



# Portfolio

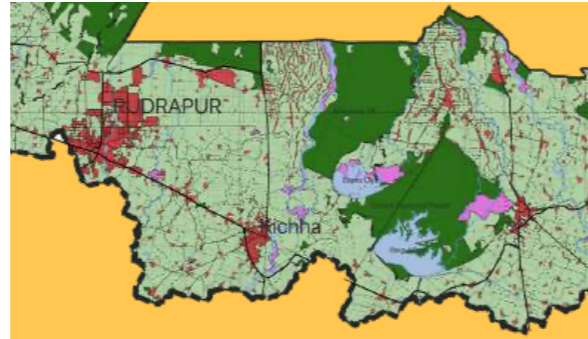
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MSc in Spatial Development and Infrastructure Systems

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# 01 Land Utilisation and Land Cover

## Academic Studio Work

School of Planning and Architecture  
Semester VII, Year IV  
Regional Planning Studio  
December 2023

2,542 km<sup>2</sup> | **Area**  
23,50,000 | **Population**  
**Location**

Udham Singh Nagar District, Uttarakhand

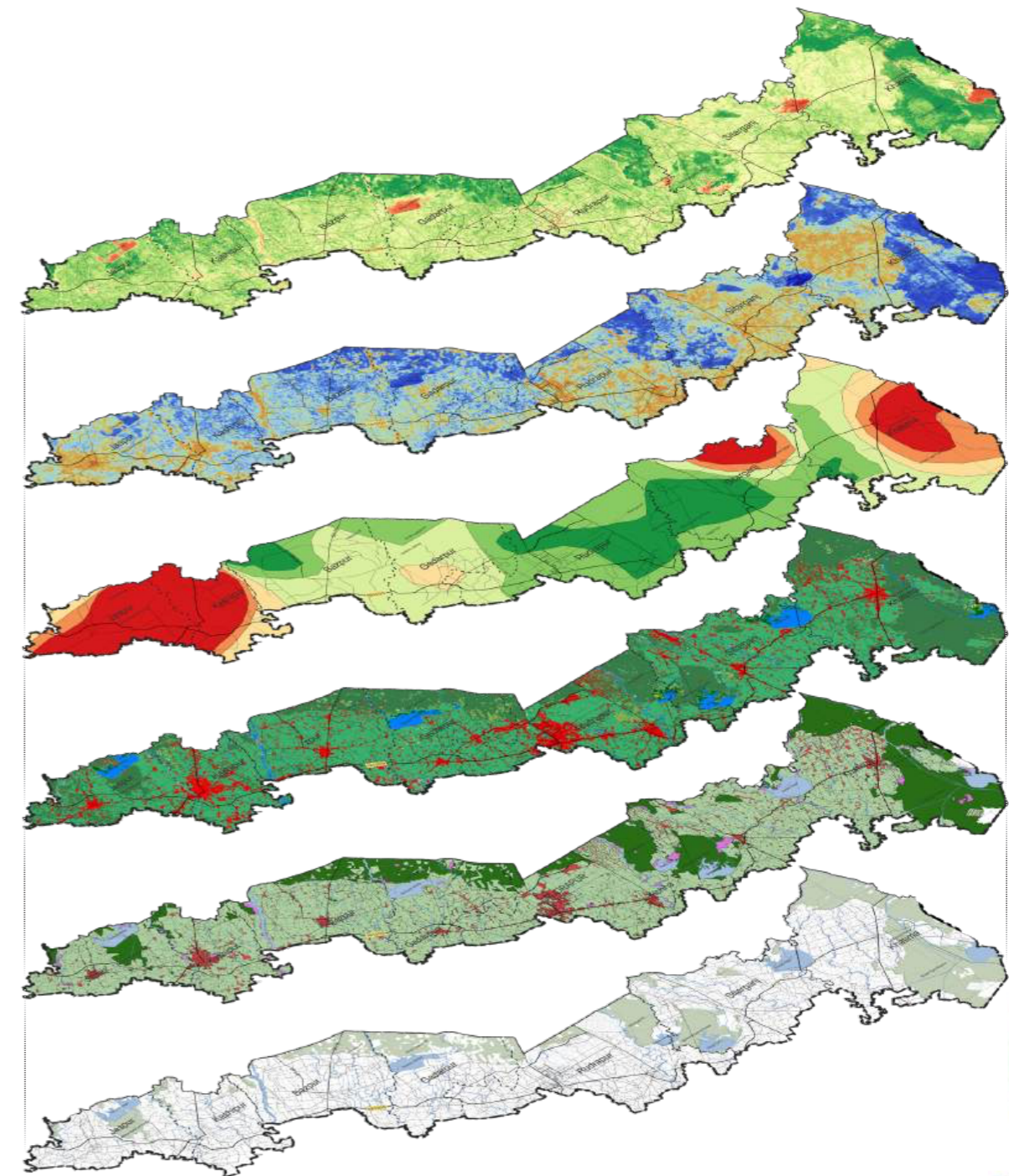
Udham Singh Nagar, one of the most backward districts in the state of Uttarakhand, selected as an aspirational district by the government, is focusing on preparing a district plan.

The district has high agriculture production, reserved forests and increasing built up which may pose a threat to balanced development using the district resources.

I conducted a comprehensive analysis of land utilization and land cover (LULC) as a crucial component in developing a district plan. Leveraging satellite imagery, I categorized different land uses, providing insights into how these categories change over time and across geographical areas.

In addition to LULC analysis, I employed key indicators such as Normalized Difference Vegetation Index (NDVI), Land Surface Temperature (LST), and Soil Loss to assess land suitability for development.

LULC 2023	Overall %	Jaspur %	Kashipur %	Bazpur %	Gadarpur %	Rudrapur %	Sitarganj %	Khatima %
Water	4.5	5.9	1.1	3.2	6.3	2.2	8.2	4.8
Forest	26.3	33.2	15.6	18.0	31.2	26.9	23.3	53.4
Agriculture	53.9	48.3	62.1	67.0	52.5	54.2	58.8	34.5
Wasteland	0.5	0.7	0.4	0.6	0.7	0.2	0.4	0.3
Built up	12.3	12.0	20.9	11.2	9.3	16.5	9.4	7.0



NDVI 2023

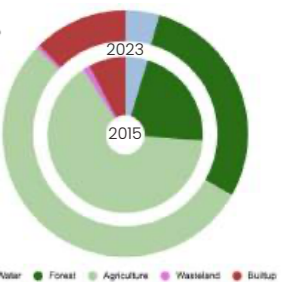
LST 2023

Soil Loss

LULC 2023

LULC 2015

Base map



# 02 Canal Oriented Development as a design strategy

## Academic Studio Work

School of Planning and Architecture  
Semester IV, Year II  
Site Planning Studio  
March 2022

120 HA | **Area**

15,500 | **Population**

**Location**

Najafgarh, New Delhi

The Najafgarh drain runs from the south-west of Delhi and drains into the Yamuna. The site lies in Najafgarh (Zone J and K), with unauthorized colonies located in the land pooling area according to the Land Use Plan 2021 of Delhi.

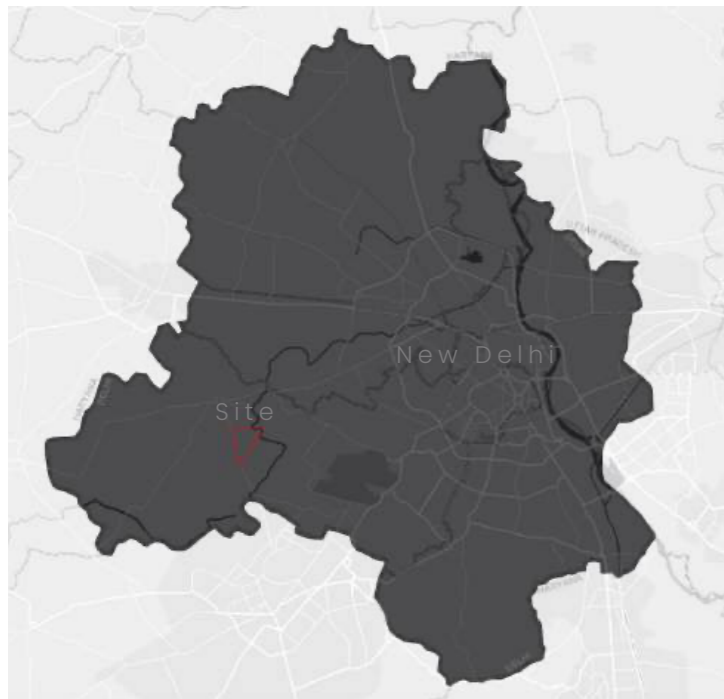
The Najafgarh drain has a significant social and environmental impact on the area, making it an imperative feature to focus on during site planning.

The aim of the exercise is to design a sector in a site focusing on a certain development concept with the major focus of the exercise being on the housing in the sector while providing basic facilities like recreation, hospitals, etc.

The exercise tries to instil the concepts of neighbourhoods and land pooling as key focus areas in defining the development to be proposed.

A site of 420HA was chosen for the exercise whose preliminary secondary data collection was done to understand the site context.

Primary surveys in the households of the site were done to understand the issues faced by the residents which were then analysed to prepare for the proposals.



The land suitability analysis was conducted to identify suitable areas for potential built-up and open spaces, taking into account the issue of urban flooding caused by the proximity to a natural drain.

Various buffers, in accordance with environmental guidelines, were established around the drain and other physical features for the land suitability analysis.

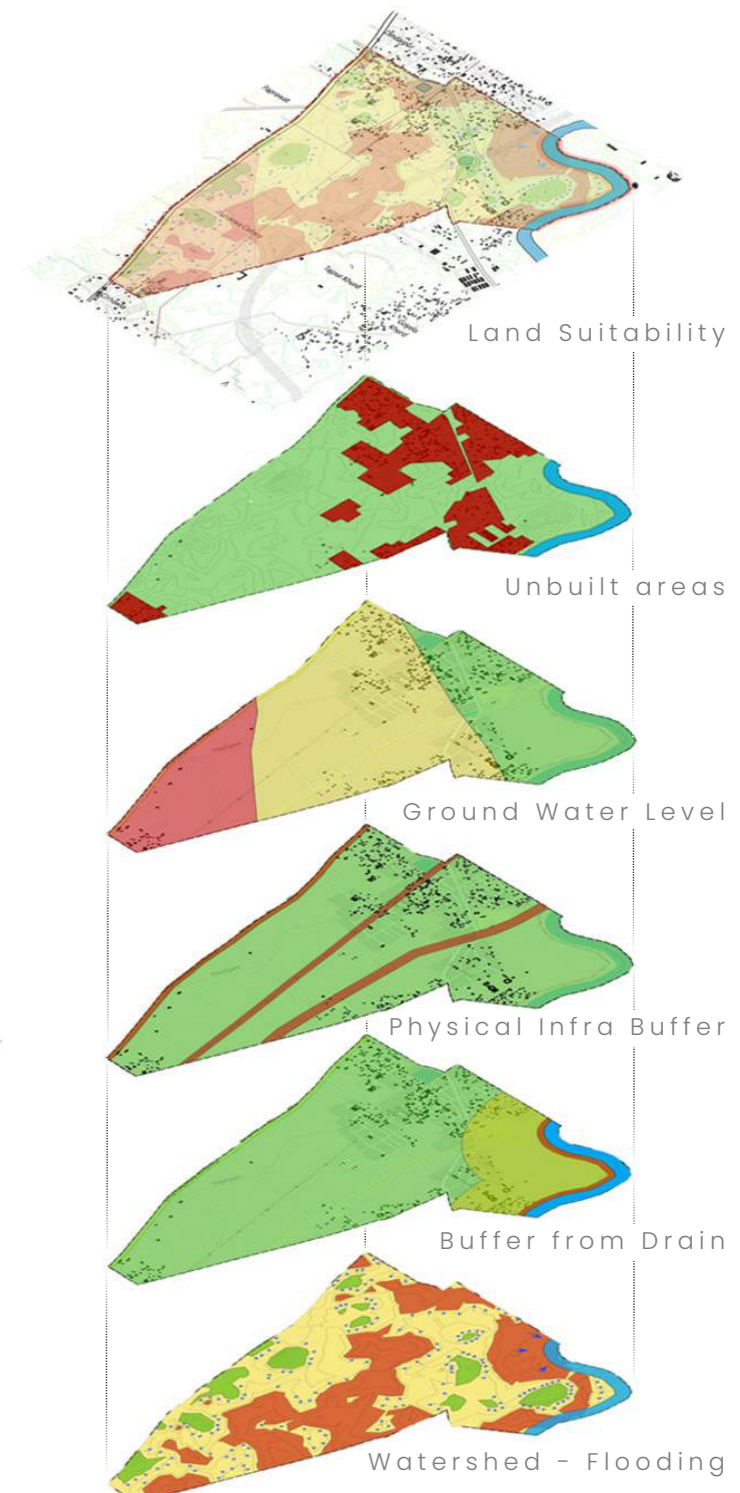
Through slope and watershed analysis, low-lying areas were identified as unsuitable for residential development. This led to the creation of green spaces in watersheds to replenish groundwater and a focus on a cyclic metabolism.

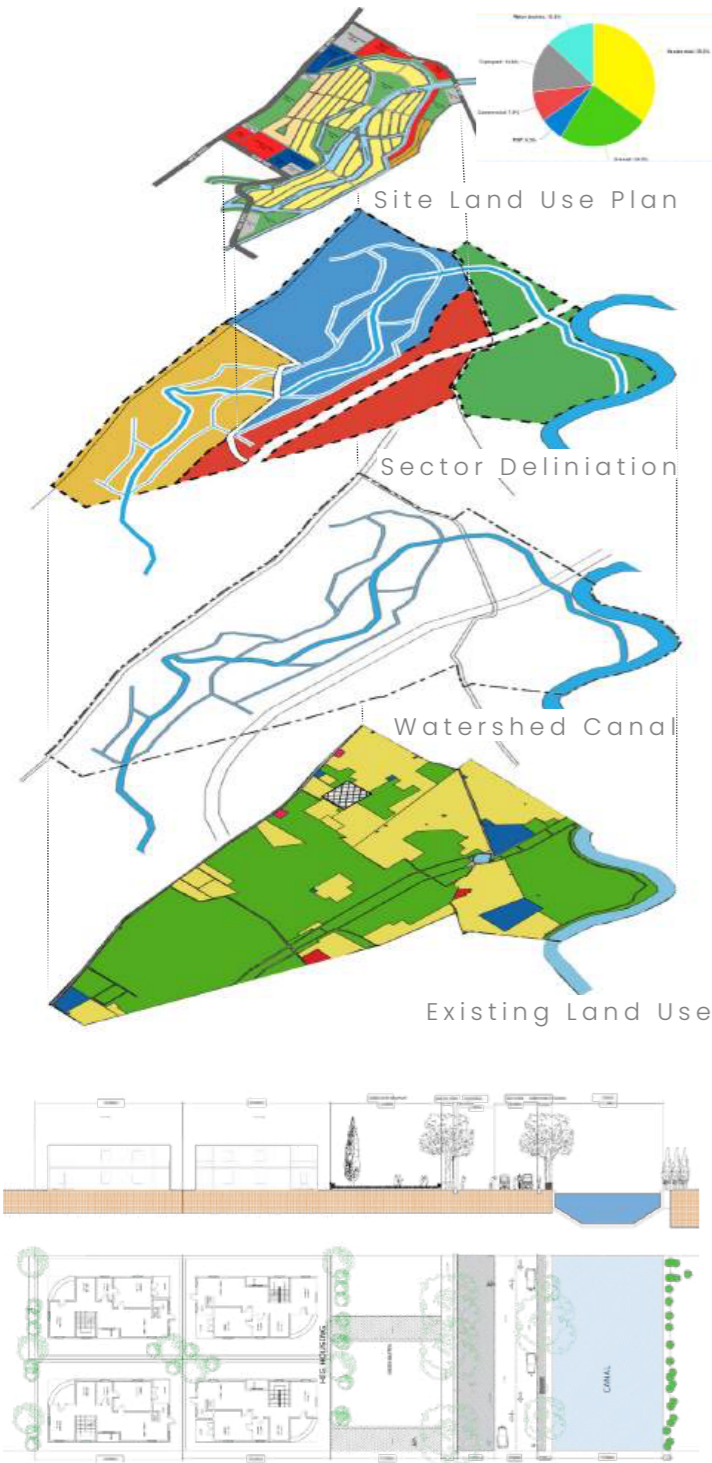
Keeping these weightages of various factors affecting the land suitability a final land suitability was derived.

### Weightages given to different factors affecting land suitability for analysis -

- Percentage of slope ideal for built up
- Ground water level defining potential density of population
- Watershed highlighting flood prone areas
- Existing built-up limiting further development
- Proximity to natural drain for environmental concerns
- Maintaining sufficient distance from roads and high tension electric lines

Soil Bearing capacity - 215 - 270 kN/m<sup>2</sup> Water Holding Capacity - 1.75 - 2.50 in/ft (Higher Medium)





Canal oriented development was taken as a development strategy to incorporate the social significance of the drain in the area.

Using the watershed analysis watershed canals were prepared through the site to create a cooler micro climate (Najafgarh reaches 49°C in summers).

Creation of canals in the site would also lead to open spaces and promenades to promote pedestrians and cyclists. Canals created from watershed preserved the natural contours to rejuvenate water table sustainability.

Original 420HA site area was divided into 4 sectors focusing on different way forward on the canal oriented development strategy where a 120HA area sector focused on the design aspect of canals.

Distribution of HIG, MIG and EWS for each of the sectors were set as per requirements in the regulations and site.

**Concept developed keeping in mind -**

1. Green spaces and pedestrian and cycle only paths along the canal
2. Promotion of NMT and Green modes of transport through interesting trips along the canal and shady trees
3. Central green spaces for social interactions and recreation
4. Wind direction accommodation through building layout
5. Canal Location and central greens to act as micro climate drivers
6. Relation of public spaces along canals and commercial shops

Area of sector - 120Ha  
 Net Residential Area - 42 Ha  
 Population - 15,750 persons  
 Net residential density - 375 PPH



Facilities	Land Use	Hierarchy	Area (HA)	Area required (MPD)
Mall	Commercial	City Level	3.8	5
Resort/Hotel	Commercial	CityLevel	4.1	-----
Community Park	Recreational	Sector Level	9.7	5
School	PSP	Sector level	2.7	0.8-1.2
College	PSP	Sector level	1	0.5-1.5
Sports complex	PSP	Sector level	2	1-3
Hospital	PSP	Sector level	1	0.2-1.5
Transit Hub	Transport	Sector Level	7.7	0.6
Park	Recreational	Block Level	2	1
Convenience Shopping	Commercial	Block Level	1.3	0.2



# 03 Integrating transit access in local level plans

**Academic Studio Work**  
 School of Planning and Architecture  
 Semester III, Year II  
 Transport Planning Studio  
 November 2021

880 HA | **Area**  
 2,50,000 | **Average monthly riders**  
**Location**

Jasola Vihar Metro Station, New Delhi

Jasola Vihar Shaheen Bagh is an elevated metro station situated on the Magenta Line of Delhi Metro.

The station lies in a predominantly residential area and on a local or collector road.

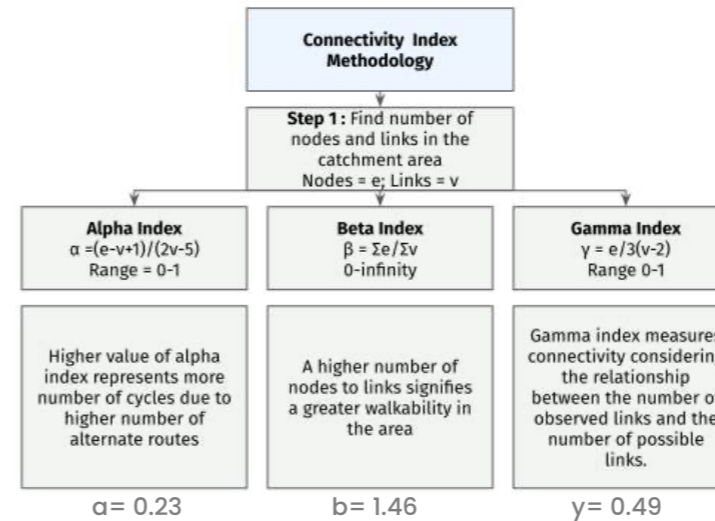
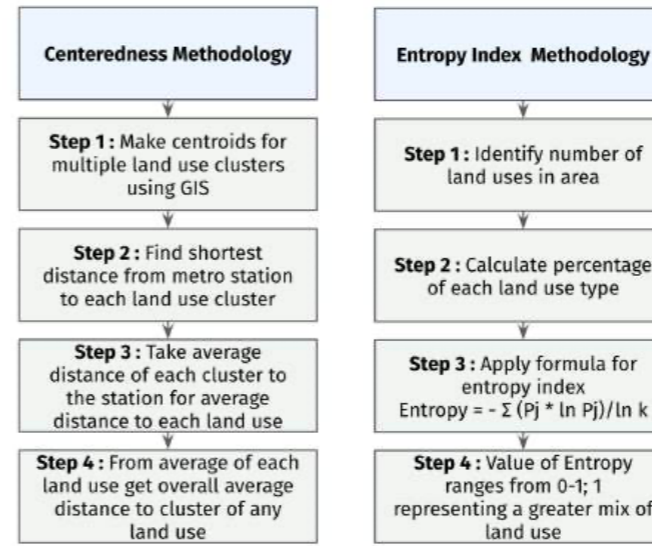
Analysis for networks for integrating last mile transport alternatives like pedestrian infrastructure, cycle tracks and bus routes for greater mode shift to public transport modes like metro.

While our area has high entropy (0.82) and five additional metro stations, diverse land use places our Points of Interest near the stations. Users prefer different metro stations, resulting in lower boarding at our station.

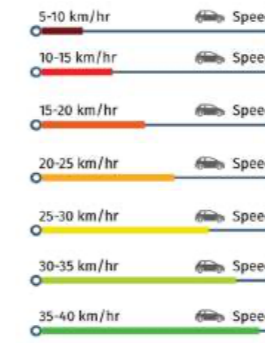
Comparing mode share data to ATL, most people use walkable distances or personalized modes to access the metro, with only 1.42% using the bus due to the nearest bus stop being 750m from the station.

Despite a low walkability index (2.27), our area has a high walk share (80%) thanks to high-density residential areas and proximity to the nearest cluster, along with a Walk ATL of 0.86 km, suitable for adults.

Cycling mode share in the catchment area remains low (2.83%) due to inadequate cycling infrastructure.



speed mapping



Accessibility Index

$$AI = EDF_{max} + (0.5 \times \sigma EDFs)$$

Accessibility index - 13.51; hence PTAL = 3 (Moderate)

Overall entropy - 0.82 (Close to 1 means more land use mix)

Centerdness = 2.7km (Poor centerdness since more average distance from cluster)

# 04 Designing spaces for commercial street

## Academic Studio Work

School of Planning and Architecture  
Semester V, Year III  
Zonal Plan Studio  
December 2022

70 HA | **Area**  
**Location**

Thiruvananthapuram, Kerala

Thiruvananthapuram was revising some of its Town planning schemes which were made to implement its masterplan through a detailed lower order plan.

MG Road being the main commercial street of the city with high historic, cultural and economic value, its development should be in a regulated manner to preserve the significance of the commercial street.

The exercise aims to explain the concept of lower order plans and the concept of zoning and how these lower order plans assist in implementation of masterplan.

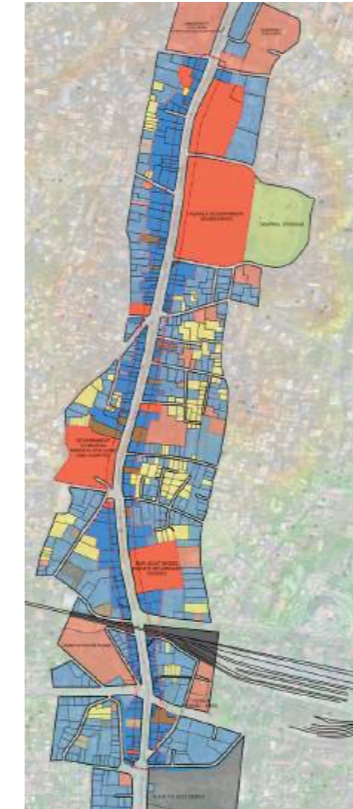
Along with examining the relevant norms and standards, subdivision regulations and development control the method of plan preparation for a lower order plan and its effectiveness in achieving its goal of masterplan implementation are achieved.

The key focus in MG Road is the commercial land use, being a major commercial street for 1.6 km in the historical centre of the city of Trivandrum.

Design interventions to increase commercial potential while maintaining the street character are imperative.



Land Use proposed in Masterplan 2037



Land Use Existing

Over time the MG Road has been a major commercial area and has constantly been increasing in commercial land use converting residential land use in the area to commercial.

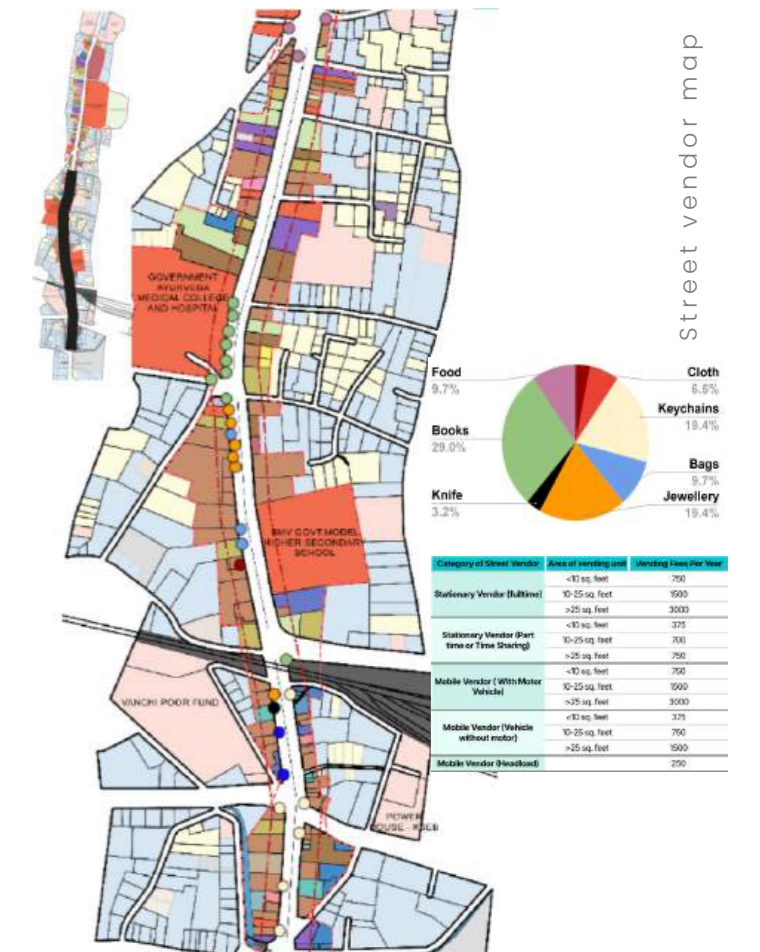
The road also has a number of government offices being a governmental centre for the city and the district too attracting people from around the district of Thiruvananthapuram.

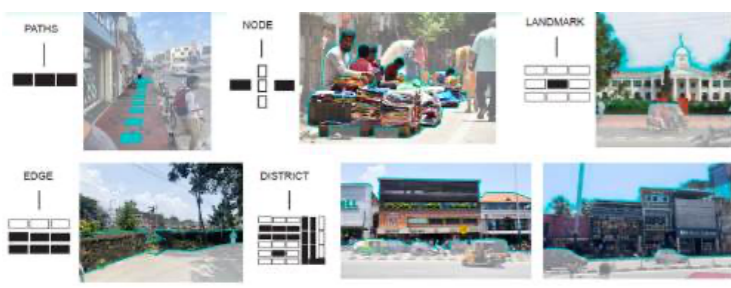
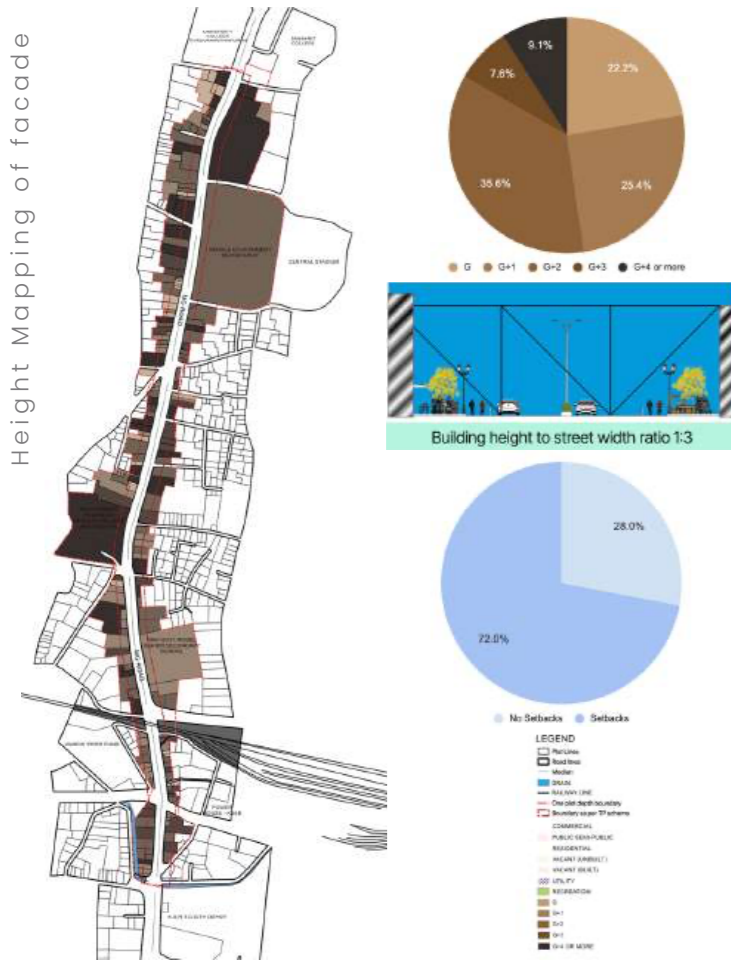
The area has experienced uncontrolled development with plot and buildings developing without any realisation of the scale and character of the area. The area also majorly lacks public spaces for relief from the bustle on the street.

The market is near historical sights and there is a presence of a lot of fashion and apparel shops along with food and beverages shops near the government offices.

Apart from the formal market, the street vendors make up an important part of the street character in the form of the informal book markets and other accessories sold on the road side.

Clustering of souvenir vendors area near tourist destinations meanwhile accessories are sold near apparel shops.





In present scenario, 10% of the buildings are according to the DTPS guidelines regarding the Ground Coverage i.e. 50%.

And around 50% building follow the Master Plan guidelines. Rest all are exceeding the limit.

Although this can be due to the road widening in 2007 and also no new DTPS has been made for the MG Road till now. The average FAR is 2.8.

FAR regulations of the Master Plan is being followed rather than the DTPS.

This Disparity between masterplan and DTPS regulations for regulations shows that even though lower order plan regulations rule over higher order plans still masterplan regulations are being followed in DTPS area

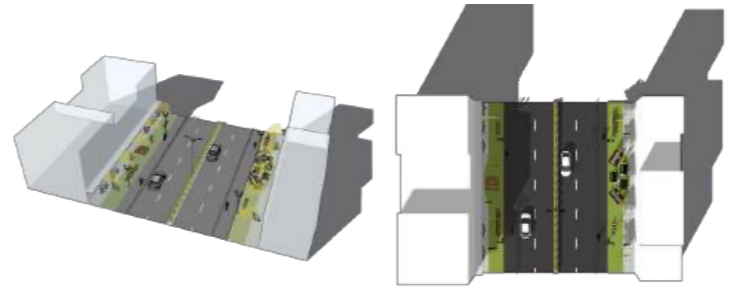
**Streets as a public place**

Among all public spaces, streets emerge as the most public. Streets are engines of economic activities, social hubs, and platforms for civic engagement. They break socio-economic divides and foster social cohesion.

**Build social trust and cohesion** - These increased local interactions create better conditions for sharing information and experience and foster stronger commercial and economic connections.

**Improve property values** - Property value studies have illustrated the positive impacts of locations with nearby placemaking amenities, green infrastructure, historic properties, and transit access.

**Strengthen local branding** - Placemaking can help the "CBD" to establish a brand or set of features that help define their comparative and competitive advantages.



Inclusivity	Coordinated Builtform	Building Frontage and Projections
		FAR and density caps
		Building placement and setbacks
		Land Use and Building use
	Complete Streets	Street hierarchy
		Street elements and infrastructure
		Livability on streets
		Function of public spaces
		Accessibility to public spaces
		Public space elements
Effective Mobility and Accessibility	Multi Utility Zone	Vending
		Vegetation
		Landscape elements
		NMT safety and access
		On street parking
		Access to public transport
		Mid-Block Crossing
		Footpath
		Junctions

Items	Cost of construction	No of Units	total
Cycle tracks	0.33 Cr per km for 1 m width	1.64km*2m*2	₹21,648,000
Cobbled pavement	80rs/ sq feet	1.8m*1.64km	₹4,960,000
Trees	1800 with RCC fencing	320	₹576,000
Furniture	10,000	130	₹1,300,000
Street lights	75,000 for 100W	320	₹24,000,000
Bollards	3000 per piece	1.5 m = 2132	₹6,396,000
Shrubs in median	200 per plant with 1m coverage	1640	₹328,000
MUZ and grass	8Rs per sq feet	62000	₹496,000
<b>Total</b>			<b>₹5,97,04,000</b>

Euclidean zoning is the separation of land uses by type—residential, commercial, retail, industrial, etc.—each into their own zones or areas within a given city. Encourages huge land consumption and automobile dependency. To tackle traditional zoning shortcomings and change in urban interaction Form based codes were introduced to work in conjunction with zoning

**Proposed Openstore front Regulations**

Minimum of 2.5m of Unobstructed MUZ space should be available after storefront activity

Maximum activity permitted 1.5m from the facade  
Maximum height of storefront activity 1.5m from the pavement height

Stores without setback may avail for storefront activities  
Stores with Setbacks may use setback area for additional permitted activities mentioned in DCR

**Why no major interventions to facade are required -**

- Interesting facade fabric
- Signage varied, bright and attractive
- Variety of buildings, heights; asymmetry is interesting which leads to interesting walking experience
- Building height to road width ratio maintained to 1:3

# 05 Crime Prevention Through Environmental Design

## Co curricular Work

NOSPlan 2021-22

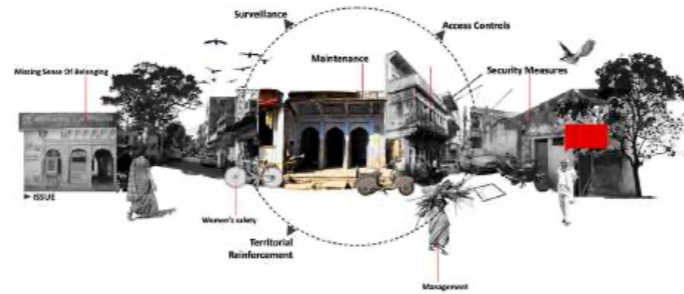
Current Practices

1st Prize Winner

April 2022

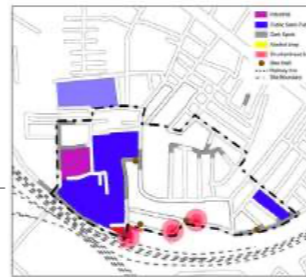
## Location

Ghaziabad, Uttar Pradesh



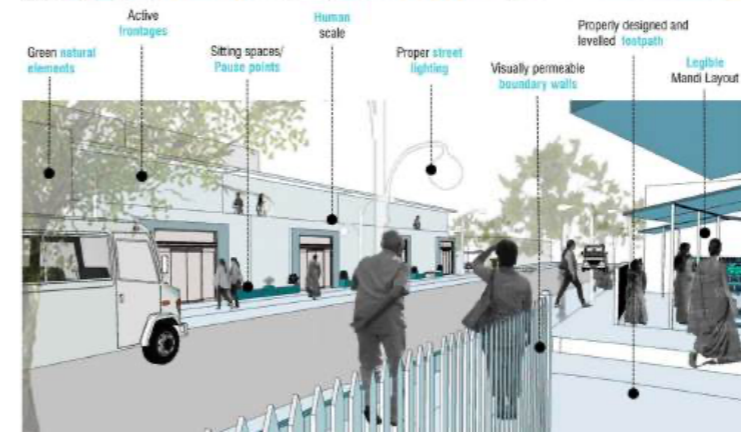
## Existing Issues:

- Bike thefts
- Incompatible land use
- Lack of access control
- Alcohol and drug use near railway track



- Informal settlements
- Jewellery store robbery
- Unmaintained street lights
- Street lights hidden by trees
- Unkempt green spaces and vacant land

- Unlit inner streets
- No access control since commercial hub
- Incompatible land use

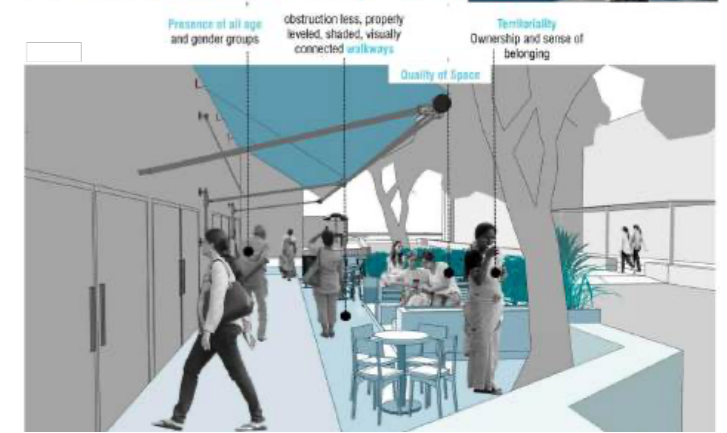
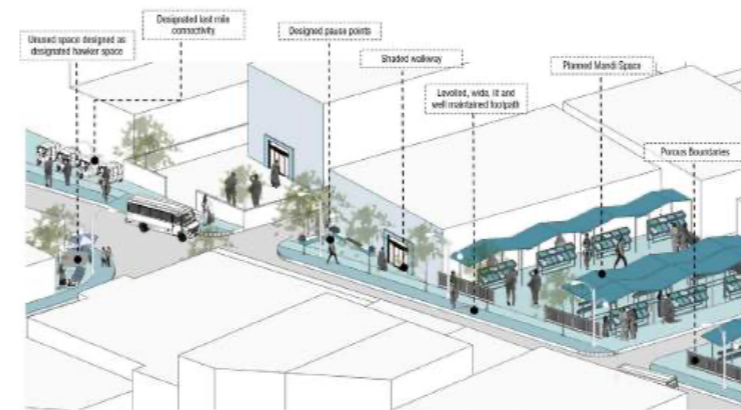


## Existing Condition:

No proper footpath or pedestrian elements, road shoulder used for Vehicular parking.

## Proposed Condition:

- Footpath designed adhering to design guidelines consisting of Green areas for natural Surveillance
- Proper street lighting
- Visually permeable boundary walls.



## Existing Condition:

Presence of badly maintained and encroached footpath with haphazard parking

## Proposed Condition:

- Well designed and integrated footpath, proper pedestrian crossings and pause points;
- Obstruction less walkways
- Territoriality- Sense of belonging

## Proposed Condition:

- Unused space designed as Hawker/ Vendors' space
- Last mile connectivity for Women and children
- Residential Land use promoted to have mixed uses for Surveillance
- Levelled, wide and well lit footpaths with porous boundaries
- Defining ownership indicates the purpose of the building or space and makes illegitimate use less likely.

## Daulatpura - Residential Land Use



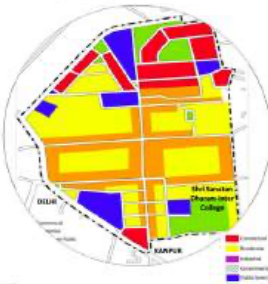
- Daulatpura is a high-density unauthorised colony adjacent to the railway line.
- No access control due to railway
- Incompatibility of land use as presence of Industry and cemetery

## RDC - Commercial Land Use



- RDC is a major commercial hub for Ghaziabad, being lively till late night. Informal settlements popped up in vacant lands
- Dead end streets are opportunities for crime

## Naya Ganj - Mix Land Use



- Naya Ganj, the old walled city area,
- The area has narrow streets with constant eyes on street thanks to the mix use
- No access control since old commercial area.

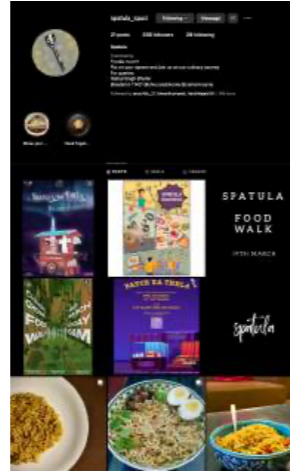
# 06 Hobbies and Interests

## Cooking

Founder of Spatula the cooking society  
School of Planning and Architecture  
New Delhi



Logo designed by self



Spatula - The Food Society  
Instagram @spatula\_spad

Held multiple events for the students of the college to promote cooking and shared interest of food.

Food walks through the street food heaven of Old Delhi  
Inter batch cooking competitions to set the stove ablaze.

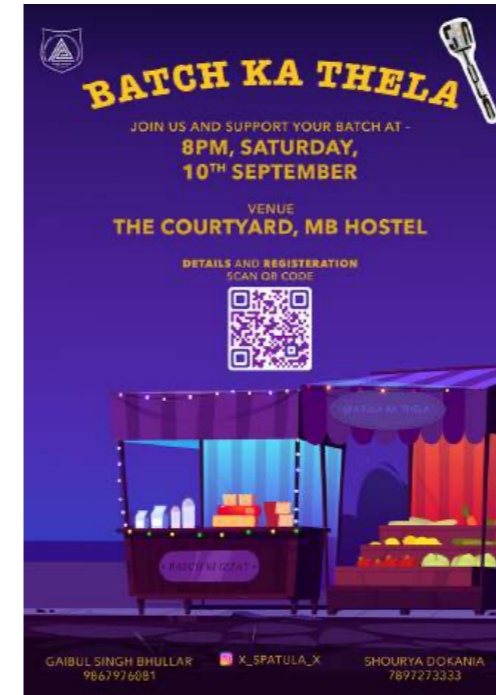
## Exploring flavours



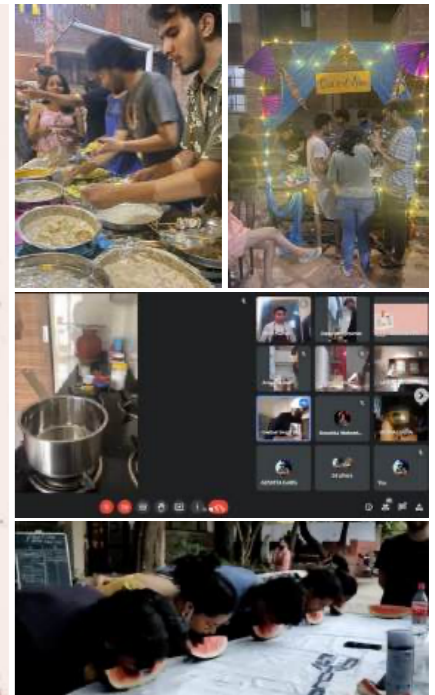
## My Creations



## Designing posters for events



## Final Satisfaction



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