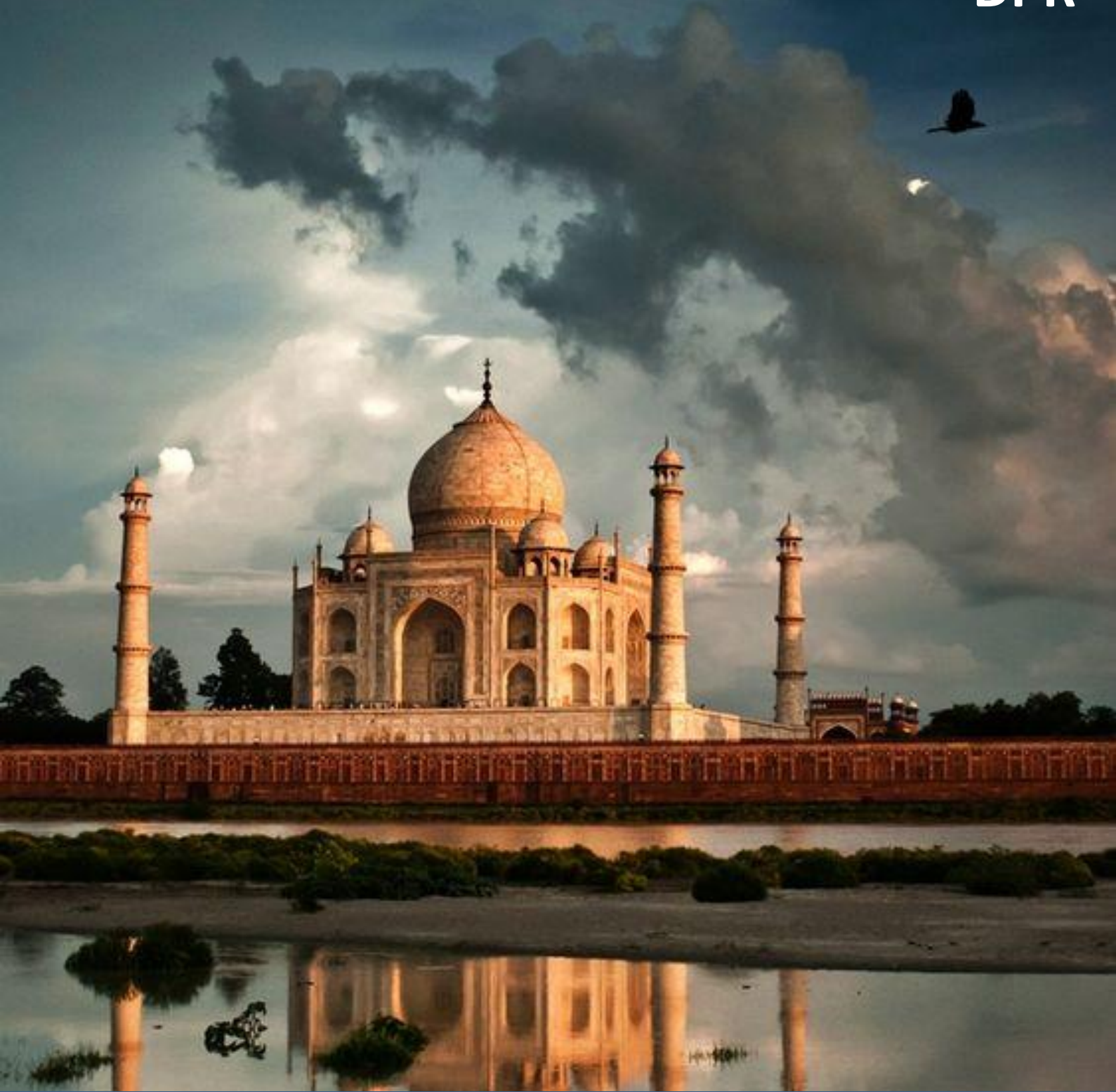


Agra Smart City Mission

REHABILITATION OF MINOR ROADS

DPR



Submitted by:

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Submitted to:



Agra Smart City Limited

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Chapter 1. Executive Summary

Rehabilitation of Minor roads

Agra is the third largest city of Uttar Pradesh and is a commercial city, having small-scale and household industries. Agra is known for handicraft work majorly marble, leather, carpet, brassware, artistic daring and jewelry craft which attracts a large number of domestic tourist and from all over the world.

Agra is located at the junction of four national highways namely Delhi Kolkata (NH-2), Agra Mumbai(NH-3), Agra Jaipur(NH-11) and Agra Aligarh(NH-93). It has two state highways namely Agra Fatehabad(SH-62) AND Agra Gajnair(SH-39).

Agra Fatehabad(SH-62) lead to inner ring road which connects NH-2 and Yamuna Expressway forming not only spine of the city but provide improved access to Taj Mahal for the tourist.

SCOPE OF THE PROJECT

The proposed project includes the development of existing Minor roads of nine wards under ABD area, The scope of work included Identification road stretch for the redesigning and scope of development to enhance the experience of accessing the Taj Mahal as well as other places. To target more tourists on this type of road it requires more components which are beautified the surrounding area and gives more importance to pedestrian and tourists with basic facilities

Main Components of minor roads

- *Survey of streets and give proposals.*
- *Resurfacing with landscaping, underground utilities, open drains to be covered*
- *Pedestrian friendly road and promote NMT.*
- *E-Toilets, Kiosk, water ATM, smart kiosk*
- *Signages, street furniture, street lights.*

The prime scope of the proposed section of the road, Agra are:

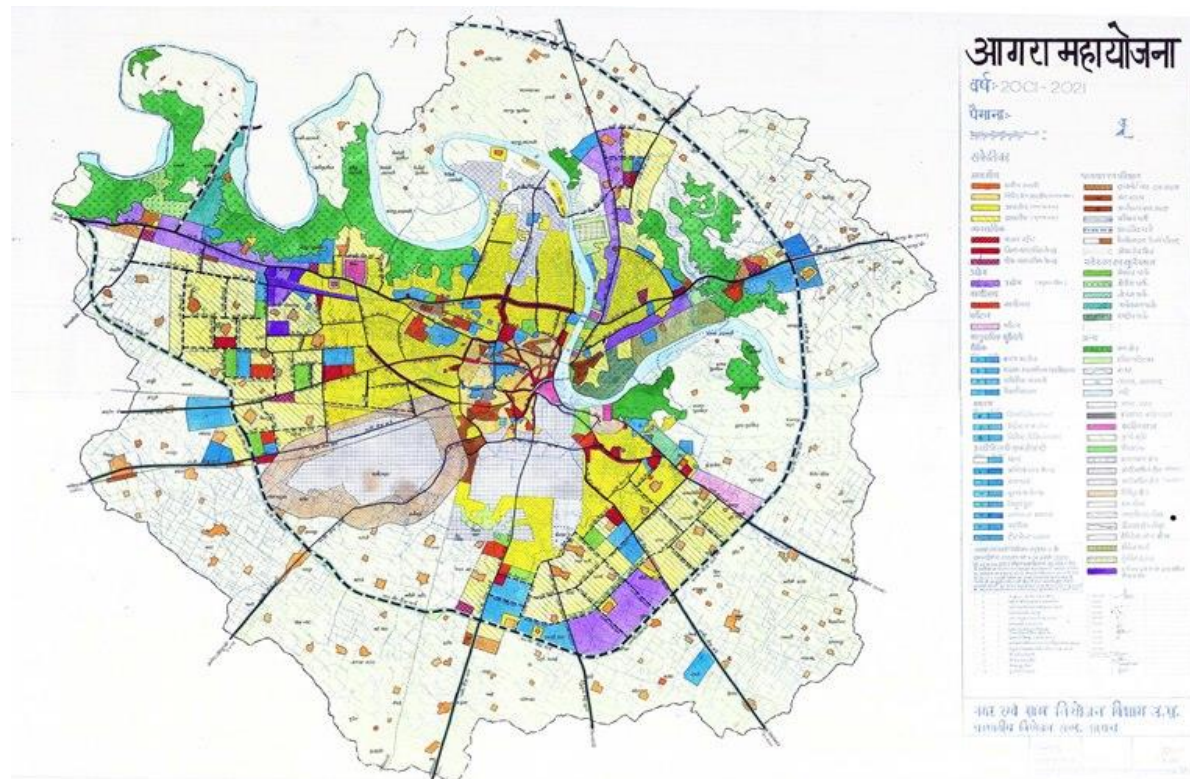
- *To relieve congestion.*
- *To provide better linkage to the arterial/sub arterial roads.*
- *To provide improved access to Taj Mahal.*
- *To connect the new urban nodes outside /nearby.*
- *Beautification streets, visual Improvements*

Chapter 2. Introduction to Agra- SCOPE & METHODOLOGY

2.1 Introduction to Agra

Agra city is governed by Municipal Corporation which comes under Agra Metropolitan Region. The Agra city is located in the Uttar Pradesh state of India. As per provisional reports of Census India, the population of Agra in 2011 is 1,585,704; of which male and female are 845,902 and 739,802 respectively. Although Agra city has population of 1,585,704; its urban / metropolitan population is 1,760,285 of which 939,875 are males and 820,410 are females.

Figure 1: Agra Master Plan 2021



Landuse as per Master Plan 2021

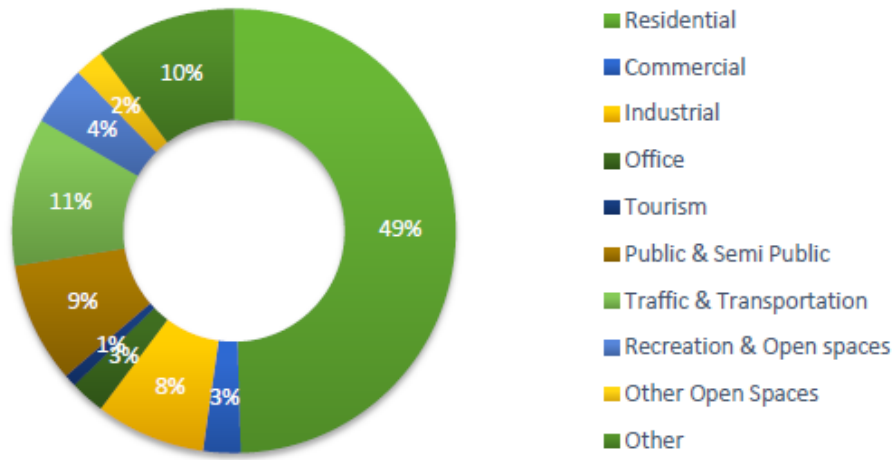


Figure 2: Land use as per Master Plan 2021



Figure 3: Agra District Map

2.2 Regional Setting

Agra city is located on the banks of the river Yamuna. As one of India’s major tourist destination, the city is part of many tourist circuits such as the Golden Triangle tourist circuit, along with Delhi and Jaipur; and

the Uttar Pradesh Heritage Arc, a tourist circuit of UP state, along with Lucknow the capital of the state and Varanasi. Its proximity to the national capital and the well-connected road and rail network has made it a major center in the regional setting.

Table 1: Distance from Agra to different cities

Cities	Distance from Agra	Connectivity Mode
Delhi (National Capital)	209 Km	Air, Rail, Road, (Express Way)
Lucknow (State Capital)	336 Km	Air, Rail, Road, (Express Way)
Aligarh	90 Km	Rail, Road
Jaipur	240 Km	Rail, Road
Gwalior	120 Km	Rail, Road
Kanpur	300 Km	Rail, Road

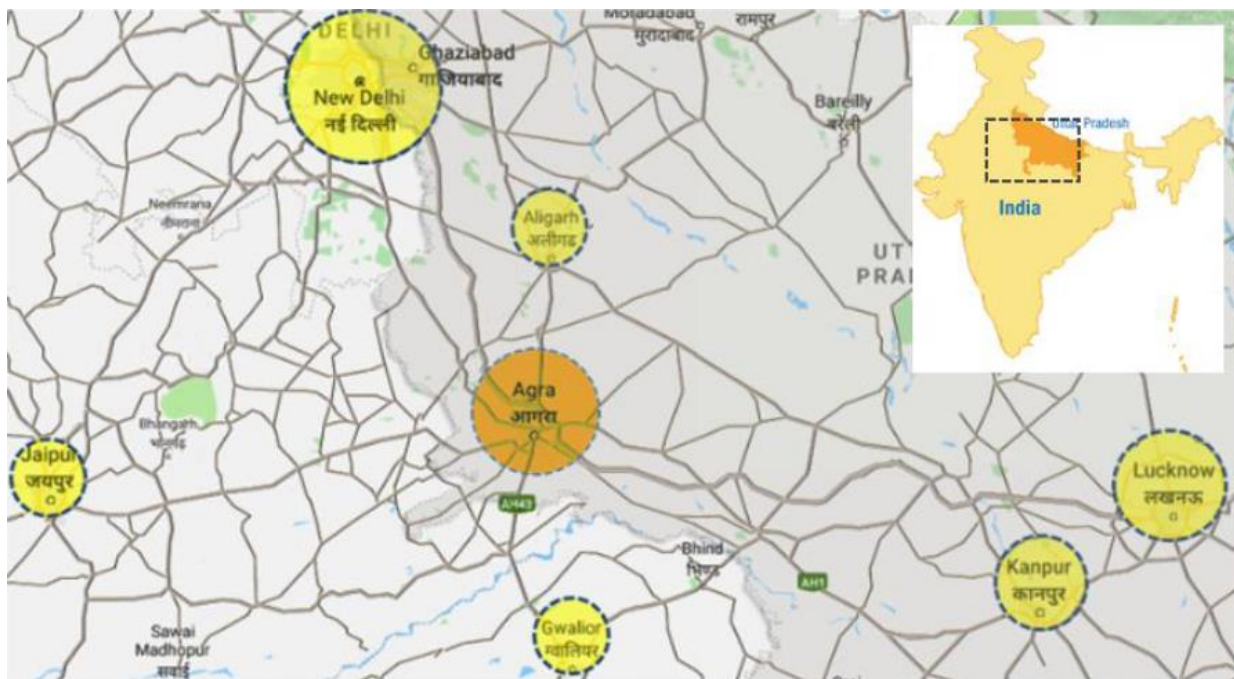


Figure 4: Agra city-Regional setting

2.3 Demographic Characteristics

According to the census 2011, the Agra Urban Agglomeration has a population of 17.65 lakhs. It comprises of the Agra Municipal Corporation area (Pop. 15.85 lakhs), Agra cantonment (Pop. 0.5 Lakhs) and adjacent rural areas. Compared to a population of 12.75 lakhs in 2001, the decadal growth rate of population has been 38.03 which is highest in the last five decades. During the post-independence period, commerce showed a phenomenal increase with the associated industrial development and establishment of the industrial estates, which resulted in attracting people to the city.

Table 2: Population Growth Agra

Census of India 2011 Year	Population (lakhs)	Growth Rate (%)
1961	4.62	-
1971	5.91	27.92
1981	7.81	32.15

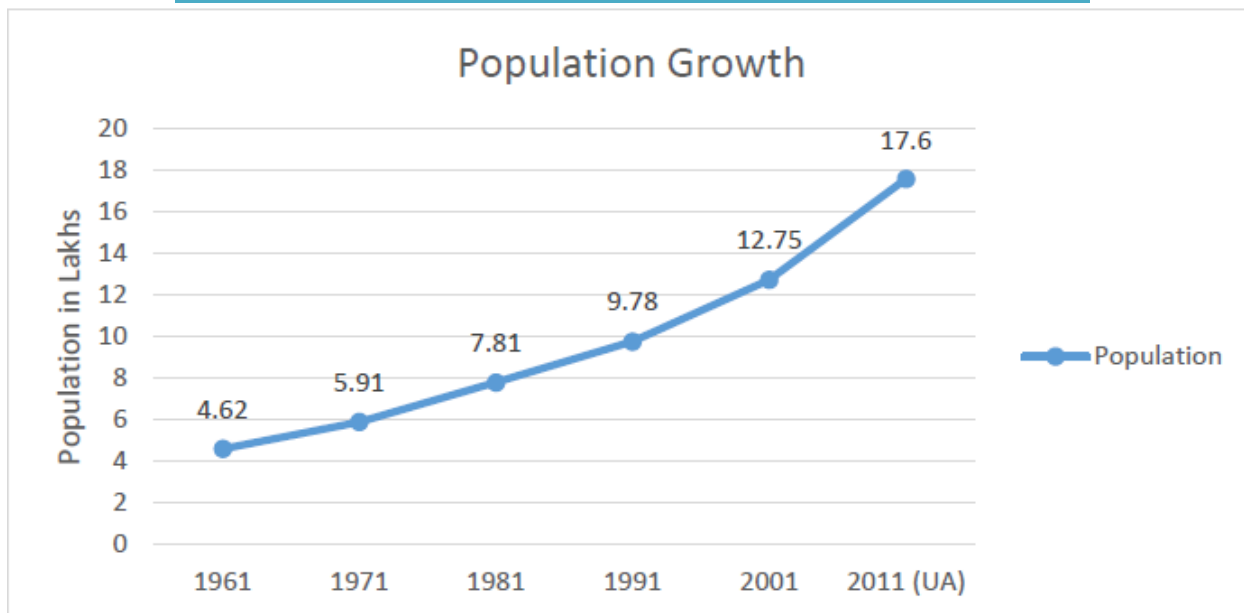


Figure 5: Decadal Population Growth Agra City

Some of the key demographic characteristic of Agra Urban Agglomeration are as follows.

- **Total Population:** 1,760,285
- **Sex Ratio:** 873
- **Average Literacy Rate:** 73.13 %
- **Population Density (District):** 1,093 persons/ sq.km

In the city of Agra, the core city area holds up a major share of the city population and has a very high population density. The area under the jurisdiction of the Agra Cantonment also has relatively lesser population density due to its land use character. However, the outward growth pockets are sparsely populated. It is important to note that, as per the city growth trends, some pockets along the proximity to main roads has been witnessing an increase in the number of settlements.

2.4 Economy

Agra is a tourist city famous for its world-famous heritage architectural wonders such as Taj Mahal, Fatehpur Sikri, etc. Tourism is also the major contributor to the city economy.

Other than its economic engagement through tourism, major industrial activity is in the form of small-scale and household industries. These are mainly located in the old Mughal city particularly Lohamandi, Rakabganj, Kotwali, Tajganj areas. The large-scale units are located in Chatta and Hariparvat areas. The city is famous for its major handicrafts products of marble, leather, carpet, brassware, artistic daring and jewelry crafts. Agra is also famous for its Petha. As far as agriculture is concerned, the area has infertile land and is prone to floods, hence the agriculture has been a subsidiary activity in the region limited to some areas.

Some of the major tourist destinations in the city are Agra Fort, Tomb of I'timād-Ud-Daulah, Mehtab Bagh, Panch Mahal, Jama Masjid, Tomb of Akbar (Sikandara), Moti Masjid, Guru Ka Taal Gurudwara, Ram Bagh, Mankameshwar Temple, etc. Tourists from all over the world visit the city around the year.



Figure 6: Different types of Local Art Forms in Agra

Table 3: Number of Tourist visit to Agra

	2012	2013	2014	2015	2016
Number	9158976	9114221	9601728	10812435	10332917
Change in tourist numbers	-	-0.49%	5.35%	12.61%	-4.43%
% of Foreign Tourists	14.7%	13.6%	12.3%	12.4%	13.2%

One of the key factors that draw a major number of tourist to the city is the connectivity it enjoys with the Delhi. Agra is well connected with the National capital via road and rail. The following section elaborates the regional setting of the city.

2.5 Review of Existing Transport System

The city of Agra has a radial pattern of the road network. The city was formed on the banks of river Yamuna, which also makes it a natural barrier within the city. The railway lines stretching along North-South Direction and East-West direction also act as a barrier cutting the city into different parts. Railway over bridges is one of the major components that act as a connector. However, ROB experience heavy traffic now a day, leading to congestion in the city. Due to heavy traffic demand, some of the ROB's have been widened. The old part of Agra, being a historical city has a network of narrow roads.

Some of the major roads of the city are appended below:

- Mall Road
- M.G. Road
- Taj road
- Idgah Road
- NH 19 towards Delhi and Kanpur
- NH 44 towards Dholpur
- NH 509 towards Aligarh
- NH 21 towards Fatehpur Sikri, Bharatpur, and Jaipur
- Dayal Bagh Road
- Mughal Road
- **Fatehabad Road**
- Inner Ring Road
- Yamuna Expressway
- Agra Lucknow Expressway

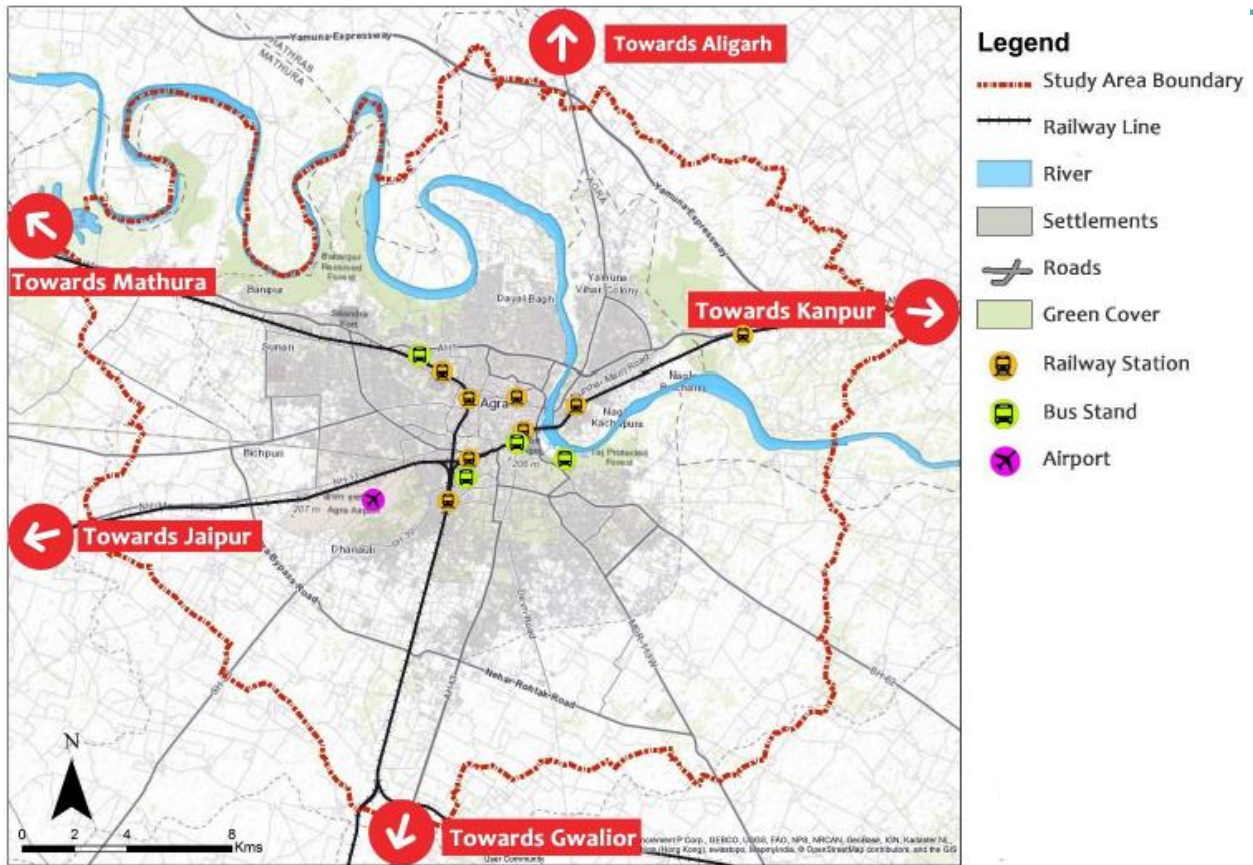


Figure 7: Existing Connectivity and Transport Setting Area

Connectivity aspects of the Agra city area described in the following subheadings.

2.6 Rail Connectivity

Location of Agra falls on the important railway corridors of the country such as Delhi - Mumbai, Delhi - Chennai. Some trains also connect the city to eastern areas of India via direct trains to the city like Kolkata. The high frequency of trains through these routes makes Agra well connected by rail with other major cities. Apart from the regular trains, Agra city is also connected through tourist circuit trains such as - the Palace on Wheels, the Royal Rajasthan on Wheels, the Buddhist Special Train etc. Agra has following Railway Stations of Indian Railways:

- Agra Cantonment Railway Station, Agra
- Agra Fort Railway Station, Agra
- Agra City Railway Station, Agra
- Raja Ki Mandi Railway Station, Agra
- Idgah Railway Station, Agra
- Yamuna Bridge Railway Station, Agra
- Billochpura Railway Station, Agra
- Fatehpur Sikri Railway Station, Agra
- Etmadpur Railway Station, Agra
- Keetham Railway Station



Figure 8: Agra Cantt Railway Station

2.7 Road Connectivity

The city of Agra is well connected by the road. The following points elaborate the regional road connectivity with Agra.

1. Northside connectivity: NH2 highway and recently built Yamuna Express Highway are the two parallel roads that connect Agra to the north. The drive to Delhi is about 4 to 5 hours.
2. Eastside connectivity: Both the NH-2 and Yamuna Express highway continues to the East till Kanpur and Lucknow.
3. Westside connectivity: From Jaipur - NH11, a four-lane highway, connects Agra with Jaipur via the bird sanctuary town of Bharatpur.
4. Southside connectivity: From Gwalior, a distance of around 120 km, takes around 1.5 hours on the National Highway 3, also known as the Agra - Mumbai Highway.

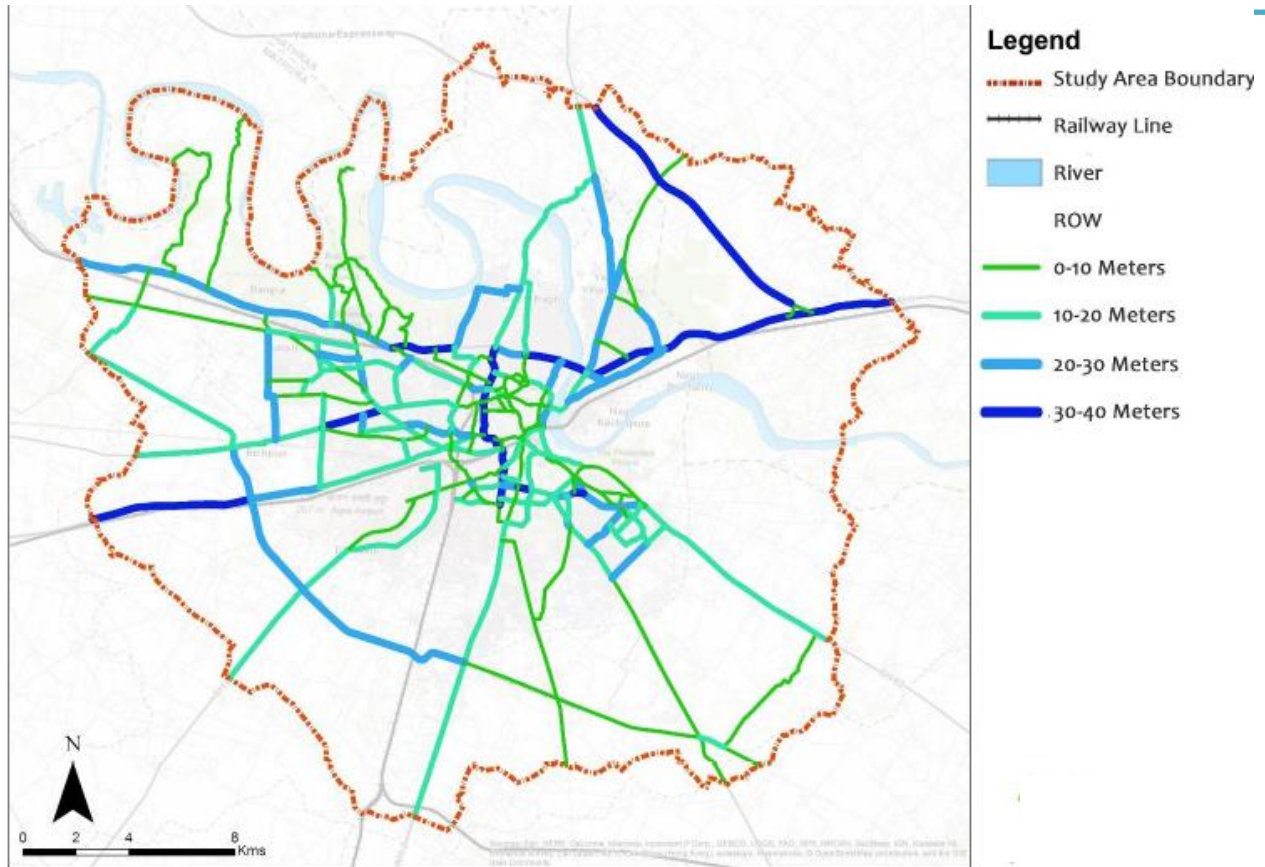


Figure 9: Road Network Inventory

2.8 Air Connectivity

Agra is also connected via air through Kheria Airport, Agra. Presently it has direct flight services to Delhi, Khajuraho, and Varanasi. However, Agra currently has only 0.2% share of the passenger air traffic demand of the state. Agra is also supposed to get its direct air connectivity to Jaipur shortly.

2.9 Introduction to Smart City Mission

Smart Cities Mission is an attempt by the Government of India to propel the country into the age of advancement and modernization through socio-economic urban growth. This advancement rests on the developments within our cities, which are considered the engines of economic growth, contributing 63% to India's GDP. This is against the fact that only 31% of the population resides in these urban areas. Out of the 7,935 towns, varying in size, 98 cities competed with each other to be selected as the first 20 to be developed as 'smart cities'. These smart cities are expected to improve the quality of life of people by enabling local development and harnessing technology, as per the Smart Cities Mission (SCM) guidelines.

Agra, leading tourist centre of Uttar Pradesh, has been successful in the competition for implementation of smart solutions in the second phase on the basis of its Smart City Proposal (SCP). This SCP consisted of an 'Area-based Proposal' (ABD) as well as pan city solution. The proposal was scored based on the quality of city-level criteria such as vision and goals, strategic plan etc. and the quality of proposals for ABD as well as pan city solution. A separate Special Purpose Vehicle (SPV) - Agra Smart City Development Limited (ISCDL) is constituted for implementation of the smart cities project.

Agra envisions retrofitting of 2250 acres of selected local area-Taj Mahal and area comprising Tajganj, Agra Fort, Jama Masjid and Fatehabad road till inner ring road form Taj Improvement District (TID). With an envisaged outlay of INR 1699 Crore spread over the next five years, the strategic nurturing of the TID will revive the historic relationship of the micro commerce with the monument. The retrofitted area can become a new socio-economic engine for the Taj experience.

Through a systematic retrofitting approach and smart infrastructure services, the proposed project will positively impact livability of 1,46,400 inhabitants, improve livelihood of ~8,000 artisans and their families, and enhance experience of ~90 lakh tourists.

Agra's pan-city proposal prescribes two initiatives to achieve (transport and safety) and (green habitat): (i) Intelligent bus operations and intelligent traffic management system (ITMS), and (ii) smart garbage management system (SGMS). The proposal, covering 24 ICT components, is encapsulated around the different themes: It is decided based on MSI (master system integrator) and ICC (integrator command and control center)

One of the major concerns identified in ABD area is traffic congestion, very poor road condition, no footpaths, congestion problems, sewerage, water problems and parking problem. Most of the roads are overburdened due to traffic but also decrease in effective right of way due to haphazard on-street parking. To address these issues as well as make way for introducing smart mobility, visual improvement, beautification of streets and to enhance the experience of Taj Mahal in the area, minor roads development in nine wards under ABD area has been proposed. In addition to this, proposal for development of minor roads with smart mobility, visual improvement in nine wards of ABD area will have following advantages.

- Distribute the traffic load on Primary Road in the ABD Area
- Streamline traffic flow
- Ease pedestrian movement in the area
- Ease movement in the heritage precinct and to integrate it with smart city features.

- Stream line all underground utilities services (Electrical Cable Duct, Optical fiber cable duct, Water distribution system, reuse/recycle treated water, house service connections, gas pipe line, storm water management system)

This detailed project report deals with the widening/upgradation of minor roads, on road parking proposal, underground utilities services proposal, visual improvements of street and design of the following nine wards in ABD area:

9 Wards Covered under Area Based Development (ABD)

Nagla Mewati (72)	Katra Fulel, (44)	Motiganj and (79)
Dhandhupura(83)	Telipada, (62)	Peepalmandi(99)
Vibhav Nagar, (98)	Rawatpada, (91)	Kalal Kheria (village)
Cantt Area (Partial)		

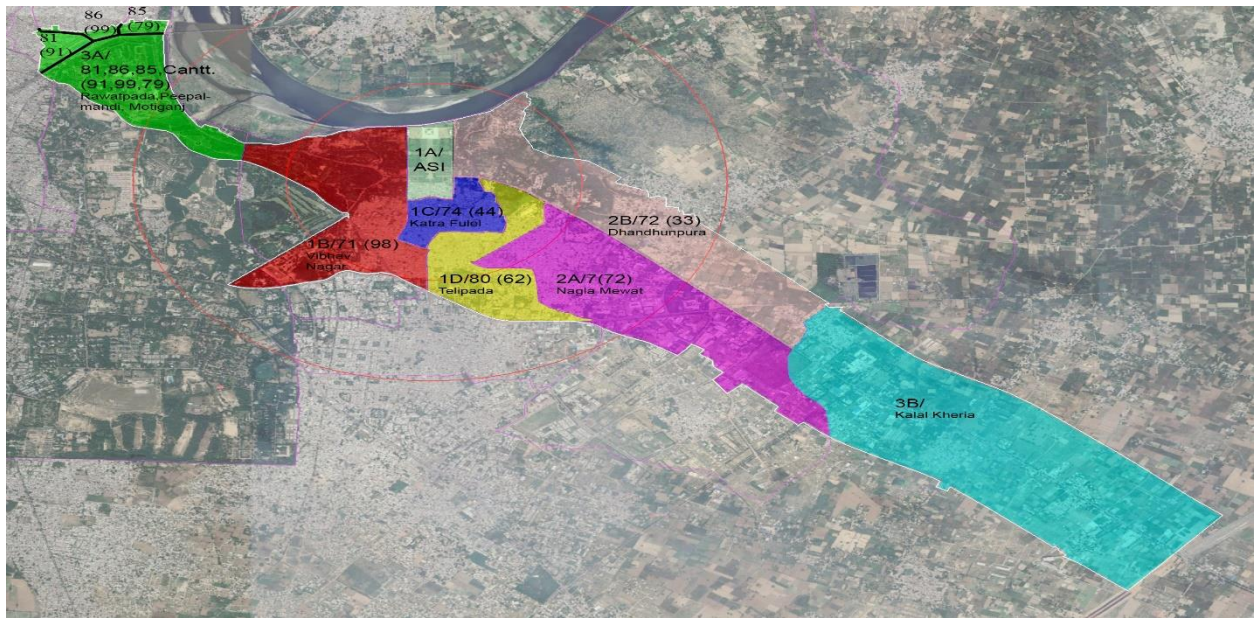


Figure 10:9 Wards Covered under Area Based Development (ABD)

This all Minor roads are divided in to nine wards for the better development and clarity of the roads.

Vibhav Nagar	Nagla Mewat	Kalal Kheria
Katra Fullel	Dhandhupura	Rawatpada,
	Telipada	Motiganj
		Peepalmandi and cant(Partial)

This Detailed Project report covers wards of Minor roads of Vibhavnagar and Katra Fullel and cost estimate of all nine wards minor roads

2.10 Project Brief

Agra is the city of the inimitable Taj Mahal. It is as loved by Indians as it is by foreigners who throng here in large numbers to admire its beauty. Along with Delhi and Jaipur, Agra forms the Golden Triangle of tourism in India. Situated in Uttar Pradesh, Agra is synonymous with the Taj Mahal, however, there's a lot more to the city than this world-famous monument. Right from the epic Mahabharata to the Mughal Dynasty, Agra has been monumental and has played a significant role in shaping India's history. Agra has two UNESCO World Heritage sites which are Agra Fort and Taj Mahal, however, Taj Mahal features in the 50 most popular tourist destinations in the world.

Near the gardens of the Taj Mahal stands the important 16th-century Mughal monument known as the Red Fort of Agra. This powerful fortress of red sandstone encompasses, within its 2.5-km-long enclosure walls, the imperial city of the Mughal rulers. It comprises many fairy-tale palaces, such as the Jahangir Palace and the Khas Mahal, built by Shah Jahan; audience halls, such as the Diwan-i-Khas; and two very beautiful mosques.

Apart from these It is very important for the approach road towards the monuments which is pedestrian friendly as well as all types of traffic, utilities and other required amenities for the smart road. In Agra, Minor Road is the very important road to reach out known and lesser-known heritage monuments in Taj ganj area. This road connects to Taj Mahal by Taj east, west and south gate roads. It is connected from the Yamuna expressway so it is the very important minor roads for the all tourist who come from the Delhi so that this minor road requires all basic facilities, landscaping, street furniture and pedestrian infrastructure to attract more tourist on this road. This project covers all type of facilities and amenities.

This map Shows all known monuments in Agra and connected roads to Taj Mahal and ABD area for the smart city. Out of this all major connected roadsto tajganj area in that all types of minor roads are more important.

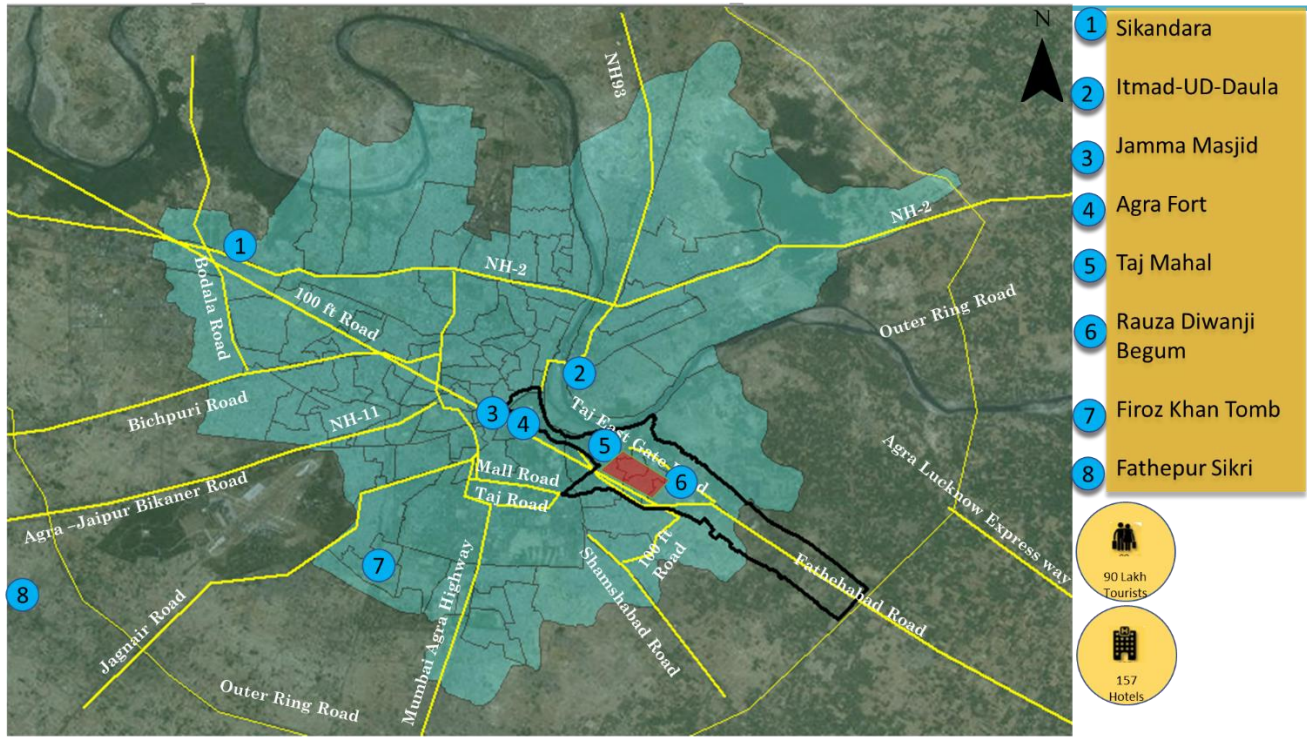


Figure 11: ABD Area and Regional connectivity map

2.10.1 Ward wise distribution of Minor roads

Around 100km of Roads covers the Whole ABD area out of that 18.5km are major roads and others minor roads

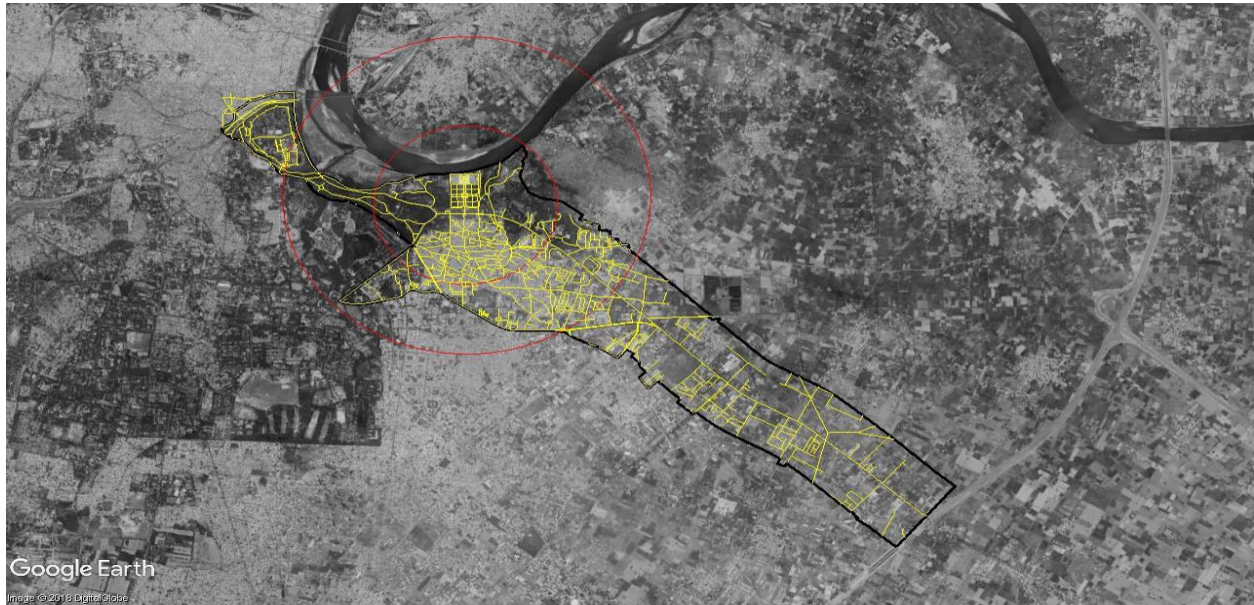


Figure 12: Roads in ABD Area (Major and Minor): 100km (Approx.)



Figure 13: Major Roads in ABD Area: 18.5 Kms

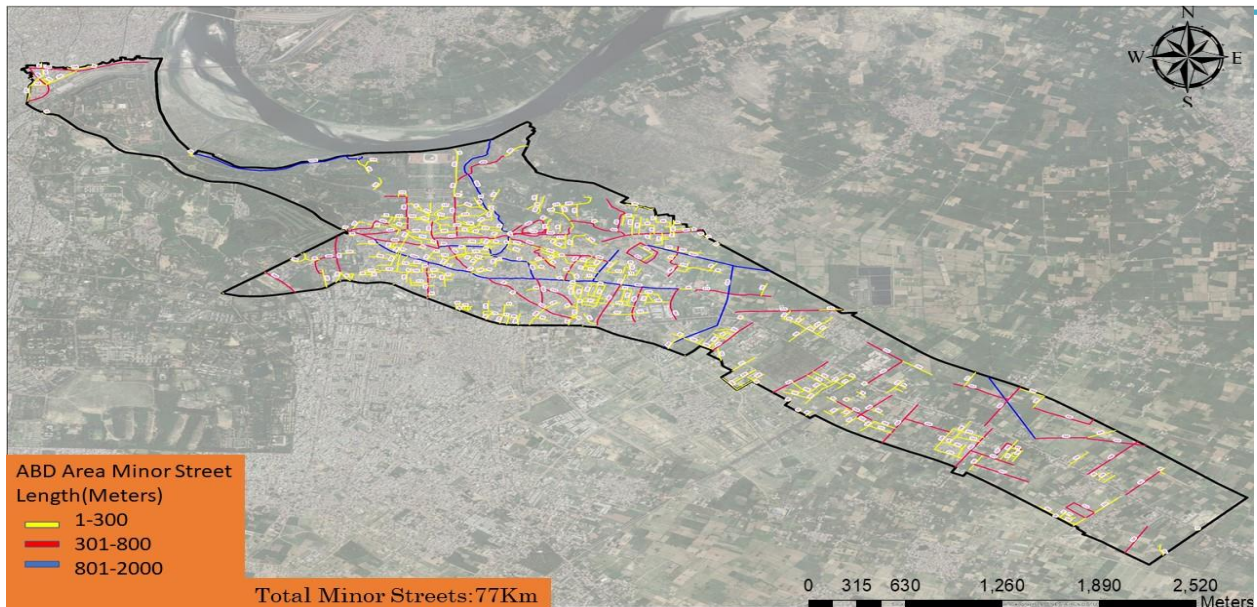


Figure 14: Minor Roads in ABD Area: 77.0 Kms

This road is extract from GIS software, total km is based on GIS

2.11 Scope of Project

Main task:

Preparation of a Detailed Concept Plan and redesign of Minor roads to enhance the experience of accessing Taj Mahal and other monuments as well as pedestrian-friendly design. Total Length of this road stretch covers nine wards of roads under smart city mission for the ABD area (Area based development).

Main Components of minor roads

- *Survey of streets and give proposals.*
- *Resurfacing with landscaping, underground utilities, open drains to be covered*
- *Pedestrian friendly road and promote NMT.*
- *E-Toilets, Kiosk, water ATM, smart kiosk*
- *Signages, street furniture, street lights.*

The prime scope of the proposed section of the roads, Agra are:

- *To relieve congestion.*
- *To provide better linkage to the arterial/sub arterial roads.*
- *To provide improved access to Taj Mahal.*
- *To connect the new urban nodes outside /nearby.*
- *Beautification streets, visual Improvements*

2.11.1 Detailed Scope of Work

2.11.1.1 Identifying road stretch and potential Development

The scope of work included Identification road stretch for the redesigning and scope of development to enhance the experience of accessing the Taj Mahal as well as other places. To target more tourists on this type of road it requires more components which are beautified the surrounding area and gives more importance to pedestrian and tourists with basic facilities

The following tasks are to be undertaken for detailed concept plan:

A. Identification of Stretch

Based on smart city proposal redesigning of road already identified for the smart road and basic facilities for tourist/pedestrian to improve the approach road, beautification of the surrounding road.

B. Proposal for landscaping, street furniture, NMT and utilities

Based on the preliminary survey and topographical survey identify the potential requirements of the road for citizens, tourist, and pedestrians. After Focus group discussion and analysis making one proposal on road to enhance the experience of streets and Install or deploy street furniture, utilities, lightening, signages.

2.12 Methodology

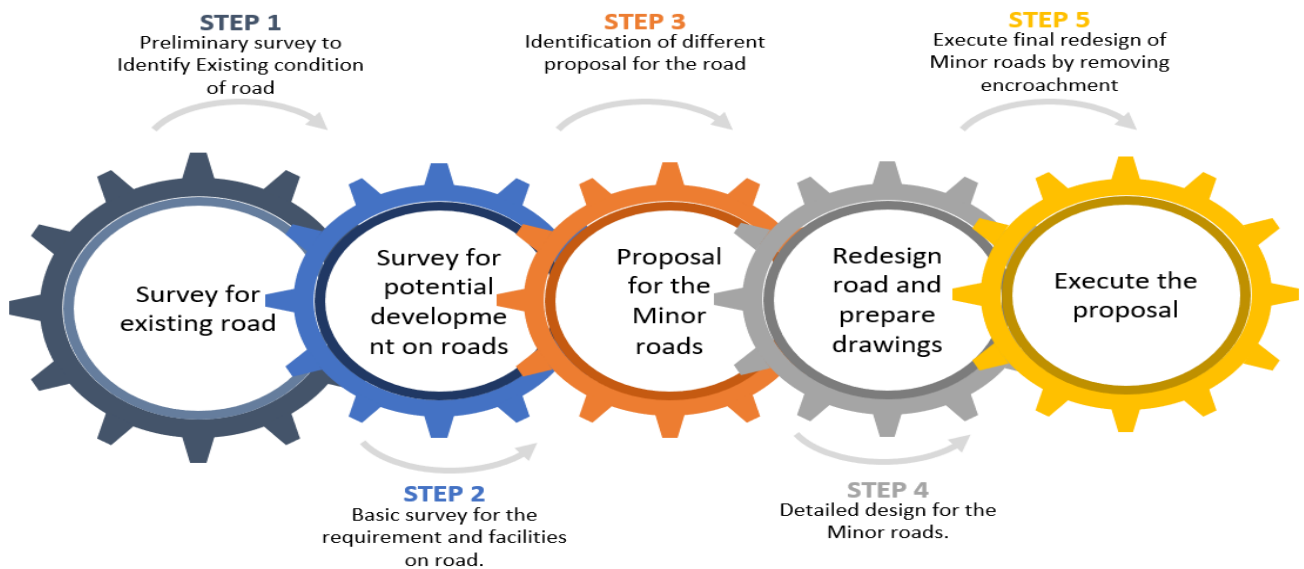


Figure 15: Methodology for Project

Chapter 3. Literature Studies

3.1 Roads and NMT

SUTP: Walking and cycling

In this exercise, we reviewed the literature regarding Transport Infrastructure planning and design to get an idea of design standards, best practices, and emerging trends. The Documents reviewed were:

Roads + NMT	Public transport	LUTI
<ul style="list-style-type: none"> • ITDP- Better streets, better cities • Sustainable Urban Transport Project- Walking and cycling • Urban design guidelines for Pune • Glenelg Road hierarchy • Abu Dhabi Street Design Manual • Complete Streets Chicago 	<ul style="list-style-type: none"> • BRT Planning Guide • HiTrans: Public Transport Planning and networks • Public transport- Citizen requirements • Public transport- Land use planning • Bus semi rapid transit mode development and evaluation • Public transport- Mode options and technical solutions • Public transport and urban design • Sustainable Urban Transport Project- Mass Transit Options 	<ul style="list-style-type: none"> • SUTP Land Use and Transport. • Transit oriented development: Curtis Et al. • TRB- Making transit work



Figure 16: Special arrangement of NMT zone, Germany

This document gives the importance of pedestrian trips and non-motorized vehicle trips. Then it discusses its design aspects. Increasing number of city governments in developed and developing cities have recently begun actively promoting bicycling and walking. It discusses some of the case studies.

ITDP: Better streets, better cities

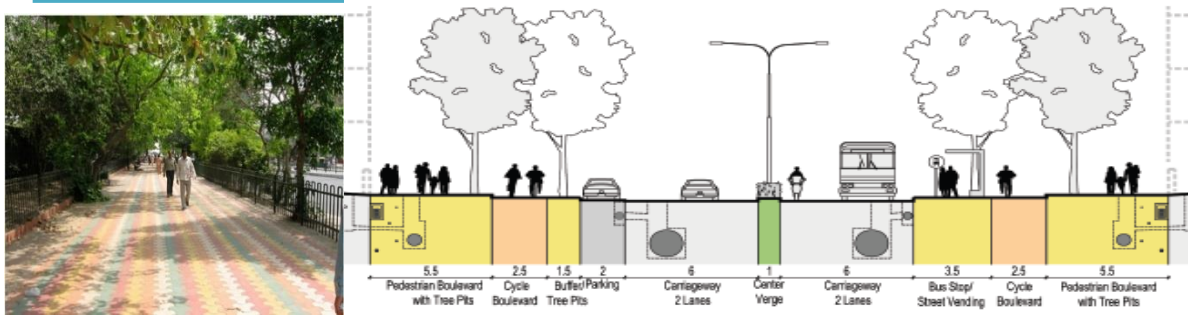


Figure 17: Cross-section of a 45m wide road

It is a Street design manual developed by the Institute for Transportation and Development Policy (ITDP) and Environmental Planning Collaborative (EPC). This document contains the following aspects.

- Importance of streets, identifying the stakeholders
- Street design elements- discusses 16 elements
- Street templates- Collection of design solutions
- Intersection templates- Collection of standard templates
- Design process-explains the process from development of a vision to completion of a final design

USDG guidelines for Pune



Figure 18: Provision of street furniture for NMT zone

The guidelines define and initiate a process to ensure that appropriate street types and street design elements will be used to create better streets to support transportation objectives for the city considering the present and future needs. The manual is structured into 5 sections giving detail description on the relevant topics for the particular section-

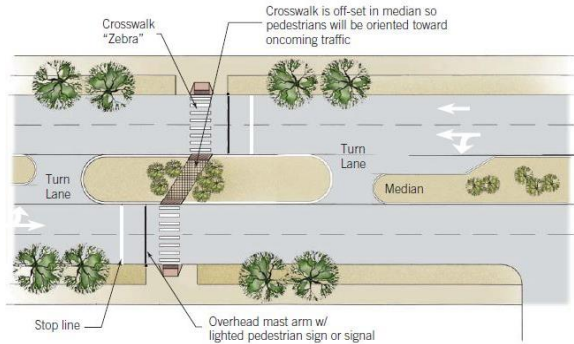
- Introduction and Context of USDG
- Goal and Design Principles of USDG
- Design Guidance

Implementation guidelines and recommendations

Abu Dhabi Urban Street Design Manual



Driveway designed as a curb cut, not a minor junction, Washington, USA.



Offset mid-block crossing, oriented so that pedestrians face oncoming traffic

Figure 19: Offset midblock crossing

This document presents contest specific design for both pedestrian realm and vehicular traffic. It emphasizes on climate, geographical and cultural aspects of street design. It also gives the design process for the same.

3.1.1 45m ROW in context of roads

3.1.1.1 Typical Design

Based on the ITDP guidelines there will be two types of sections for 45M ROW with the different type of land use as shown in the table. Guidelines covers all types of ROW and Land use.

Table 4: Classification of ROW

Type of section	Length of Road (km)	Land Use
45A	20.67	RR
45B	8.71	RC

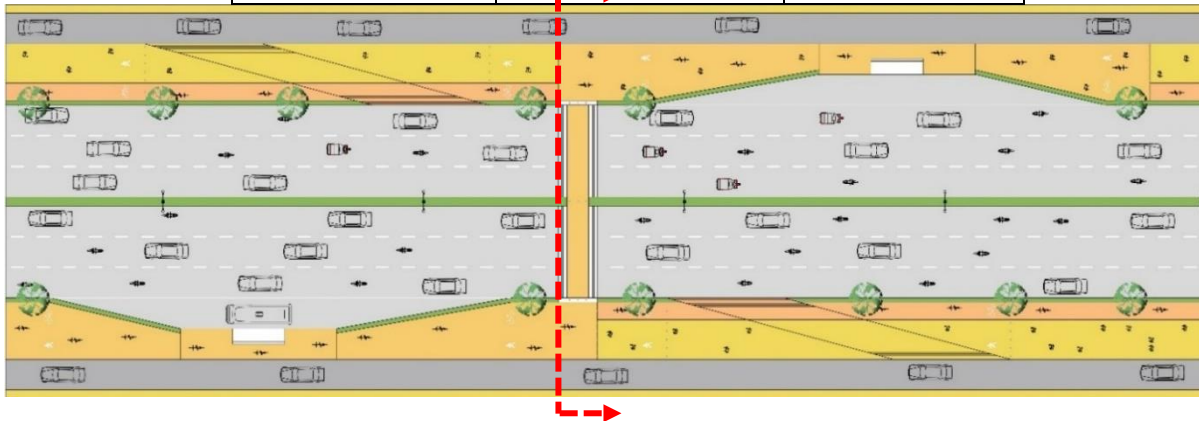


Figure 20: Map showing 45m ROW R+R

45 A (RESIDENTIAL + RESIDENTIAL)



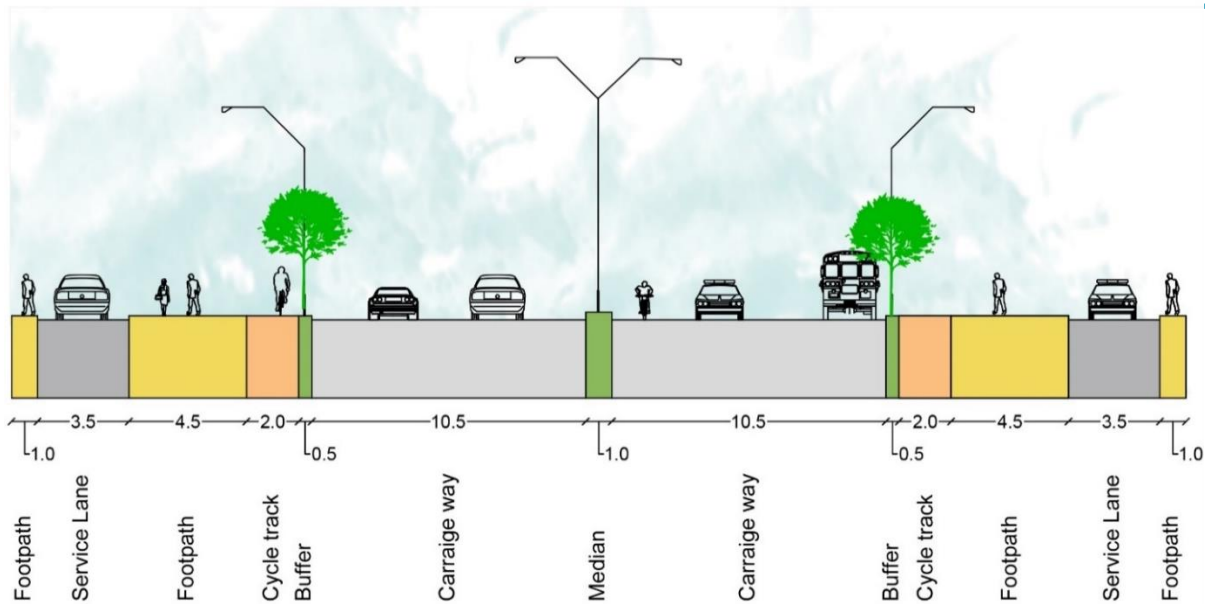


Figure 21: Plan and section of 45A road

This section has a residential land use on both sides. Considering this a service lane has been provided on either side of the road. A carriageway of 10.5m on both sides is provided.

An NMT zone of 4.5 m wide footpath and a 2m wide cycle track is elevated at a level of 150 mm from the carriageway level.

High-rise pedestrian crossing is provided near curbside bus stops for the safety of pedestrians. The High-rise pedestrian crossing can also be used by cyclists to cross the road. Cycle stands are provided in proximity to the bus stops to access the public transport easily.

A bus bay of 53 m has been provided for the city buses with a de-acceleration length of 20 m and an acceleration length of 15 m for the ease of movement of city buses on the carriageway.

45 B (RESIDENTIAL + COMMERCIAL)

Figure 22: Map showing 45m ROW R+C

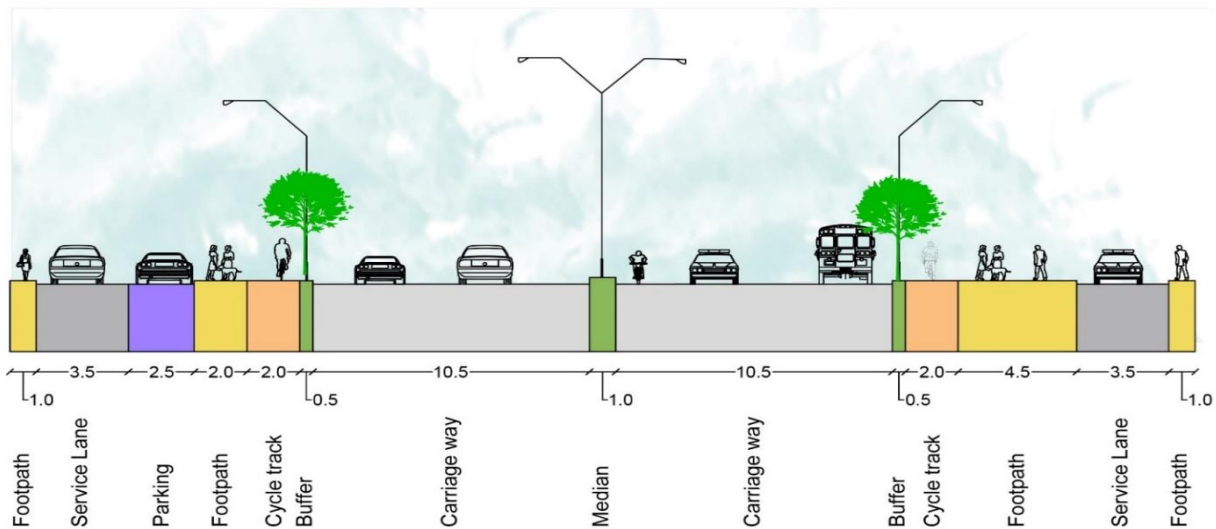
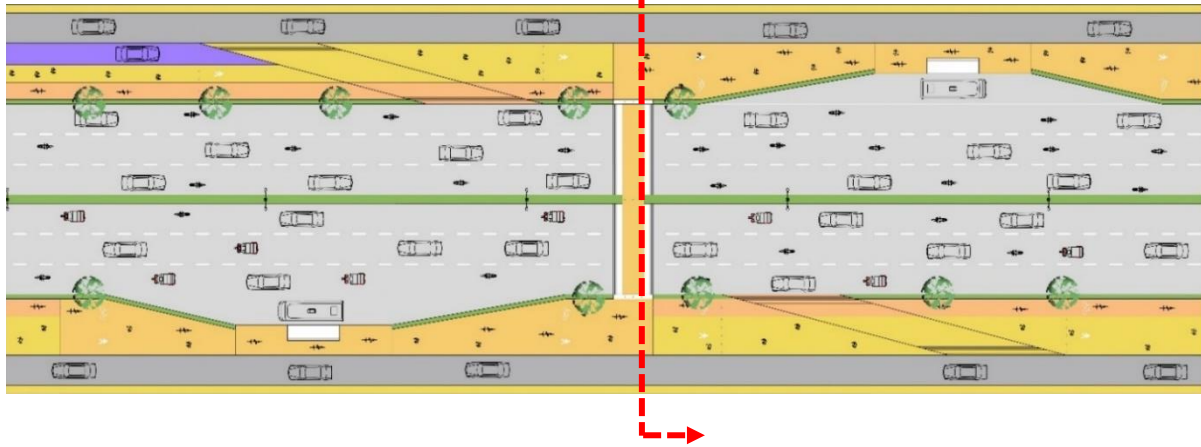


Figure 23: Plan and section of 45B road

This section has a residential land use on one side and commercial on the other. Considering this a service lane has been provided on either side of the road and parking pockets at certain areas on the commercial side. A carriageway of 10.5m on both sides is provided.

An NMT zone of 2.0 m wide footpath and a 2m wide cycle track is elevated at a level of 150 mm from the carriageway level is provided on the commercial edge whereas 4.5 m footpath is provided along the residential edge.

High-rise pedestrian crossing is provided near curbside bus stops for the safety of pedestrians. The High-rise pedestrian crossing can also be used by cyclists to cross the road. Cycle stands are provided in proximity to the bus stops to access the public transport easily.



A bus bay of 53 m has been provided for the city buses with a de-acceleration length of 20 m and an acceleration length of 15 m for the ease of movement of city buses on the carriageway.

Chapter 4. Survey and Proposal for Minor roads

4.1 Introduction Minor Roads

Agra is the third largest city of Uttar Pradesh and is a commercial city, having small-scale and household industries. Agra is known for handcraft work majorly marble, leather, carpet, brassware, artistic daring and jewelry craft which attracts a large number of domestic tourist and from all over the world.

Agra is located at the junction of four national highways namely Delhi Kolkata (NH-2), Agra Mumbai(NH-3), Agra Jaipur(NH-11) and Agra Aligarh(NH-93). It has two state highways namely Agra Fatehabad(SH-62) AND Agra Gajnair(SH-39).

Agra Fatehabad(SH-62) lead to inner ring road which connects NH-2 and Yamuna Expressway forming not only spine of the city but provide improved access to Taj Mahal for the tourist.

SCOPE OF THE PROJECT

The proposed project includes the development of existing Minor roads of nine wards under ABD area, The scope of work included Identification road stretch for the redesigning and scope of development to enhance the experience of accessing the Taj Mahal as well as other places. To target more tourists on this type of road it requires more components which are beautified the surrounding area and gives more importance to pedestrian and tourists with basic facilities

Main Components of minor roads

- *Survey of streets and give proposals.*
- *Resurfacing with landscaping, underground utilities, open drains to be covered*
- *Pedestrian friendly road and promote NMT.*
- *E-Toilets, Kiosk, water ATM, smart kiosk*
- *Signages, street furniture, street lights.*

The prime scope of the proposed section of the road, Agra are:

- *To relieve congestion.*
- *To provide better linkage to the arterial/sub arterial roads.*
- *To provide improved access to Taj Mahal.*
- *To connect the new urban nodes outside /nearby.*
- *Beautification streets, visual Improvements*

4.2 Minor Roads in Vibhav Nagar

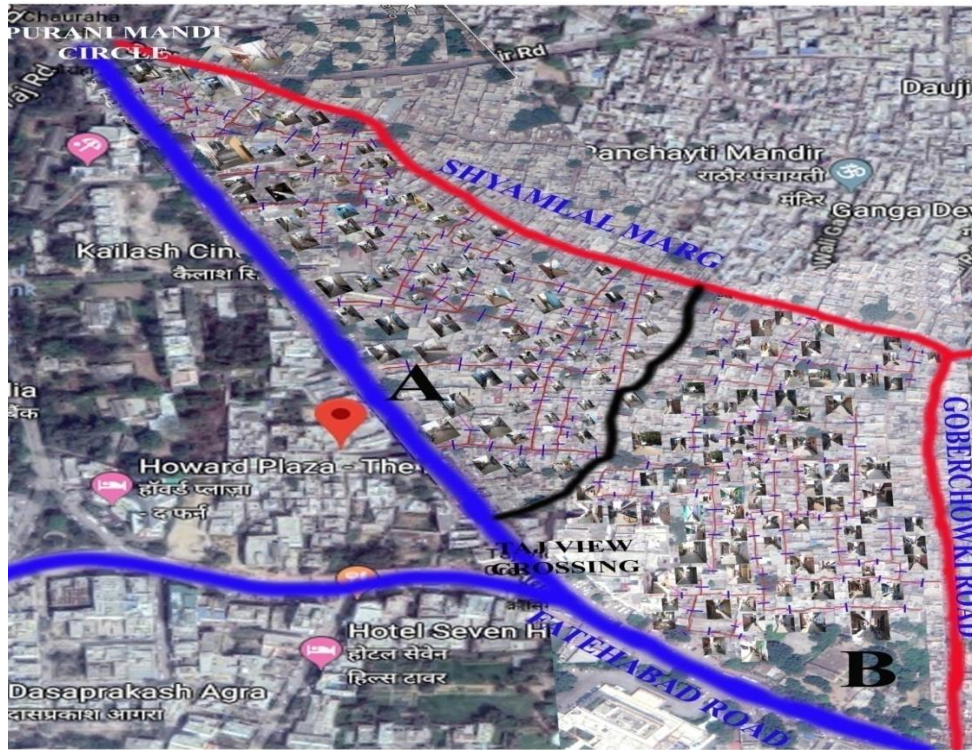


Figure 24:Google Image of Minor Roads (Vibhav Nagar Ward)

- Total Minor roads 6.67 KM
- Vibhav Nagar ward covers total 6.67km of minor roads. This roads ROW varies between 3m to 11m.It is divided into two regions A & B.
- Vibhav nagar Region A as shown in figure.

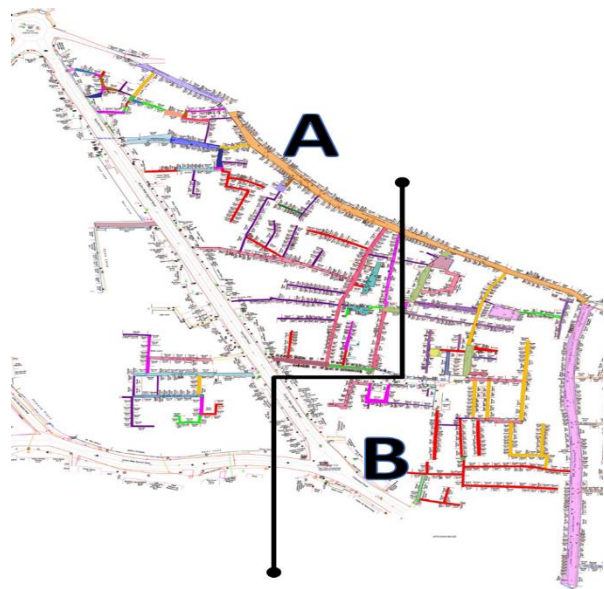


Figure 25:Vibhav nagar ward Minor roads

4.3 Existing Situation of Minor Roads



Figure 26: Minor Road Diversity: Urban Scape

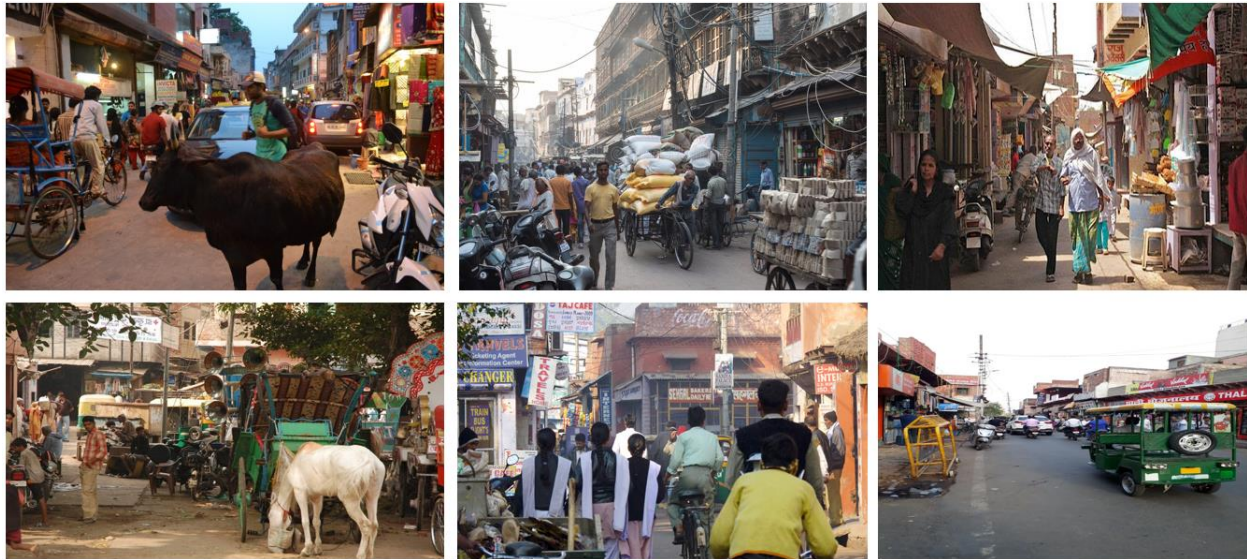


Figure 27: Minor Road Diversity: Users



Figure 28: Visual Analysis

4.4 Challenges and Issues of Minor Roads

The said road does not have a stormwater drain, underground electrical utilities, cycle track, pedestrian path, median at few stretches of the minor roads, public conveniences, unplanned crossings/junctions and illumination, parking lots, bus shelter, drinking water kiosk, health kiosk for first aid, landscape areas and badly encroach.

Issues of Minor Roads

1. Congestion and bottlenecks on the road due to high density of slow moving traffic.
2. High density pedestrian zone.
3. Absence of designated pedestrian pathway leads to congestion on carriageway.
4. Narrow carriageways due to heavy encroachment on either side of the road.
5. Lack of proper traffic management.
6. Surplus organic parking on road due to the absence of organized parking facilities.

SWOT Analysis Minor Roads

STRENGTH

- Heritage City
- Tourist City
- Craft City
- Part of Golden Triangle
- Diverse Urban scape

WEAKNESS

- Lack of Pedestrian Path
- Lack of Public Convenience
- Lack of Covered Drain
- Lack of Traffic Management
- Lack of Personal Belongingness
- Lack of Infrastructure

OPPORTUNITY

- Enhancing Walkability
- Encouraging Public Convenience
- Balance Mobility
- Enhancing Traffic Management
- Engage Local Talent
- Development of Infrastructure

Threat

- Non-Coordinated Development
- Encouraging Vehicular Development
- Loss of Character due to development
- Increase of Air Pollution due to open drain and littering
- Non-Coordinated Utilities

4.5 Project Facilities / Amenities for Minor Roads

The facilities will include different types of amenities, utility duct, pedestrian walk, street furniture, non motorized transportation in minor roads, paintings, lights etc.

4.5.1 Essential Goals for Integrated Street



Figure 29: Essential Goals for Integrated Street

4.5.2 The different Proposal for Minor Roads

1. Equitable road space
2. Priority as per activities and volumes
3. Pedestrian friendly pathways
4. Provision for on road public utilities.
5. Encouragement to non-motorised transport (e.g. Walking and cycling)
6. Intelligent traffic management
7. Non-vehicle streets / zones
8. Smart parking

MAKING USER FRIENDLY STREETS

- Segregating zones for motor and pedestrian movement.
- Defining zones for vendors on street in order to avoid organic congestion on street.
- Provision of cycling tracks wherever possible.
- Designated public parking in order to avoid unorganized parking on streets.



- Making streets user friendly and adaptive

ADAPTIVE APPROACH

- Converting organic street markets to planned temporal activities.
- Signage use appropriate to the locals.
- Retaining heterogeneity of built form in order to preserve city's uniqueness.
- Adapting measures like signboards and bollards in order to regulate traffic.
- Flexibility in Right of way to meet the influx demand.

SUSTAINABLE TRANSPORTATION POLICY



4.6 Design Proposal for Vibhav Nagar Minor Roads

After the topographical survey and another preliminary survey, a stretch of 6.67 Km design by dividing into different types of sections based on the ROW and land use. Detailed sections divided in to two region A & B available for information as follow:

4.6.1 Facilities provide on Minor roads

- Street Furniture
- Street lighting/smart poles
- Smart Toilets
- Landscaping: Pathways, Sculptures, Pergolas, Percolation pits, Tensile Umbrella, Feature wall, covered sitting, Open Gymnasium, Bollards, Plantation,
- Healthcare kiosks
- Drinking water kiosk
- Equitable road space
- Priority as per activities and volumes
- Pedestrian friendly pathways
- Provision for on road public utilities.
- Encouragement to non-motorised transport (e.g. Walking and cycling)

- Intelligent traffic management
- Non-vehicle streets / zones
- Smart parking

4.6.1.1 *Street Furniture*

- Purpose of street furniture is to cater to the comfort need of the road users especially pedestrian and cyclist
- Well designed and properly placed furniture inculcates sense of discipline among road users, acts as traffic calming measure and adds aesthetic value to the street.
- Following are the commonly used street furniture:
 - Seating/benches
 - Trash bins
 - Bollards and railing
 - Signage/ info kiosks
- Street Furniture brings in life on the streets and improves its aesthetics and usability.
- As per the ground level condition and situation of Agra all furniture Will be of durable material, easy and cheap to maintain, safe to use, easily available in case of repairs and replacement and aesthetically pleasing.
- Will be placed such that it does not obstruct the pedestrian or vehicular flow of roads
- Will be placed along all the streets. The location, type and quantity will be decided depending on the adjacent land-use of the roads and user activity and space availability.
- Street furniture will be convenient to use and have universal accessibility.
- All street furniture will be suitably placed to allow access for street cleaning.
- Street furniture is to be provided at all such locations having high public activity and pedestrian flow like commercial plazas public buildings, recreational areas, transit stations, parks and gardens, educational institutes, market areas, shopping malls etc.
- Street Furniture will be placed within pedestrian area wherever provided.
- This all street furniture cost taking into BOQ and Plans

Benches:

- Benches or seating will be provided at the building/ frontage edge of the footpath and ideally with provision of shade.
- Where seating is oriented parallel to the curb, it will face toward buildings when located in the furnishings zone, or away from buildings when located in the frontage zone.
- Where sidewalk width permits, seating in the furnishing zone will be perpendicular to the curb. As per the road condition benches provide between footpath and property line which is called as furniture zones and Seating will be designed to encourage sitting and to discourage lying down. Street benches design can be change based on local market avability.

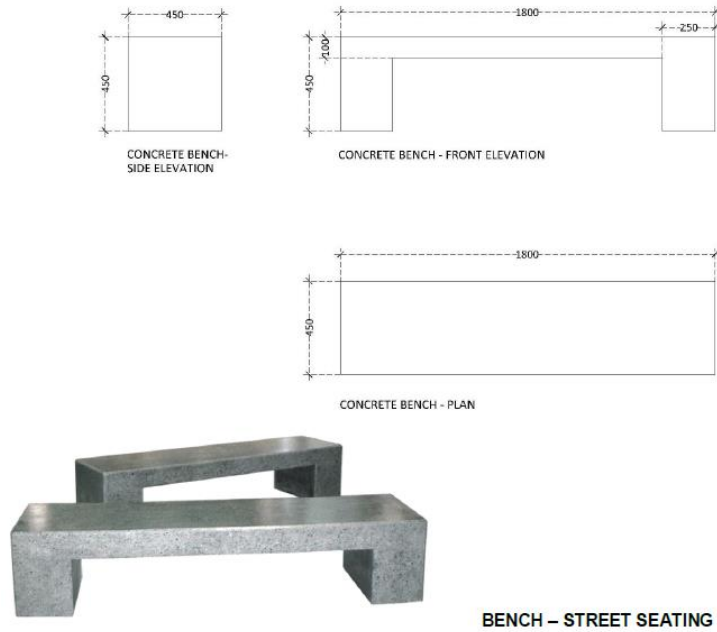


Figure 30: Benches

Recommendations for Trash bins/Dustbins:

- Size of trash bins provides in such a way that it does not occupy more than 2 sq.m of space of any street.
- Trash bins will be located at intervals of not more than 200m.
- Trash bins will be located ideally on the edge zone or within verge between carriageway and footpath.
- Design of trash bins will be such that it conceals the litter bags, is covered, facilitates easy removal of litter and cleaning of bins.
- It is recommended to provide for separate bins for segregating the wet waste and recyclable waste.

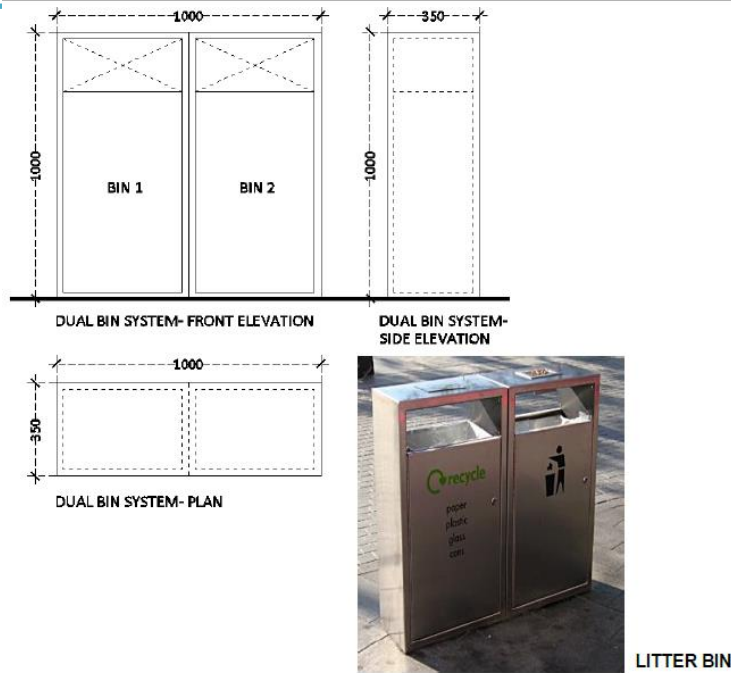


Figure 31:Dustbins

4.6.1.2 Street lighting/smart poles

- Lighting of streets is one of the most important and essential elements for safety of road users including pedestrians.
- Good quality light promotes safer environment by ensuring inter-visibility between users.
- Quality of lighting has major impact on perceptions of security especially for pedestrians and cyclists.
- Lighting will be designed to ensure that both the vehicular carriageway and pedestrian/cycle path are sufficiently illuminated.
- Street lights can have various designs and appearances depending on the type /theme or aesthetic significance of any street.



Figure 32:Types of Street Lights

Smart Pole:

Smart Pole offers multiple services to the city residents. The integral parts of the smart pole are as below:



- Smart pole has telecom tower infrastructure to match with city aesthetic and ready to accommodate upcoming technology as 4G and 5G
- Energy efficient and remotely controllable LED Street Lights

- Wi-Fi hotspot services for the city
- Surveillance cameras for safety and parking violation detection
- Environmental Sensors to monitor air quality, temperature and humidity
- Electric Vehicle charging points to promote use of electric vehicles in the city
- Mobile based application with functionality of SoS
- Centralizes Command and Control centre for monitoring the implementation of smart solutions
- Optical fiber for better bandwidth to the Wi-Fi users/providing backhaul to telecom operators

Street Light:

Smart pole project is planned for some poles to be installed in the roads to cover the entire city area and in parallel to this LED street lights to be installed which will replace the conventional street lighting. The benefits of replacing conventional lighting with LED street lights are as below:

- LEDs have extremely long lives compared to conventional lamps
- LED luminaries don't have filaments that can quickly burn out and they don't contain toxic chemicals like mercury, unlike traditional high-pressure sodium lamps or mercury-vapor lamps
- LED luminaries can last 70,000 hours approx., also have reduced maintenance costs because of their long lives
- LED luminaries produce less heat than other bulbs. As it provides more lumens per watt than conventional lamps
- LEDs are suitable for places where replacing light bulbs is expensive, inconvenient or otherwise difficult.
- LEDs are highly energy efficient. While compact fluorescent lamps (CFLs) recently have been touted as the standard in green lighting, LEDs actually have double their energy efficiency
- LED use 15 percent of the energy of an incandescent bulb while generating more light per watt. LEDs produce approx. 80 lumens per watt, traditional streetlights can only muster 58 lumens per watt
- Energy efficient LED helps to reduce carbon emission.

Additional key financial benefits are:

- Better governance and coordination through centralized command and control center
- Zero capital investment for Smart Street Lights
- Zero operation and maintenance cost for 15 years
- Leveraging investment of some amount for city infrastructure
- Annual premium on revenue sharing model
- Better and smart services to citizens

How it is works:

Very easy to install, operate and maintain, poles can be installed by an engineer and two technicians in just seven hours - 4 hours for structure and 3 hours of internal connections. The monitoring of the functions is done from a remote-Control Command Centre. Everything from streetlights to energy data analysis, WiFi signal connectivity, traffic management, advertising message, video recording to alarm systems can all be monitored and managed from the Control Command Centre, which is manned by well-trained personnel.

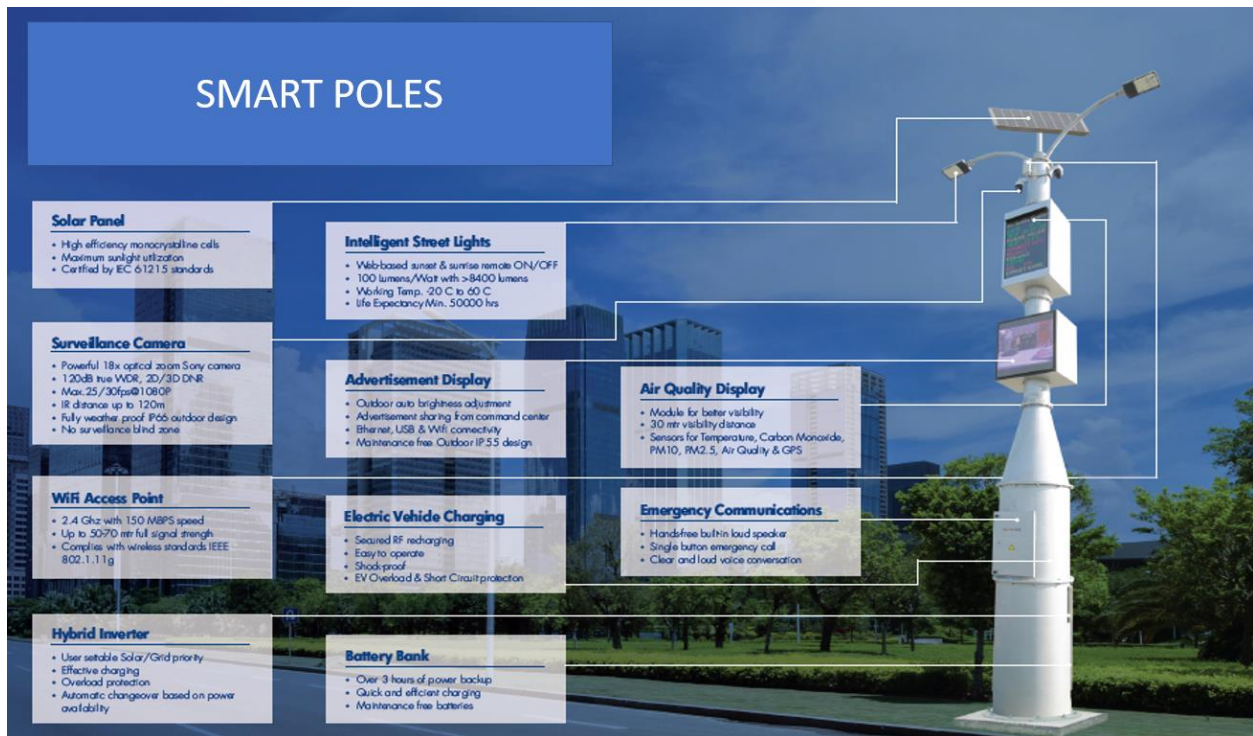


Figure 33: Smart Poles

4.6.1.3 Pedestrian walkways/Footpaths

Footpath or sidewalk is a portion of the street reserved only for pedestrians. It is provided on both edges of the street. Footpaths will be walkable, clean and safe for pedestrians and will be free from encroachments, parking and utility obstructions. Good footpaths are the most essential components of any good street in the city.

Attributes of good footpath design include:

- Accessibility by all users.
- Continuity and connectivity.
- Adjoining landscaping to create a buffer space
- Footpath level will be maintained at entry to lanes / smaller roads meeting main road. Heavy duty paving blocks to be used in this portion. Suitable ramps to be provided outside footpath area for vehicle access. Footpath width shall not be reduced to provide ramps.
- Design of footpaths will be such that it provides convenience to pedestrian as well as provides for vehicular access to adjoining properties.
- A gentle ramp needs to be provided in parking bay or at road side edge of the footpath to give access to property entrances without altering the surface levels of the walkway. It is to be seen that such vehicular access ramp does not hamper clear walkway for pedestrians. Ramp can be provided at road side edge of footpath only when the clear walkway width is 2.5m or more. This makes it easy for the pedestrians since the levels are not disturbed at every property access gate.
- Ramp, steps at the property entrance and compound wall of property will be within the property premises without any encroachment on footpath. Footpath width shall not be reduced to provide ramps/steps.

- Gate of the property will be inside opening type without causing any obstruction on footpath

Pedestrians find it inconvenient to change the level frequently. Motorists tend to use the footpaths more often like a vehicular way or parking space and dominate the pedestrians making it unsafe for them the lowered access portion is bound to get sunk due to frequent vehicle movement. This causes its wear and tear causing water Bollards can be used to restrict the vehicular movement along footpaths

In Agra Fathabad road as per ground level condition and pedestrian survey provision of 2-2.5m footpaths along the 7.5km stretch. Level of Footpath will be 150mm from the ground level and it is towards street storm water drain to avoid water accumulation. Also provide suitable ramps wherever required on road. PWD traffic data available in Annexures. Typical sections available in this DPR.

Based on IRC Guidelines and pedestrian survey following width of footpath provide for the urban streets.

Table 5: Guidelines for Footpaths

Clear walking zone of footpath (m)	Max. Number of persons per hour in both directions
1.8	1350
2	1800
2.5	2250
3	2700
3.5	3150
4	3600

4.6.1.4 Parking Lots

2-wheelers and cars are most common private vehicles parked on street. Autos, cabs, school buses are public and semipublic vehicles consuming road space for parking.

It is to be noted that provision of on-street parking is an additional facility provided by the municipal corporation and is not the right of the citizens. Based on the survey and ground level condition provisions of parking lots at major attraction tourist spots and availability of space along carriage way.

As per the Road condition

- Intersections and other critical locations are kept free from parking and other encroachments up to min 50m from junctions on all arms.
- Suitable curbside lengths are kept clear of parked vehicles near bus stops. Parking will not be allowed on footpaths and cycle tracks or other corridors meant exclusively for pedestrians and cyclists and vehicles thus parked will be penalized.
- In central areas, street parking may be permitted on one side of the road one day and on another side on another day depending on the site location. Some streets in the city could be declared as 'No parking' streets in consultation with traffic police.

-
- **Parallel parking for cars is the most efficient parking layout in terms of the number of vehicles relative to the area occupied. Parallel parking is recommended because it also takes away minimum road space from other road users. The same parking lane can be used as perpendicular parking for two-wheelers. This type of parking provides on road on street parking as well as nearby street vending zones. Detailed plan and sections available in annexures.**

4.6.1.5 Traffic Management System

TRAFFIC SIGNS

Traffic signs have been prescribed in the Motor Vehicles Act 1988 for following:

- Road Safety Rules
- Permissible Speed and Access.
- Warning about potential hazards
- Directions and distances of destinations, landmarks and suburbs.

Commonly used road signs as per IRC 67-2012 are as follows:

Mandatory/Regulatory Signs: In accordance with the Motor Vehicle Act, 1988, every driver of a motor vehicle shall drive the vehicle in conformity with any indication given by the mandatory signs and not obeying these signs is an offense. These signs are generally on circular boards.

Cautionary/warning Signs: Cautionary signs are meant for cautioning the driver about the hazards lying ahead on the road. These signs are on triangular boards.

Informatory Signs: These guide the road users regarding the distance and directions roadside facilities & destinations. These signs are on rectangular boards.

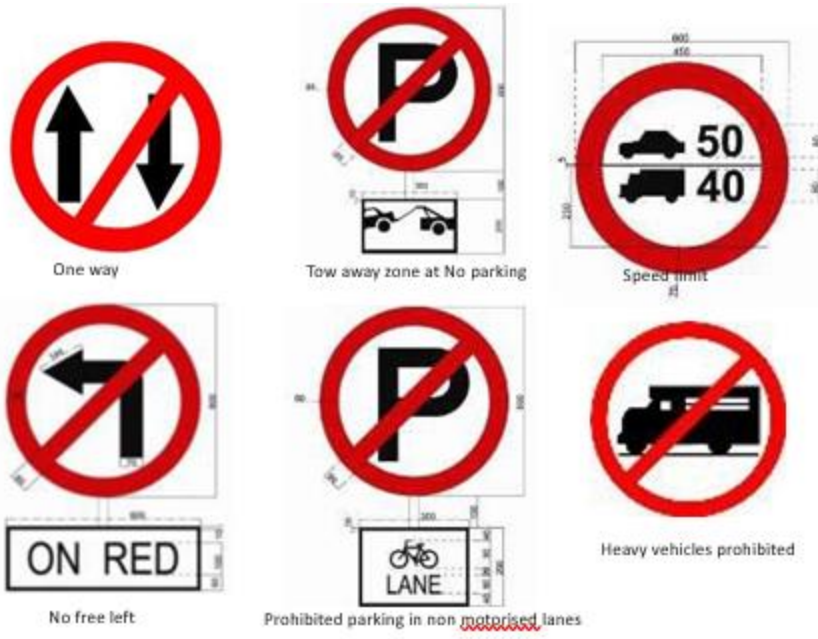


Figure 34: Prohibited Signages



Figure 35: Informative Signages

Road Markings

Road Marking is an essential element which is required for improving efficiency of the street. Markings will strictly adhere to:

- IRC 35 – 1997 for road markings
- MoUD IUT Code of Practice for Road markings

Road Markings are done in following ways

- Line – Center line, Dotted line, Stop line etc
- Arrows – Straight, left, right, U-Turn, round about
- Word – STOP, BUS WAY, CYCLE LANE etc
- Diagram – Cycle, utility box, bus box etc.

- **Paint Markings:** Paints used for road markings will be hot applied Thermoplastic paints instead of ordinary paints, for better visibility and long life. Visibility at nights is improved by the use of minute glass beads embedded in the pavement marking material to produce a retro reflective surface.
- **Plastics:** Cold rolled or glued down plastic strips with adhesive at the back are used for cross walks / Zebra strips. This product is heavy-grade material with reflective beads embedded in the plastic. This method is used to mark the stop lines on bituminous roads in high density urban areas.
- **Epoxy technology** has become more affordable and reliable. This material competes directly with plastic with respect to usage and cost.
- **Cats eye** are reflectors which either reflect the light falling on them or can have a blinking mechanism at important locations.
- **Reflective Posts** – These are plastic posts usually painted in red, fluorescent orange or yellow color and are fixed with bolts

Pavement marking, zebra crossing, all types of painting on road will be covered in Fathabad Road

Traffic signals

At major intersections, traffic signals grant right of way to various road users to move along or cross a street. This reduces chaos on roads and improves road safety. The decision of whether a given intersection needs a traffic signal or not will be taken based on warrants provided by IRC:93-1985, "Guidelines on Design and Installation of Road Traffic Signals" or any more recent prevailing guideline by IRC. These signals will integrate with command and control center and control center which is covered in junction improvement projects wherever required.

SPEED BREAKERS

Speed Breakers are induced elements on the streets whose sole purpose is to reduce vehicle speeds.

They are ideally introduced where the surrounding land use expects low speed or where many accidents take place due to over speeding.

There are 3 types of speed breakers:



4.6.1.6 E Toilets

Features:

1. Area of around 20 square feet
2. 2 doors -- a sliding door at the front, and a normal door ahead of the toilet.
3. The waste is treated and it is reduced to a sand-like material & it is removed physically once in three months.
4. Cost Rs. 3.5 -5.5 Lakhs (inclusive of bio-membrane reactor's price).
5. Bio-membrane reactor is a nano-technology- aided device that instantly recycles the used water and makes it ready for future use.
6. Manged at remote location and remote washing can be done through GPRS controls.
7. The average life of a unit is estimated to be around 7-10 years.
8. Automatic door, lights and exhaust fan starts at drop of coin.
9. When the user doesn't flush, the toilet flushes itself.



Figure 36:Public E-Toilet

4.6.1.7 Landscaping: Pathways, Sculptures, Pergolas, Percolation pits, Tensile Umbrella, Feature wall, covered sitting, Open Gymnasium, Bollards, Plantation,

PLANTATION

Trees play an important part in the design, function, and aesthetic success of the street scape.

Trees are essential on streets for following reasons:

- To provide shade to road users especially, pedestrians and cyclists. To reduce local ambient heat and provide cooler atmosphere. Improve quality of air by absorbing pollutants.
- To reduce surface water, drain off.
- Make streets aesthetically pleasing.
- Trees along sides of the street are desirable to frame the street and enhance pedestrian movement.

Following are broad level recommendations for planting trees on streets:

- Trees should not obstruct the pedestrian flow or vehicular flow. Clear walkable footpath should be available depending on the road width.
- Street trees should typically be upright and branched above 2.4m to provide adequate walking clearance under branches.
- It is recommended to plant trees in Multi-utility zone as recommended by IRC codes. In case of narrow streets and in absence of Multi-utility zone, trees should be planted
- in parking zone / shoulder as it is advisable that trees utilize parking space instead of compromising walking space.
- It is mandatory to have tree pits which provide space for tree growth. Tree pits can be individual, elongated or connected. They may be surfaced with porous pavers, or grates that allow water to readily flow to the root zone. Minimum tree guard dimensions should be followed as per table mentioned in this chapter.
- Thorny plants should not be planted in the median.
- Plantation at edge of footpath (even within private premises) should not be of a type which would overgrow and spread on to the footpath blocking pedestrian path.

Trees should be only planted in following areas:

- Along the edge of the carriageway ideally within an unpaved areas (verge) between footpath and carriageway.
- MUZ wherever provided.
- Verge between footpath and cycle tracks. Within parking belts.
- Within frontage zones on commercial streets

Existing trees on carriage way:

At some locations it is seen that existing trees occupy space on carriage way. They are either on edge or in between the carriage way. These need to be highlighted with Chevron road marking, cats eyes and reflective posts so that they are visible in night. This way accidents can be avoided. If possible, they should be shifted to the edge making sure their life & growth is not hampered.

Provision of Sculpture, opengym equipment and bollard wherever required as per the ground level condition of fathabad road.

4.6.1.8 Healthcare kiosks

Health kiosks are interactive device designed for self-service check-in and collection of patient's health report. Kiosk interacts through touchscreen that does not require any expertise to navigate. It is a tool for providing patients health condition and monitors them between doctor visits. The independent,



Figure 37:Healthcare Kiosk

unassisted collection of information is clinically useful with a patient identifier. The health kiosk shall monitor and measures different physiological parameters of the body such as blood pressure, heart-rate, body-temperature and blood sugar level will be continuously transmitted through wireless technology. All the parameters are monitored using PC via WSN protocol and also updated in server (IoT). The patient can therefore approach with the results about his/her physiological parameters to the doctors and also with a suggestive prescription for necessary discussion. Welcoming this

application for the improvement of advanced check-up procedure comforts the limitation to make use of regular device for experimenting telemedicine. This healthcare kiosk project will be implemented as different tender.

Common biometrics can be measured through a health kiosk

- Weight
- BMI (with self-entered height)
- Body fat percentage
- Blood pressure (systolic and diastolic)
- Upload of glucose measurements (via USB-enabled glucometer)
- Upload of fitness and activity information from activity monitors/pedometers
- Kiosks can be interactive and display health education information or participant-specific information from trackers. Typically, if a user's biometrics are out of normal range, a recommended action is displayed. Industry leading vendors will then take the data recorded, upload it to the individual's Personal Health Record (PHR) and Health Assessment, and use it as a way to identify at-risk members for outreach to offer them lifestyle risk modification programs.

Here We proposed three option of smart healthcare kiosk. Out of these three options will go for the best economical and quality option based upon the community of the citizens. Options are smart health care kiosk look like ATM machine, Healthcare kiosk with medicine vending machine, cubical first aid kiosk for community centers as well as at different locations.

4.6.1.9 Drinking water kiosk

Drinking water kiosk will be provided at major attraction places like malls,towards Taj east gate road and major tourist footfall at particular location.



Figure 38: Drinking Water Kiosk

4.7 Existing and proposed sections for Vibhav nagar

4.7.1 Shyamlal Marg and Gobarchowki Road

This stretch covers residential building and commercial land use with some existing encroachment. Satellite image from P-P section to N-N section available in map and proposal for this stretch shown in section manner detailed plan available in drawings for this stretch.

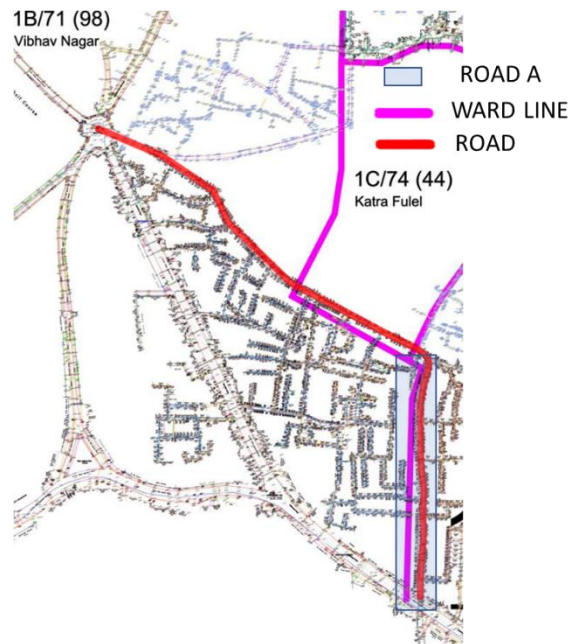


Figure 39: Minor Road; Survey Drawing Of Ward 1b/71 (98) Vibhav Nagar.

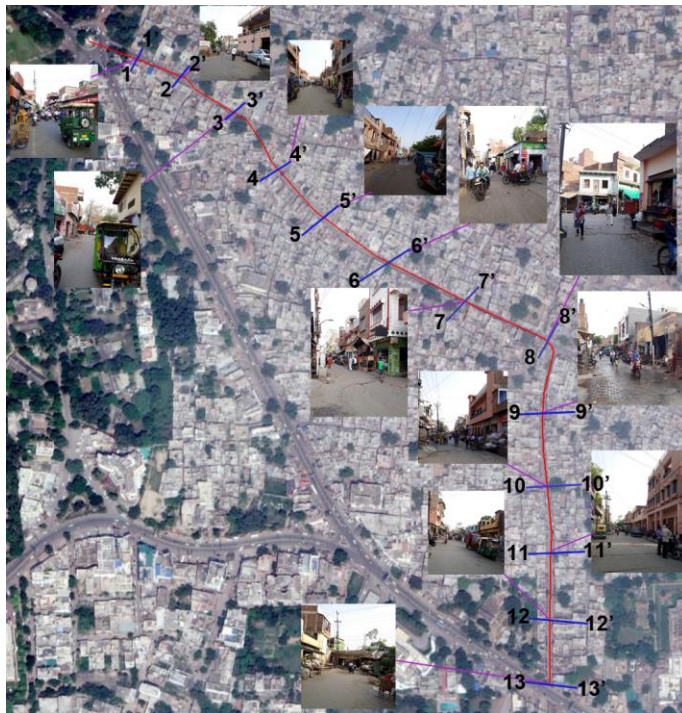


Figure 40: Minor Road; Shyamlal Marg With Section Lines (Google Image)

This 1.07km road divided in to two part called as Shyamal marg and gobarchowki road.

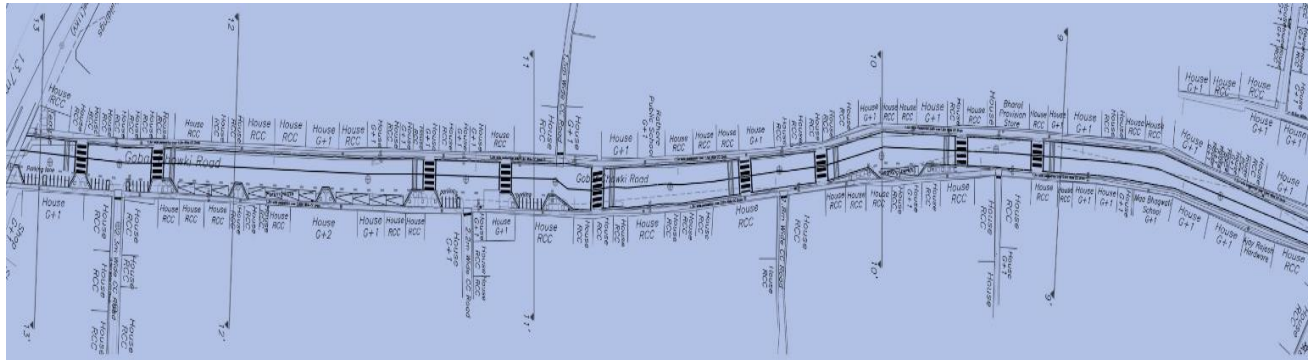


Figure 41: Survey drawing of Gobar chowki road

4.7.1.1 A detailed proposal for Shyamal Marg and Gobarchowki Road

In this stretch majorly provide Storm water drain, Utility duct, and pedestrian path. Every section shows different types of facilities and detailed plan available in drawings.

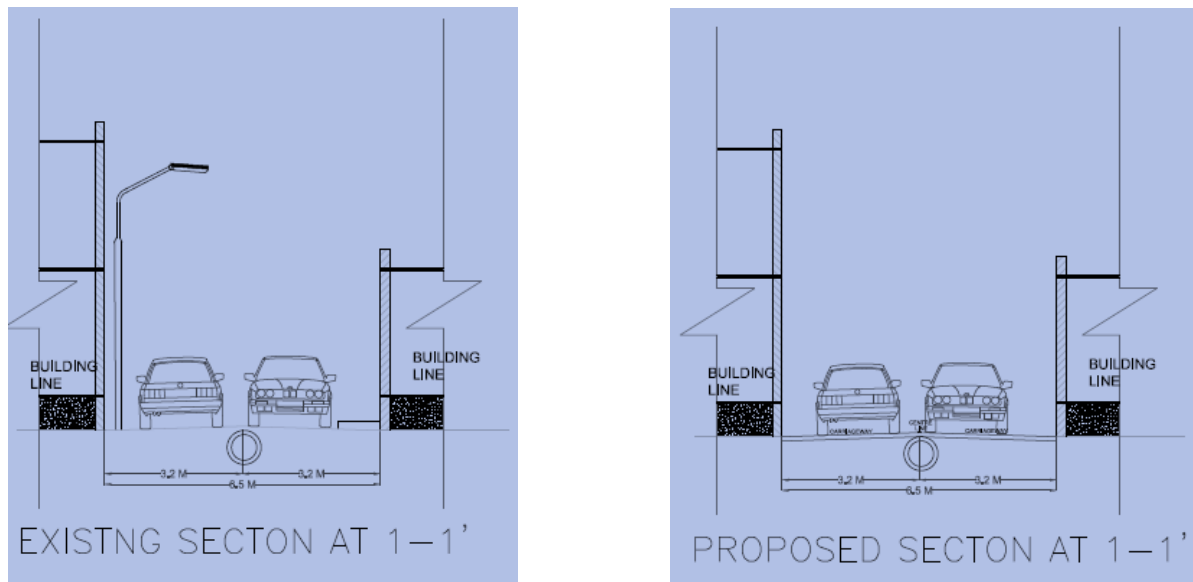


Figure 42: Section 1-1 at Gobar chowki Road

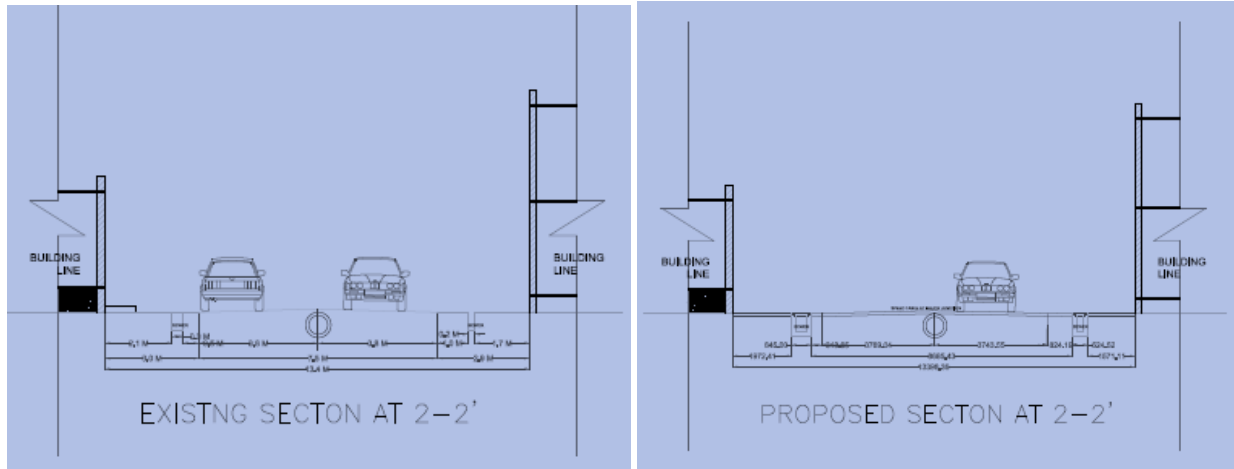


Figure 43: Section 2-2 at Gobar chowki road



Figure 44: Before after for section 1-1 and 2-2

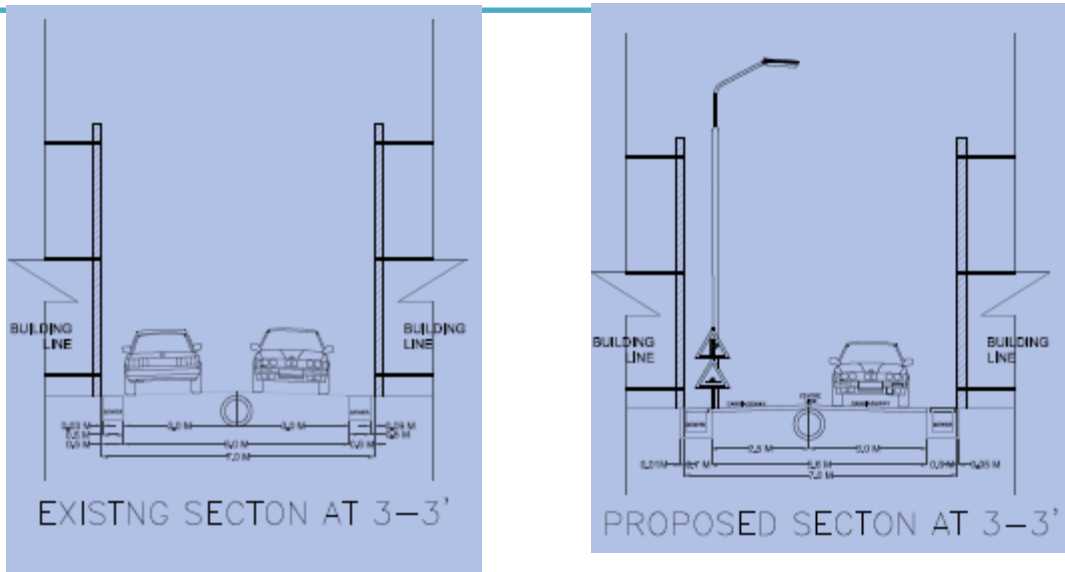


Figure 45: Section 3-3 at Goberchowki road



Figure 46: Before after at Section 3-3

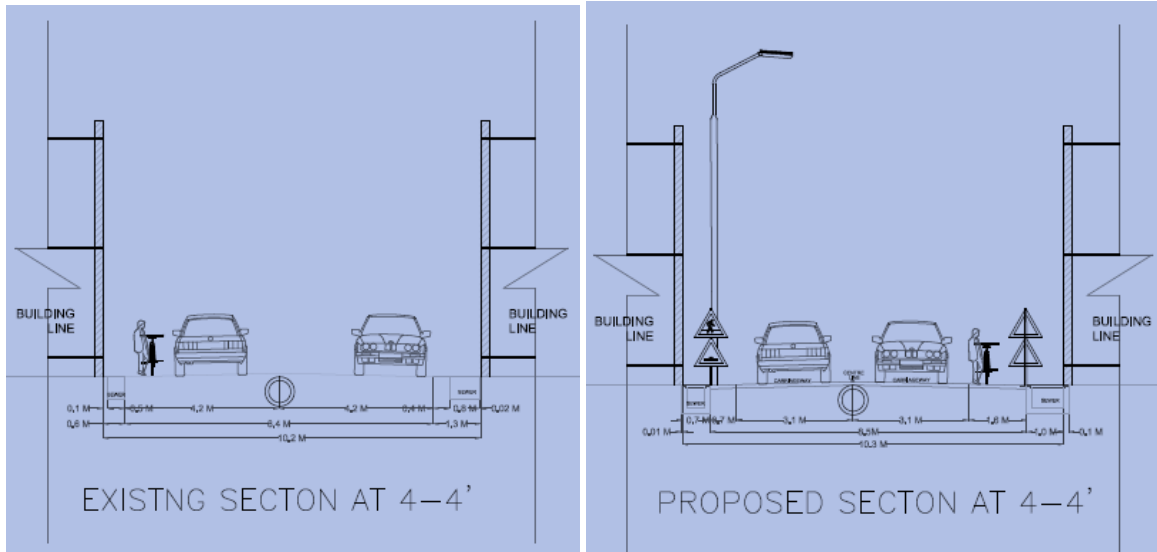


Figure 47:Section 4-4 at Gober chowki

Other detailed section of all vibhav nagar roads attached in drawings

4.8 Minor Roads in Katra Fullel

AREA: 2,95,164 SQ.M./ 73 ACRES

POPULATION: 15,000

RAINFALL: 660 MM. per season

LITERACY RATE: 40%

DEMOGRAPHICS: 48% FEMALE/ 52% MALE

LOCALITIES OF KATRA FULEL WARD

- | | | |
|-------------------------|--------------------------|------------------------|
| 1. KATRA FULEL | 13. DALIHAI | 25. GALLA MANDI |
| 2. KATRA JOGIDAS | 14. GURIHAI | 26. BABA GAFUR GALI |
| 3. KATRA DESHAM | 15. CHOWK THANA | 27. NURPUR |
| 4. KATRA UMAR KHAN | 16. CHOWK KAGHZIYAN | 28. SANJAY COLONY |
| 5. RAJIV NAGAR | 17. KASERAT BAZAR | 29. SHEIKH BULAKHI |
| 6. VASUDEV NAGAR | 18. NANDA BAZAR | 30. TULSI SAMAJ |
| 7. KUSHTH ASHRAM | 19. DAFNAI GATE | 31. VALMIKI BASTI |
| 8. DUSSERA GHAT | 20. CHANDAR VAIDHYA GALI | 32. ARYA SAMAJ GALI |
| 9. ASAD GALI | 21. TULSI CHABUTRA | 33. RUI KI MANDI |
| 10. TAJ MAHAL EAST GATE | 22. TILA MATTAMAL | 34. PURANI SABZI MANDI |
| 11. HANUMAN CHOWK | 23. MATKE WALI GALI | 35. SEVARAM GALI |
| 12. MADARSA DAFNAI | 24. NUNIYAYI | |

Figure 48:Localities of Katra Fullel wards

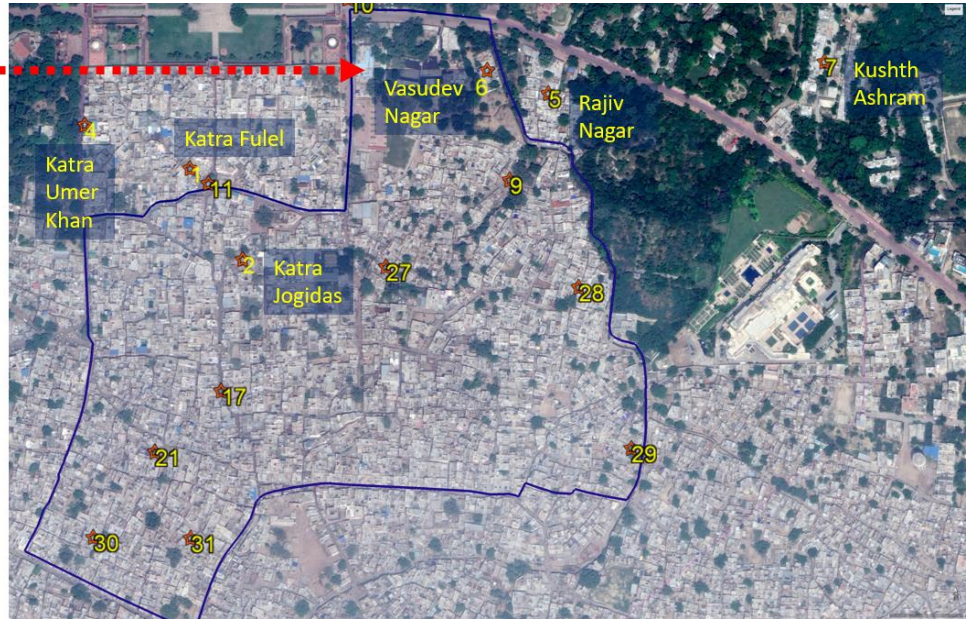
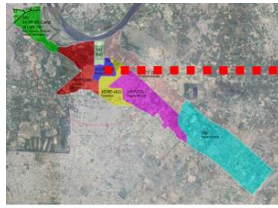


Figure 49:Katra füllel Ward

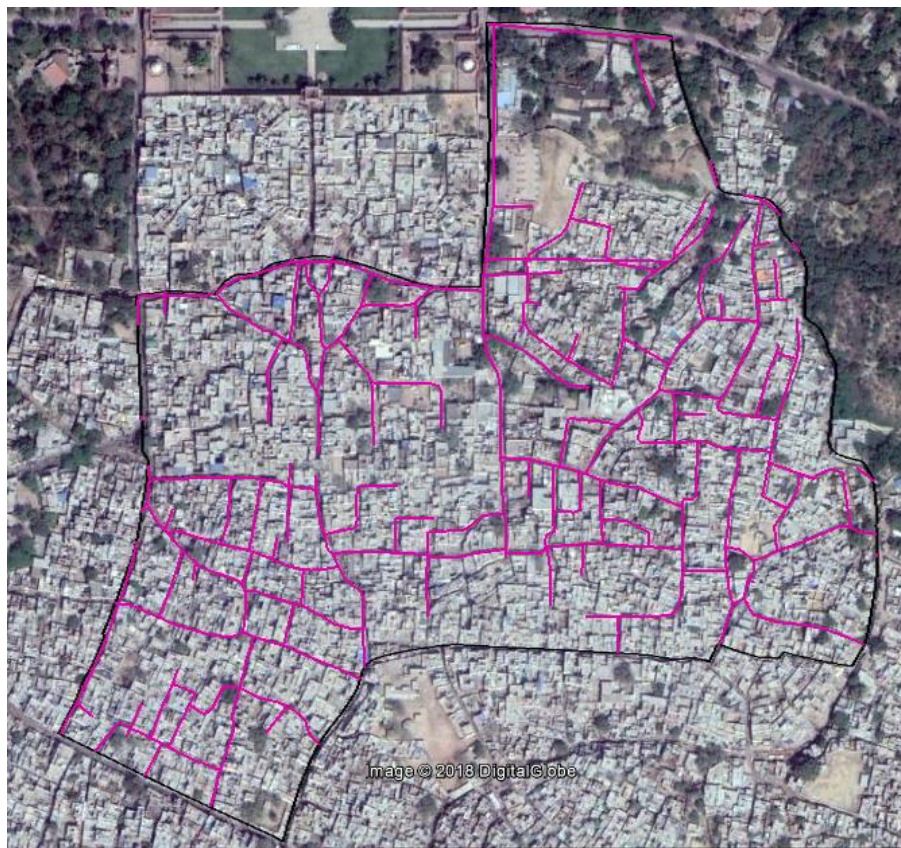


Figure 50:Minor roads of Katra füllel

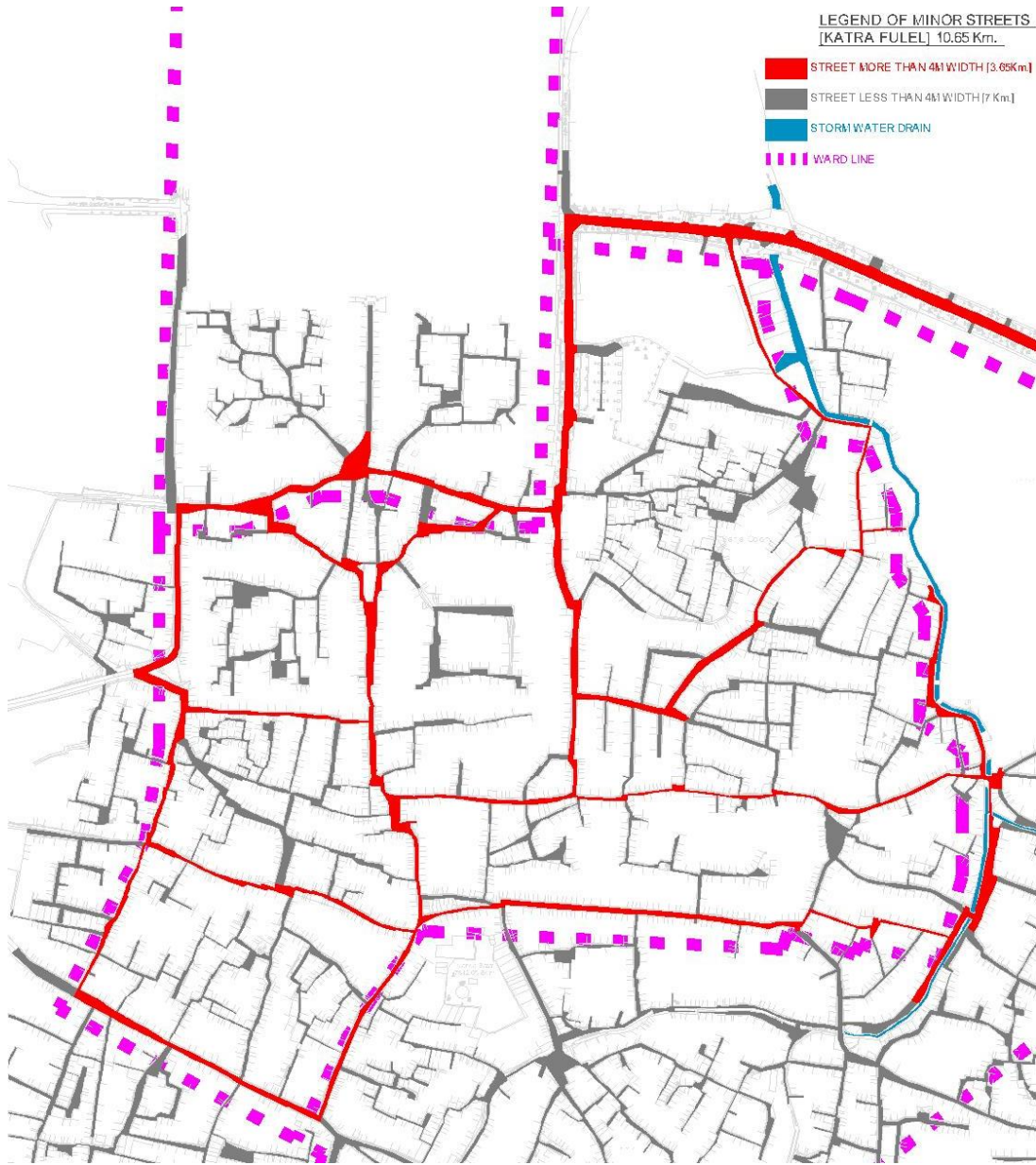


Figure 51: Master Plan: Minor roads of Katra fullel Ward

Total 25km minor roads covers in katra fullel ward

4.9 Challenges and issues at katra Fullel Ward



Figure 52:Minor Road Diversity: Urban Scape [Nurpur]

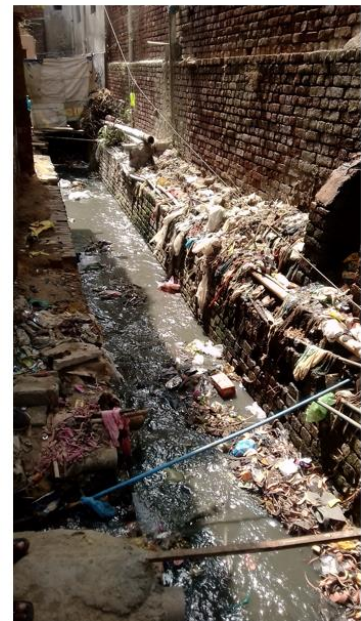


Figure 53:Minor Road Diversity: Urban Scape [Asad Gali]

SWOT Analysis

STRENGTH

- Rich Cultural Heritage
- Proximity to South Gate of Taj Mahal
- Tourist Attraction
- Craft City
- Diverse Urban scape

WEAKNESS

- Lack of Pedestrian Path
- Lack of Public Convenience
- Lack of Covered Drain
- DIRTY
- Lack of Personal Belongingness
- Lack of Infrastructure

OPPORTUNITY

- Making it CLEAN
- FUNCTIONAL SEWERAGE TO BE LAID
- RAIN WATER MANAGEMENT
- Local Ponds to be rejuvenated
- Encouraging Public Convenience
- Creating local Leaders

Threat

- Non-Coordinated Development
- Encouraging Vehicular Development
- Loss of Character due to development
- Increase of Air Pollution due to open drain and littering
- Non-Coordinated Utilities

EXISTING GAPS/ CHALLENGES

1. Manholes present, with no connections to homes or Intermediate Pumping Station Kolhai.
2. Manholes covered with interlocked pavers.
3. Freestanding manholes.
4. Manholes connecting to Nallahs, drains or Taj East Drain.
5. Solid Waste is thrown directly into Taj East Drain by Agra Nagar Nigam workers at Nurpur where the wall is broken.

4.10 Existing and proposed sections for Katra fulel

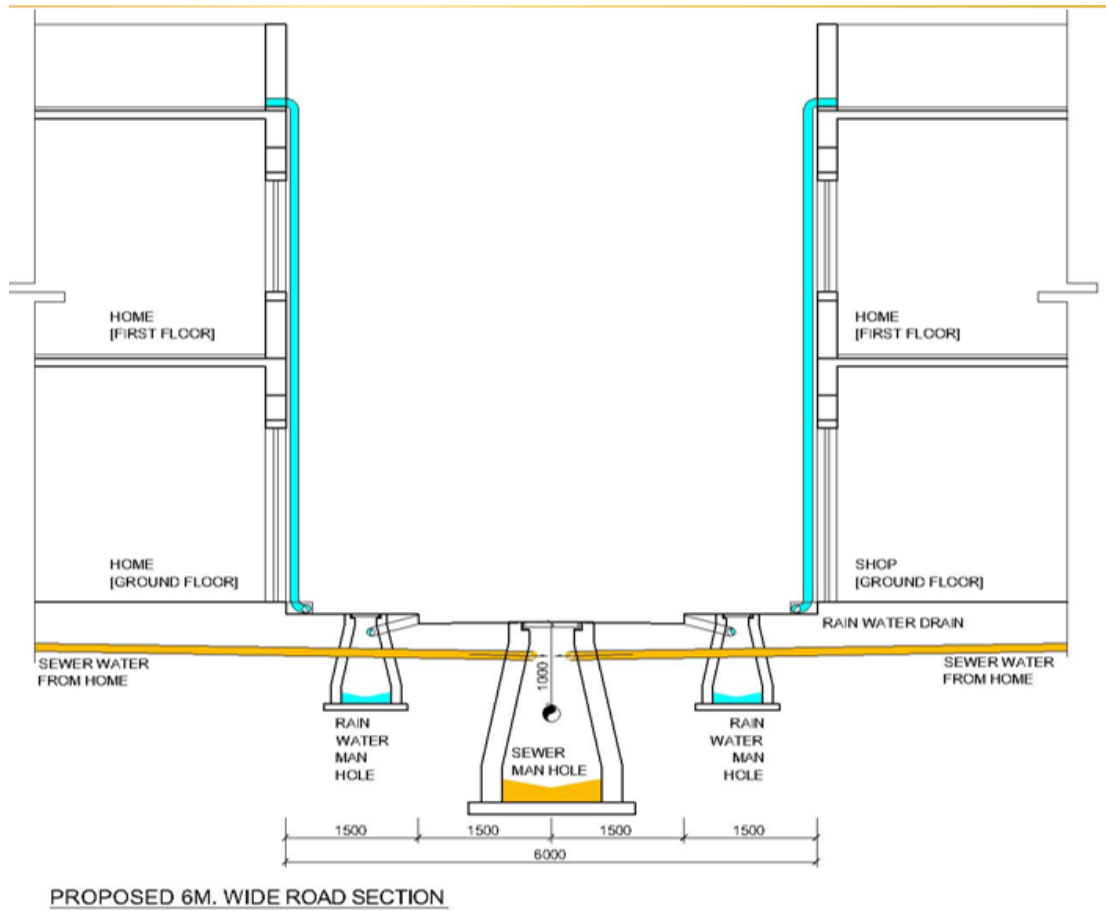
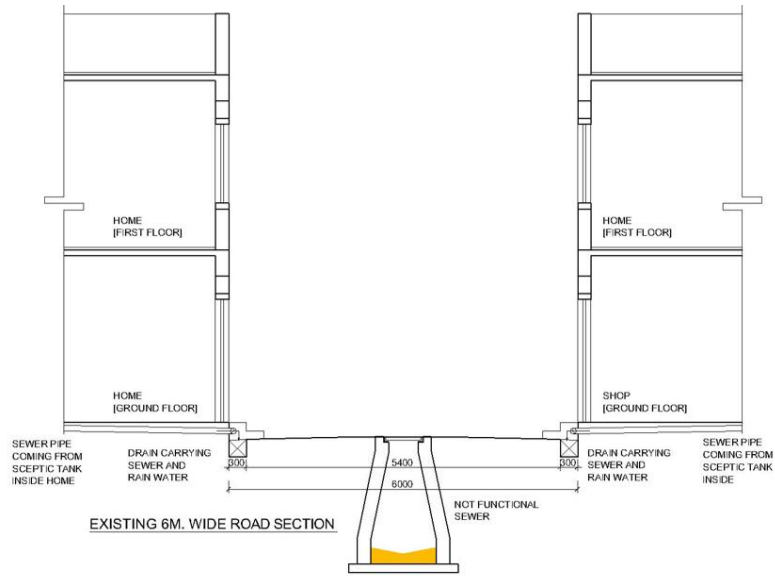
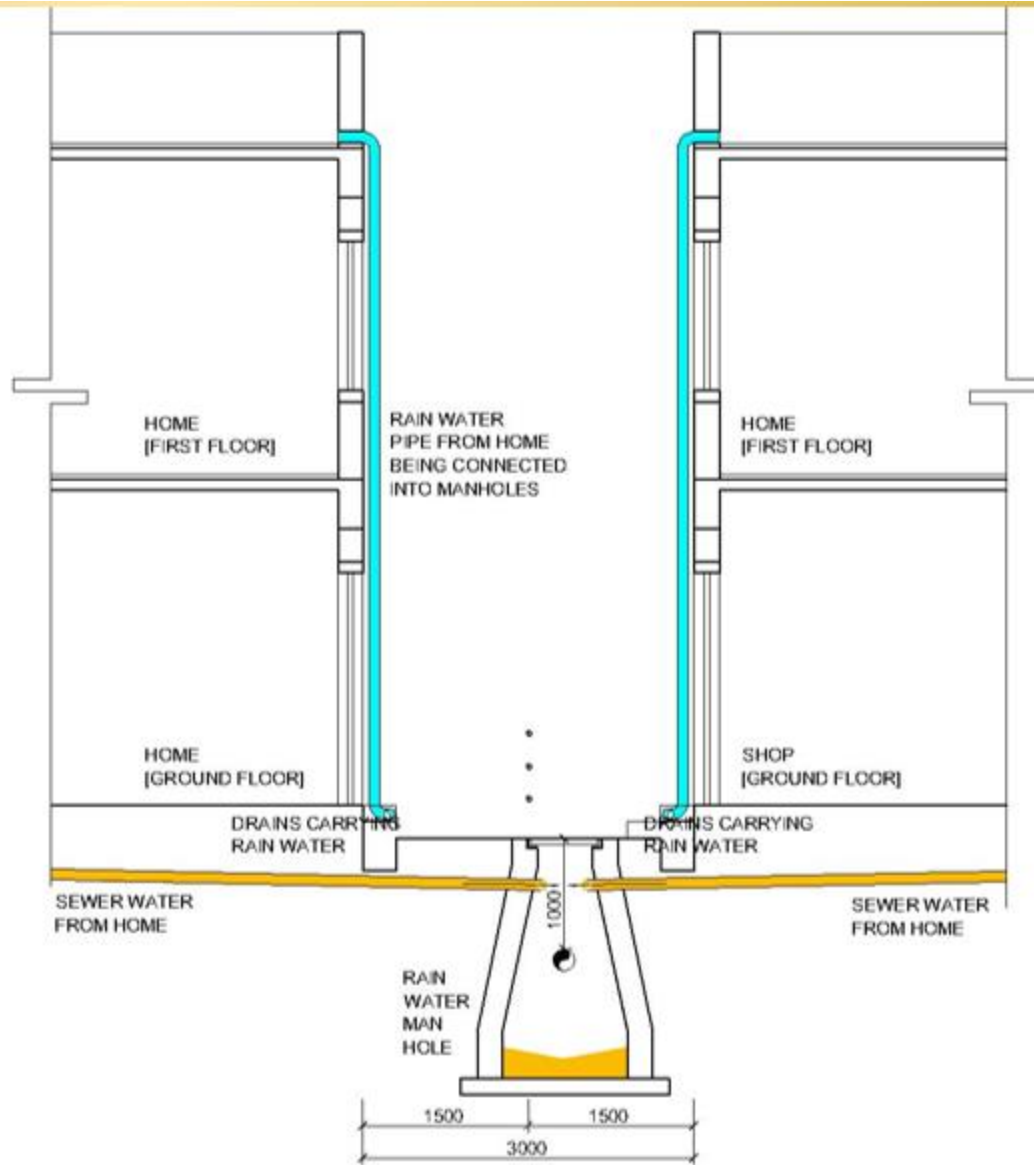


Figure 54:6m Existing and Proposed section



PROPOSED 3M. WIDE ROAD SECTION

Figure 55:3m Proposed section

4.11 The significance of This Proposal

The development of the said ward minor roads will come and ease the movement of the traffic entering, beautification of streets, visual improvements, street furniture for the define city Agra ABD area. Since the ABD area is divided into nine wards details and design of two wards other minor roads design proposal same as this wards which provide, city is visited by a large number of tourists, intrastate population, development of this stretch will help the local commuting needs, better linkages to internal roads which will create value to the adjacent lands and will expand the expansion and development of the city.



4.12 Financial Feasibility

The cost of the project of minor roads project provide by SCM, Agra majorly includes the facilities/ Amenities mentioned above. The amenities/ facilities covered by ASCL would be funded under Smart city fund

Annexures:

All Annexures regarding this Project attached in this report.

Chapter 5. BOQs and Cost Estimates

Attached seperatly

Drawings

Attached Separatly



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