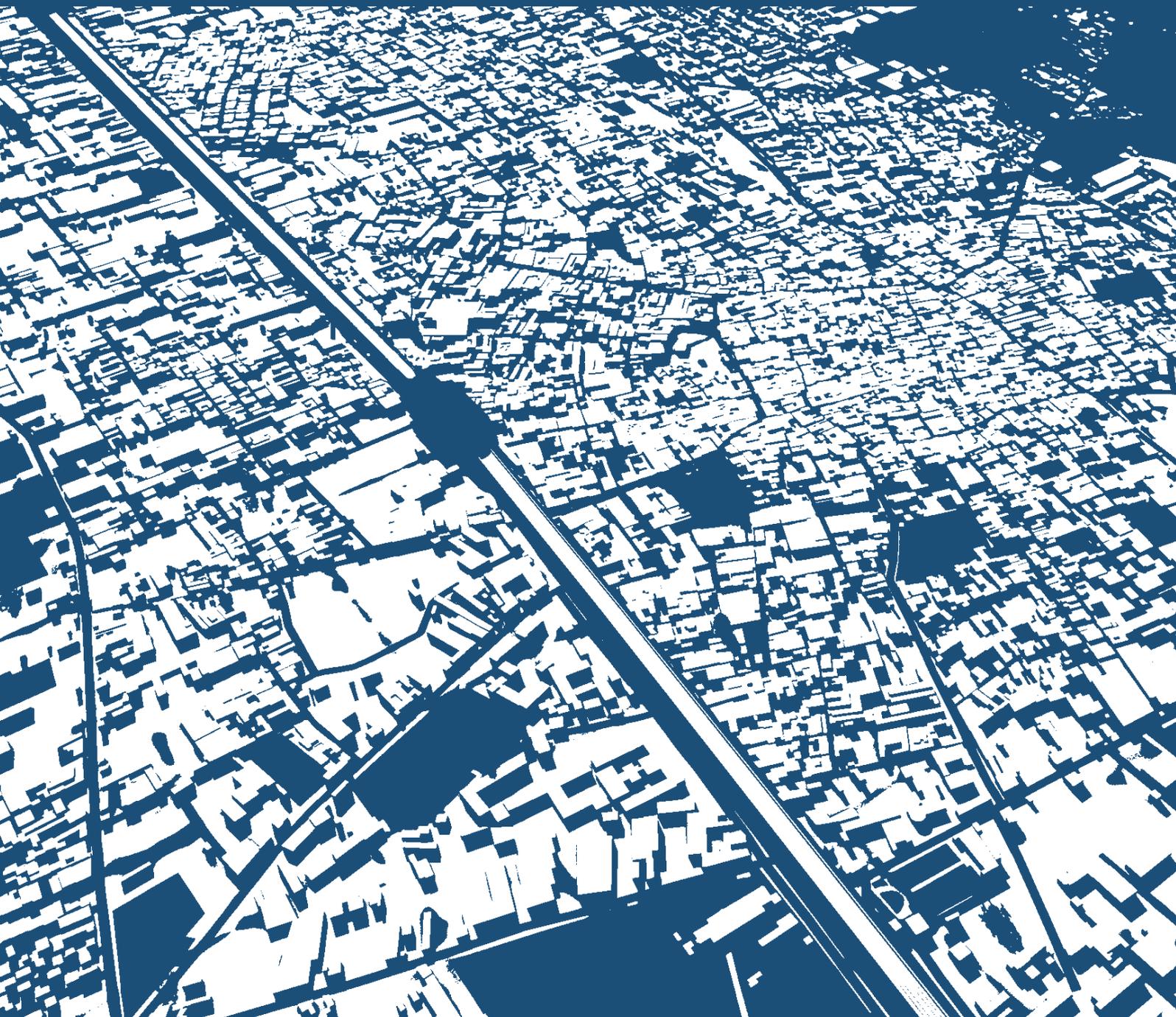




CITY LEVEL PROJECTS

# TRANSIT ORIENTED DEVELOPMENT

Along Rohtak Road (NH-10)





## Delhi Urban Art Commission

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## Acknowledgements

It is said that for an artist to join establishment is a kiss of death. I was fully aware of this aphorism when the Minister of Urban Development, Mr. Kamal Nath, asked me to be the Chairman of the Delhi Urban Art Commission. I had three conditions before accepting the assignment and one of these was that DUAC should be allowed to carry out site specific studies for improving slums and unauthorized colonies. Subsequently, the Minister along with the then Lieutenant Governor of Delhi, Mr. Tejendra Khanna, and Secretary, Ministry of Urban Development, Dr. Sudhir Krishna, approved the proposal to carry out three dimensional studies for improving slums and unauthorized colonies. I am grateful for their support.

I would like to thank other members of the Commission, Eric P.Mall, Satish Khanna, Sonali Bhagwati and D. Diptivilasa for helping to make success of problematic urban design exercises and charting new paths.

I take this opportunity to thank senior consultants, architects, urbanists and planners as well as younger colleagues who have been working full time. DUAC Secretary, Vinod Kumar, and other permanent staff have enthusiastically supported us and guided us through government procedures. Many thanks to all of them.

### Raj Rewal

Chairman

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Delhi Metro Rail Corporation  
Delhi Urban Shelter Improvement Board  
BSES Rajdhani Power Limited  
BSES Yamuna Power Limited  
RWA's and Area Councillors

## Preface

Half of Delhi lives in ramshackle slums and shabby unauthorized colonies. This state of affairs is a serious blot on the face of the city which has great historical monuments and aspires to be a world class city. The centre of New Delhi is lined with leafy trees and can boast of superb example of contemporary architecture but its growth under exploding population has disintegrated into shanty towns.

My first memory of Delhi is that of a child going in a tonga from the railway station to our government quarter in New Delhi around a square which became our home for several years. The squares were built near Birla temple and when my father was promoted in the government hierarchy, he was offered an independent house with a larger area but my mother refused to move as she had developed kinship with families around the square. This was my first lesson in neighbourhood "mohalla" as an urban phenomenon.

In fact the word 'urb' in Latin stands for neighbourhood space. It was a period when Connaught Place was the leisurely centre for social, shopping and cultural activities and the Old Delhi was lively and still gracious, dominated by Jama Masjid and Red Fort. Delhi's monuments like Humayun's Tomb, Qutab Minar and Lodhi Garden were favourite places for picnics.

Seventy years have passed since the tonga ride, Delhi has dramatically changed as the population of Delhi has exploded from under a million before partition in 1947 to about twenty million today.

As a Professor in the School of Planning and Architecture in Delhi, I had ample scope of studying typology of Indian cities which helped me to design Asian Games Village in my mid-career around 1980 as a series of clusters (mohalla neighbourhood) woven around pedestrian pathways, segregated from road networks. This was a low rise high density housing built within the framework of 150 FAR (FSI 1.5).

Delhi has changed even more drastically during the last thirty years since the Asian Games Village was built, but the idea of a city as a series of sympathetic, humane interconnected neighbourhood building blocks interspersed with social, cultural and educational facilities has remained embedded in my mind.

Delhi Urban Art Commission was established to preserve, develop and maintain the aesthetic quality of urban and environmental design within Delhi. During the last 40 years of its existence, DUAC has not received any three dimensional exercises which visualizes neighbourhoods, wards etc. The emphasis has often been only appraising individual

buildings and complexes submitted through local municipal agencies. After taking over the direction of DUAC in 2011, members of the Commission arranged meetings with wide spectrum of advisors and formulated principles on which a building can be automatically and speedily approved and decided to take over the job of visualization and three dimensional planning for various aspects of the site specific designs which need to be urgently developed if Delhi has to maintain standard as a world capital city.

A large part of Delhi lives in unauthorized colonies and slums and even the Master Plan of Delhi had suggested a detailed design proposal to augment the Master Plan based on ground realities.

In order to fulfil the requirements of neighbourhoods, wards, the DUAC has undertaken a few pilot projects which can be eventually developed in a manner that the local municipal agencies can implement them. In order to carry out these studies, DUAC developed in its own office a core group of architects and urban planners. This was done on the basis of DUAC mandate that "the Commission may suo motu promote and secure the development, re-development of which no proposals in that behalf have been received from any local body".

The studies involve the visual tools for ground studies combined with extra assistance of Google images. It is hoped that the proposals and their conclusions would be evolved to such an extent that a process can be worked out with the resident welfare associations to make meaningful designs for the neighbourhood upgradation for the different kind of wards.

The DUAC's site specific designs are the seeds which can grow and it is hoped that economic principles would be evolved to implement the meaningful neighbourhood upgradation for the different kind of slums and wards. India cannot remain shabby and ramshackle forever and solutions have to be found for shanty towns.



**Raj Rewal**  
Chairman, DUAC

January 2014

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## Summary

Indian cities were always planned with a sense of finding all uses within a walkable distance, creating neighbourhoods close to each other within a distance of 10 -15 minutes, distances which made the place more interactive and lively during the day as well as at the night. This further helped in preserving natural resources for the future generation by creating compact footprints and compact family sizes.

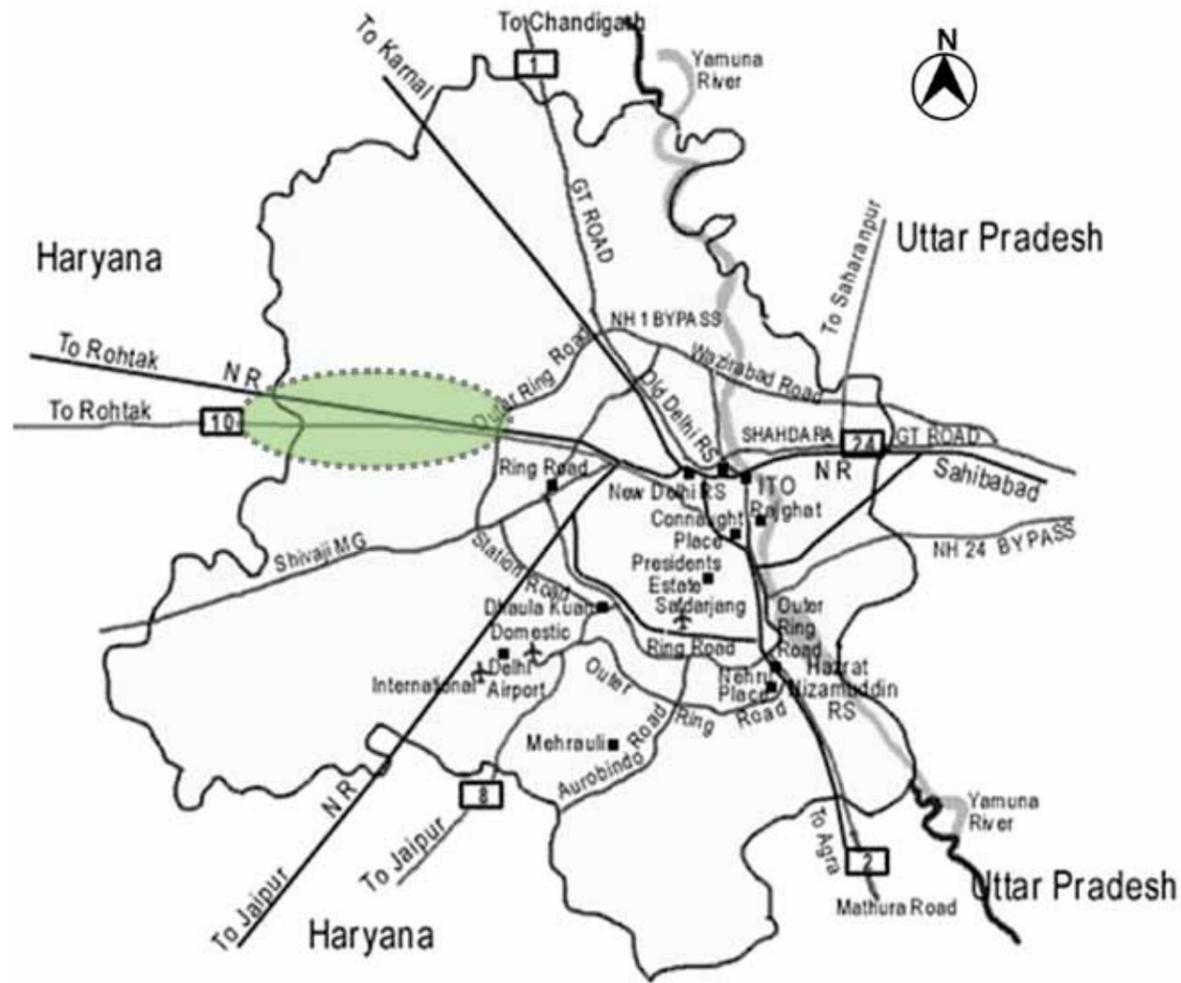
The extensive push and pull of urban growth has led to the migration of people from villages to urban areas in need to fulfil their needs and aspirations for better future due to this migration of people and families from villages to urban centres. Due to this extensive pressure the cities were forced to swell and expand to accommodate more and more people. Due to high land values the people are forced to live on the fringes of the city and commute daily for a longer distance to earn their daily needs, which further leads to a haphazard development and uneven distribution of densities. This uneven distribution makes some areas dark and dingy during different hours of the day which leads to illegal and criminal activities.

Later with the addition of Metro as a mode of mass transit for the the city dwellers half of the trip generated are underutilized due to uneven development around these mass transit corridors, which puts an extra pressure on one end during the morning hours and in the evening on the other end of the mass transit.

To overcome such defficiencies there is a need to restructure the city through enhancement of public transport with proper structuring of roads and urban form along the Metro stations through an hierachical development, which could reduce the use of private transport as a mode of comuting, and workplace and home could be approached through a walkable or a cycle-able distance which could help in controlling the sprawl of urban areas and further could help in preserving land as a commodity and other natural resources for the future generations.

### 1.1 Introduction

The site identified falls in a strategic location acting as a transition area, with Rohtak railway line and the National Highway-10 sitting in a very close proximity to each other connecting the capital to the NCR region and the western part of the country by the means of rail and road from the western end of the capital which, further connects the city of Delhi to the NCR region to Bahadurgarh, Haryana, by another layer of transit through an elevated route over the National Highway as a part of mass transit proposed by the Master Plan of Delhi-2021. The line will be completed by the year 2016 as part of Ph-IV & Ph-III execution plan of DMRC out of which seven station through a length of 7.5 km has already been implemented in Ph-III & are functional, whereas six new stations, adding a length of 8 km, will be added as a part of Ph-IV which will connect the capital to NCR as a third connection to the west of the city.

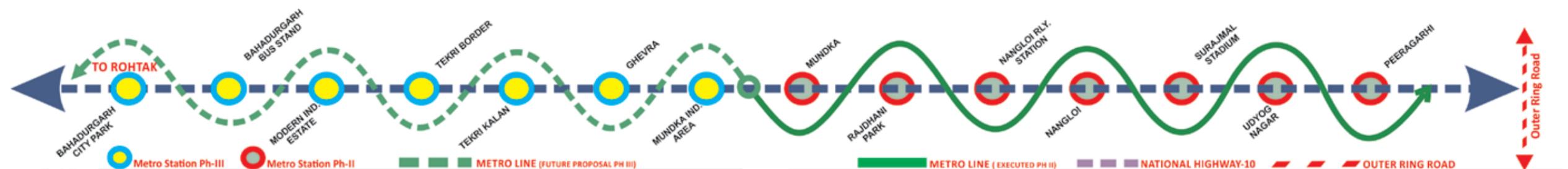


Location of site on the map of Delhi

S. No.	Ward Number	Wards Name	Ward Population
1	30	Mundka	50311
2	31	Nangloi Jat West	56397
3	32	Nilothi	49964
4	35	Kirari Suleman Nagar	52973
5	36	Prem Nagar	52444
6	40	Sultan Puri South	40739
7	42	Peragarhi	45714
8	43	Nangloi East	50150
9	46	Mangolpuri East	55730
10	48	Mangolpuri West	50413

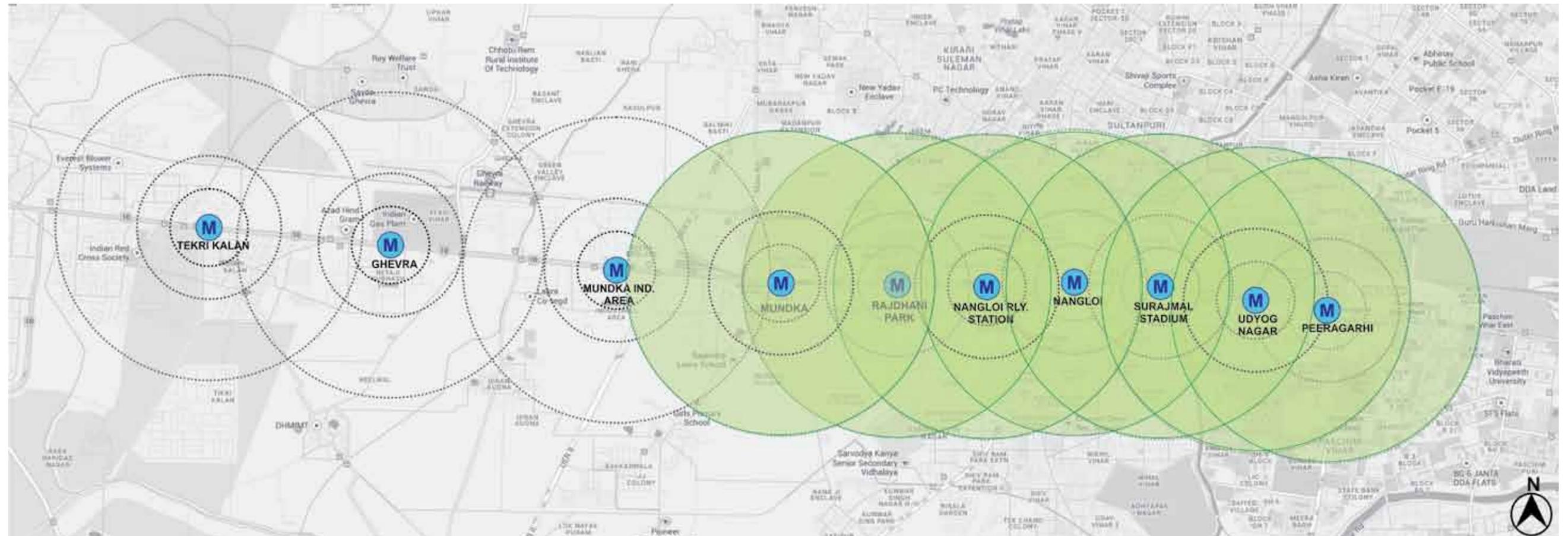
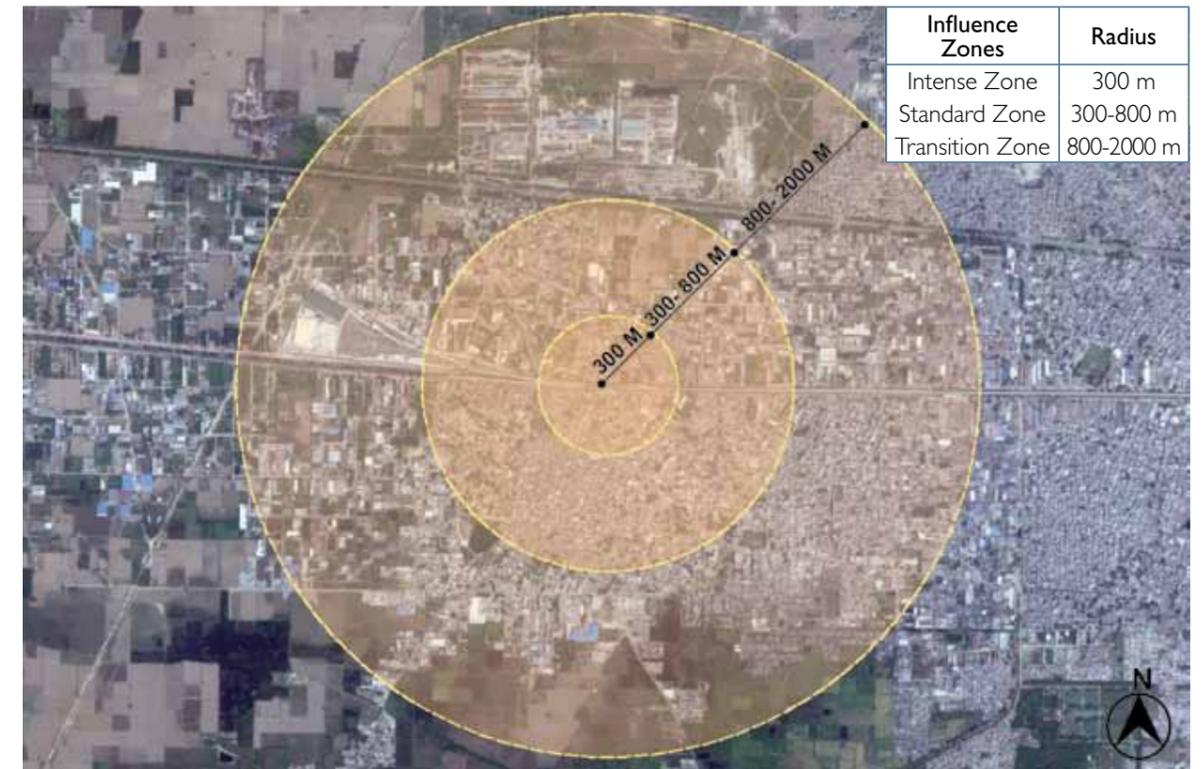
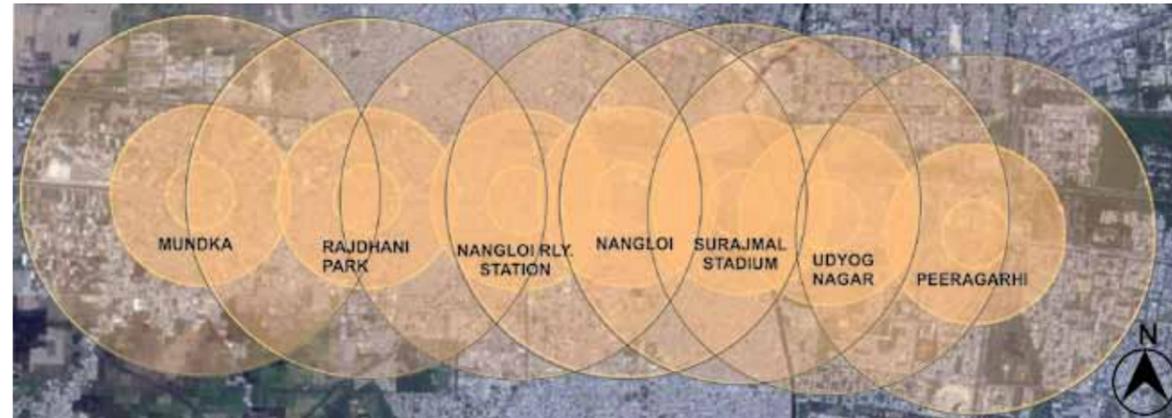


Location of site on Ward map of Delhi



TOD Influence Zones earmarked from the centre of the metro stations ranging from 3-15 minutes of walking distance. These zones are planned to maximize the use of public transport by creating connections between the areas surrounding to the MRTS by providing walkable routes shaded by trees and under covered colonnades with cycle tracks running parallel to the built form with ancillary facilities like cycle stands, public toilets, auto-rickshaw/taxi stands, proper shaded areas, disabled friendly pathways etc.

Intense TOD Zone	Standard TOD Zone	TOD Transition Zone
300m radius is the influence zone.	Zone between 300 - 800 m radius is the influence zone which is around 10-minute walk.	2000m radius - 10 min cycling distance influence zone of transit stations.

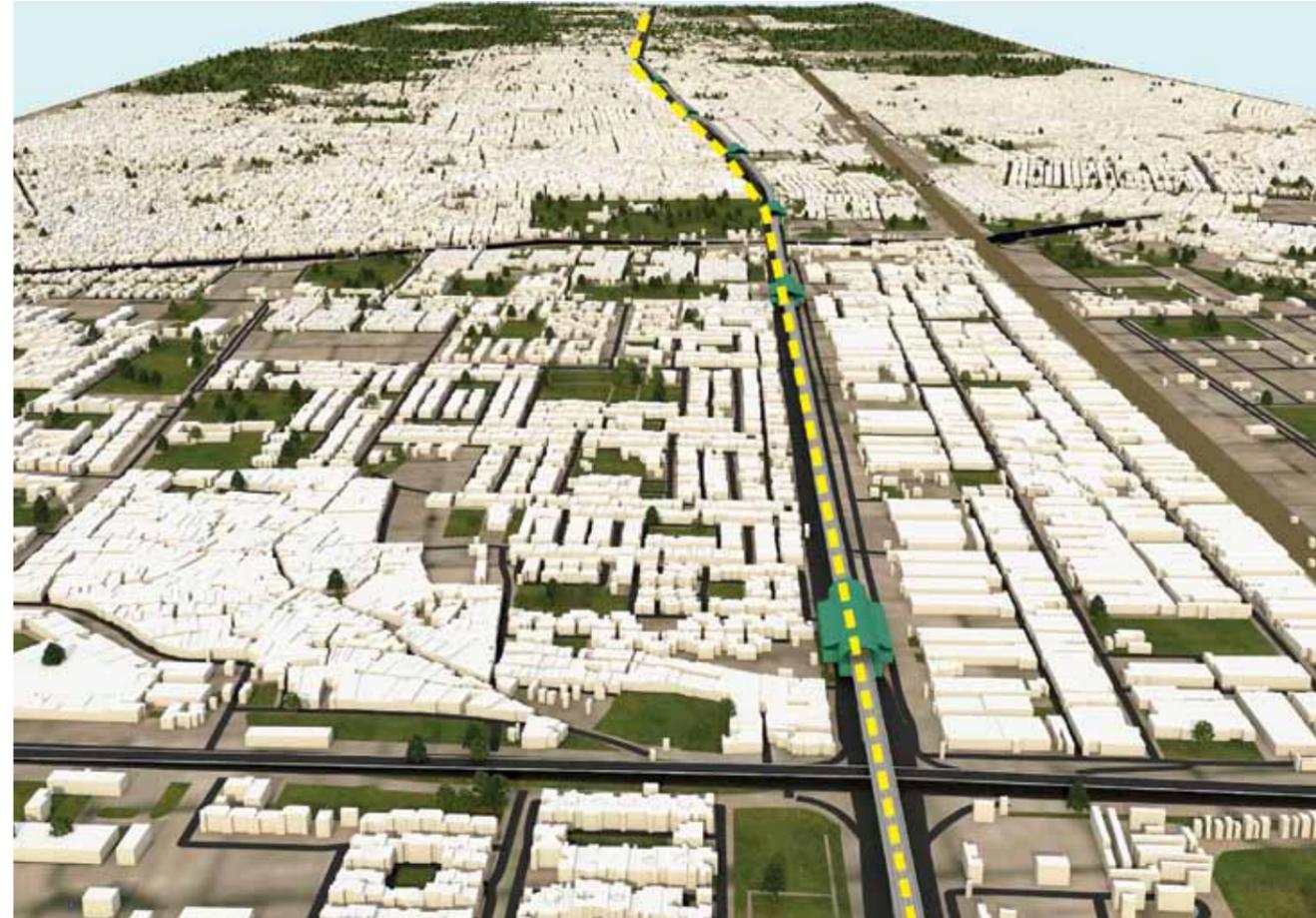


TOD Influence Zone Ph-IV Metro Stations

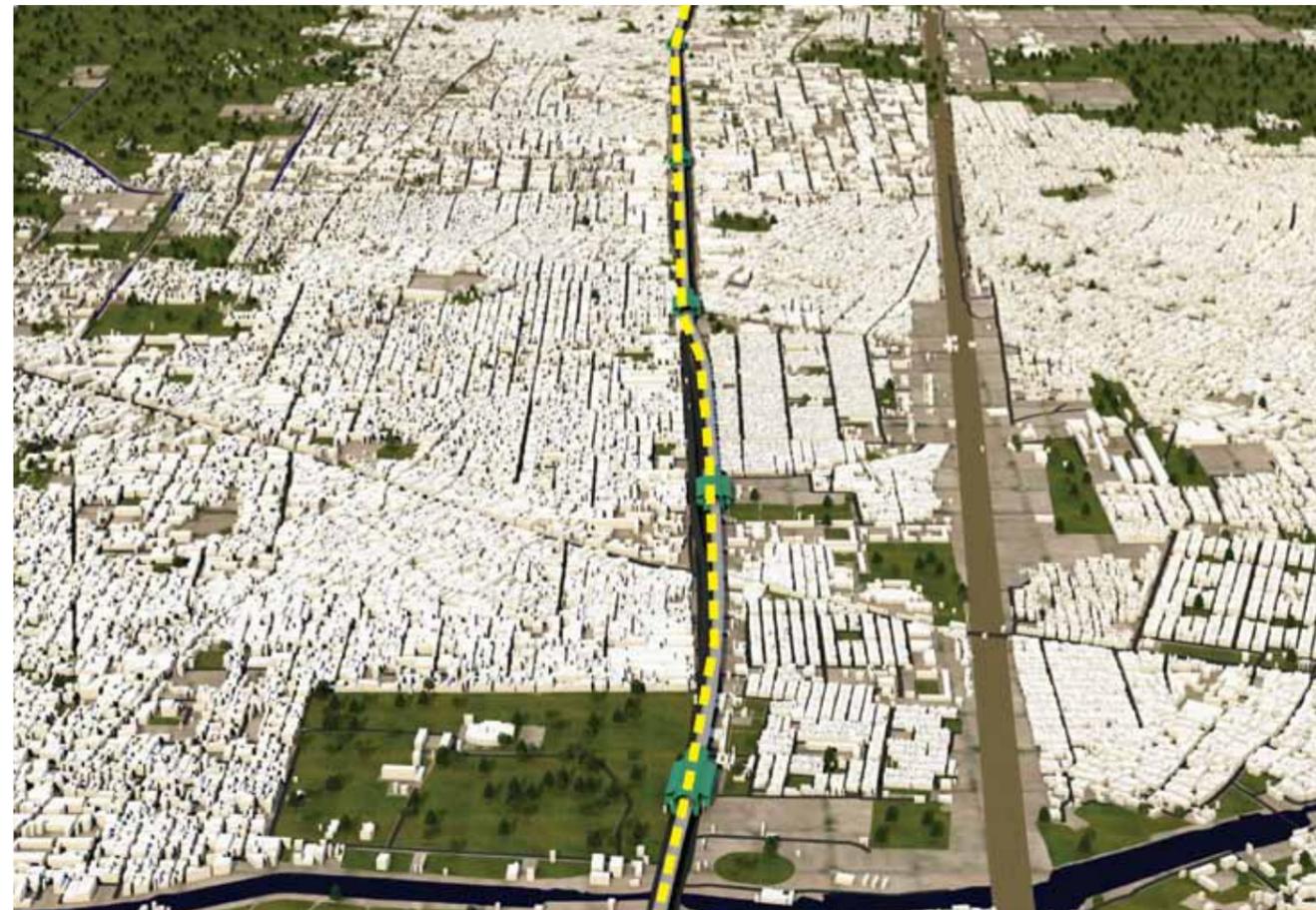
TOD Influence Zone Ph-III Metro Stations (Existing)

Location of Metro Stations

### 3.1 Morphology



### 3.2 Circulation Network

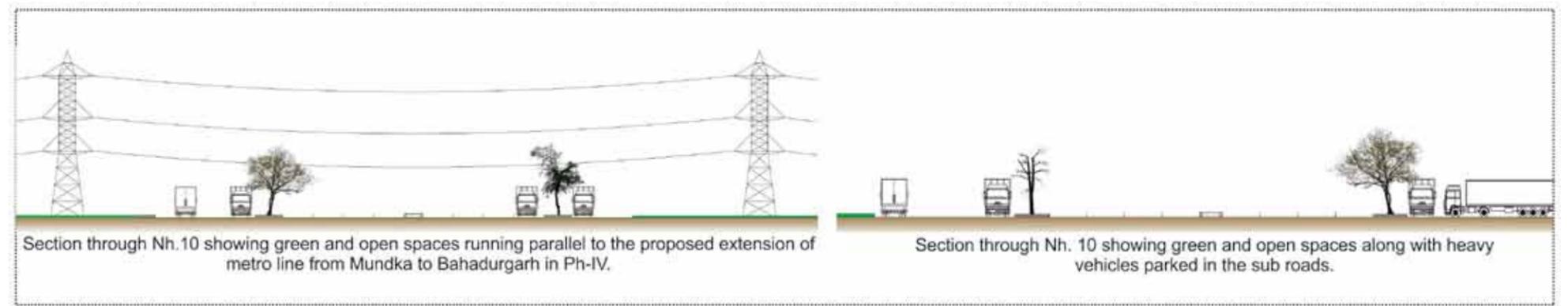


- The site is connected to the rest of the city and NCR through NH-10, which further divides the site along the centerline into two parts acting as the main spine having a ROW of 60- 90 M all along the length, which further meets the Outer Ring Road and makes a junction at one end.
- This National Highway-10 acts as a collector road where all the feeder roads coming from the surrounding areas meet the NH-10 having ROW of 6-18M with an unorganized undefined pattern of movement of pedestrians and vehicles, with all infrastructure facilities like electrical lines, water supply and sewage running parallel to these neighbourhood roads.
- The pattern of the streets could be visualized as organic in villages and slums all along where the streets are meeting the Highway at an angle, whereas the strict grid iron pattern could be seen as followed in the new development/ planned and area surrounding them.

### 3.3 Existing Greens



● Marshy Land ● Farm House ● Nursery ● Garden Parks ● Forest Land ● Barren Land ● Cultivation Land



Section through Nh. 10 showing green and open spaces running parallel to the proposed extension of metro line from Mundka to Bahadurgarh in Ph-IV.

Section through Nh. 10 showing green and open spaces along with heavy vehicles parked in the sub roads.



- As one moves along the National Highway from Outer Ring Road to the boundary of the city, one can see the changes in the relationship of built to open spaces, which are more organized with trees all along the periphery.
- These spaces are more in the form of gardens and parks but, as one moves out away from the Outer Ring Road the relationship between built and open spaces completely inverts, due to a large extent to the proportional changes of building from walk up structures to ground structures surrounded by agricultural land.



### 4.1 Peera Garhi

**Context:** This station, located near the intersection NH-10 and Outer Ring Road, provides access to the Peera Garhi village from the north side of the village, and to the planned residential colonies developed by DDA. It also provides access to the planned Udyog Nagar to the south.

**Station Configuration:** The station includes a MetroBus transfer loop but no on-site parking.

**Physical Barriers to Development:** The station area includes drop-off lanes for buses and passenger vehicles, but does not include any general parking areas next to the Metro station.

**Regulatory Barriers to Development:** Zoning around the station currently has the ability to support industrial and commercial TOD, but residential and mixed-use TOD would be challenging with zoning regulations

Floor area ratios (FAR) to 1-1.2

#### Development Opportunity

Pros	Cons
Opportunities to reconsider underutilized land.	Lack of ridership.
Potential for residential and commercial uses.	Elevation difference between the rail line and surrounding parcels create physical barriers.



### 4.2 Udyog Nagar Station

**Context:** This station is located next to the Nangloi Bus Depot at a walkable distance which makes this station more accessible for the people from the surrounding areas with industrial development on the north. It has the potential for future development due to the existing potential vacant lands in close proximity.

**Station Configuration:** The station area includes drop-off lanes for buses and passenger vehicles. On-site parking is not provided.

**Physical Barriers to Development:** Access to the surrounding station site is made easy by space for all modes, but due to large width ROW and no crossovers it is difficult to access the two sides of the development.

**Regulatory Barriers to Development:** Zoning around the station site supports industrial and commercial uses, but not residential.

Floor area ratios (FAR) to 0.5- 0.9.

#### Development Opportunity

Pros	Cons
Opportunities to reconsider underutilized land.	Lack of ridership.
Potential for residential and commercial uses.	Elevation difference between the rail line and surrounding parcels create physical barriers.



### 4.3 Surajmal Stadium

**Context:** This station is located adjacent to the Surajmal Stadium on the north and Northern Railways wireless station area to the south. The station is surrounded by unauthorized colonies like Nangloi Jat, Shiv Vihar having warehousing and residential as predominating uses, where as in the north it is further surrounded by JJ colonies housing units with small retail shops. The north contains areas zoned with low to medium density residential.

**Station Configuration:** The station includes a MetroBus transfer loop but no on-site parking.

**Physical Barriers to Development:** There is a sizeable elevation change between the platform area and surrounding parcels located around the MetroLink line.

**Regulatory Barriers to Development:** Zoning around the station site supports industrial and commercial uses, but not residential.

Floor area ratios (FAR) to 0.5- 0.9.

#### Development Opportunity

Pros	Cons
Opportunities to reconsider underutilized land.	Lack of ridership.
Potential for residential and commercial uses.	Elevation difference between the rail line and surrounding parcels create physical barriers.



### 4.4 Nangloi Station

**Context:** This station, located near the intersection of Najafgarh- Nangloi Road & N H-10, is predominately surrounded by residential communities.

**Station Configuration:** The station area includes drop-off lanes for buses and passenger vehicles, but does not include any general parking areas next to the Metro station.

**Physical Barriers to Development:** This station is located next to the flyover; this setting around the Metro station acts as a barrier to the pedestrian friendly development.

**Regulatory Barriers to Development:** Zoning around the station site supports industrial and commercial uses, but not residential.

Floorarea ratios (FAR) to 1- 2.

#### Development Opportunity

Pros	Cons
Opportunities to reconsider underutilized land.	Lack of ridership.
Potential for residential and commercial uses.	Elevation difference between the rail line and surrounding parcels create physical barriers.



### 4.5 Nangloi Railway Station

**Context:** This station, located near the intersection NH-10 and the road which leads to Nangloi Railway station, provides access for the people to both the Metro station and the interstate terminal. The station is surrounded by residential communities and warehouses to the south and north of the Metro station.

**Station Configuration:** There is no designated space for buses and drop-off and transfer loop and no on-site parking.

**Physical Barriers to Development:** There is a sizeable elevation change between the platform area and surrounding parcels located around the Metro line.

**Regulatory Barriers to Development:** Zoning around the station site supports industrial and commercial uses, but not residential.

Floor area ratios (FAR) to 0.5- 1.2.

#### Development Opportunity

Pros	Cons
Opportunities to reconsider underutilized land.	Lack of ridership.
Potential for residential and commercial uses.	Elevation difference between the rail line and surrounding parcels create physical barriers.



### 4.6 Rajdhani Park Station

**Context:** This station serves a mixed development area that includes unplanned hospitals as medical facilities surrounded by shops. With a topology of shops on ground by floor and residential at the upper level, the area comprises large commercial and industrial uses with large godowns as one moves away from the station area.

**Station Configuration:** The station includes a MetroBus transfer loop but no on-site parking.

**Physical Barriers to Development:** There is a sizeable elevation change between the platform area and surrounding parcels located around the MetroLink line.

**Regulatory Barriers to Development:** Zoning around the station site supports industrial and commercial uses, but not residential.

Floor area ratios (FAR) to 0.5- 1.2.

#### Development Opportunity

Pros	Cons
Opportunities to reconsider underutilized land.	Lack of ridership.
Potential for residential and commercial uses.	Elevation difference between the rail line and surrounding parcels create physical barriers.



### 4.7 Mundka Station

**Context:** This station is located at the western end of the existing Metro corridor along the National Highway and is primarily surrounded by industrial uses with some smaller single-storey commercial uses and a considerable amount of residential uses (Mundka village) in surrounding neighborhoods.

**Station Configuration:** The station includes a Metro Bus transfer loop but no on-site parking.

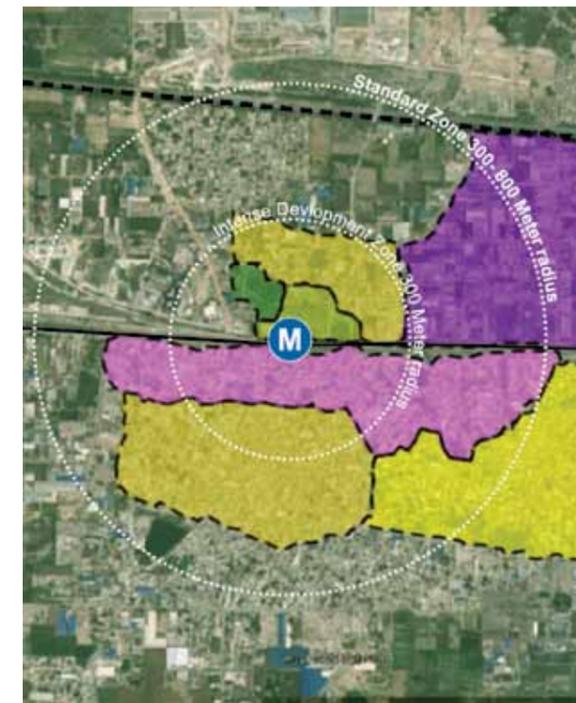
**Physical Barriers to Development:** There is a sizeable elevation change between the platform area and surrounding parcels located around the MetroLink line.

**Regulatory Barriers to Development:** Zoning around the station site supports industrial and commercial uses, but not residential.

Floor area ratios (FAR) to 0.5- 0.9.

#### Development Opportunity

Pros	Cons
Opportunities to reconsider underutilized land.	Lack of ridership.
Potential for residential and commercial uses.	Elevation difference between the rail line and surrounding parcels create physical barriers.





### 5.1 FAR-300

FAR	300
ECS	2 for 100
Plot Size (Block 1)	99246 sq. mtr
Ground Coverage	30%
Total FAR	297738 (11 floors)
Total cars required	5954
Total area under existing greens	10,940 sq. mtr
Podium height	3.6 mtr
Ground Floor Height	6.4 mtr
Typical Floor Height	3.2 mtr
Width of Block	18 mtr
Colonnaded Walkway	4 mtr wide
Walkway under shaded trees	6 mtr wide
Vehicular Entry to the block	Roadevel

Along the length of the site of 14.5 kms, the area surrounding the station ranges from planned residential to unplanned residential developments, from planned manufacturing areas to unplanned hazardous industries, from small to large open areas and farmlands and agricultural fields with varying FARs from 0.3 to 1.5 and densities from 60 pph to 160 pph. The station areas along the stretch have the potential to act as a node for the surrounding areas with walkable and cycleable tracks which can further discourage the use of private vehicles with compact and higher densities as existing on site. For detail elaboration of design, two stations (Mundka & Rajdhani Park) have been identified from the existing site because of the setting, existing street network and potential sites around these two Metro stations.



Image shows the existing fabric between the two stations

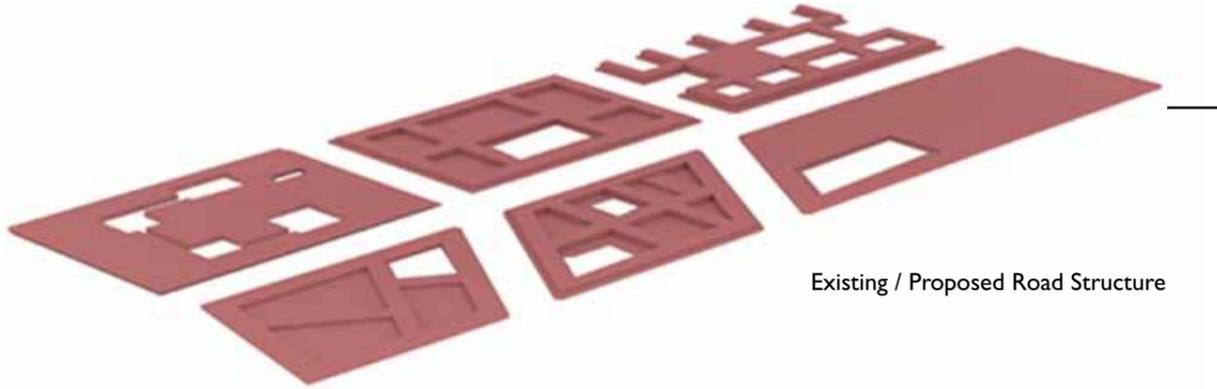
— — — — Intense Development Zone      ○ Metro Stations



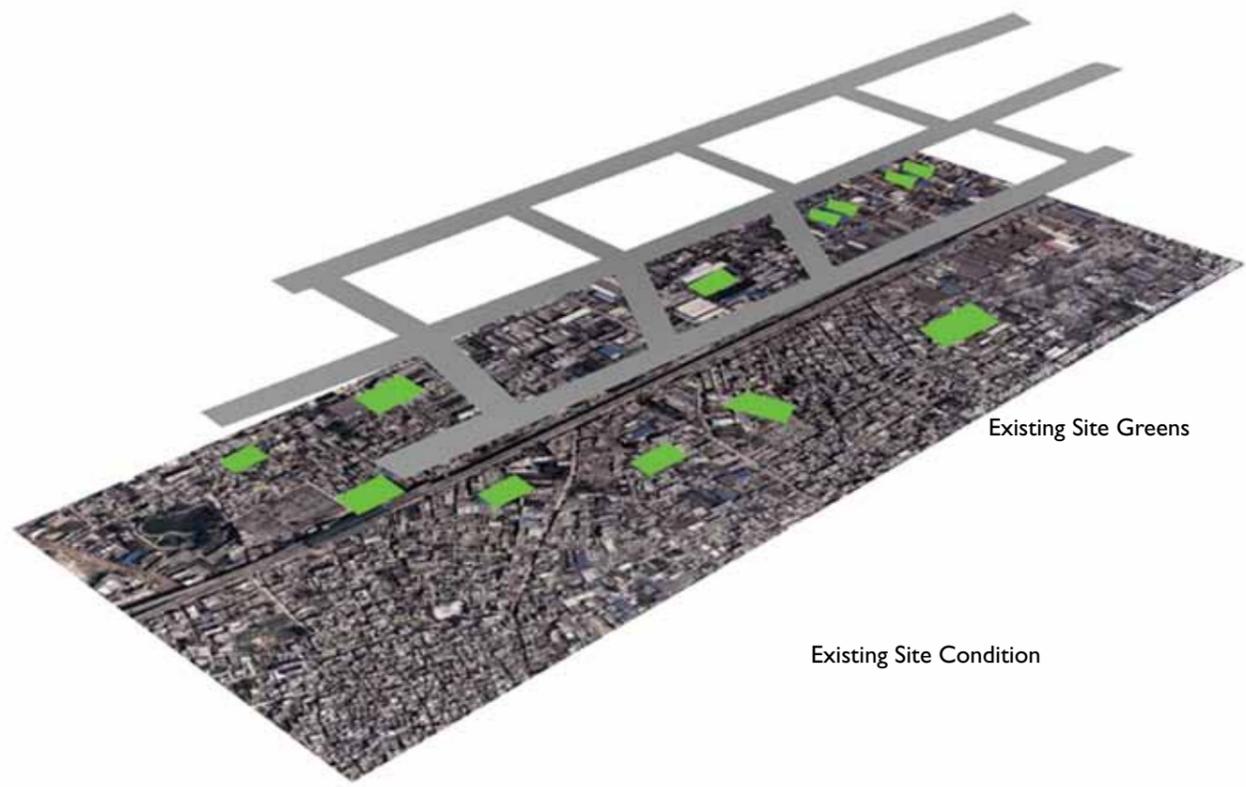
Section at AA'(showing the Reserved Greens with large trees)



Proposed Built form / Plot Lines



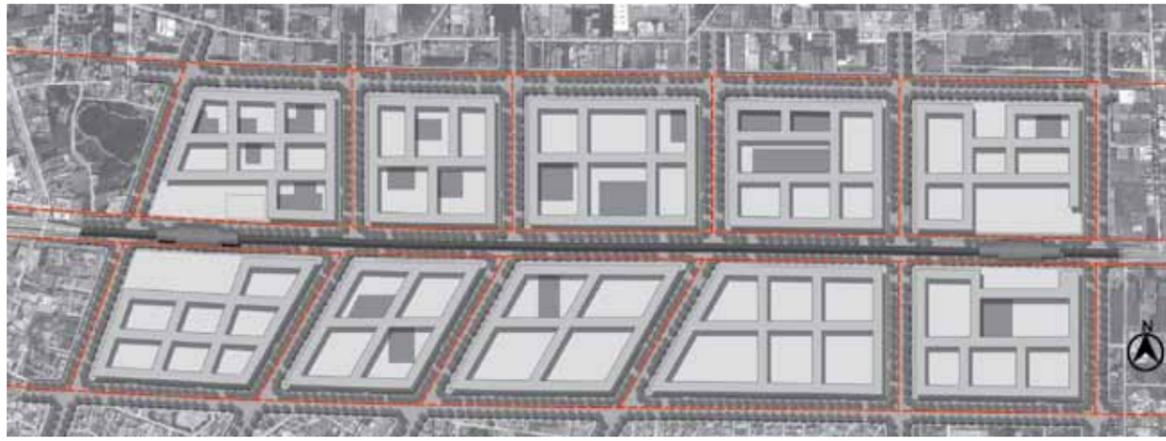
Existing / Proposed Road Structure



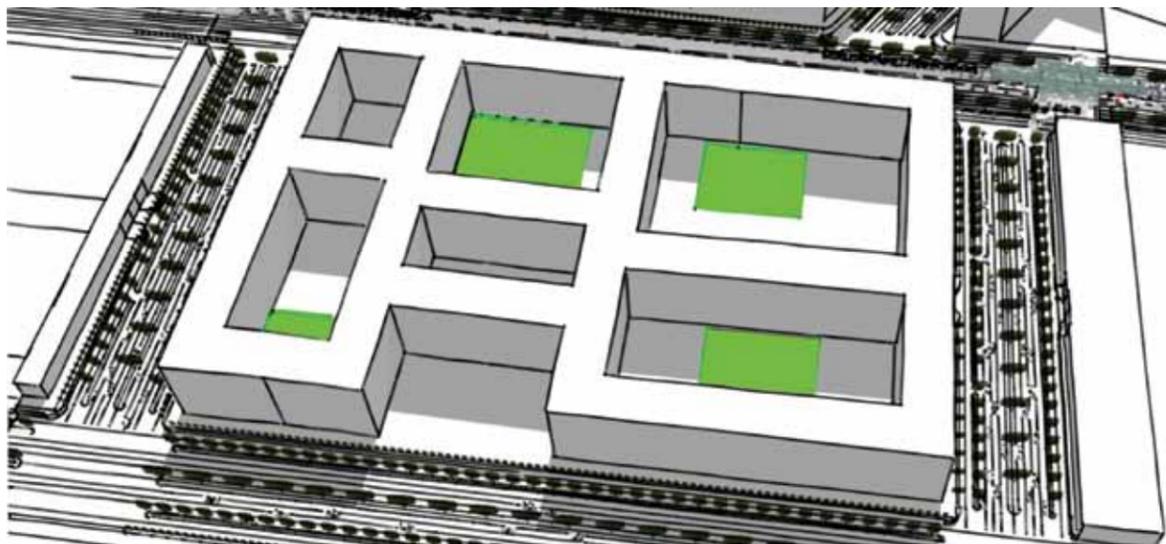
Existing Site Greens

Existing Site Condition





The area between the two stations, Mundka and Rajdhani Park, has been divided into 10 different plots with an approximate area of 10 hectares. The division of these plots has been done through the existing structure of roads; the orientation of the road and location has been retained in the proposed scheme whereas the ROW has been modified and organized to 60M for the side & rear roads of the plots, whereas the ROW of the National Highway has been enhanced from 60M (existing) to 72M.



A typical block has been identified from the scheme between the two stations to further elaborate the design proposal



The above images are of a proposed block showing the relation between the proposed built form and the network of open spaces. These open spaces are designed around existing greens having trees of large foliage around which the semi-paved courtyards are planned in such a manner that existing greens acts as a rainwater recharge zones, whereas the basement parking and services are planned around these greens. These two levels of green area have been created – one with existing greens, and the second are the greens which are semi-paved and more active in terms of movement around the built form. Vertical cores are located around these courtyards to maximize the movement in and around the built form.



**Areas & Considerations**

FAR	300
ECS	2 for 100
PLOT SIZE	99246 sqmtr
Ground coverage	30%
Total FAR	297738 (11 floors)
Total cars required	5954
Total area under existing greens	10,940 sqmtr



The courtyard space between the blocks acts as a pedestrian friendly confluence zone integrating the existing green areas with the cores of the buildings. It is designed such that it caters to people from all walks of life as well as for the differently-abled people. Native species of trees are being proposed along with the existing trees located on site. The existing green is at ground level whereas the proposed green is at 3.6m level. Avenue trees have been used along pathways and large foliage trees have been used along the periphery and seating spaces. This courtyard space acts a gathering space for the residents as well as for visitors.



View of typical courtyard



View of typical courtyard



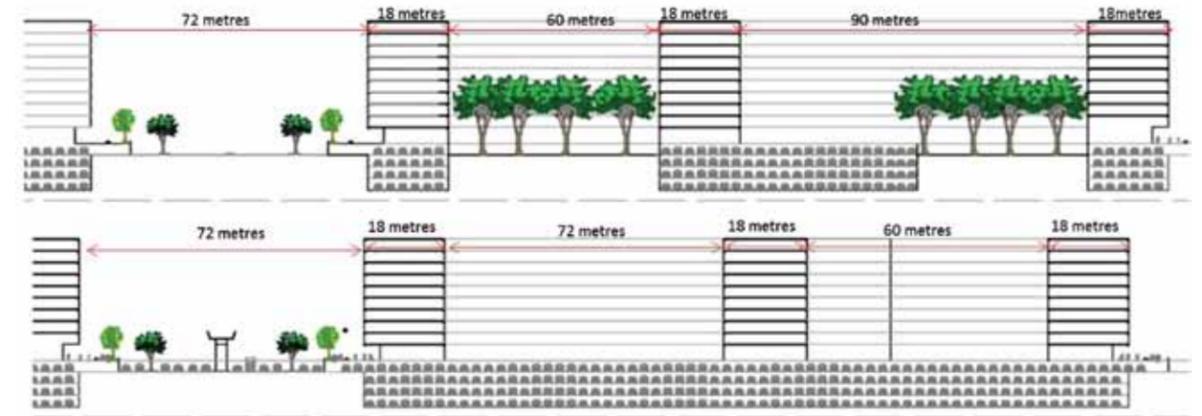
Typical section along National Highway-10



Detail AA as per above section



Typical section along the side road





Sectional view through National Highway and the building blocks



Sectional view through typical building blocks



Sectional view through typical building blocks



View showing the proposed ROW along the Metro Corridor

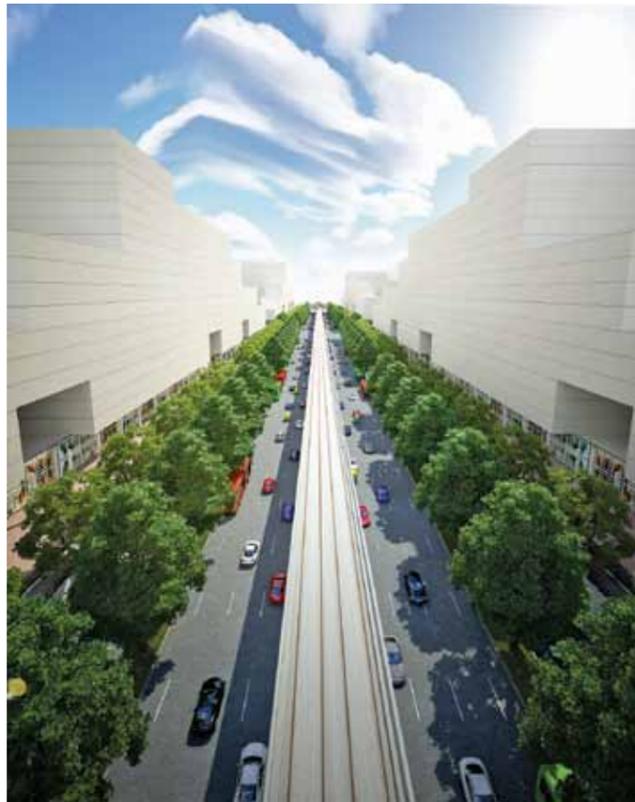
The ROW of the National Highway has been modified from existing 60 m to 72 m by addition of an extra carriageway which makes the main carriageway **four lanes** on the either direction and by making two carriageway lanes reserved for the service road with other ancillary facilities like public toilets, bus stops & surface parking.



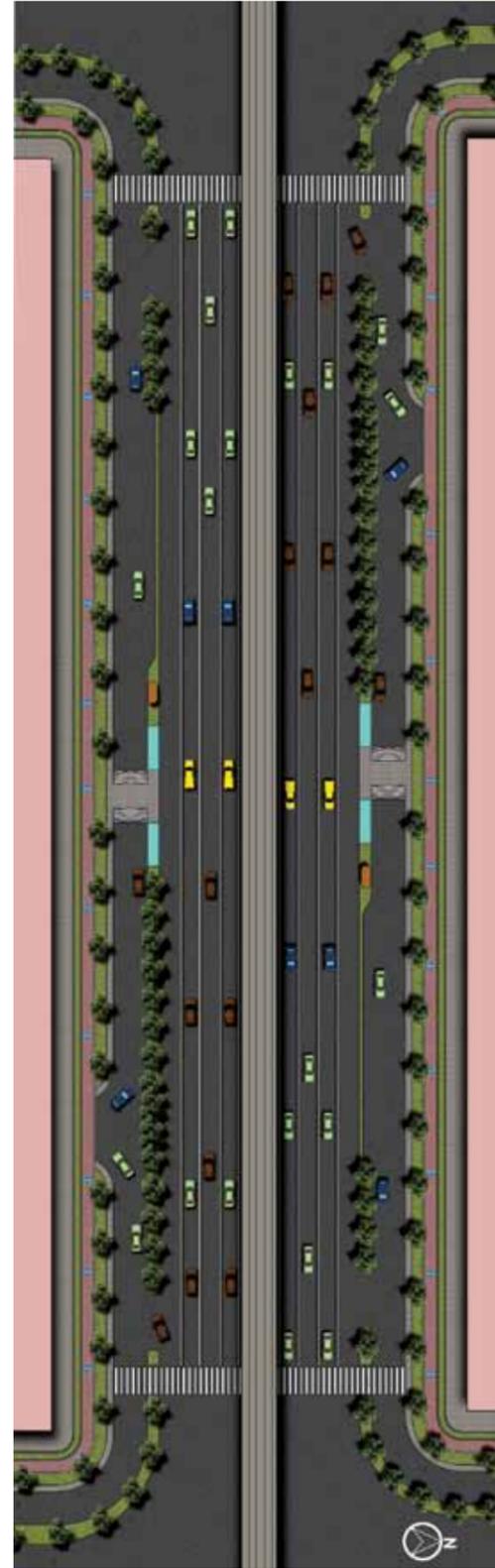
Key Plan



Typical view under the Metro station



Aerial view along the National Highway-10



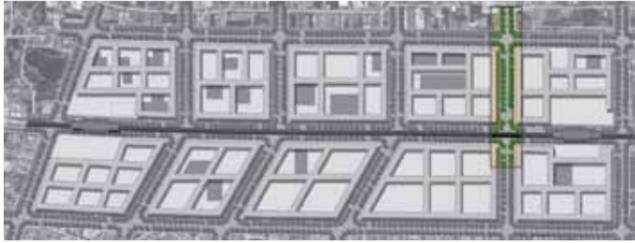
Typical street scape along the NH-10



Typical view of Junction



Typical view along National Highway



Key Plan



View of the typical junction



View of the side road



Typical view of the proposed side road showing the modified ROW from 10- 12m ( existing) to 60M with three lanes on either direction.



Typical view of junction



Typical view of the side road



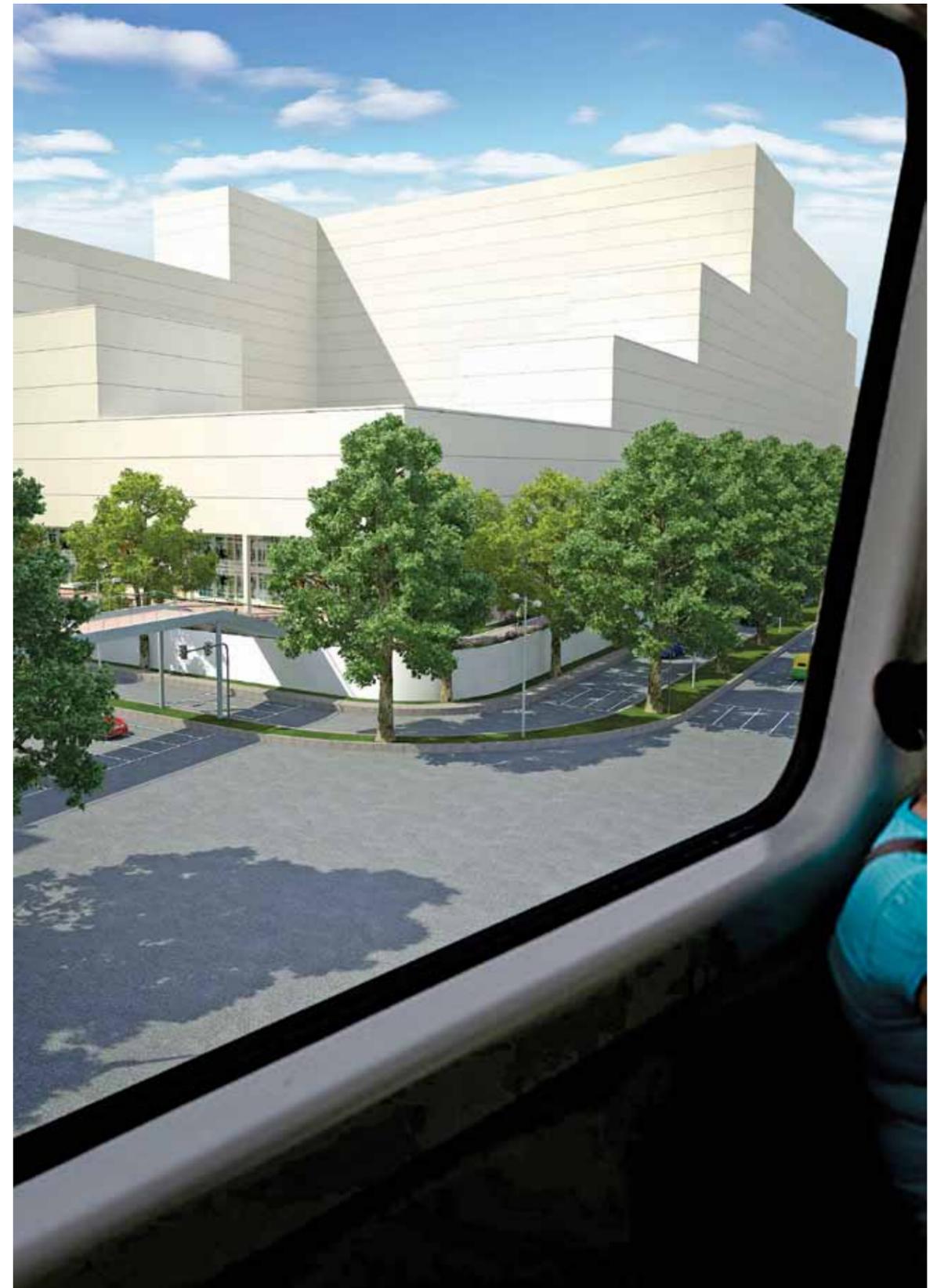
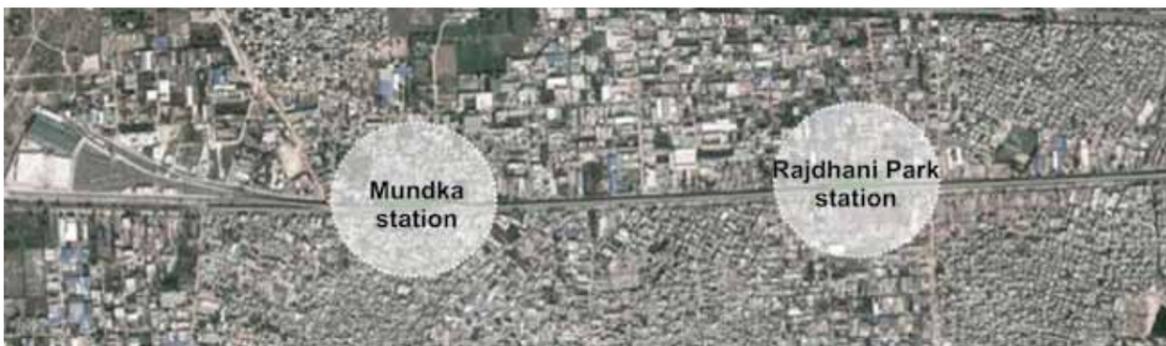
Typical view of the along NH-10/ raised podium



Typical view of the National Highway from raised podium



View from the Metro train

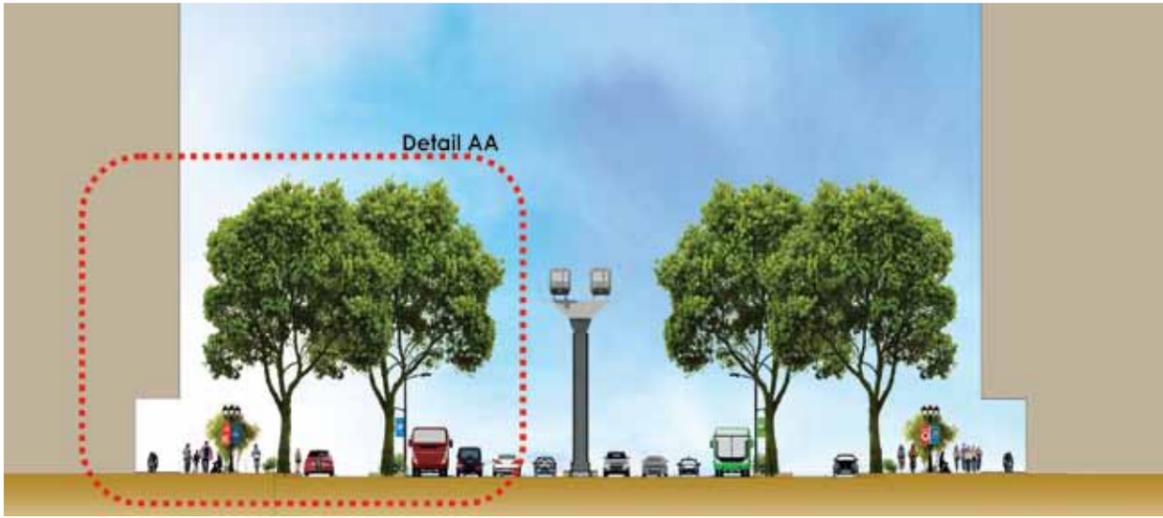


View from the Metro train



### 5.2 FAR-200

FAR	200
Block Area	99246
Total FAR	198492
Ground Coverage 30%	29773
Parking	3970 Cars
Floors Required	6
Basement Floors	3



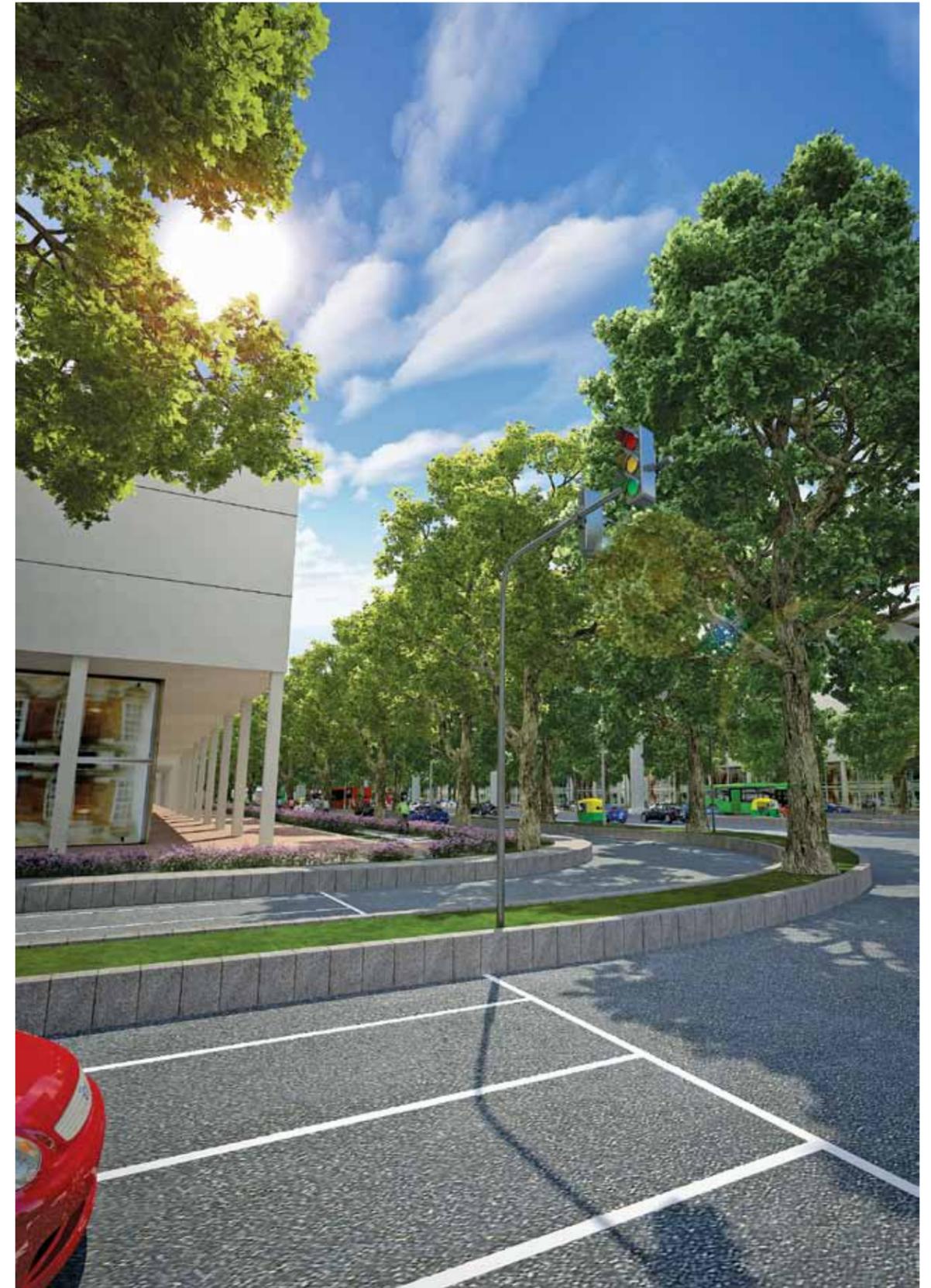
Typical section along NH-10



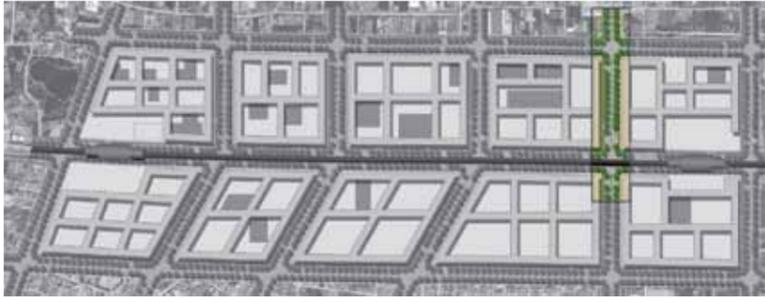
Typical side road section



Detail AA as per above section



View along typical junction



Key Plan



View along side road



Aerial view along side road



Typical view of the proposed side road showing the modified ROW from 10-12m (existing) to GOM with three lanes on the either direction.



Typical view of the junction



View of the service road showing ancillary facilities



Key Plan



Typical view under the Metro station



Aerial view along the NH-10



Typical streetscape along NH-10



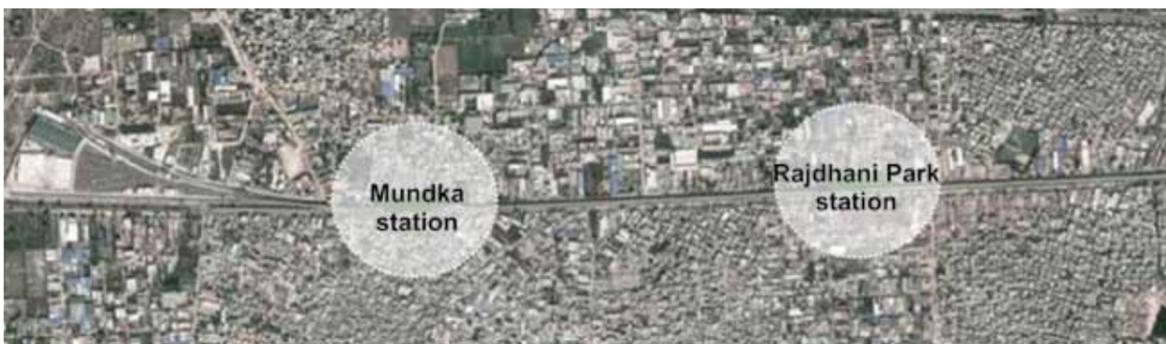
View of side road along NH-10



Typical junction along NH-10



View from the Metro train



View from the Metro train

