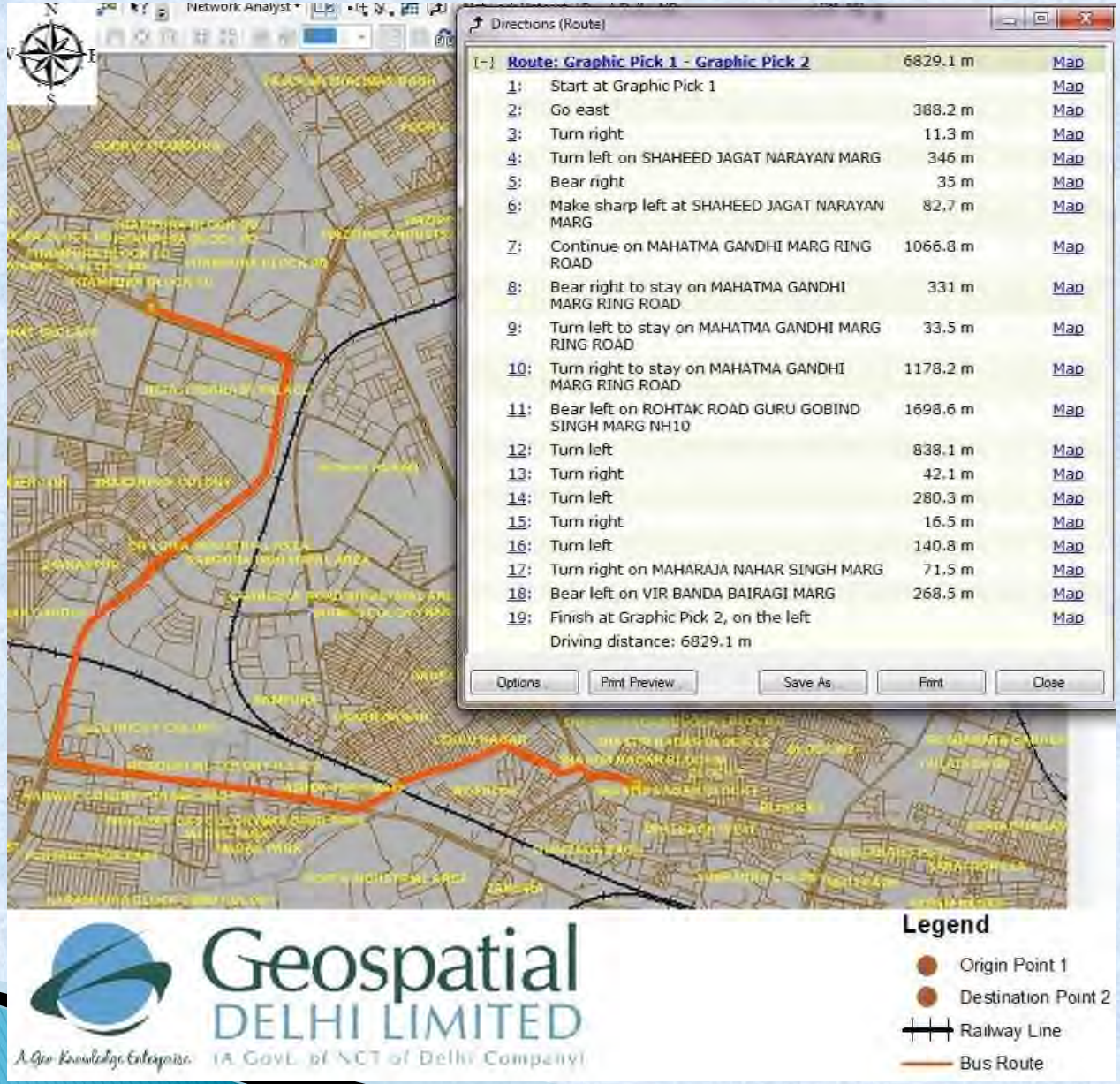
Identify shortest path that connects a specified set of points

Map showing Road & Metro Network

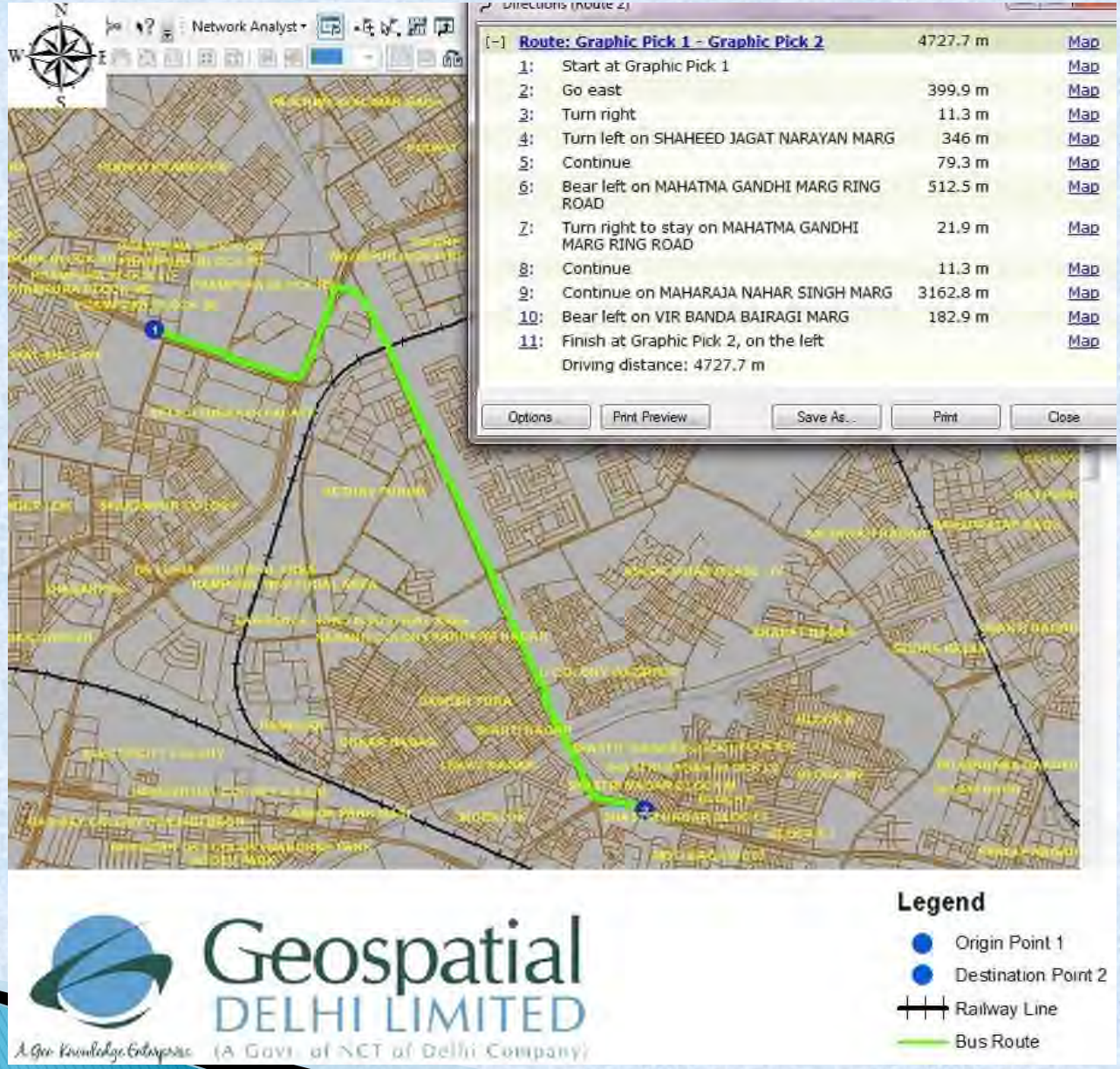


Map Showing Metro Line

Map Showing Bus route 1



Map Showing Bus route 2



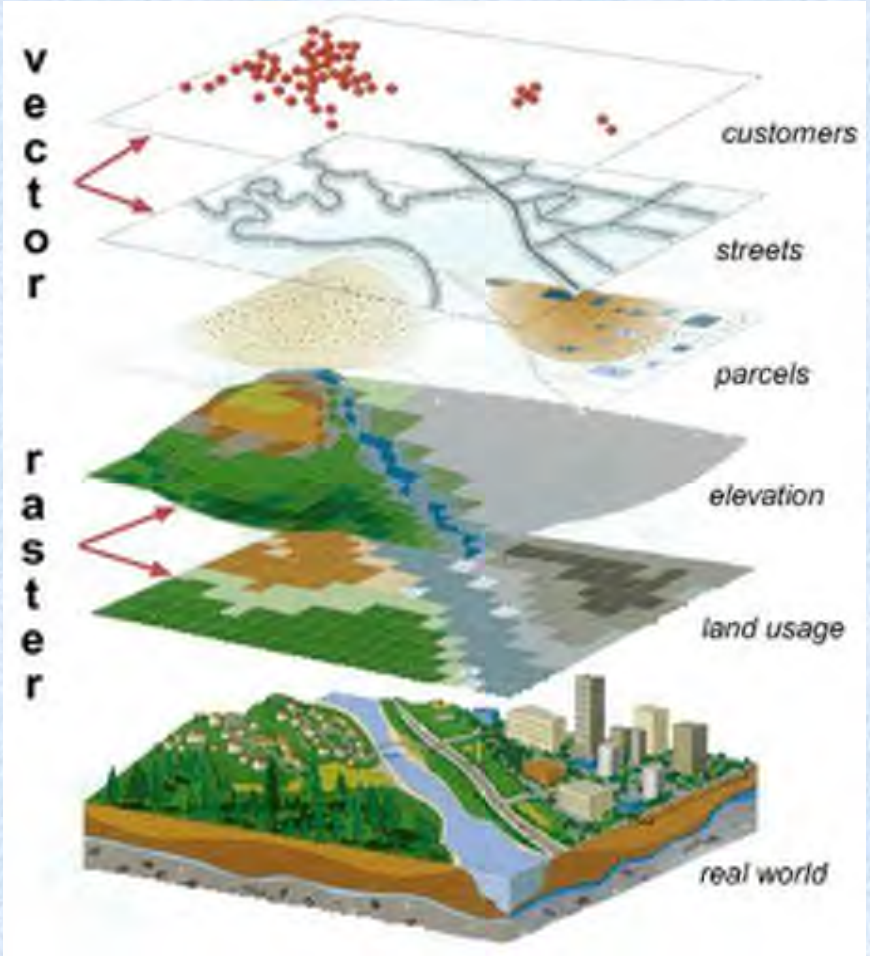
Significance of SDM

- Due to technological developments and trends everything has become spatial / spatial usage increased.
- Developments in data collection systems, GIS technology, geographic information science, and computing have made the decision-making process more feasible and attractive.

continued……

Significance of SDM

- Volumes of data (non-spatial data and spatial data) are more effectively analyzed using the data integration and management capabilities of GIS.
- These developments make it possible for decision makers to have a much broader view of phenomena.



GIS role in SDM?

- For many applications, the main information requirement of the decision-makers is for relatively structured spatial information.
- GIS systems incorporates facilities for manipulating and analysing spatial data.
- Huge volume of Spatial and Non-Spatial data can be analysed with different combinations using GIS.

GIS role in SDM?

- GIS furnishes digital tools for abstracting and organizing data, modeling geographic processes, and visualizing information that enable planners to make meaningful and effective decisions.

Spatial Decision Making

…….How it can be done?

An approach…

Spatial Decision Making

The Spatial Decision Making Process

Define the Problem → Evaluate Alternatives → Implement the chosen Alternative

Gather facts and develop alternatives.

Select the best alternative.

Follow up and evaluate the chosen alternative.

Spatial Decision Making process

- Identify a problem / Requirement
- Identify Factors influencing the problem
- Allocating weights to the factors
- Developing & Analysing alternatives
- Selecting an alternative that can resolve the problem

How it can Help?

- Analysing & Displaying spatial and non- spatial data help the planners and administrators in taking quick decisions during…..
  - Crisis
  - Calamities and
  - For the regular developmental planning

Spatial Decision Making

Where it will be used…. spatial information is one of the most critical elements underpinning decision- making for many disciplines,

Health Sector	Agriculture
Utilities & Infrastructure	Urban Infrastructure Development
Electricity	Solid Waste Management
Oil & Gas	Slum Improvement & Sanitation
Water Resources	Urban/Sub-Urban/Regional
Environmental	Capacity Building
Forestry	Finance /HR
Natural Resource Management	Planning
Risk Management	Disaster management
Transportation	Telecommunications

Spatial Decision Making

- **Benefits……**
  - To make things more accessible
  - Save time and Money
  - Avoid wastage
  - Reach aid at right time.

Spatial Decision Making

Identifying Areas prone for Spread of Dengue / Malaria

(Step1: Identify a problem / Requirement)

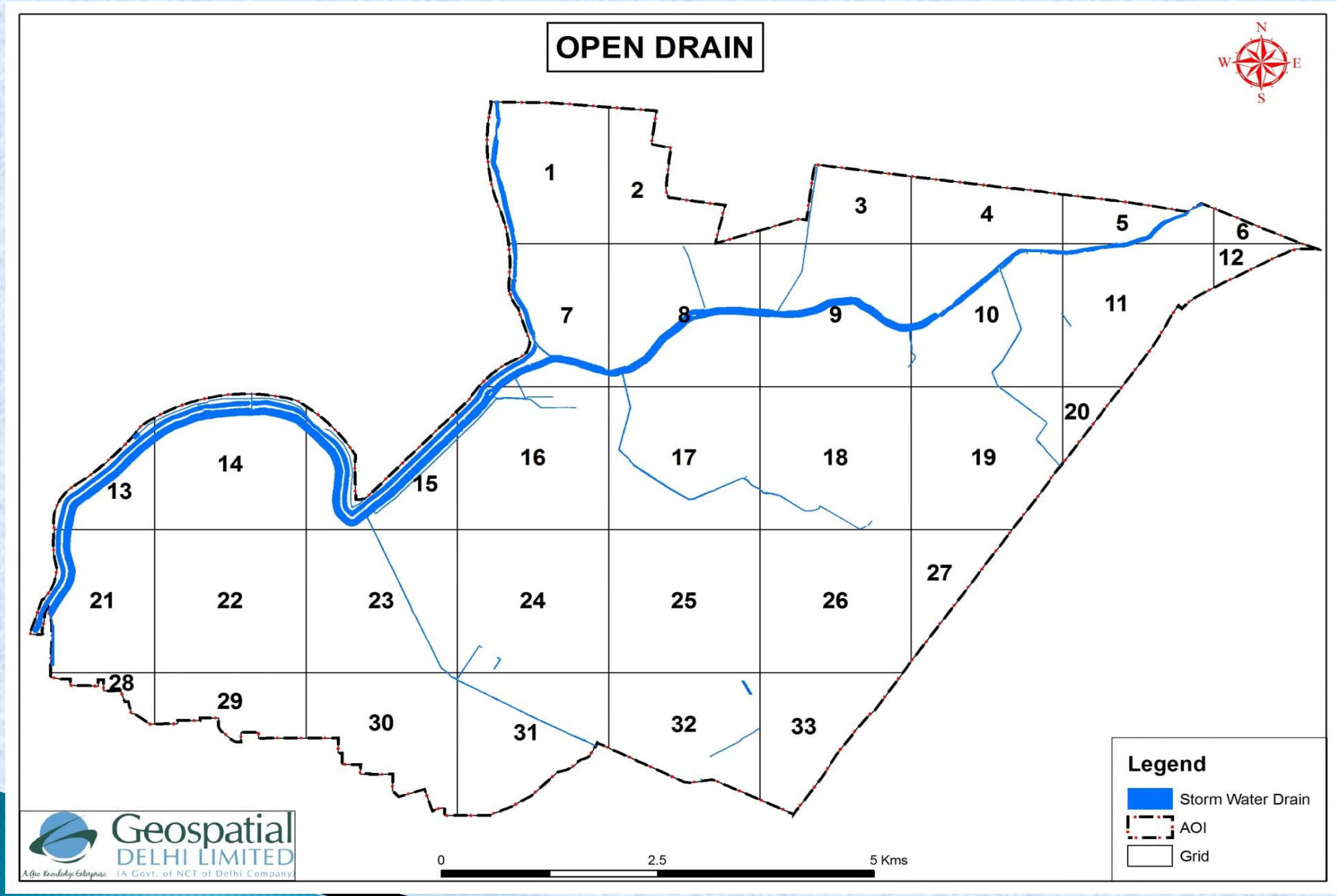
- Input Data:
  - Data available with GSDL (Spatial Data)

Step2: Identifying Factors influencing

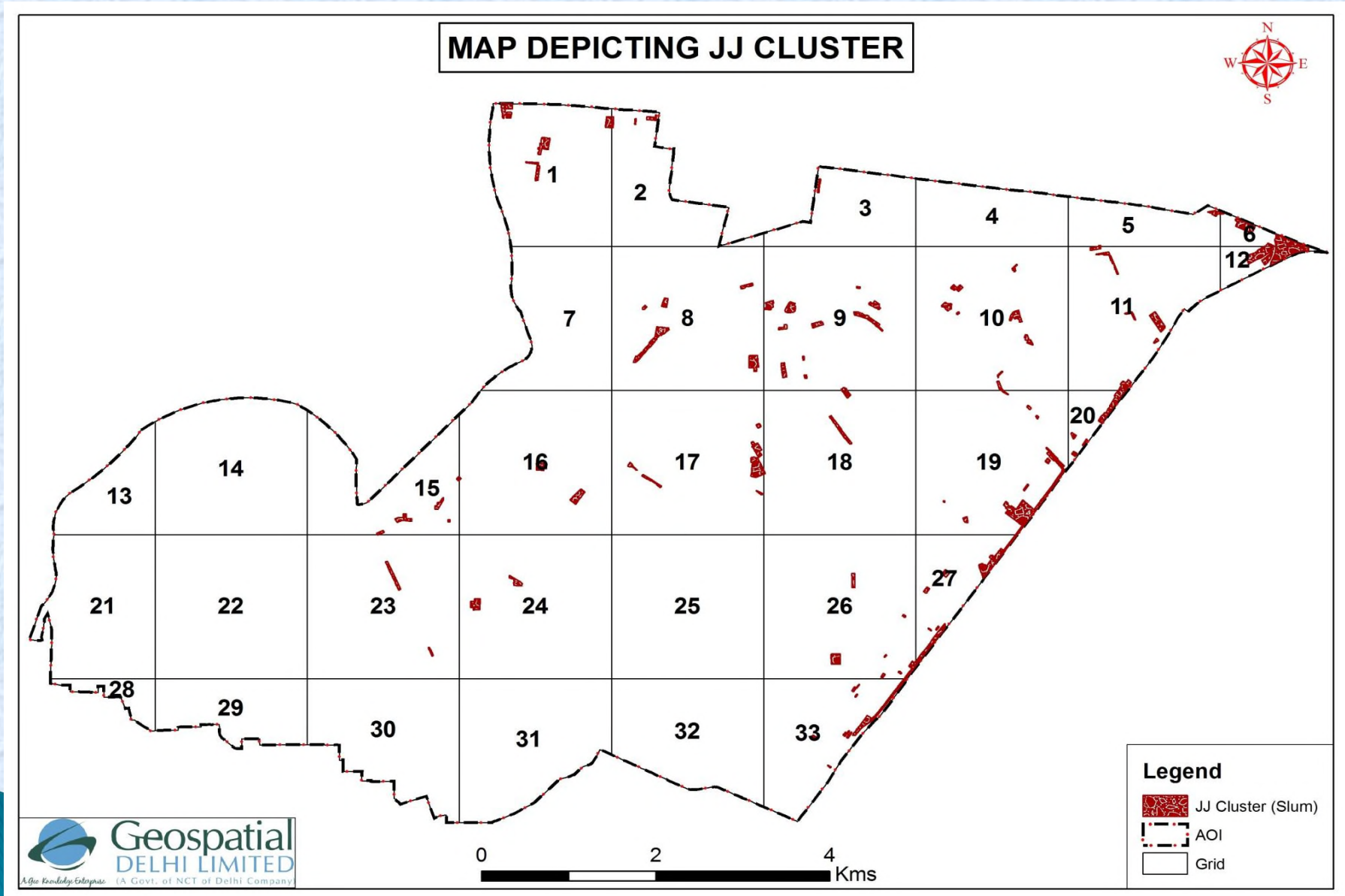
The Following maps represented certain areas as favorable for Mosquito breeding.

1. JJ Cluster /Slum area,
2. Parks & Open spaces,
3. Storm Water Drainage,
4. Tanks & Ponds

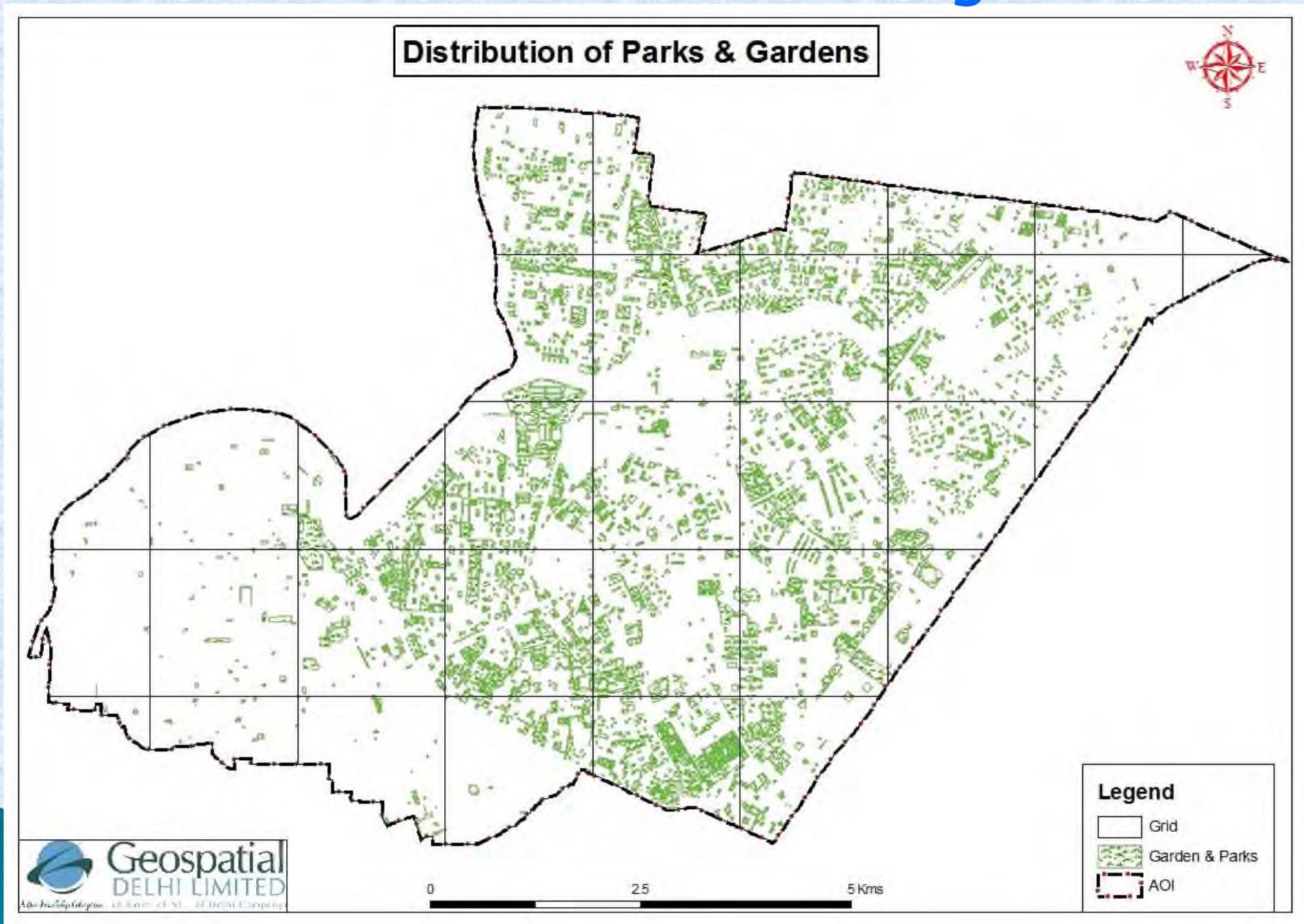
Identification Factors Influencing-1



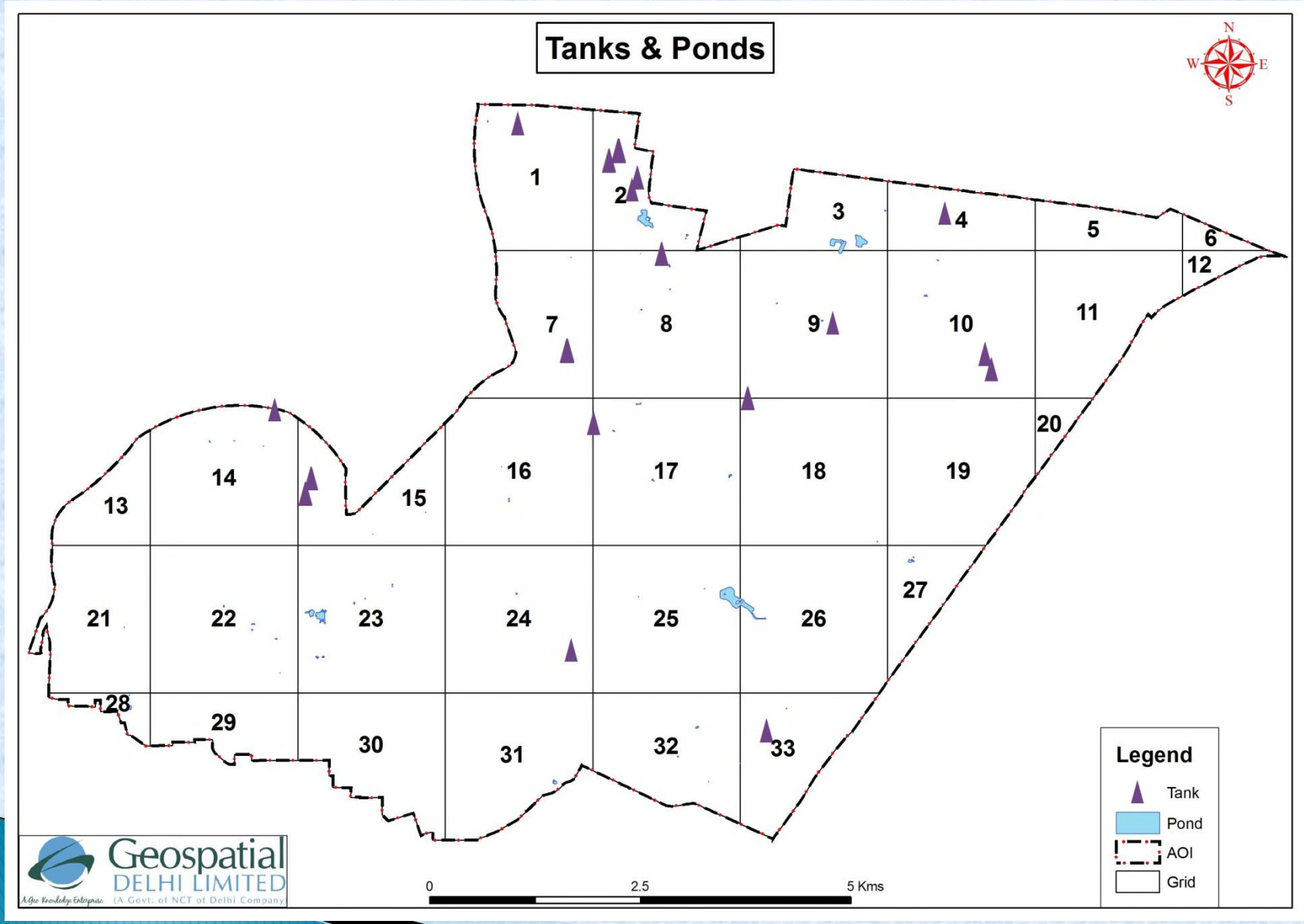
Identification Factors Influencing-2



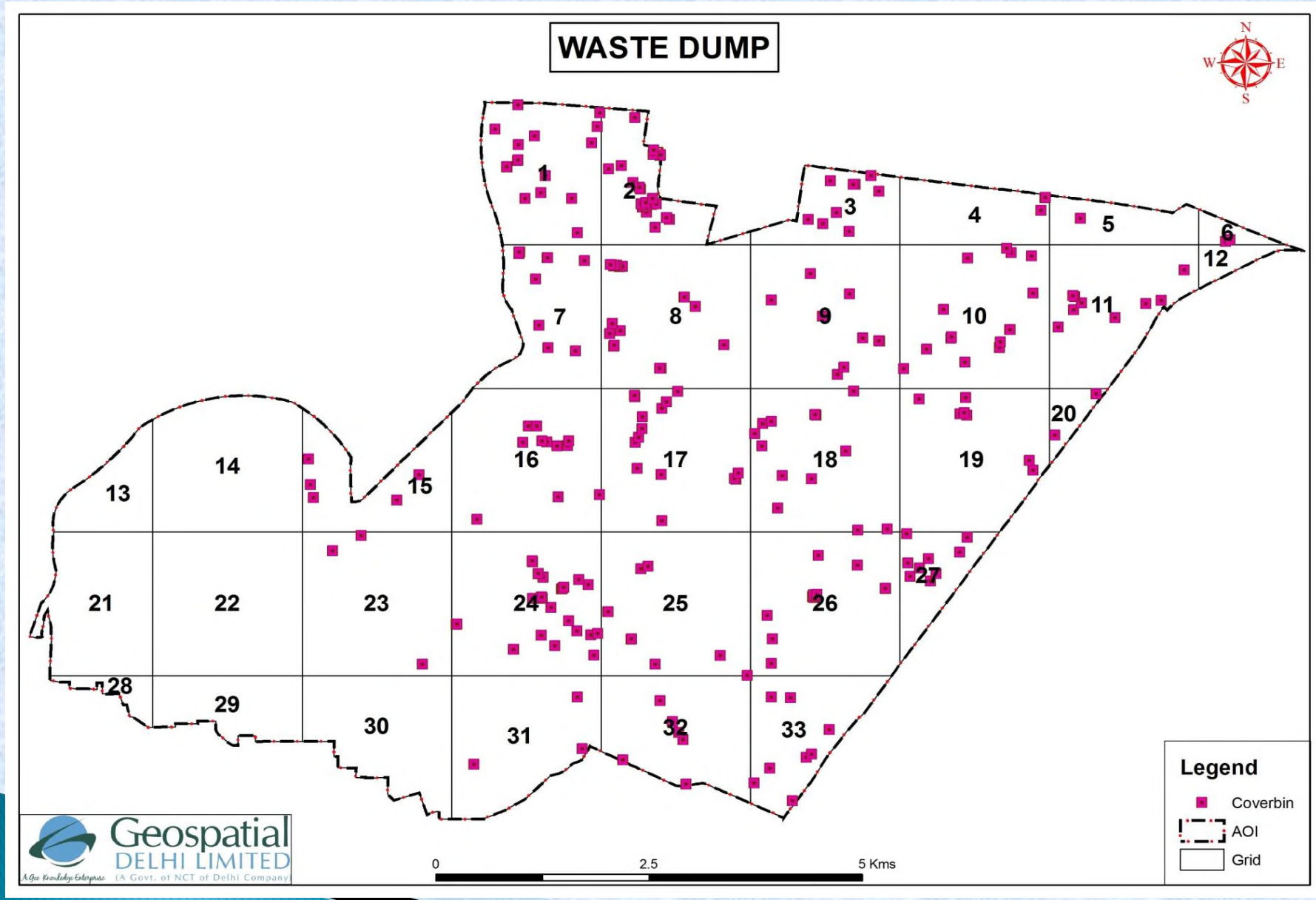
Identification Factors Influencing-3



Identification Factors Influencing-4



Identification Factors Influencing



Step3: Allocation of Weightage

- Depends on the intensity, Weightage has been given to the individual thematic maps.

Open Drainage- 4

Slum Area- 3

Tanks & Ponds- 2

Open Spaces & Parks - 1

Spatial Decision Making

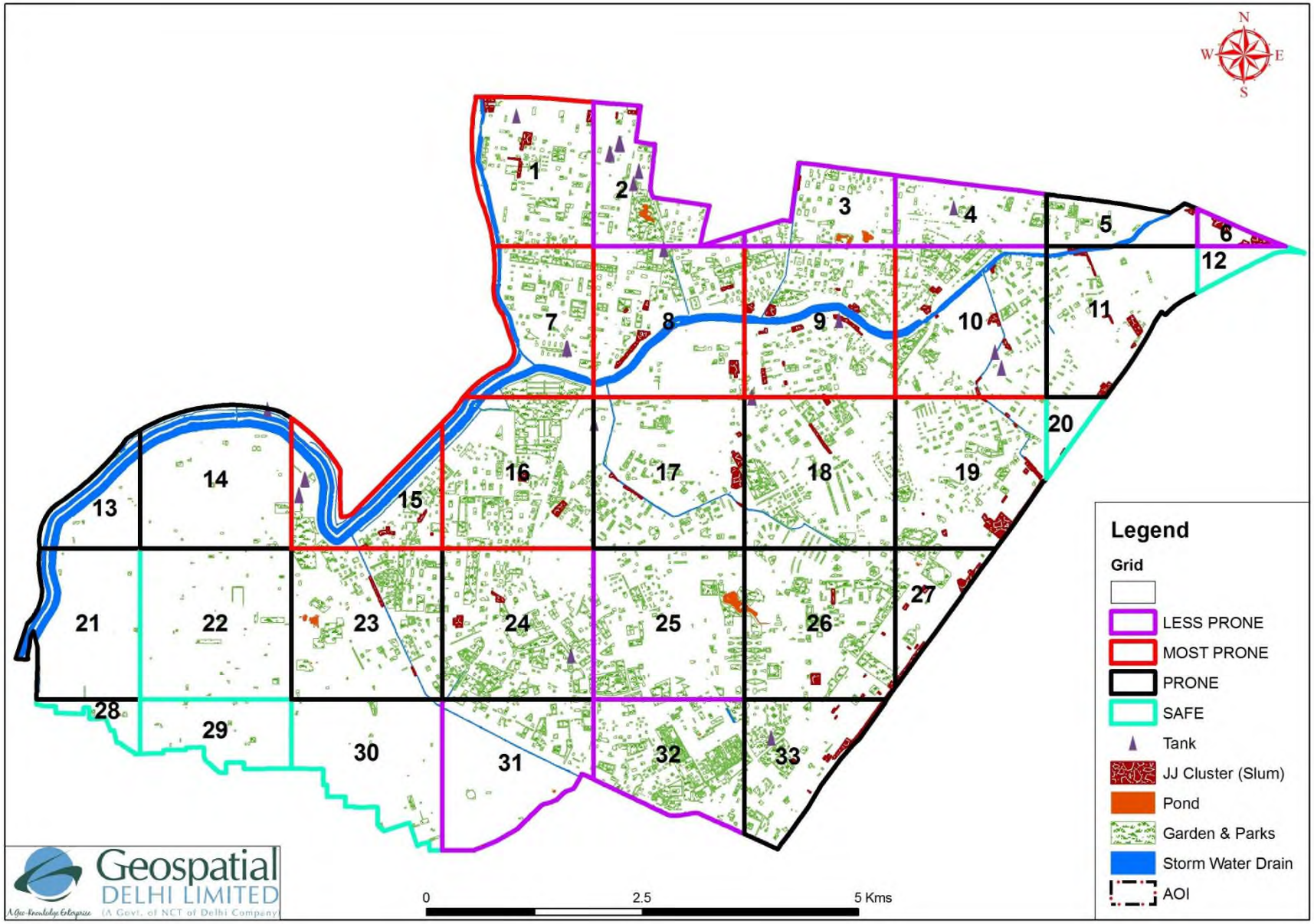
- Data Assessment
  - A grid of 1750/1750 meter has been created for the study area and density of each parameter per grid was assessed.
  - JJ Cluster /Slum area, Storm Water Drainage, Parks & Open spaces, Tanks & Ponds data were analyzed separately.
  - Based on the Density thematic layers have been categorized as High, Medium and Low.

Data integration and prioritization

- Data integration and prioritization were performed through thematic map integration.
- Spatial data (Thematic maps) on Storm water, Open spaces & Parks, Slum areas and Ponds were placed over the grid separately and density of each feature per grid was assessed using GIS techniques.
- Depending upon the number of combinations, the areas were demarcated as Most Prone, Prone, Less prone and Safe zone areas.
- Wherever all four parameters coincided, they were demarcated as Most prone areas for Dengue spread / Malaria paradigm..

- Wherever Parameters like slums, Parks & open area and Sewerage Open drains or Tanks are coinciding were marked as areas prone for Dengue / Malaria disease.
- Wherever Categories like Tanks or Ponds & Open spaces are coincided were marked as less prone areas.
- Areas with no category or sparsely open spaces have been categorized as safe areas.

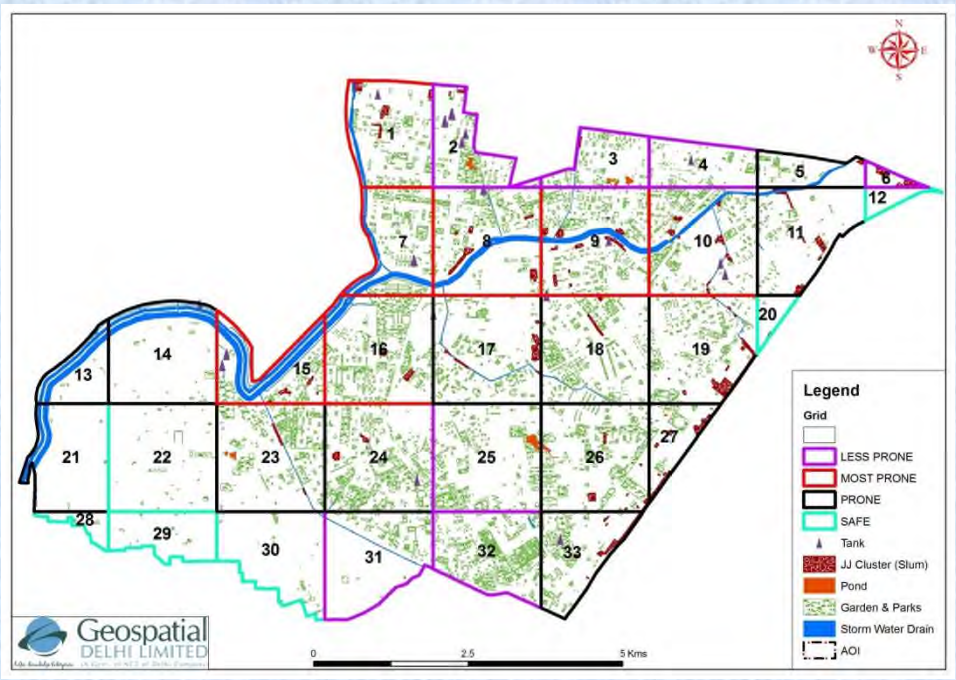
Areas prone for Dengue

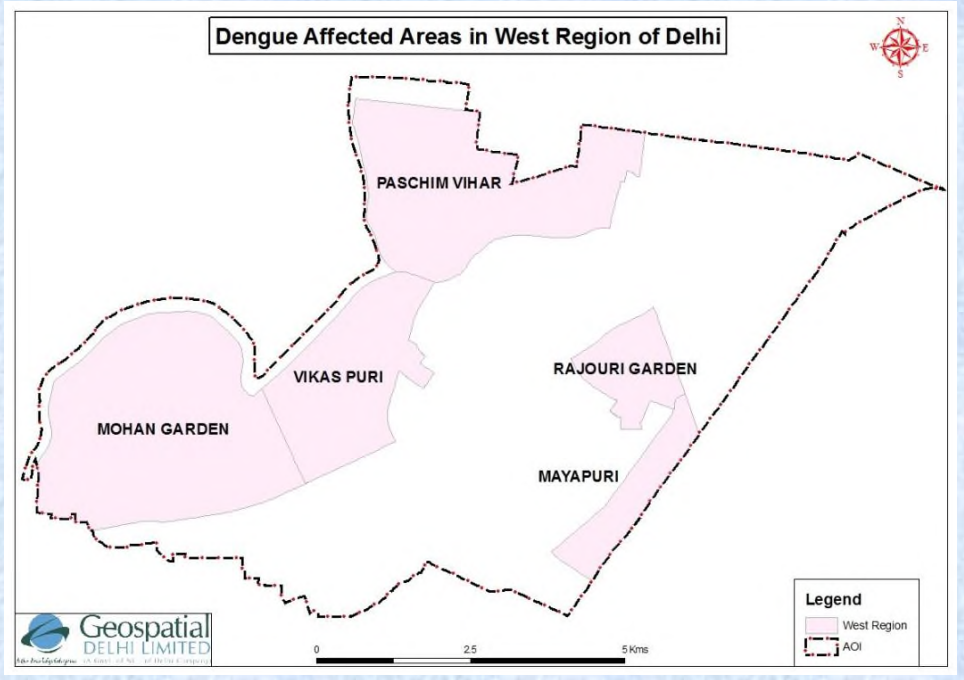


Spatial Decision Making

Could we able to predict the effected areas before actually it spreads?

GSDL Data Correlation with Actual Occurrences in West Region of MCD





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Spatial Decision Making

Conclusion:

- Spatial Data along with GIS technology plays a vital role in Decision making process

Thank You

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