CITY LEVEL PROJECTS

DECONGESTION OF TRAFFIC JUNCTIONS

Ten Junctions Identified by Delhi Traffic Police

(An ISO 9001 : 2008 Certified Organisation)

Delhi Urban Art Commission

The Delhi Urban Art Commission was set up by an Act of Parliament in 1973 to "advise the Government of India in the matter of preserving, developing and maintaining the aesthetic quality of urban and environmental design within Delhi and to provide advice and guidance to any local body in respect of any project of building operations or engineering operations or any development proposal which affects or is likely to affect the skyline or the aesthetic quality of the surroundings or any public amenity provided therein".

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Organisations / Others

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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
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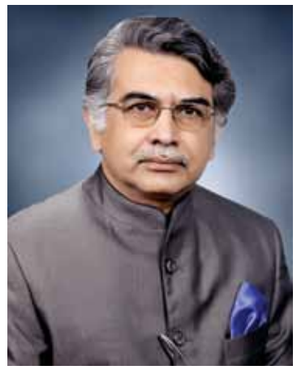
Preface



The city of Delhi, capital of this vast land of diversities, is a city laden with layers of history, a place where civilizations have lived, prospered and perished over centuries. The modern city today, built over and around a rich tapestry of heritage, presents an opportunity at every turn, to allow for coexistence of the past, present and the future. In order to understand this multidimensional urban spectrum and attempt to plan the future, various city level studies have been initiated by the DUAC. I hope that these studies will help the planners of modern day Delhi to carefully articulate urban space, structure, form and environment and sensitively address future requirements.

I convey my thanks to all the Consultants and Members of the Commission who have tirelessly worked on this research project to bring out this document. I also take this opportunity to place on record my sincere appreciation of the efforts of Secretary and other staff of DUAC for providing the necessary administrative support to make this happen.

I fondly hope that the authorities of the local, state and national government take these studies seriously and implement, in right earnest, the suggestions given herein.

January, 2018

Sd/-

Prof.Dr.P.S.N.Rao

Chairman, DUAC

Contents

Summary

The study was taken up on a request from Delhi Traffic Police as a part of their initiative to decongest 200 junctions in Delhi. These junctions were WWidentified as choke points causing traffic delays and longer travel times. Congestion at traffic junctions affects multiple streams of traffic and has a magnified effect. Junctions also play an important role in ensuring safety of vulnerable road users i.e. pedestrians and cyclists as these are the points of direct conflict between these users and motor vehicles due to crossings. Poor design of junctions is the primary reason for traffic jams and also pedestrian and cyclist fatalities on roads. Adequate and well designed junctions considerably improve the capacity of road network in terms of throughput and traffic dispersal while ensuring safety of all road users.

The ten junctions taken up are located all over Delhi on arterial roads with varying types of traffic ranging from inter city movement to traffic generated due to events, to traffic attracted by prominent land use, to general everyday commuting traffic. From the study it is determined that while each of the junctions were unique in terms of context, character, and issues, they also exhibited some common issues that can be summarily resolved through strong policing and implementation policies. Each Junction was taken up individually to understand the specific factors causing congestion.

1. Pusa Roundabout : Geometry of the roundabout, that has evolved incrementally with recent developments like blue line metro; and increased local traffic due to the IAS coaching industry were found to be the primary reasons for congestion. Therefore, proposals are design based while also resolving issues like conflicting pedestrian movement and on-street parking at the junction.

2. Nangloi Depot Junction : Junction is riddled with multiple issues like landuse generated incompatibility of modes (NMVs and buses maneaouvering together), junction geometry, location, and pedestrian - vehicular conflicts. Congestion is proposed to be reduced by shifting the signal to the adjacent three arm junction (Udyog Nagar Metro Station), providing alternate entry/ exit to depot, and providing a grade separated pedestrian crossing.

3 & 4. Kamal T-Junction and Liberty Chowk : Kamal T-Point and Liberty Chowk are at a distance of 1.1km to each other. Hence a consolidated traffic study of the entire stretch from Kamal T-Point to Liberty Cinemas has been conducted. Kamal T-Point is located at the intersection of New Rohtak Road and Swami Narayan Marg. After 5pm traffic from Zakir is diverted to Inderlok by closing entry to Zakhira Flyover to avoid congestion at junction. An alternative to this diversion has been made by redesigning the junction to handle the huge volumes of traffic. Primary issue at Liberty Chowk is on-street parking during prime time movie shows at Liberty cinemas.

5. S-Block Junction, Mangolpuri : Sanjay Gandhi Memorial Hospital is located near the junction and related auxilliary services like cheap food stalls and multiple modes of intermediate public transport have developed organically, encroaching the carriageway at junction. Other factors causing congestion are - skewed geometry and encraochment by corner plots. This is proposed to be resolved by shifting IPT stands and vendors to an organised space, relocating inappropriately placed bus stops, and strict enforcement of non-encroachment atleast upto 50 m of junction.

6. Palla Chowk : Junction is surrounded by industries and numerous banquet halls and lies on a prominently used regional corridor leading to Punjab. City traffic attracted during wedding season leads to heavy congestion affecting the regional traffic. Long term solution for this junction is a flyover segregating the two types of traffic but in the meantime, it is proposed to divert the traffic destined for banquet halls to the slip road (Narela Road) via two loops.

7. NSG Roundabout, Mehram Nagar : Road width beyond the Dwarka underpass decreases considerably causing bottleneck and the shockwave is experienced at the junction. Road widening at pinch points and a roundabout to handle the sporadic traffic to and from the airports has been designed at the junction.

8. Escorts Junction, New Friends Colony : Junction is located adjoining Fortis Hospital. The primary issue at the junction is commercial encoachments which has resulted in lack of pedestrian facilities and irregular widths.

9. Nizamuddin Khatta. : The junction is a major city node connecting East Delhi to South & Central Delhi. Due to new projects identified in junction vicinity, proposals for short term improvement have been provided.

10. Kapashera Chowk : Kapashera chowk is located at the intersection of Old Delhi Gurgaon road and the Najafgarh-Kapashera road. Lack of pedestrain facilities, on street parking and IPTs idling at junction cause congestion at the junction.

1.1 Traffic in Delhi

Congestion on urban roads is caused due to multiple factors that include but are not limited to –
a) Land use,
b) High volume to capacity ratio (V/C),
c) Development of suburbs leading to greater directional splits,
d) Bottlenecks on links due to varying carriageway or encroachment,
e) Bottlenecks/ low navigability of nodes (junctions),
f) Driving behaviour, etc..

Magnitude of effect due to each of these factors varies to a great extent based on context. In a city like Delhi, which on one hand enjoys privileges and facilities of global cities and on the other faces numerous third world issues like rampant encroachment, poor policing, exponential increase of private transport, inefficient and insufficient public transport; almost all of the previously mentioned congestion factors come into play.

Major causes of traffic congestion

At 1749 km of road length per 100 km², Delhi has one of the highest road densities in India. Major roadways include the Ring Road and the Outer Ring Road, which had a traffic density of 110,000 vehicles per day in 2001. Total road length of Delhi was 28,508 km including 388 km of National Highways. However, the road network has been unable to keep up with the exponential increase in the growth of vehicles and traffic in Delhi from 1981 to 2001, continuing upto 2011 as noted by Master Plan of Delhi (MPD) 2021. There has been a rise in per capita trip rate (excluding walk trips) from 0.72 in 1981 to 0.87 in 2001 and exponentially more in 2011. Keeping in view the population growth, this translates into an increase from 45 lakh trips to around 118 lakh trips in 2001 and 144 lakh trips till 2008.

Compounding the issue is the inadequate public transport system in Delhi. In spite of metro and bus services, the public transport is unable to keep pace with the growing population, as a result of which, more and more people use their private vehicles, leading to increased congestion on the roads. As per the Transport Demand Forecast Study (TDFS) undertaken by GNCTD and approved by the UTTIPEC in 2011, it is seen that **between 2001 and 2008, the private motor vehicle trips have increased from 28% to 35%** and non-motorized vehicle trips from 9% to 15%; however, **bus trips have decreased from 60% to 42%** of the total number of trips (TDFS 2007)

Delhi roads are characterised by mixed traffic, which include, personal vehicles, buses, trucks, motorised three-wheelers, motorised two-wheelers, cycle rickshaws, electronic cycle rickshaws, cycles, animal-driven carts and pedestrians. This creates problems for traffic management and leads to delays in movement of the traffic. At intersections, cycle time varies from 120 to 180 seconds, which leads to long queues, especially in the peak hours when multiple signal cycles are required to clear the junction.

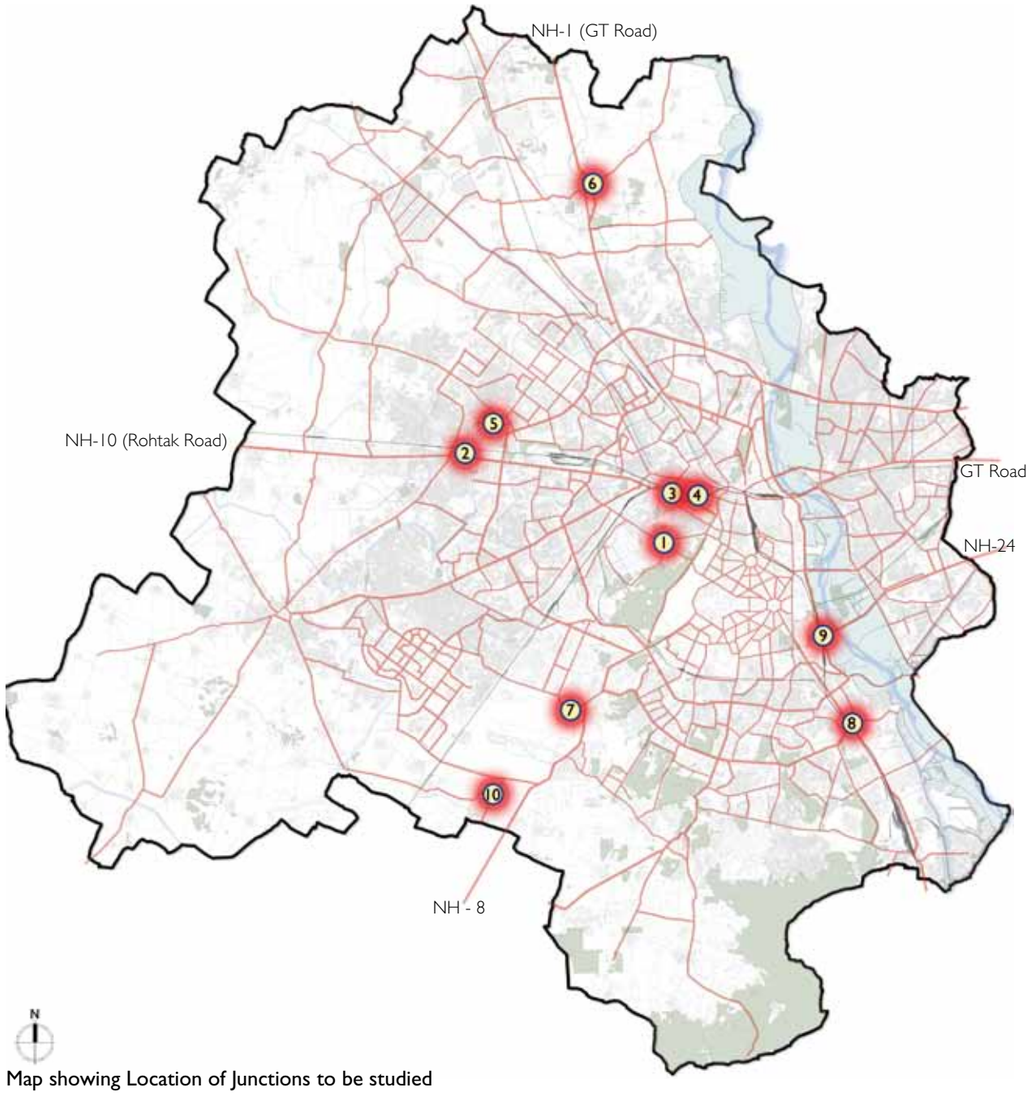
Outcomes of congestion

According to a study done by IIT Madras (Harry Raymond Joseph, Gaurav Raina and Krishna Jagannathan, 2015, Cost estimates for road congestion in Delhi: projections and recommendations), traffic **congestion on Delhi roads costs about Rs 60,000 crore annually**. The contributing factors to this assessment are - fuel waste due to idling of vehicles, productivity loss, air pollution and road crashes. Apart from these factors, other negative externalities of congestion are -
a) Financial loss due to wear and tear of vehicles,
b) Loss of life resulting from hindered movement of emergency vehicles,
c) Inconvenience caused due to inability to forecast travel time, and
d) Indiscriminate flouting of traffic rules which, ironically is often both cause and effect of congestion.

1.2 Project Background

Joint Commissioner of Police (traffic) Delhi vide their letter no: 3270/TE (D-I)/ Traffic dated 23.05.2016 had requested the Delhi Urban Art Commission (DUAC) to undertake studies on "Decongestion of Traffic Junctions in the NCT of Delhi" for 10 traffic junctions, to improve traffic congestion points in the city through modified geometry by various transport regulatory innovative measures. The 10 junctions identified by Delhi Traffic Police are as follows:

1. Pusa Roundabout, Rajender Nagar, West Delhi
2. Nangloi Depot, Rohtak Road, West Delhi
3. Kamal T-point, Rohtak Road, Central Delhi
4. Liberty Cinema, Rohtak Road, Central Delhi
5. Mangolpuri S-Block Chowk Near Sanjay Gandhi Hospital,Mangolpuri, north-west Delhi
6. Palla Red Light Chowk, North delhi
7. NSG Round About, Mehram Nagar, South Delhi
8. Escorts, New Friends Colony, South-East Delhi
9. Nizamuddin Khatta, South-East Delhi
10. Kapashera Chowk, South-West Delhi



Map showing Location of Junctions to be studied

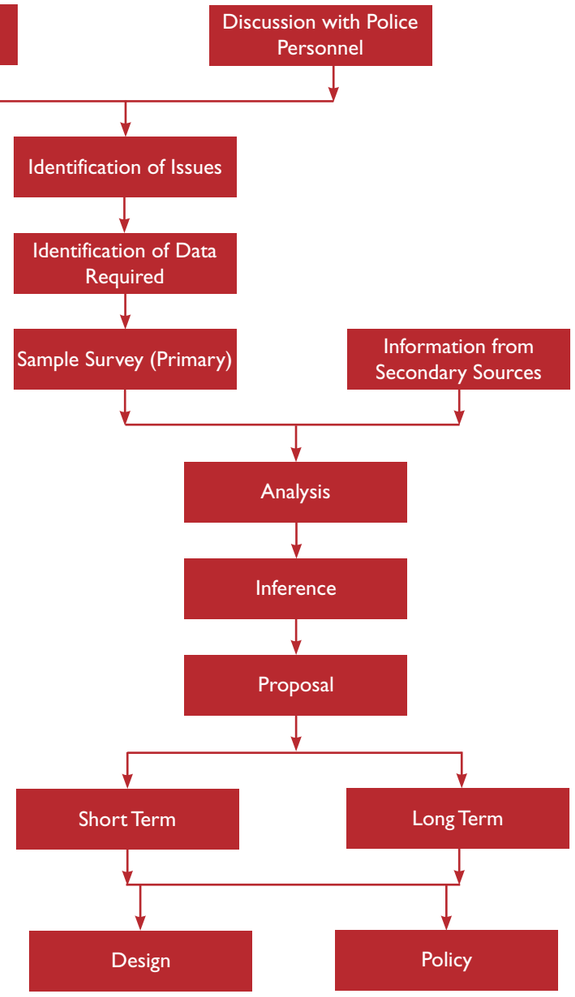
1.3 Study Approach

AIM Study and derive measures to Decongest 10 congested Junctions in Delhi

OBJECTIVES

1. To determine the factors contributing primarily to congestion in each of the ten junctions
2. To analyse the situtation keeping all road users in mind including motorists, pedestrians, NMV users, IPT operators, etc.
3. To provide immediate, easily implementable measures to ease the existing condition wherever possible
4. To provide a comprehensive solution for alleviating the issues for the forseeable future

METHODOLOGY



CHAPTER 2
PUSA ROUNDABOUT

2.1 Site Context

Pusa Rounabout is a 5 - arm signalised junction connecting South and Central Delhi to North Delhi. It is surrounded by Patel Nagar on north-west, Rajender Nagar on east, and Pusa institutional area on south. Prominent buildings adjacent to the roundabout include Rajender Place district centre, BLK Hospital, Jaypee Siddhartha Hotel, and a fire station. Of the five arms intersecting at the junction, Patel Road and Pusa Road function as arterial roads while Shankar Road & Dr. K.S. Krishnan Marg function as sub-arterial roads. Govind Lal Sikka Marg is a collector road connecting the residential pocket of East Patel Nagar to the city network.

Map showing surrounding areas (context) of Pusa roundabout

Pusa Roundabout

The Junction is heavily congested almost throughout the day. The morning and evening peaks are due to the large number of commuters travelling to Connaught Place, South Delhi or Gurugram. The junction is used by considerable amount of traffic during afternoons as well due to small businesses and numerous coaching centres (for Indian Administrative Services) located in its vicinity.

Rajender Place Metro Station

This Metro station is extremely popular and hence this station attracts a lot of IPTs which leads to traffic Jams.

Source: [Online], Available from: https://www.lyfboat.com/hospital/blk-super-speciality-hospital/

BLK Hospital

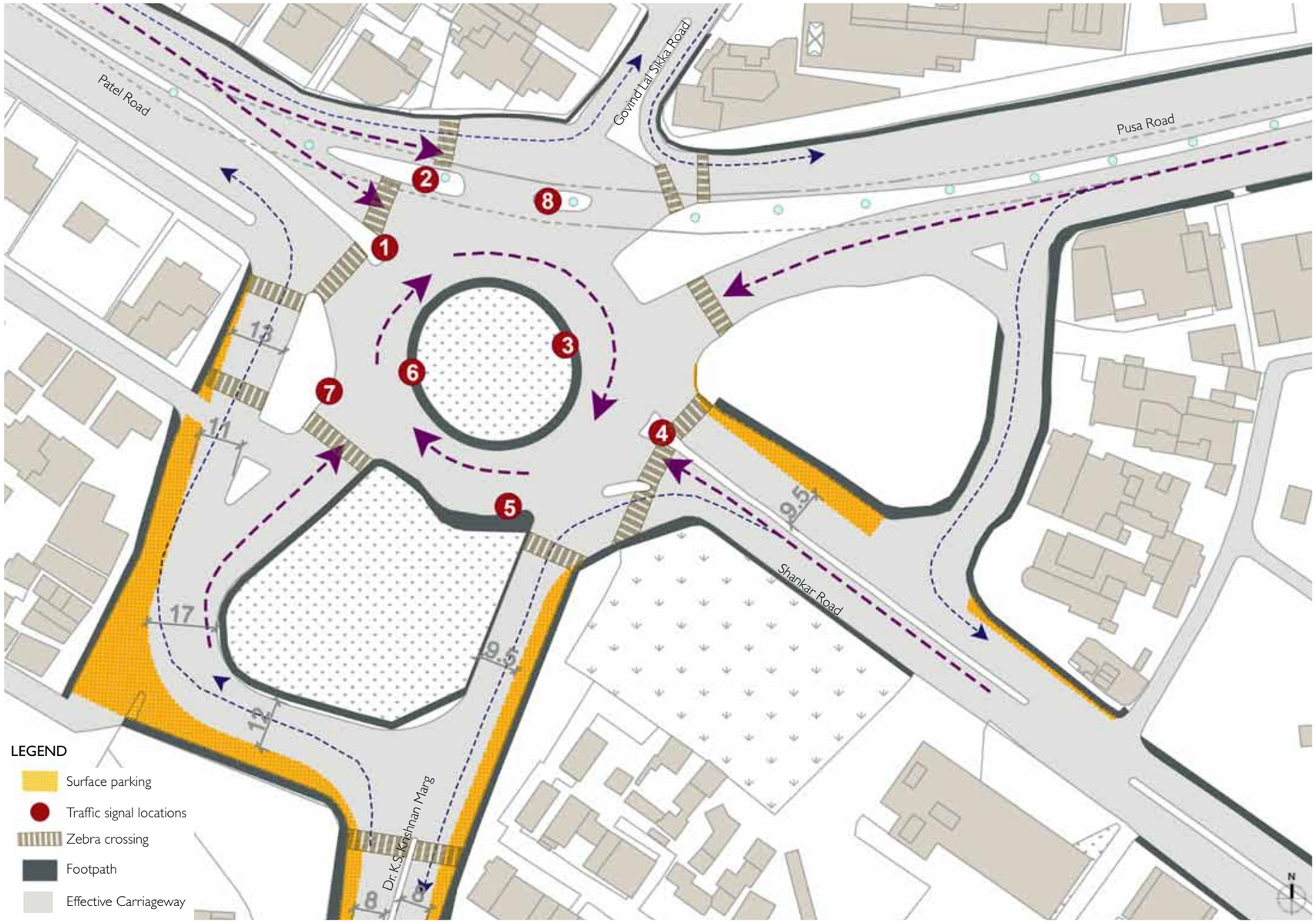
A 650 bed Multi- Speciality hospital in the heart of West Delhi. BLK is ranked amongst the top 10 Multi-speciality hospitals in NCR

Source: [Online], Available from: http://www.indiaprofile.com/images/hotels/delhi/first-class-hotels-around-delhi/

Hotel Jaypee Siddhartha

Located within a 5km radium of Connaught Place and a 45 minute drive from Indira Gandhi international Airport, Jaypee Siddhartha is one of the major landmarks of the area.

2.2 Existing Scenario



Map showing existing scenario at Pusa roundabout

Eight signals currently used to manage the junction

The roundabout at Pusa is unusual not only because its a five arm roundabout, but also because of its non-conforming geometry. The images below show the evolution of its geometry while the adjoining map shows all the road widths (existing and effective), traffic movement patterns, and signals. It also shows the existing pedestrian infrastructure including provisions for crossing. The observations used for assessment and analysis later are supported using photographic evidence.

Temporal Changes

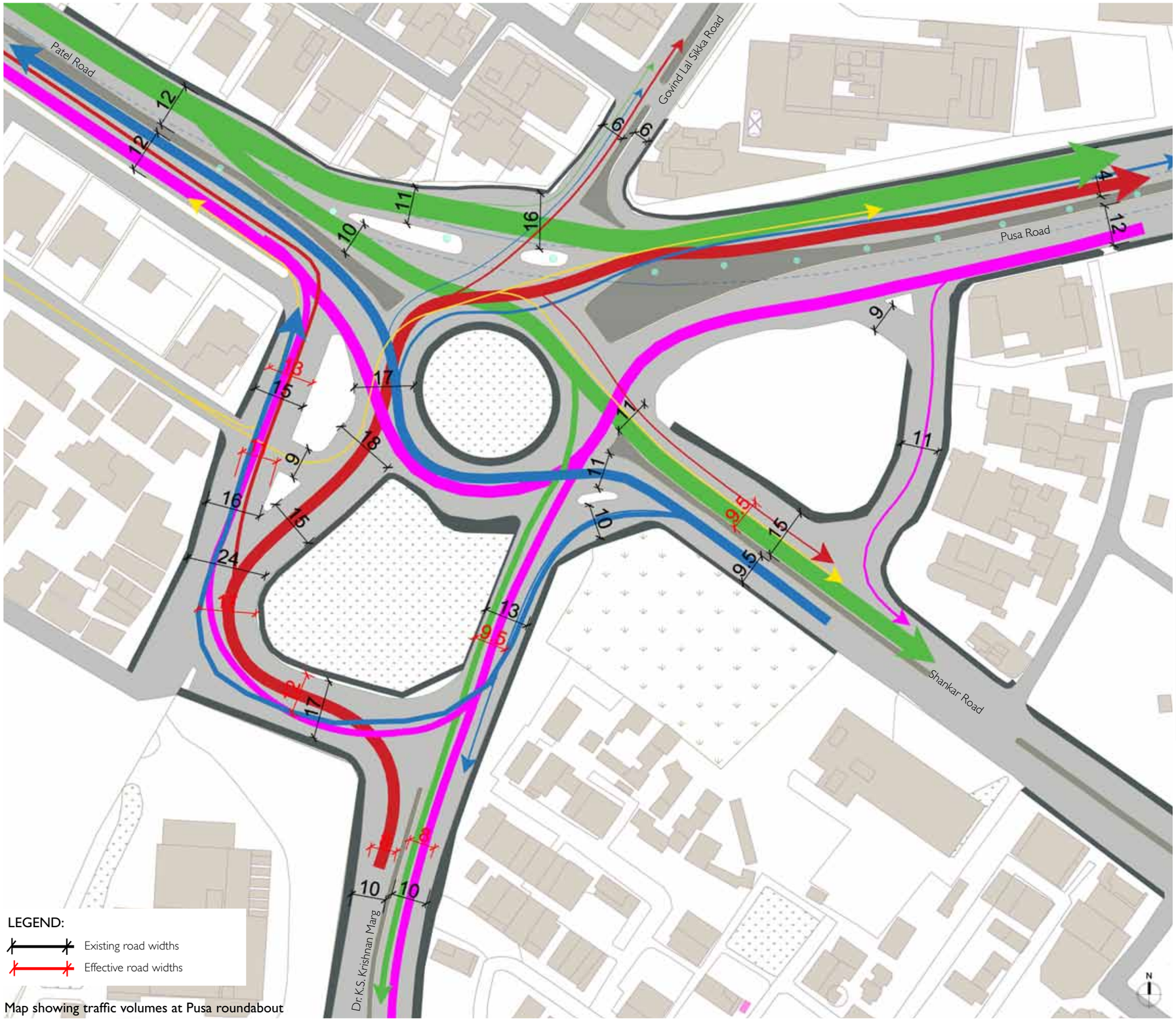
Time Line year: 2000
A five arm roundabout connecting Central Delhi to North & North- west Delhi

Time Line year: 2004
The size of the roundabout was reduced to incorporate metro piers and also to accommodate the increased traffic volume.

Time Line year: 2010
The roundabout was re-structured by adding another arm from Dr. K.S. Krishnan Marg.To manage the increased traffic and multiple traffic islands the roundabout was signalled.

2.3 Site Analysis

2.3.1 Analysis: Traffic Flow



Map showing traffic volumes at Pusa roundabout

In order to analyse traffic movement patterns across the junction, sample surveys were carried out. Traffic volume surveys were done via video recordings of minimum 15 minutes on all five arms on a weekday. To capture peak volumes, survey was carried out from 9:00 am to 9:30 am. Due to the sprawled layout of the junction, it was impossible to capture the directional flows at the junction in a single video so as to determine the volume of traffic moving from one particular arm to another.

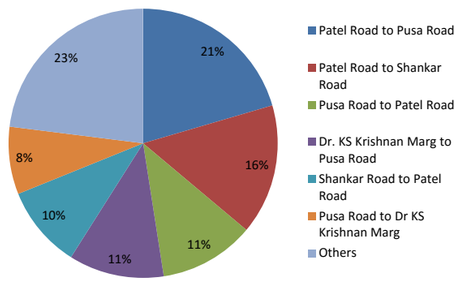
Therefore, sample origin-destination surveys were carried out on each arm. Mode-wise traffic volumes obtained through video recordings clubbed with sample origin destination surveys on each arm were utilised to obtain the flow patterns for all arms. From the data, the following observations can be made -

- The roundabout is used by heavy traffic volumes during peak hours.
- Number of buses passing through the junction is very high given the arterial nature of Pusa and Patel Roads.
- The heavy volumes are primarily across :
  - Patel Road – Pusa Road
  - Patel Road – Shankar Road
  - Dr. KS Krishnan Marg - Pusa Road

The table below gives the flow volumes in terms of passenger car units to enable a direct comparison of congestion load by each direction of traffic.

Origin / Destination	Patel Road	Pusa Road	Shankar Road	Dr. K.S. Krishnan Marg	Access to colony
Patel Road	0	345	298	106	0
Gobind Lal Sikka Marg	21	0	27	58	0
Pusa Road	617	0	84	345	53
Shankar Road	472	69	0	45	0
Dr. K.S. Krishnan Marg	181	245	50	0	0
Access to colony	0	0	0	0	0

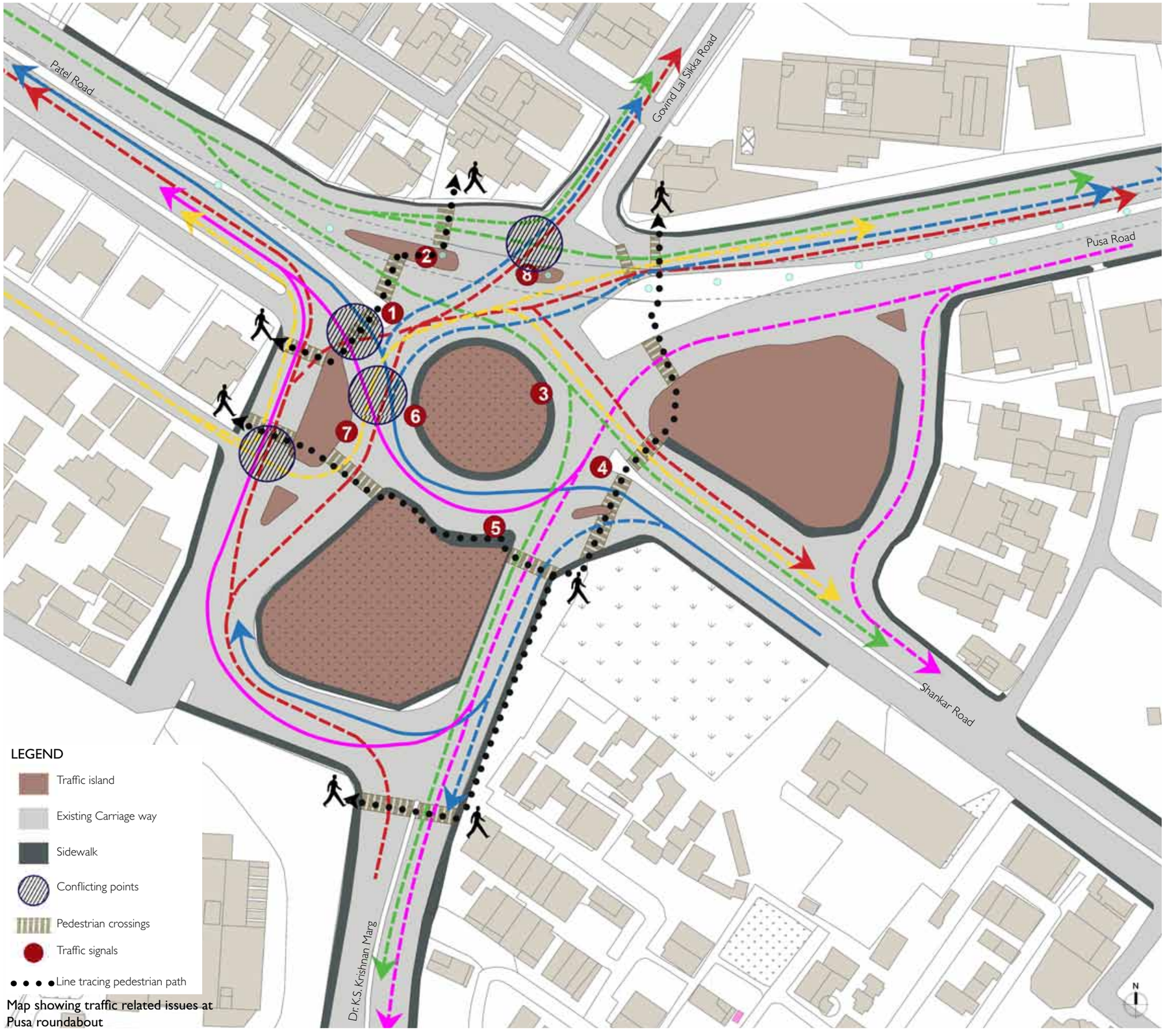
Traffic Volume in PCUs (Passenger Car Unit)



Graph showing percentage load of high volume flows

PUSA ROUNDABOUT

2.3.2 Issues



Map showing traffic related issues at Pusa roundabout

As mentioned previously, the roundabout has undergone multiple geometric changes since its design and these changes have been incremental and organic in nature instead of being planned.

This has led to creation of multiple alternatives for traffic streams causing confusion. For example, traffic from Shankar Road and Pusa Road can choose to move behind the model library island or continue around the circle as shown in the map using continuous flow lines.

Lack of adequate thought given to the changes has also resulted in conflicting movements. The four conflict points identified have been shown on the map. Another resulting issue is the creation of redundant spaces at the junction (considering the sprawled extent) which are being used for parking of commercial and private vehicles. Parking as an activity is strictly avoided upto 50 m of intersections to prevent disruption of traffic flow.

The junction, due to the sprawl is managed via 8 signals causing the traffic to more often than not halt twice before finally clearing the junction. Due to the sprawl manually managing the roundabout is very difficult as visible range is restricted. At present, signal failure which is not uncommon at the site leads to completely grid-locked traffic that may take hours to clear up.

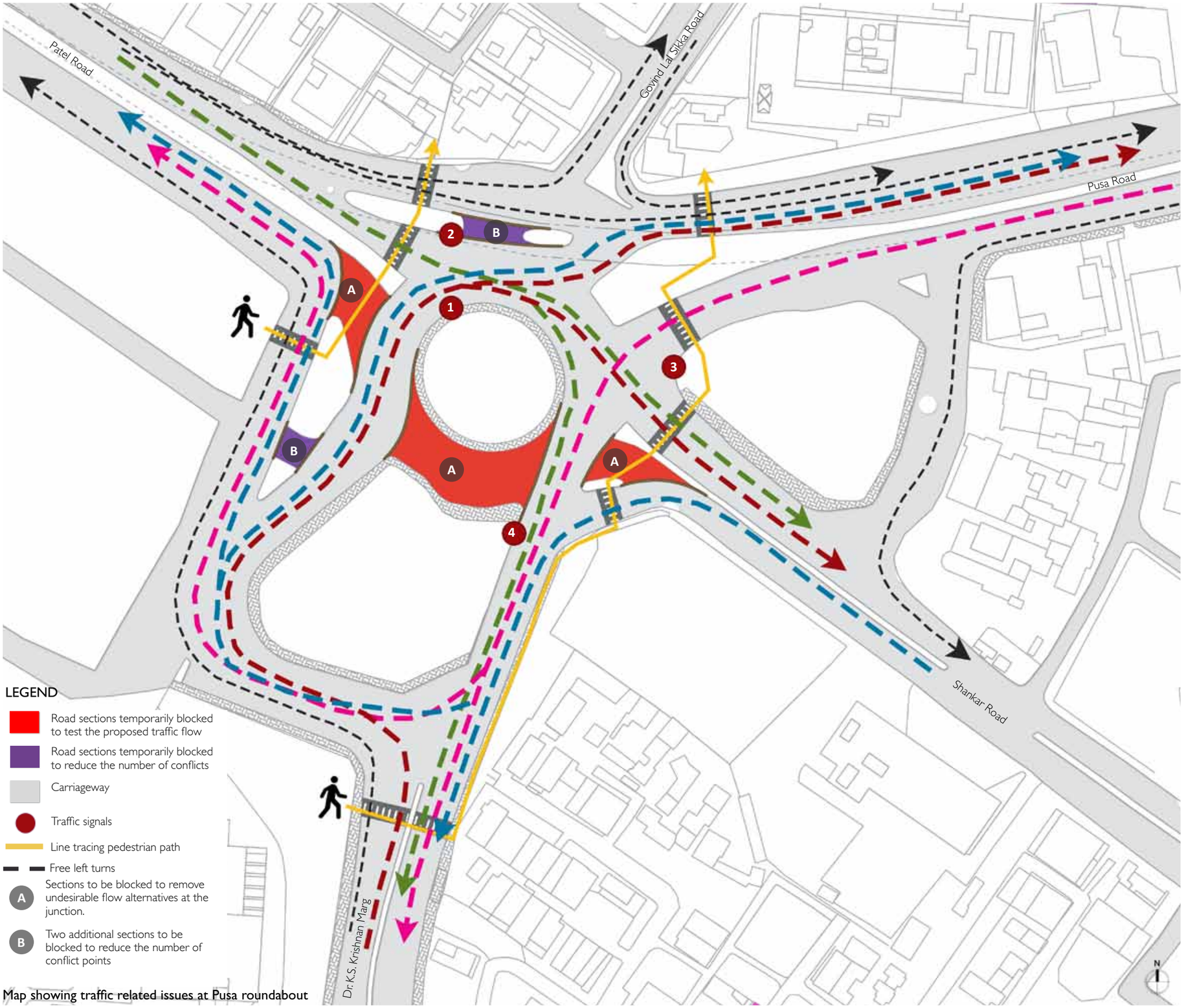
Image showing a major conflict point at the roundabout

Multiple movement alternatives and lack of visibility at roundabout

Absence of pedestrian crossing facilities - Patel Road at roundabout

2.4 Proposals

2.4.1 Proposal I - Short Term measures: Design Layout



Map showing traffic related issues at Pusa roundabout

For an immediate resolution of some of the most important issues identified, the following measures are proposed.
Three small sections have been identified that need to be blocked to remove undesirable flow alternatives at the junction. These sections are marked in the map with Label - A. The blocking can be temporary in nature using police barricades or keb lining.

Two additional sections need to be blocked to reduce the number of conflict points (Labelled B). These two road blocks would restrict traffic from the colony near Pusa from entering the junction and prevent traffic from Shankar Road and Dr. K.S. Krishnan Marg from entering Govind Lal Sikka Marg.

The benefits to be gained through these minor interventions are a more streamlined flow of traffic, reduced number of signals, reduced number of conflicts, and a more feasible pedestrian crossing across the junction.

Currently 8 signals are required at the roundabout to successfully direct the traffic entering and exiting the junction. After implementing the above mentioned measures, the number of signals would come down to 4 through proper staggering and coordination of signals.

Pedestrian crossing would also be greatly facilitated after blocking the earmarked sections as the number of vehicle lanes to be crossed is decreased as shown in the map. Also these stretches would provide a refuge to the pedestrians while navigating the junction.

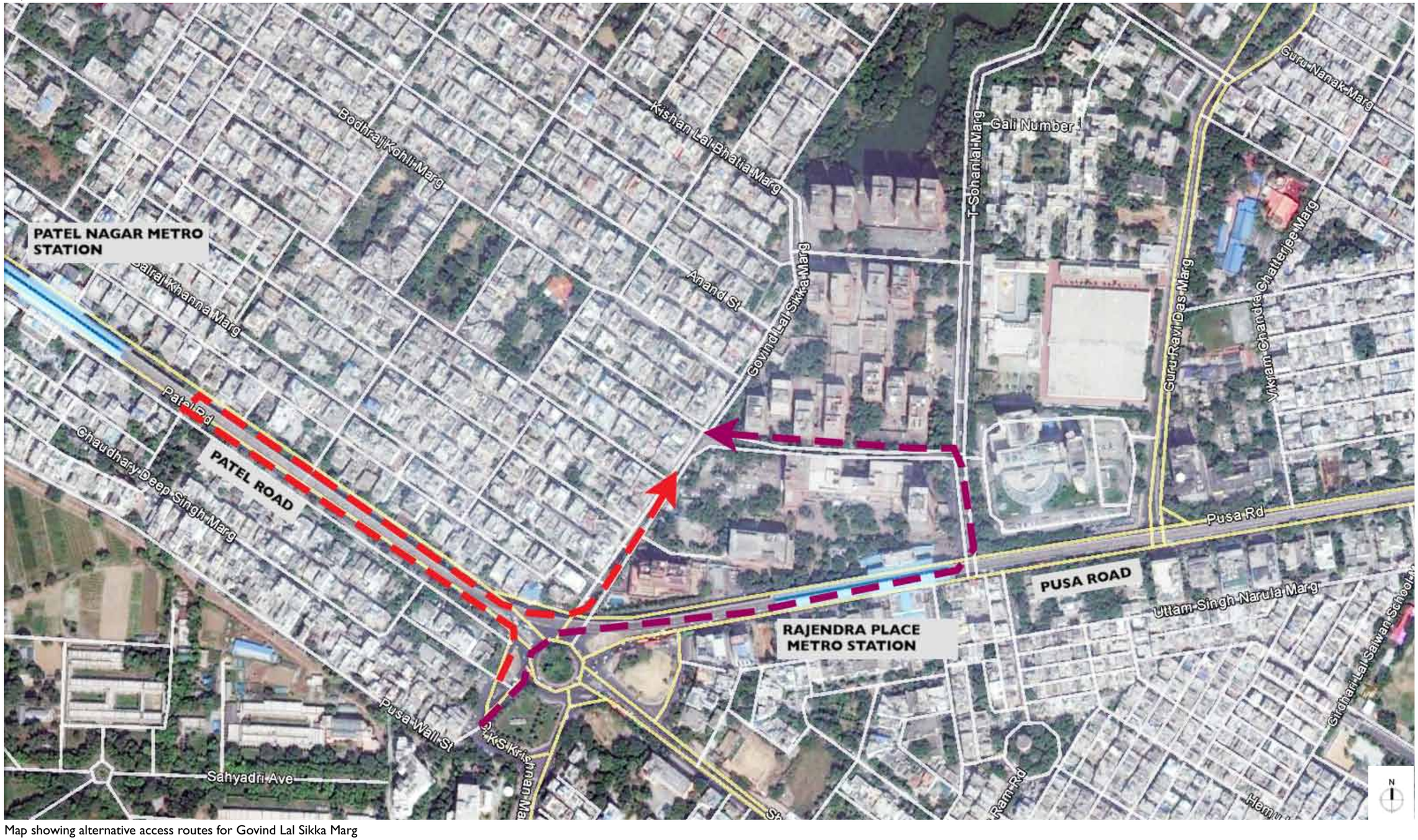
PUSA ROUNDABOUT

2.4.1 Proposal 1 - Short term measures : Alternate Route Map

Govind Lal Sikka Marg provides access to East Patel Nagar on west and commercial spaces including the Rajendra Place district centre on east. These commercial pockets are also accessible from Pusa Road and T Sohanlal Marg as seen in the map below. The prominence (or lack of it) of traffic to Govind Lal Sikka Marg can be assessed from the volume study as well as the fact that at present, the road can be accessed from the roudabout but traffic exiting from the road has to compulsorily head to Pusa Road and cannot access the roundabout to go to any other arm. From the analysis, it was found that the opening of Govind Lal Sikka Marg from the roundabout led to an increase in cycle time which can be easily avoided by directing that traffic to Patel Road or Pusa Road. Both these alternatives have been illustrated in the map below.

The benefits to be accrued are: lesser waiting time for traffic from Patel Road as most of it goes to Pusa Road which will now be unsignalised except for short duration pedestrian crossing signals; and reduction in the total cycle time at roundabout as the number of phases would decrease by one.

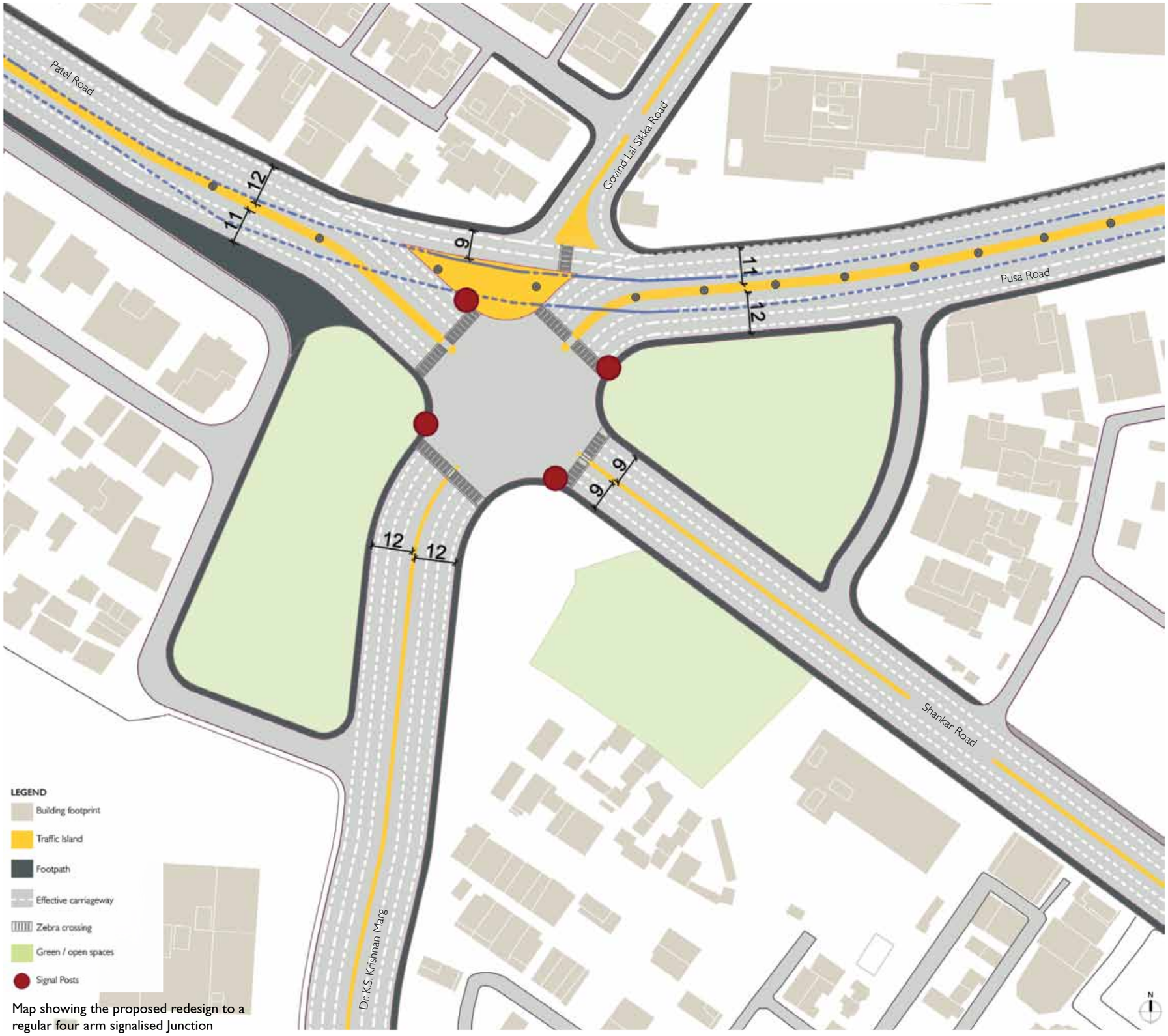
Note: Congestion below Rajendra Place Metro station has to be be addressed via traffic management and space allocation in order to reroute this traffic successful.ly Success being measured in terms of reduced travel times.



Map showing alternative access routes for Govind Lal Sikka Marg

PUSA ROUNDABOUT

2.4.2 Proposal II - Long Term measures: Signalised 4 arm junction : Design Layout



Map showing the proposed redesign to a regular four arm signalised Junction

For long term solution of the congestion at Pusa roundabout, one of the solutions proposed is redesign of the junction to a regular four arm junction with a two lane free left turn from Patel Road to Pusa Road and Govind Lal Sikka Marg. Carriageway width of existing free left turn from Pusa Road to Shankar Road has been reduced to prevent misuse of the extra road space for idling, circumventing traffic signal, and on-street parking. Carriageway width of each arm is to be maintained as per the widths throughout the respective stretches. The Signal will include pedestrian phases for comfortable pedestrian crossing.

PUSA ROUNDABOUT

2.4.3 Proposal III : Long Term measures: Redesigned Signal Free Loop : Design Layout

Map showing the proposed redesigned Signal free loop

The signal free amoeboid loop was conceptualised to utilise the opportunity offered by the site in terms of possible long weaving lengths as well as constraints in the form of overhead metro corridor that cuts through the junction.

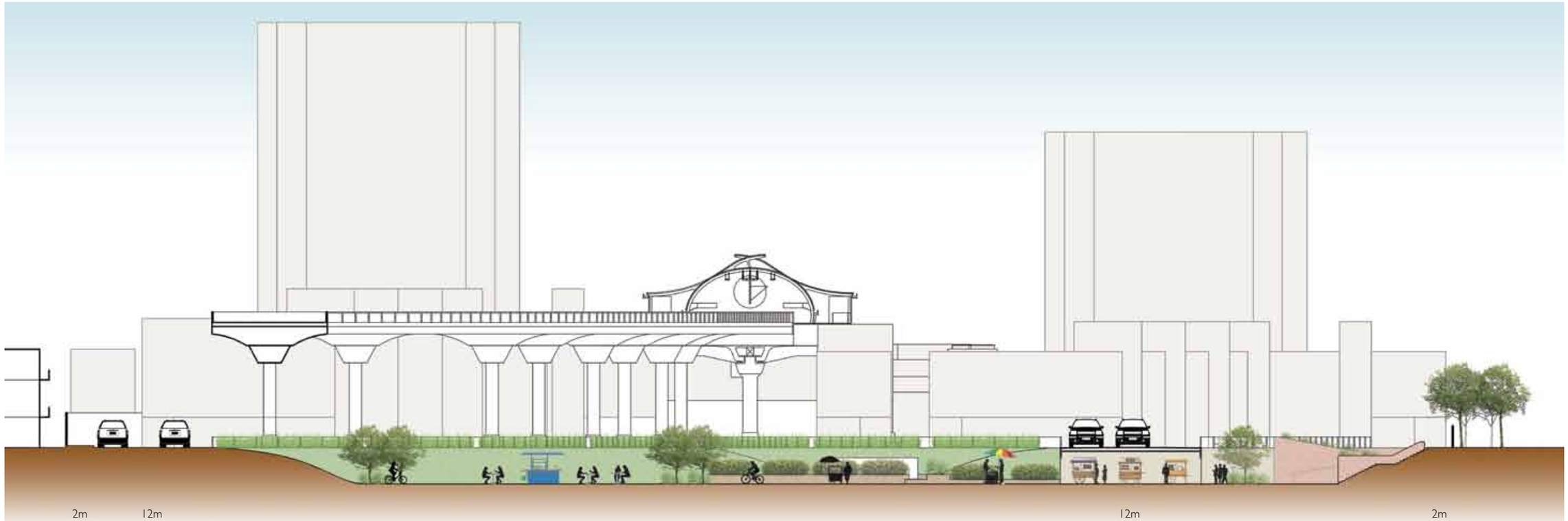
Compared to the existing signalised roundabout, the proposed solution reduces the time spent by vehicles to cross the intersection as it is completely signal free except pedestrian crossing on each arm as opposed to an average waiting time of 1.5 cycle times experienced by vehicles at present. It also minimises the conflicts as 90 degree conflict points have been reduced to merging and diverging conflicts. The loop is self-regulatory ensuring smooth traffic movement even when signals in the area stop working.

The proposal has been designed keeping in mind pedestrian mobility and three grade separated pedestrian crossings with plaza designed at appropriate locations. At Pusa Road, due to unavailability of space, the subway is opened at a refuge on the median and half the carriageway would have to be crossed using signalised zebra crossing

At present there are three small pockets of green including the roundabout which have been consolidated in the design to an exciting 15000 sq. mt. It offers better opportunity of groundwater recharge as well as visual and pollution relief to surrounding population.

- Seamless movement of traffic
  - Waiting time : Limited to pedestrian signals
  - Minimum conflicts
  - Self regulated
- Better pedestrian crossing facilities via grade separated plazas and pedestrian signals.
- Consolidated green spanning 15000 sq. mt.
- Efficient utilisation of space

2.4.3 Proposal III - Long term measures: Redesigned Signal - Free Loop : Cross section



Pedestrian Sidewalk

Carriageway- for uninterrupted vehicular movement through Pusa junction

Sunken pedestrian plaza with sit - outs , eateries , designed open spaces for seating etc.

Subway for pedestrian crossing under the carriageway

Entry to the pedestrian plaza

Stairs leading to the sunken plaza

Pedestrian Sidewalk

A-A' Proposed Plaza Section

View 1: Focusing on the Lily Pond created within the Plaza to control the micro climate

View 2: Focusing on the subway connection for pedestrians

PUSA ROUNDABOUT

2.4.3 Proposal III - Long Term measures: Redesigned Signal - Free Loop : 3D aerial view

View 3: Aerial view showing the Signal free loop

PUSA ROUNDABOUT

CHAPTER 3
NANGLOI DEPOT JUNCTION

NANGLOI DEPOT JUNCTION

3.1 Site Context

Nangloi Depot junction lies on Rohtak Road which is a National Highway (NH-10) with a right of way of 60 m. It connects Delhi to Rohtak as the name suggests. The junction is flanked by mixed typology residential area in south, the DTC depot and a wholesale vegetable market in the north, DSIIDC industrial area in the east and Surajmal stadium in the west. The junction is formed with Jwalapuri 60 feet road providing access to the residential pocket of Jwalapuri. There are 2 metro stations located on either side of the junction which are part of the green line of metro network - Surajmal Stadium Metro Stadium and Udyog Nagar Metro Station.

Map showing surrounding areas (context) of Nangloi Depot Junction

Given below is a brief profiling of areas around the junction in terms of functional, social, economic and spatial characteristics

1) DSIIDC and Udyog Nagar Industrial Area:
A planned Industrial Area under DSIIDC which is a major employment centre.
2) Jwalapuri:
Resettlement Colony (Sub Zone G-17)
3) Miyanwali Nagar:

- Settlements here started around the late 1970s and 1980s. This part is majorly privately developed except some Group Housings which are essentially DDA Flats. Huge tracts of land were allotted by the DDA to private societies to develop on their own.
- Post 2008, following a change in MCD rules, the concept of a builder floors came up. However, the land developed by DDA has no such bungalows or builder floors.

4) Peeragharhi Village:

- Organic growth
- Non conforming cluster of Industrial concentration having more than 70% plots in the clusters within Industrial activities
- Notified by GNCTD for redevelopment (Sub Zone G-17)

Entry to Nangloi Depot at the Junction - manned alongwith signal

Nangloi Depot T Junction formed with Rohtak Road & Jwalapuri 60ft road

3.2 Existing Scenario

3.2.1 Land use

Existing Landuse when compared to that proposed by the Zonal Development plan for this area shows that this area has developed majorly as per the plan with organized industrial and residential areas and untouched urban villages. However, a section between the drain and the industrial area (behind depot) which had to be retained as green buffer has been encroached upon by basti and a water treatment plant has also been located there.

Banquet Halls are present along the study corridor which seasonally increase the demand for parking which is mostly accommodated on the road itself

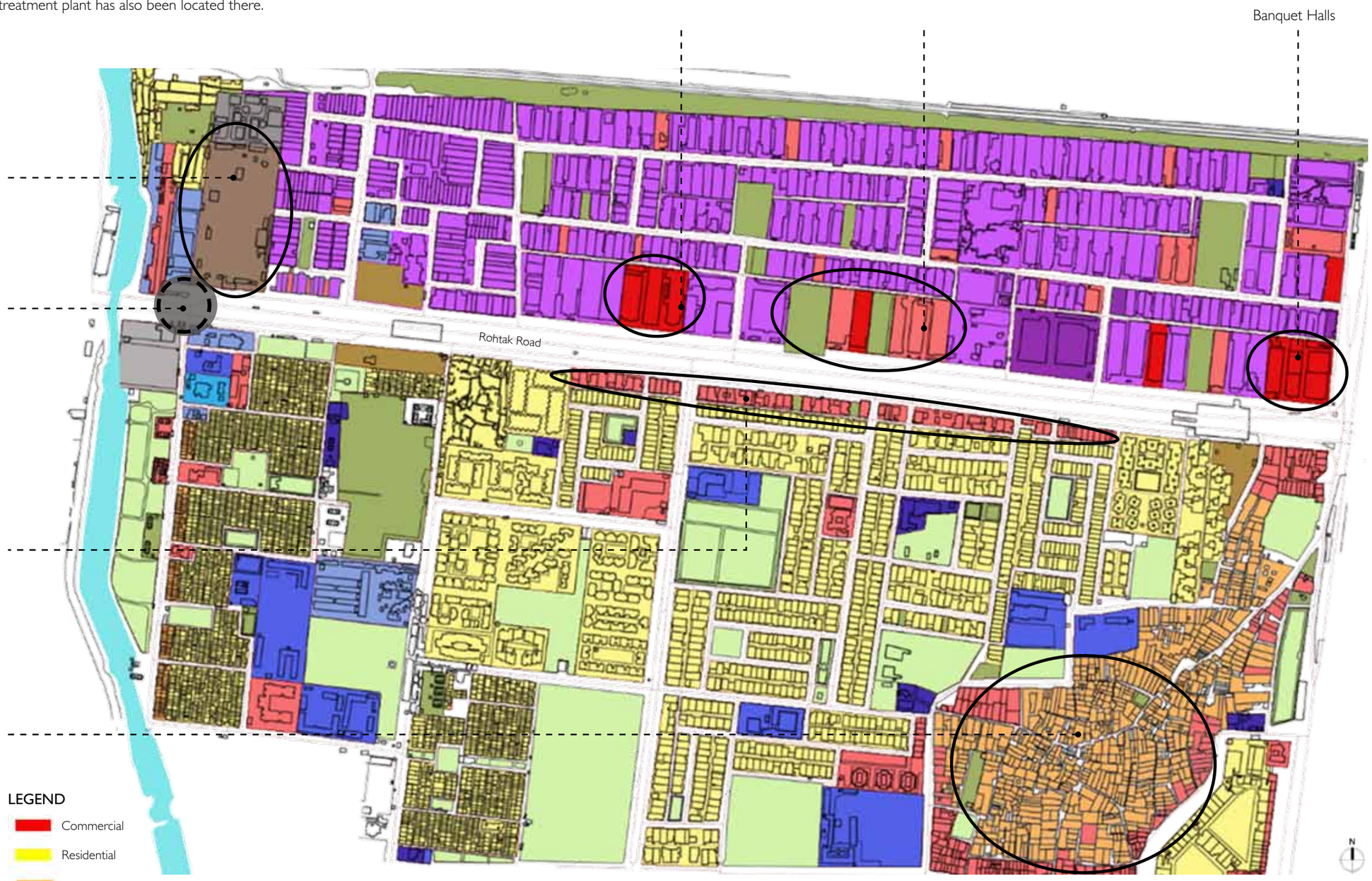
Commercial activity in the form of offices of IT professionals and Logistics companies are present apart from motor showrooms

Nangloi bus depot; owned and operated by Delhi Transport Corporation; accomodating more than 100 buses at present as per depot personnel; for intra city operations. The depot opens onto the junction turning it into a 4-arm junction in terms of movement.

Case study: T-junction in front of Nangloi Depot formed by Jwalapuri 60 feet road and Rohtak Road.

The southern edge of the corridor is defined by a mixed use of land with ground floor commercial and other floors used for residential purposes. However, completely commercially used buildings are used to run hotels, clinics, banks and showrooms

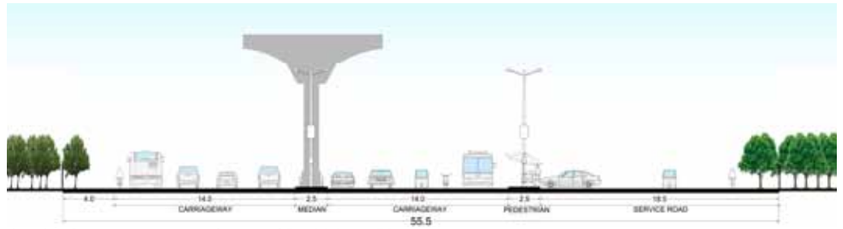
Urban village of Peeragarhi has its entry and exit points from Rohtak Road, adding to the traffic at the already busy junction



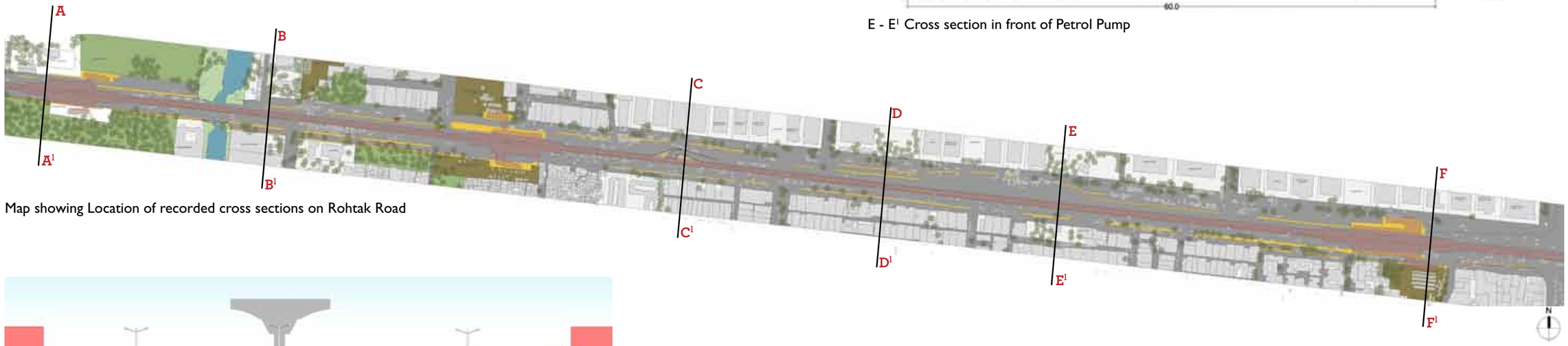
Map showing areas surrounding Nangloi Depot and their land use

3.2.2 Cross - Sections on Stretch (between Surajmal Stadium Metro station to Peeragarhi Metro Station)

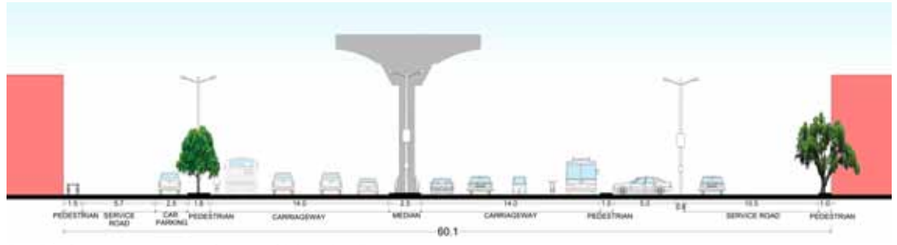
Along the 2 km stretch that was studied, the cross section of the road changed multiple times with available right of way varying from 55.5 m at the section in front of Rail Neer Plant to 75 m below Peeragarhi metro station. The ROW as provisioned for in the master plan is 60 m. Also, the median or the centreline of cross-section at present is shifted towards the residential side with more space available towards industrial pockets and banquet halls. Before construction of the metro the median coincided with the geometric centre of ROW but was shifted during construction of metro corridor. Given below are six prominent changes in cross-section as observed at the site.



A - A^{1} Cross section in front of Rail Neer Plant



Map showing Location of recorded cross sections on Rohtak Road

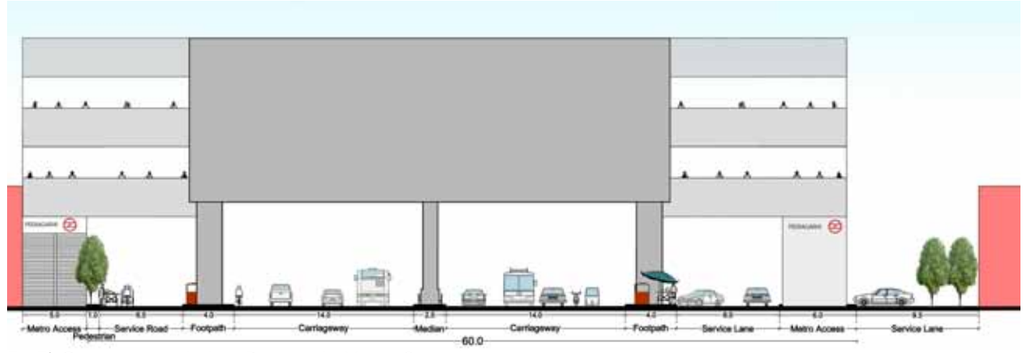


B - B^{1} Cross section in front of Nangloi Depot

C - C^{1} Cross section in front of Honda Showroom

D - D^{1} Cross section in front of Cherish Banquet Hall

E - E^{1} Cross section in front of Petrol Pump

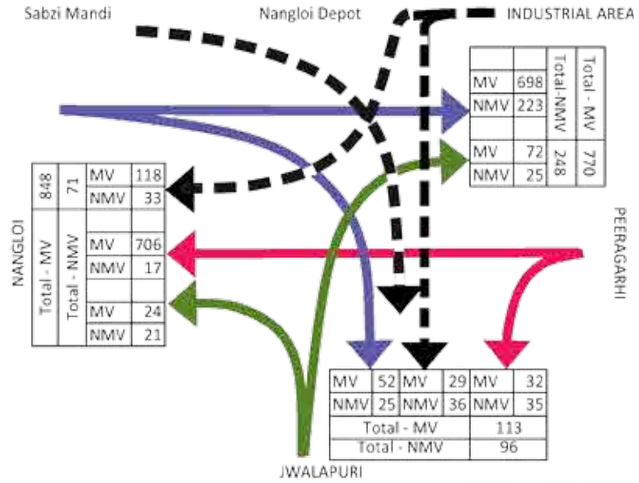


F - F^{1} Cross section below Peeragarhi Metro Station

NANGLOI DEPOT JUNCTION

3.3 Site Analysis

3.3.1 Traffic volume analysis & Issues at Junction



Flow diagram depicting different streams of traffic volume at Junction (in PCUs) from a sample survey carried out for 15 minutes

- Total PCUs that use the Junction to turn right towards Peeragarhi from Jwalapuri is 97 whereas the PCUs that use the service road to turn towards Nangloi from Industrial area is 151.
- Traffic from Nangloi to Jwalapuri (77 PCUs) is on the lower side.
- Sabzi Mandi attracts NMVs that segregate from the mainstream traffic at the junction forming a separate flow.

The primary issue as per assessment is the unwarranted stream of vehicles accessing the junction via the service road. They not only spill onto the carriageway hindering the straight moving traffic from Nangloi to Peeragarhi, but effectively form a fifth arm at the junction which has not been provided for in the signalling system. Hence, these vehicles encroach the pedestrian phase of signal to cross the junction.

Similarly, vehicles accessing or egressing the Sabzi Mandi located between the depot and the drain, use the service lane at the junction instead of taking a much longer route for a U-turn which is not feasible for these non-motorised carts laden with fruits and vegetables. This movement forms the sixth arm at the junction and is in complete contrast of character with the regional traffic and the buses that form the bulk of the traffic.

The Junction is flanked by industrial areas in the north and residential areas in the south. This leads to large number of pedestrians crossing over for work. Lack of adequate crossing facilities for pedestrians causes undesirable and sometimes fatal conflicts with through moving vehicles, which are generally moving at high speeds due to the arterial nature of the road.

Map showing Traffic Flow Pattern across Nangloi Depot junction

The 4th stream of steady traffic from the service lane outside depot

Encroachment of pedestrian phase in signal cycle by the informal streams of vehicular traffic from the depot results in unsafe and haphazard pedestrian crossing

NANGLOI DEPOT JUNCTION

3.3.2 Issues on stretch (Surajmal Stadium Metro station to Peeragarhi Metro Station)

1. Vending Encroachment
2. Idling
    - o IPT – pick up, drop off
    - o Quick shopping stop (vendors on carriageway)
3. Pedestrian infrastructure
4. On-street Parking (showrooms & banquets) – vacant metro parking
5. Mixed traffic (more cyclists due to presence of industrial area and LIG/ EWS housing)

Dedicated U-Turn for traffic immediately after Mianwali red light, renders it useless; leads to frequent wrong directional movement

Udyog Nagar Parking lot lying vacant

Underutilised parking lot at Peeragarhi Metro Station

Map showing Issues on the stretch

Continuous parking on either side of footpath makes it difficult to access for pedestrians

Absence of footpath on bridge over the drain - despite presence of heavy pedestrian movement

Absence of footpath

Random, an complete encroachment of footpath considerably reduces its usability throughout the stretch

Spillover of Sabzi Mandi onto service lane leading to vehicle idling on carriageway

Informal vending on footpath hinders pedestrian movement and leads to target customers (vehicles) stopping and idling on carriageway

Low maintainance of service lane. Also a lane blocked T- junction due to the presence of a religious structure - Mazar

Redundant spaces created due to metro construction are being neglected and have become garbage dumps. These could be efficiently used as vending zones

NANGLOI DEPOT JUNCTION

3.4 Proposals

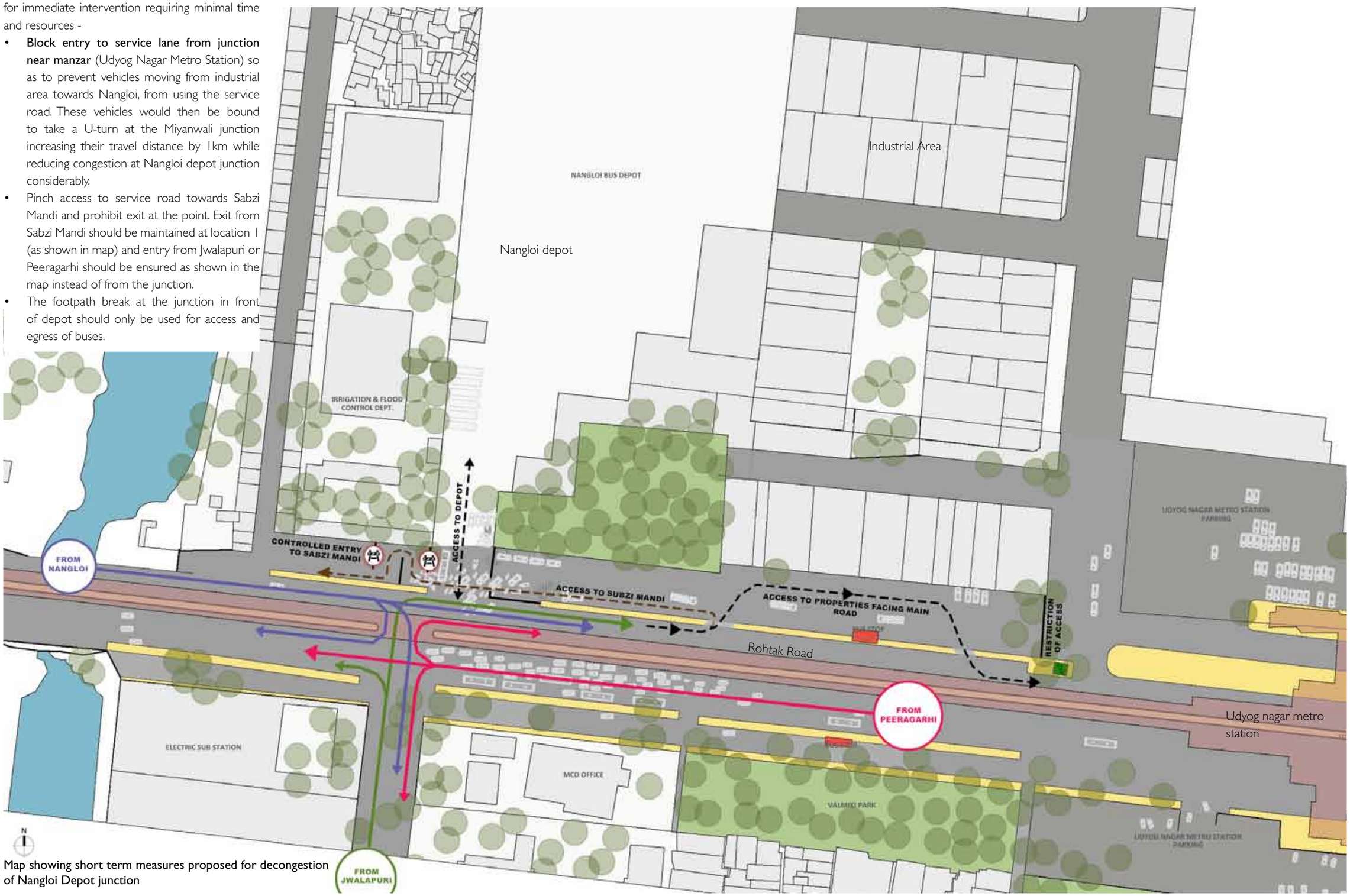
3.4.1 Proposal 1 - Short term measures

In the short term few measures have been identified for immediate intervention requiring minimal time and resources -

- **Block entry to service lane from junction near manzar** (Udyog Nagar Metro Station) so as to prevent vehicles moving from industrial area towards Nangloi, from using the service road. These vehicles would then be bound to take a U-turn at the Miyanwali junction increasing their travel distance by 1km while reducing congestion at Nangloi depot junction considerably.
- Pinch access to service road towards Sabzi Mandi and prohibit exit at the point. Exit from Sabzi Mandi should be maintained at location 1 (as shown in map) and entry from Jwalapuri or Peeragarhi should be ensured as shown in the map instead of from the junction.
- The footpath break at the junction in front of depot should only be used for access and egress of buses.

ENFORCEMENT - Simple enforcement measures that would relieve congestion at the junction as well as the stretch are:

- Enforced pedestrian crossing phase in cycle time
  -Pelican signals
- Prevention of vehicle idling on carriageway



Map showing short term measures proposed for decongestion of Nangloi Depot junction

NANGLOI DEPOT JUNCTION

3.4.2 Proposal II - Circulation Improvement Plan : Design and circulation changes at junction

Interventions:

For the long term solution it is proposed to shift the existing signal from Nangloi junction to the adjacent junction below Udyog Nagar metro station. For workability of this proposal, entry and exit of the depot is proposed to be shifted as shown in the map. For the traffic turning right from 60ft road (towards Peeragarhi), a dedicated U-Turn is provided 200 m away from the junction (towards Surajmal Metro station) to ensure that the current issue does not crop up in reverse. as the only U-turn currently available is extremely congested and nearly 1km away (2km increase in trip length).

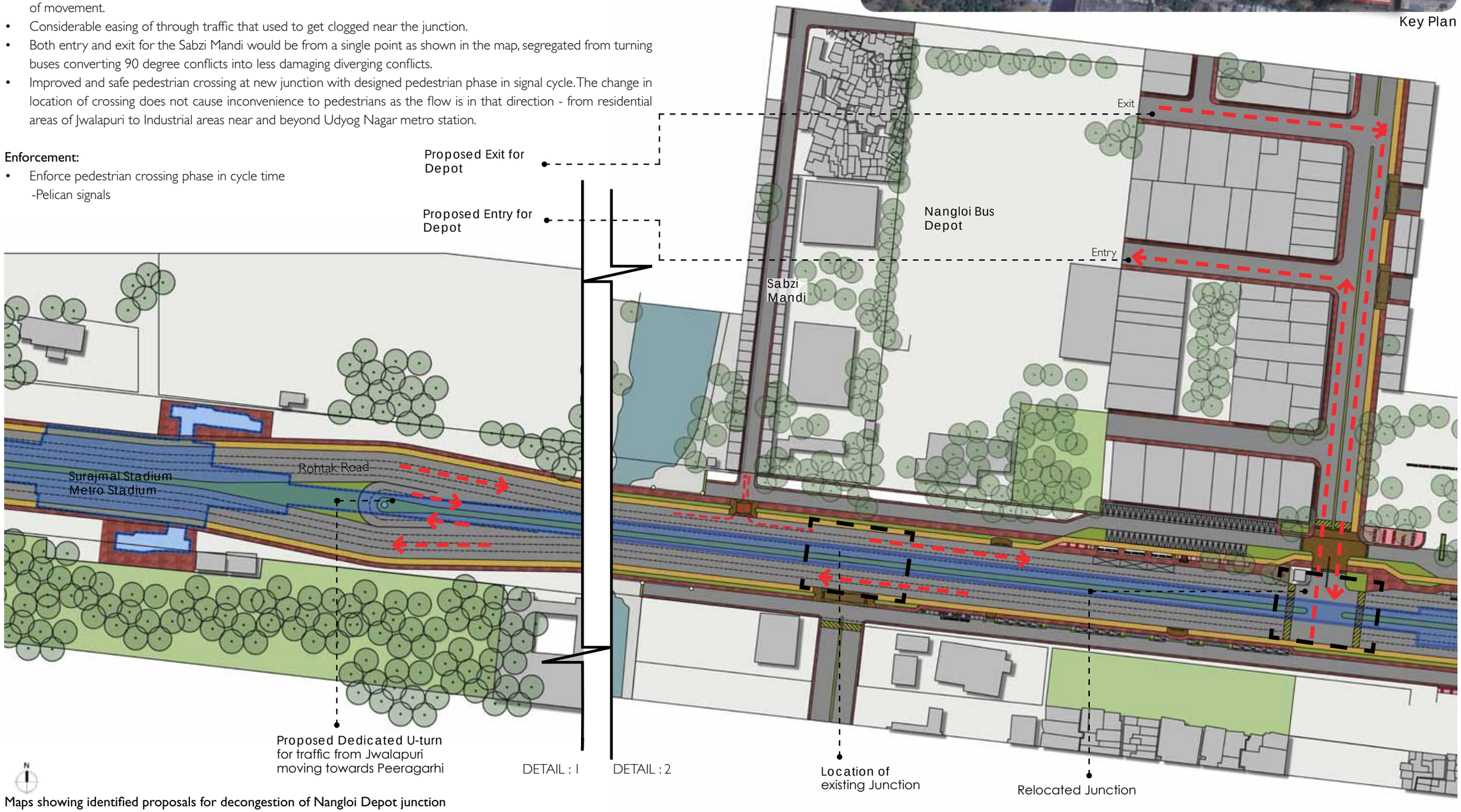
Outcomes:

- All traffic flows are provided for in a planned manner removing the need for traffic violations in terms of direction of movement.
- Considerable easing of through traffic that used to get clogged near the junction.
- Both entry and exit for the Sabzi Mandi would be from a single point as shown in the map, segregated from turning buses converting 90 degree conflicts into less damaging diverging conflicts.
- Improved and safe pedestrian crossing at new junction with designed pedestrian phase in signal cycle. The change in location of crossing does not cause inconvenience to pedestrians as the flow is in that direction - from residential areas of Jwalapuri to Industrial areas near and beyond Udyog Nagar metro station.

Enforcement:

- Enforce pedestrian crossing phase in cycle time
  -Pelican signals

Key Plan



Maps showing identified proposals for decongestion of Nangloi Depot junction

3.4.2 Proposal II - Circulation Improvement Plan : Design improvement for the stretch (Nangloi Depot to Peeragarhi Chowk)

Map showing a road section between Nangloi Depot and Peeragarhi Junction to depict changes proposed for the entire stretch

In the 2 km stretch between Peeragarhi metro station and Surajmal Metro station, the cross section of the road is found to vary intermittently. The regional character of road is superimposed with urban uses like industries, commercial, public/ semi - public and residential but the road layout (cross-section) does not incorporate the same. Hence, with the proposal for decongestion of the junction, a redesign proposal for the stretch has been prepared for a comprehensive resolution to the problem. The major interventions are - reduced lane widths (3m instead of 3.5m), segregation of traffic (non motorised vehicles), dedicated vending zones, and stands for intermediate public transport modes like the Gramin Sewa which is operated here. The redesign aims at ensuring a smoother flow of traffic by minimising bottlenecks, vehicle idling islands, pedestrian accumulation at one place spilling onto carriagway, etc.

PARKING:
Efficient Parking designed to prevent encroachment of carriageway

BUS STANDS:
Space to accomodate multiple buses, extra space for passengers to wait by shifting the NMV lane behind the bus shelters and merging the MUZ and footpath

TABLE - TOP CROSSINGS:
In order to slow down the on coming traffic from secondary roads before merging with the main traffic table top crossings have been provided

VENDING ZONES:
Located at places with maximum pedestrian movement such as intersections and metros with limited direct access from the main carriageway

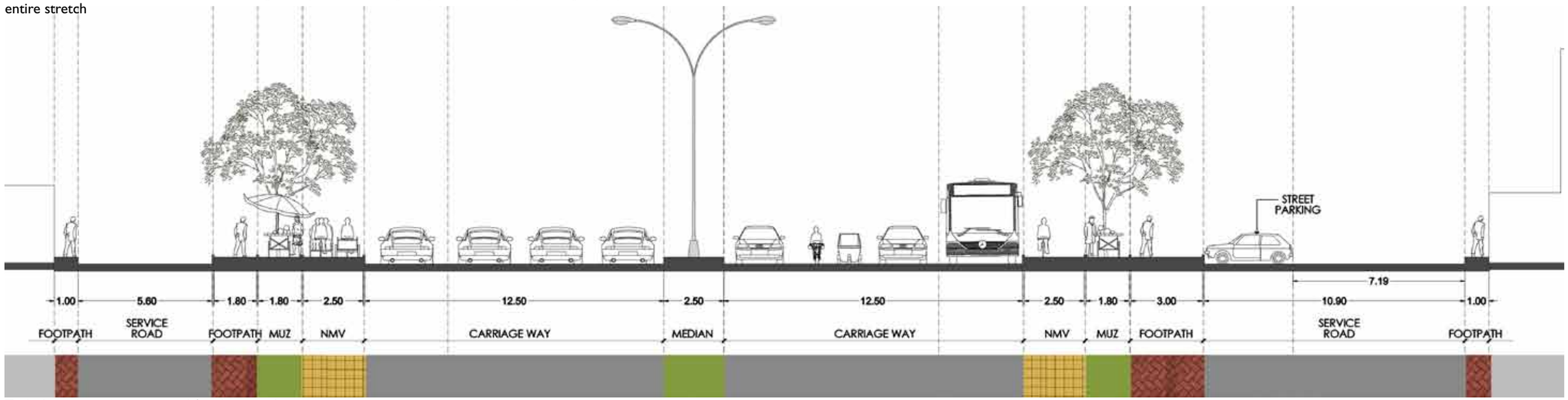
IPT STANDS:
Auto drop off/pick up points located along the carriageway edge by shifting NMV lanes, at places with maximum pedestrian footfall
Metro stations and intersection designed with rickshaw parking areas

Interventions and Outcomes

- Separate NMV lane Segregation of motorised and non-motorised road users
- Reduction of lane widths to 3 m
- Earmarked vending zones
- Earmarked spaces for pick up/ drop of PT/ IPT
- Defined parking spaces on service road
- Separation of pedestrian path from carriageway via grills

Enforcement -

- Enforce adherence to design components
- Stop vehicles from idling on carriageway



Typical cross section proposed for the stretch

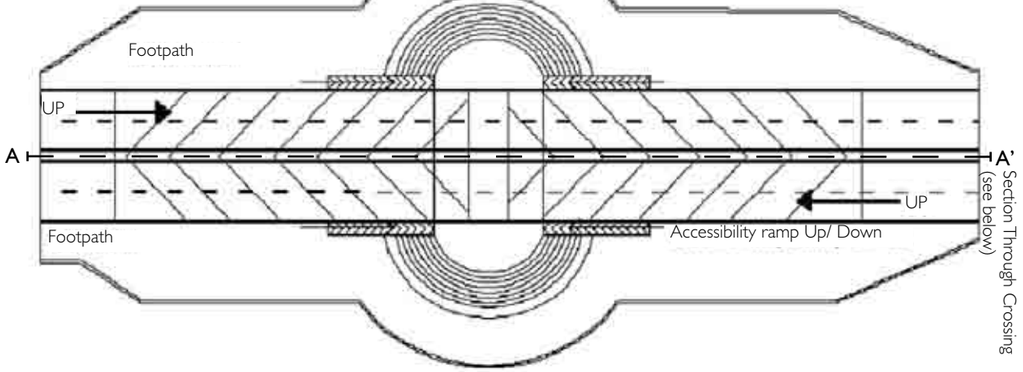
3.4.3 Proposal III - Improvement Plan with Grade separated Pedestrian Crossing

As mentioned earlier, large volumes of pedestrians cross the Junction both ways throughout the day due to presence of residential colonies on one side and industrial area on the other. Hence, a dedicated crossing has been proposed to ensure convenience and safety of pedestrians. As evidence has shown that regular grade separated alternatives like subways and footover bridges are underutilised due to inconvenience, at-grade pedestrian crossing with a vehicular flyover was deemed to be the ideal solution. Vehicular flyover is possible here due to presence of service lane on both sides providing access to the abutting plots.

However, since distance between Nangloi Depot Junction and T-Junction near Udyog Nagar Metro Station is 200 m, a regular flyover achieving the 2.7 m clearance required for pedestrian movement is not possible. Hence, instead of an at-grade pedestrian crossing with a vehicular flyover, a humped pedestrian crossing has been designed. Vehicular movement has been raised 1.5 m above ground level at a slope of 1:30 while pedestrian subway is recessed 1.2 m below the ground level at a slope of 1:12. With 50 m on both sides of the raised carriageway for merging/ diverging, a length of 10 m has been obtained for the crossing. Wider subway, reduced depth below ground, and buildings located at a distance from the carriageway, ensure that the subway is well lit and its interiors are visible from surrounding ground level.

Source: EIL, Developments Consultant & Creative Arc Architects and Transport Planners, from Pedestrian Design Guidelines, UTTIPEC, DDA 2009

Plan



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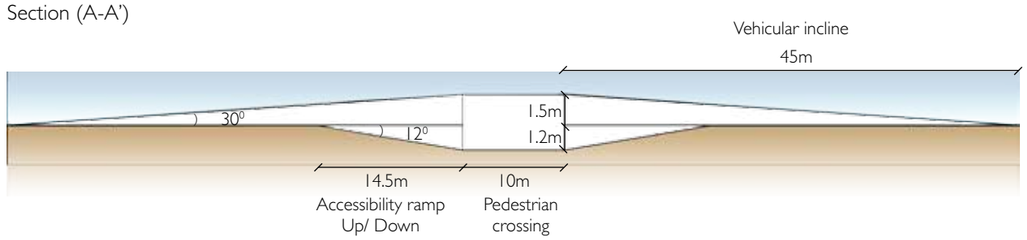


Source: EIL, Developments Consultant & Creative Arc Architects and Transport Planners, from Pedestrian Design Guidelines, UTTIPEC, DDA 2009

Sample Detail of a Humped Pedestrian Crossing

Map showing location of proposed pedestrian crossing

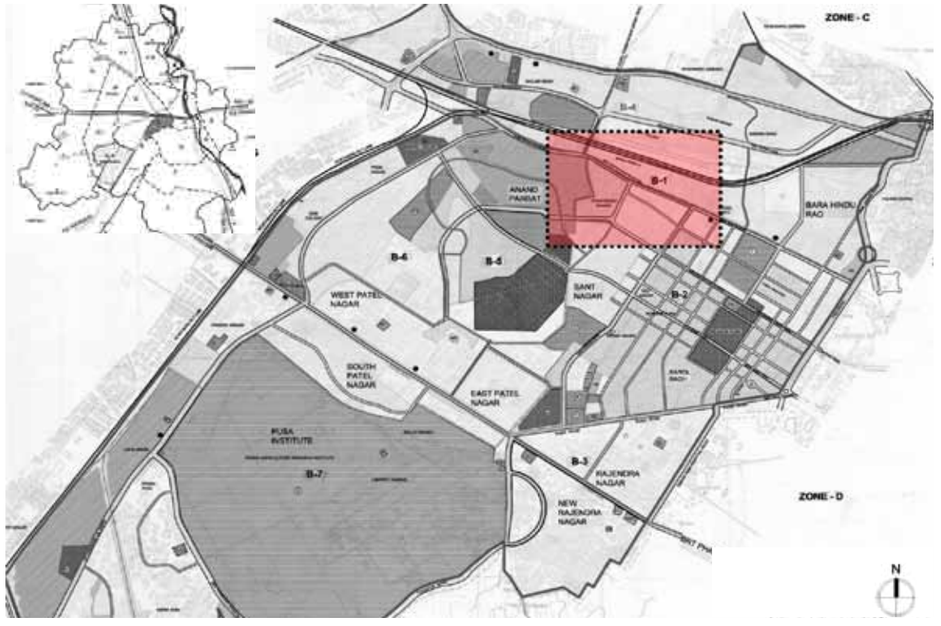
Aerial view showing the Grade separated Pedestrian crossing

NANGLOI DEPOT JUNCTION

CHAPTER 4
KAMAL T-POINT & LIBERTY CINEMA CHOWK

KAMAL T-POINT & LIBERTY CINEMA CHOWK

4.1 Site Context



Zonal Plan showing Study area location

Source: Base Map Zonal Development Plan, DDA

The site is located in Delhi Master Plan 2021, Zone B (City Extension, Karol Bagh). Both sites Kamal T-Point and Liberty Chowk are connected by a stretch of 1.1km road. Traffic issues along this stretch needs to be resolved in order to eradicate congestion at the junction. Hence a traffic study is done as a combination of three study area locations:

- Kamal T-Point
- Liberty Cinemas
- 1.1km stretch on New Rohtak Road Connecting the two Junctions

In the course of study a smaller junction (entry to Ram Swaroop Vidyarthi Marg) has been identified for design improvement along New Rohtak Road. The image below shows the surrounding landmarks and study area; where in Kamal T-Point is marked as Junction 1 and Liberty Cinema Chowk is marked as Junction 2.

Study area identified along the stretch of New Rohtak Road

Kamal T-Point

Kamal T-Point : Site Context

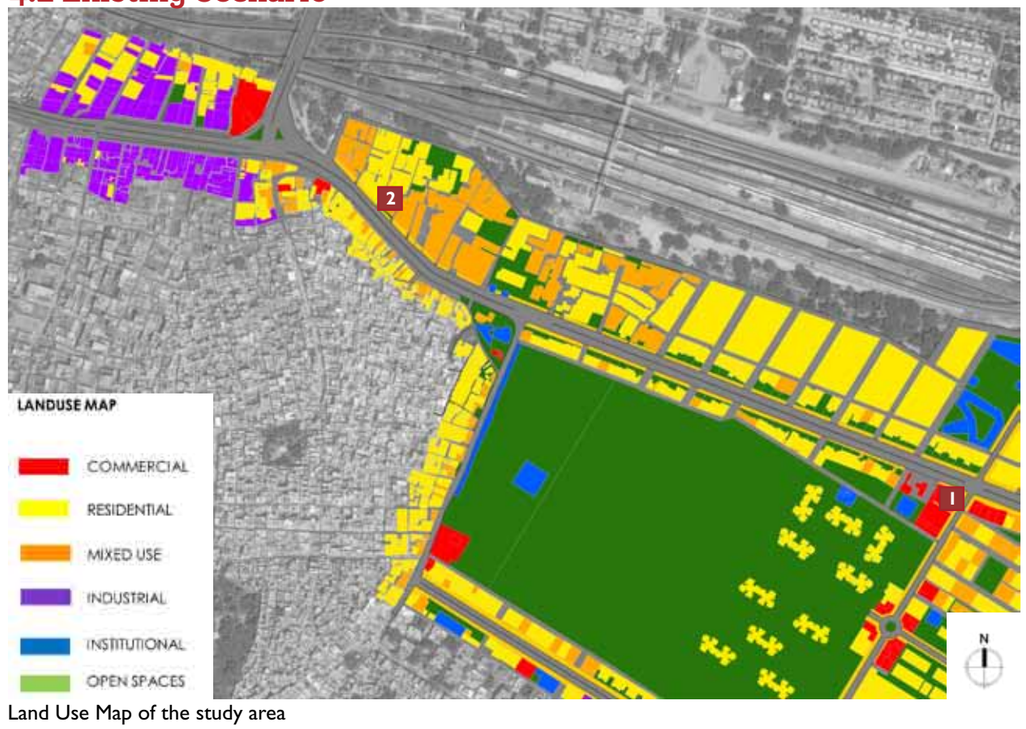
Kamal T-Point is a three arm signalised junction at the intersection of New Rohtak Road and Swami Narayan Marg. Swami Narayan Marg leads to Shastri Nagar metro station and New Rohtak road joins Liberty Chowk to Zakira as shown in above figure. The junction have heavy traffic flow towards Shastri Nagar throughout the day;; and there is heavy traffic flow towards Zakira in the morning peak hour from 9am to 11am. In the evening i.e after 5pm the traffic from Zakir is diverted to Inderlok by closing off the entry to Zakira Flyover.

Liberty Chowk

Liberty Cinema Chowk: Site Context

Liberty Chowk is a four arm signalised intersection. The road stretch from Kamal T-Point to Liberty cinemas is Guru Govind Singh Marg . The major land at the junction is the Liberty cinemas. The junction has a major issue of on-street parking during prime time movie shows at Liberty cinemas

4.2 Existing Scenario



Land Use Map of the study area

The major land use along the stretch is residential .The land use along the stretch after Kamal T-Point towards Zakira is Industrial (Anand Parvat Industrial area).

The stretch after Liberty Cinema has a number of commercial and public establishments. Due to the presence of large number of industrial and commercial land use adjacent to junctions there is large amount of on street parking and encroachment along the road. This amounts to traffic congestion.

The Sarai Rohilla Railway station also lies towards the north of the stretch. This stretch has heavy pedestrian flow but lacks in pedestrian facilities as well as bus stop facilities

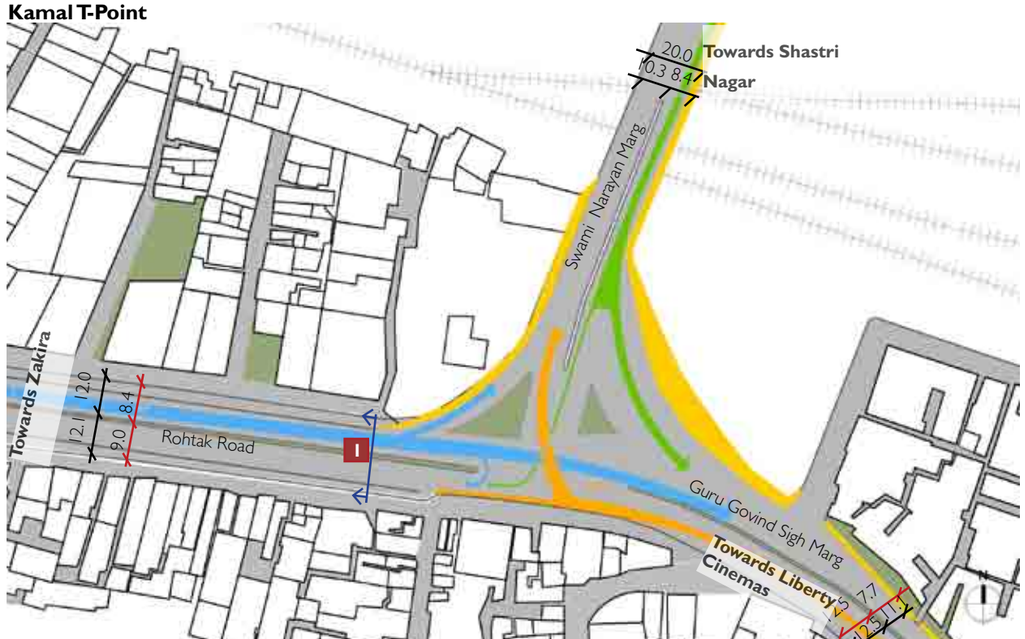
Street view of Liberty Cinema
Source: http://static.panoramio.com/photos/large/51477069.jpg

Lohar settlement along Rohtak road

4.3 Site Analysis

Existing Site Scenario and Traffic Volume Analysis

Kamal T-Point



Traffic flow at Kamal T-Point:

From	Towards (Veh/hr)			
	Arm 1	Arm 2	Arm 3	Total Inflow
Arm 1		704	2304	3008
Arm 2	696		1707	2403
Arm 3	1080	1364	504	2948

LEGEND:

Existing road widths

Effective road widths

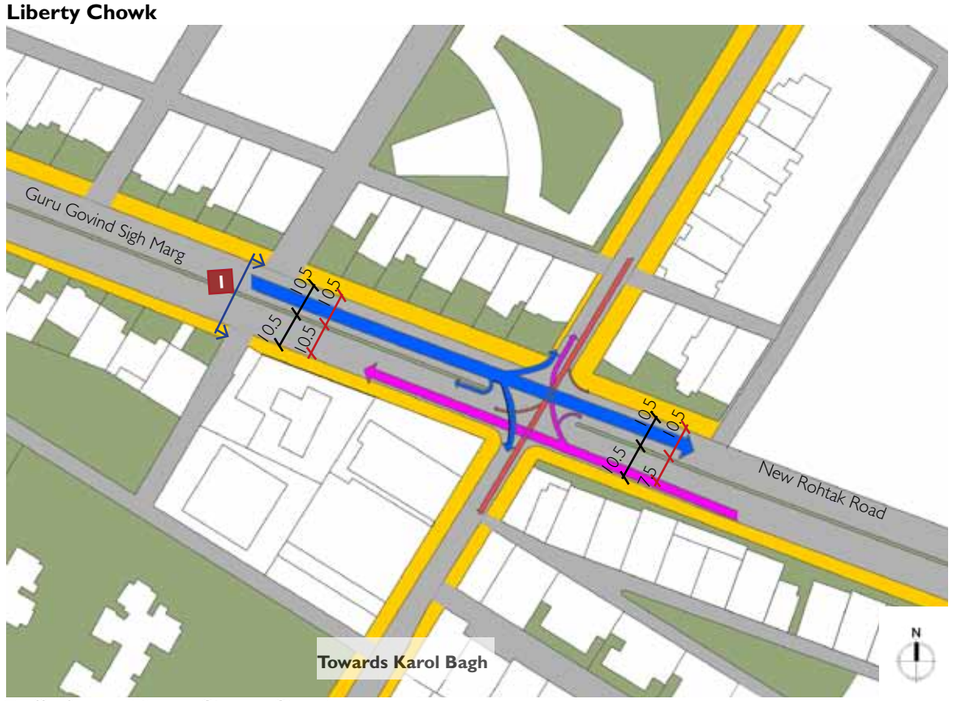
In order to study and analyse the traffic volume and traffic movement patterns a sample survey was conducted at the junction. Traffic volume surveys were done via video recordings of minimum 15 minutes on all three arms, to capture peak hour volumes, The survey was carried out during morning peak hour that starts at 9am.

Observations from site visit and traffic volume study are as follows:

- There is heavy traffic flow towards Shastri Nagar throughout the day.
- Major issue related to traffic volume at the junction is that the traffic volume of the two convicting flows that is from Zakira To Liberty and from Liberty to Shatri Nagar is the highest.
- Large amount of vehicular traffic opts to take wrong directional movement to access the commercial areas and to avoid U-Turn at Liberty cinemas.

Cross section of road towards Zakira Flyover from Junction

Liberty Chowk



Traffic flow at Liberty Cinema Chowk

From	Towards (Veh/hr)			
	Arm 1	Arm 2	Arm 3	Arm 4
Arm 1	188	131	2580	2804
Arm 2	76		44	372
Arm 3	1624	56		103
Arm 4	14			

LEGEND:

Existing road widths

Effective road widths

Traffic survey was conducted in the same manner as in the case of Kamal T-Point. Traffic volume surveys were done via video recordings of minimum 15 minutes on all three arms, to capture peak hour volumes, The survey was carried out during morning peak hour that starts at 9am.

Observations from site visit and traffic volume study are as follows:

- Both the straight moving traffic volumes are heavy as compared to other traffic flows.
- There isn't heavy queue up due to signal timings but unruly on street parking does disrupt traffic at places.
- On street Parking during show timings at Liberty Cinemas is huge at the junction.
- The Free left turn just before the Junction appears to be narrow and inaccessible.

Cross-section of Road towards Liberty Cinema Chowk

KAMAL T-POINT & LIBERTY CINEMA CHOWK

Issues along the 1.1km stretch of New Rohtak Road connecting the two Junctions

On Street parking (Truck):
No segregated truck bays in the area, which leads into congestion on the major road.

Commercial Encroachment:
Haphazard commercial development, lead to encroachment by both shop keepers and hawkers

LEGEND:

- On Street Parking Truck
- Spill Over Activity
- Footpath

Map showing issues along the stretch

KAMAL T-POINT & LIBERTY CINEMA CHOWK

Issues along the 1.1km stretch of New Rohtak Road connecting the two Junctions

HAWKERS ACTIVITY
Hawkers selling along the footpath, they cause congestion as they spill over on to the roads.

ON-STREET PARKING (CARS)
Cars and two wheeler on street parking, leading the road to be narrow, which causes congestions and traffic jams, both in major and arterial roads

Map showing issues along the stretch

KAMAL T-POINT & LIBERTY CINEMA CHOWK

4.4 Proposal

ISSUES		PROPOSALS
On street parking is being done on footpath space		Provide continous grill and greens at regular interval to prevent on street parking.
Existing 10.5m carriageway is not effectively utilised by vehicular traffic 1m of carriageway goes to shoulder space		Redesign road cross section and provide 9.5m carriage-way and utilise remaining road space for pedestrian pathway and cycle tracks
No space for pedestrian movement		
At bus stop location road is slightly widened to provide space for stopping buses.This space is encroached by hawking activities		Place bus stop immediately adjacent to carriage-way and footpath /cycle track must pass from behind the bus stop
No pedestrian crossing facilities		Provide table top crossing along with pedestrian signal at every 250m

Strategy followed along the stretch connecting the two junctions

The above table gives an overview of strategies following while giving the proposal. The proposal has been formulated keeping in mind the concept of shared spaces and designing for the pedestrian traffic along with improved vehicular traffic movement.

Width of Carriageway: As per UTTIPEC report on Street Design Guidelines, Nov 2009 the given street comes under Other Sub Arterial Road. The report also specifies the category of roads require 2-3 motorised lanes with minimum width of 3.1m. Taking into account the width of carriageway at the narrowest section was measured to be 9.5m and as per the above specification a constant width of 9.5m has been proposed along the stretch

- Parking: In order to prevent on street parking along the road, it is proposed that there should be continuous fencing along the footpath.

- The lack of pedestrian crossing facilities have also been attended has been attended to by providing table top crossings at every 250m along the stretch between the 2 junctions.

Map showing Road Hierarchy in Delhi

Source: UTTIPEC (DDA), Street Design Guidelines, 2009,

Proposed Road Cross sections

Map showing location of cross-sections along the stretch joining the two junctions

As discussed in the earlier section to resolve issues along the 1.1 km stretch joining Kamal T-Point and Liberty Cinema Chowk the road cross sections need to be improved.

The proposed cross section are made in an inclusive manner so that all road users have designated space. The existing cross section doesn't have sufficient provision for pedestrian or cyclist traffic which causes them to use carriageway for for movement.

Total five sections have been detailed along the stretch :

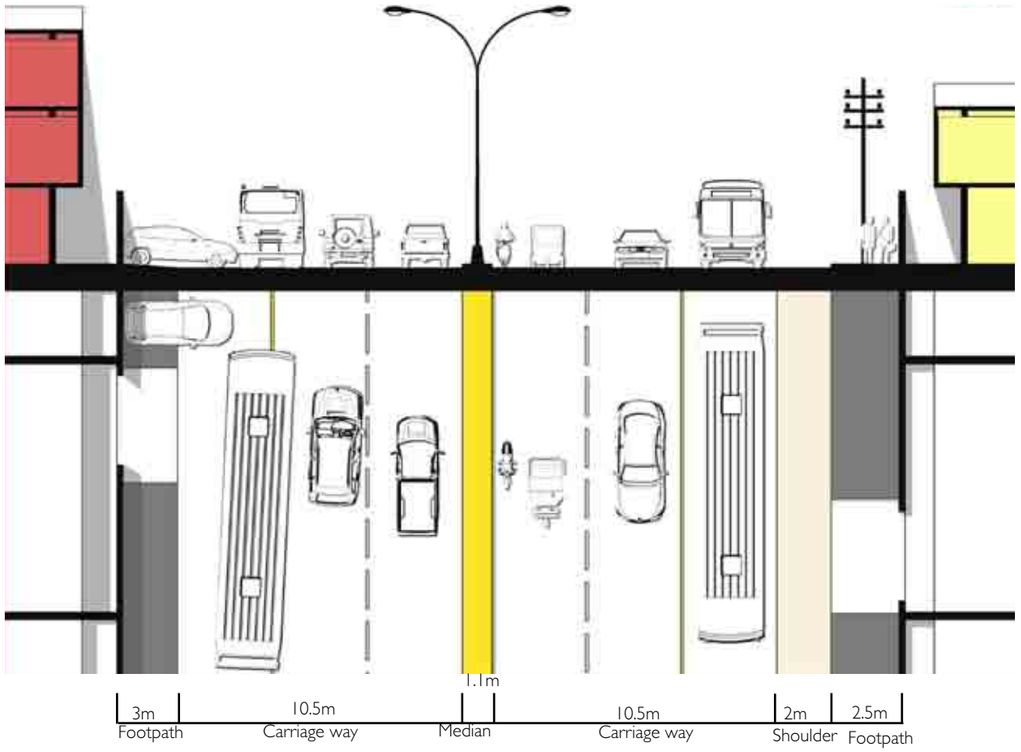
Section 01: Before Liberty Chowk As there are number of entries to private properties in this stretch,the section shows how the entry must be designed without disrupting pedestrian movement and effective.

Section 02: After Liberty Chowk The section explains the entry to gated colonies along the stretch.

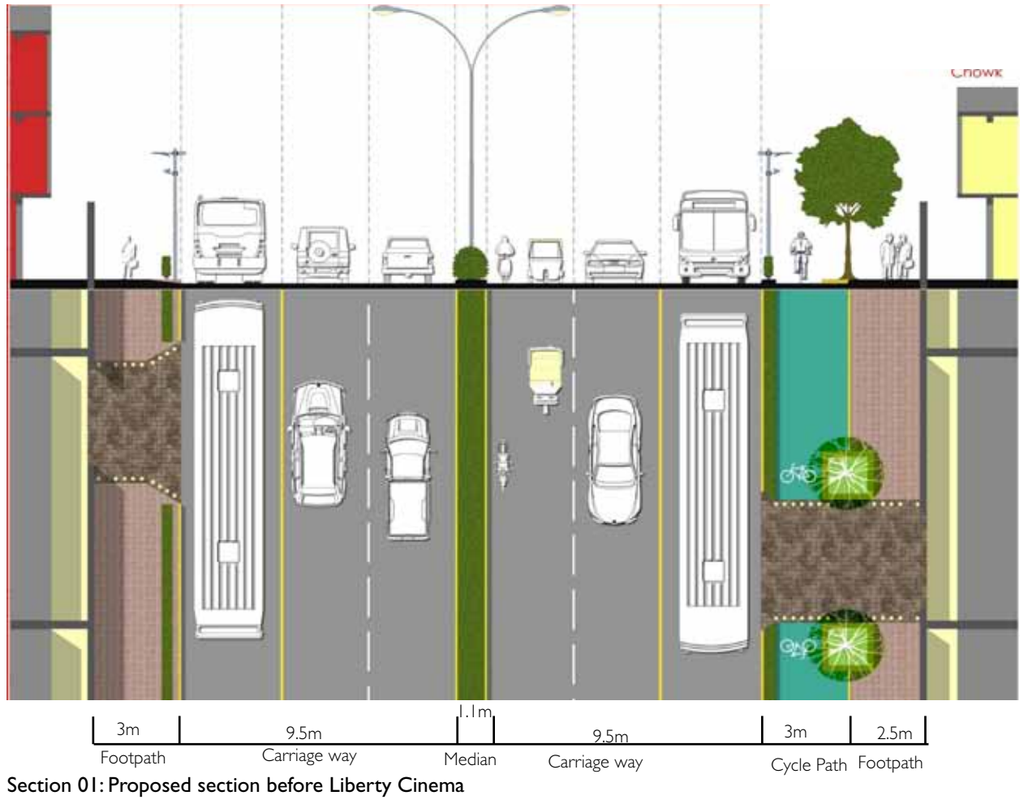
Section 03: At Bus Stop The existing Bus stop section is designed with bus bay, but the buses do not stop inside the bay which causes passengers to wait on road outside the bus shelter. The proposed cross section is so designed that the buses stop at the curb side. This will ensure that there is minimum queue for the bus when it stops at the bus stop

Section 04: Before Kamal T-Point Before the stretch narrows down slightly, this is the narrowest cross section on the road. The proposed section shows how to accommodate all road users.

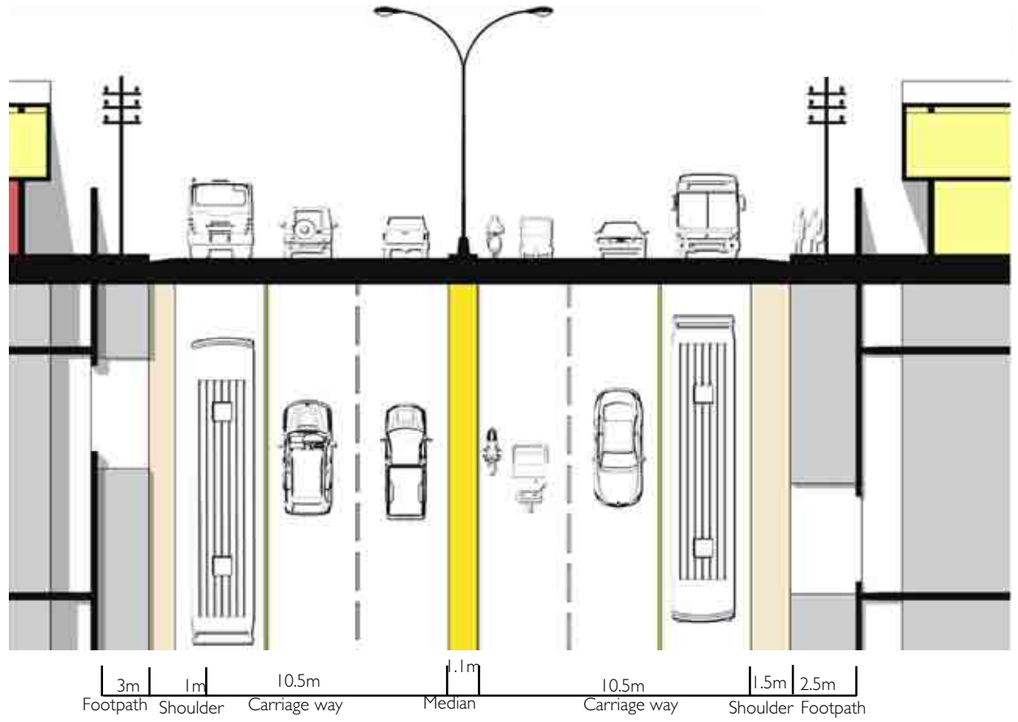
Section 05: After Kamal T-Point After Kamal T-Point the section includes a service lane that is at -6m from road surface. Also there is heavy on street parking here along the shoulders of the stretch. The proposed cross section shows how the area under on-street parking can be reclaimed as footpath.



Section 01: Existing section before Liberty Cinema



Section 01: Proposed section before Liberty Cinema

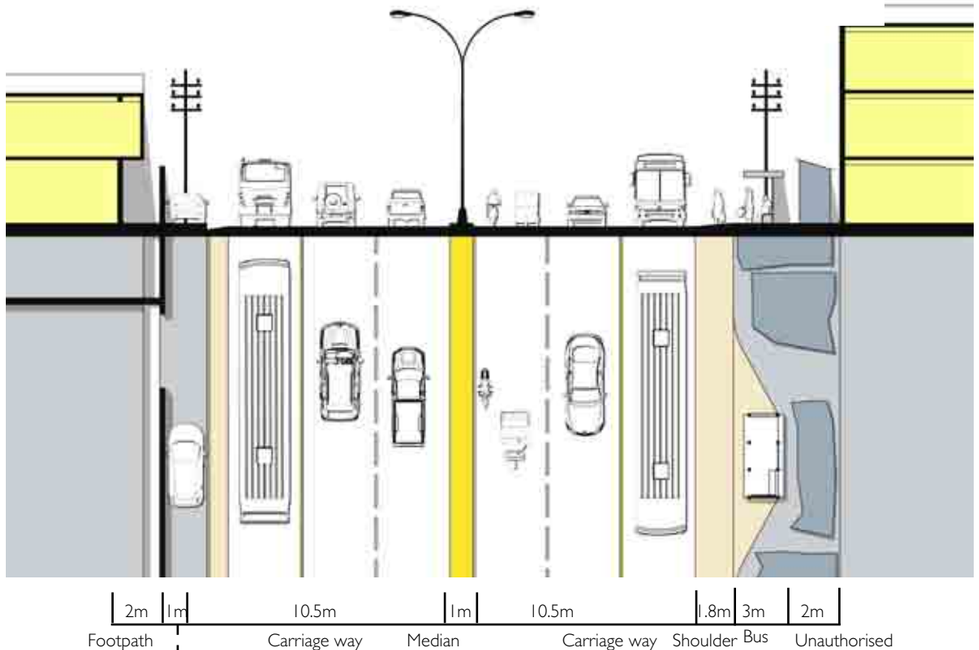


Section 02: Existing section after Liberty Cinema

Section 02: Proposed section after Liberty Cinema

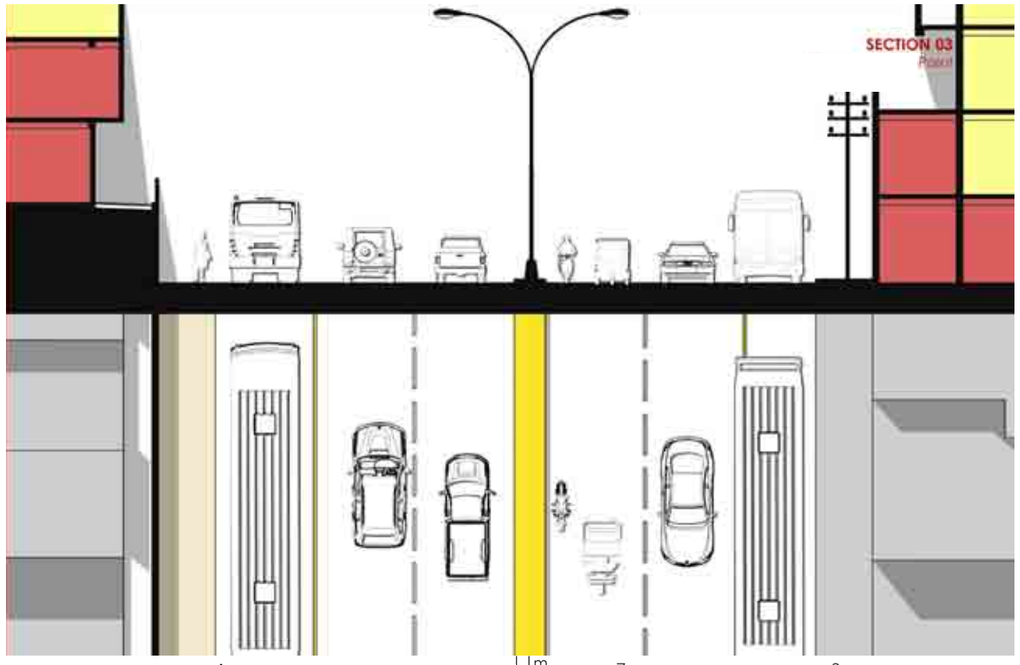
KAMAL T-POINT & LIBERTY CINEMA CHOWK

Following is the image of cross-sections depicting the proposal along the 1.1 km section

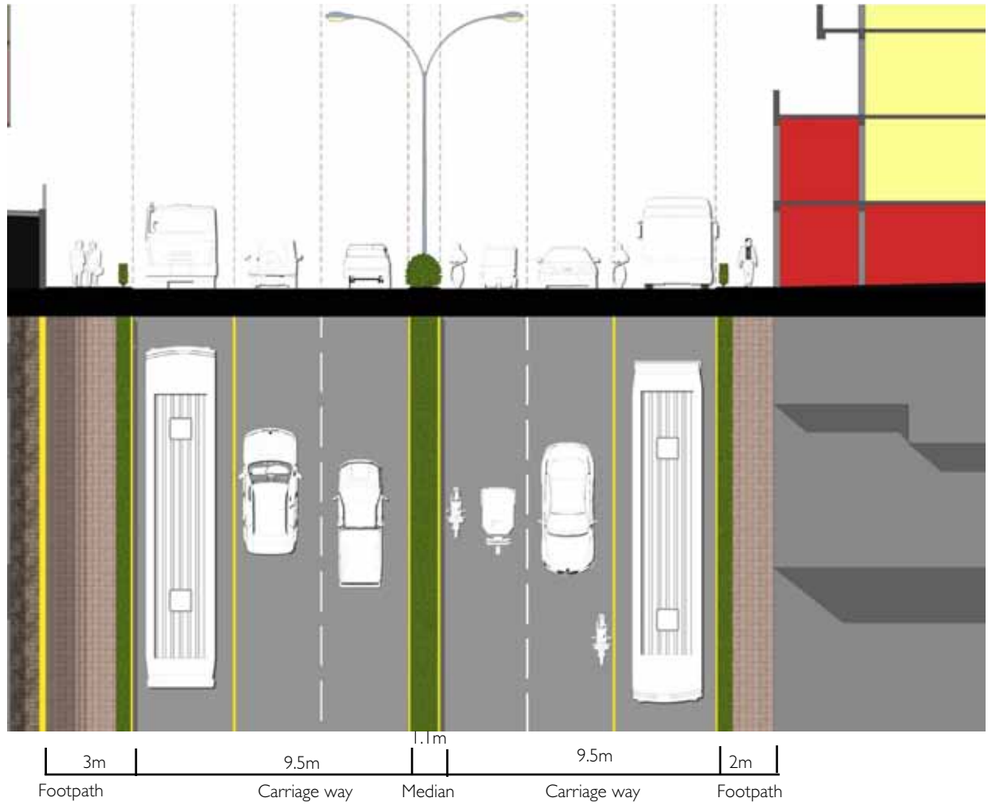


Section 03: Existing section at bus stop

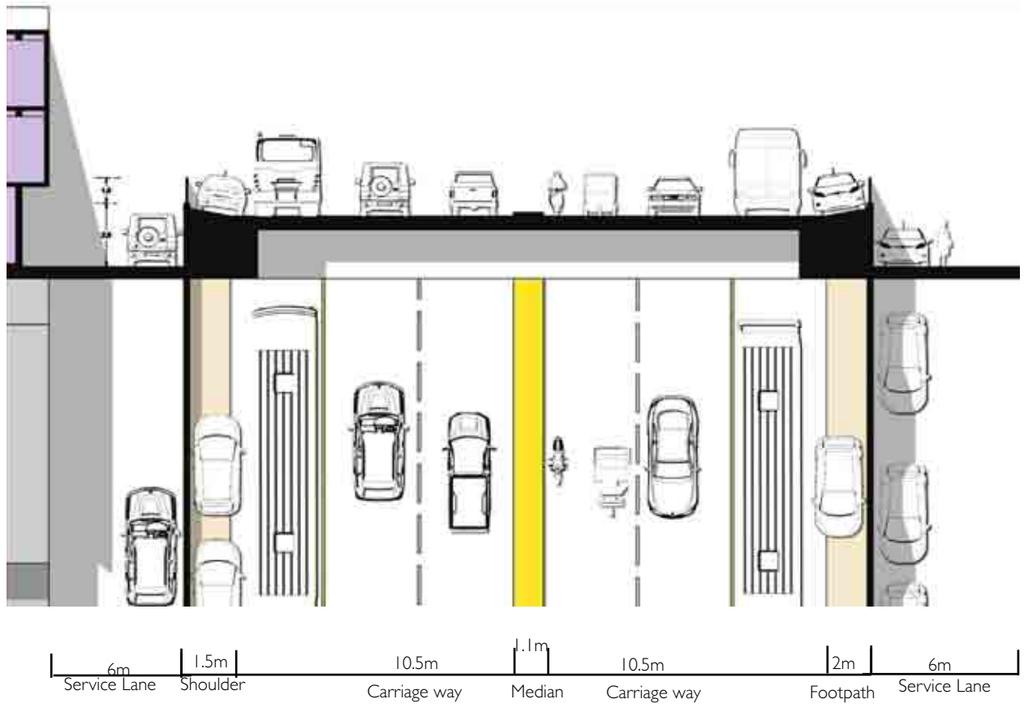
Section 03: Proposed section at bus stop



Section 04: Existing section before Kamal T-Point



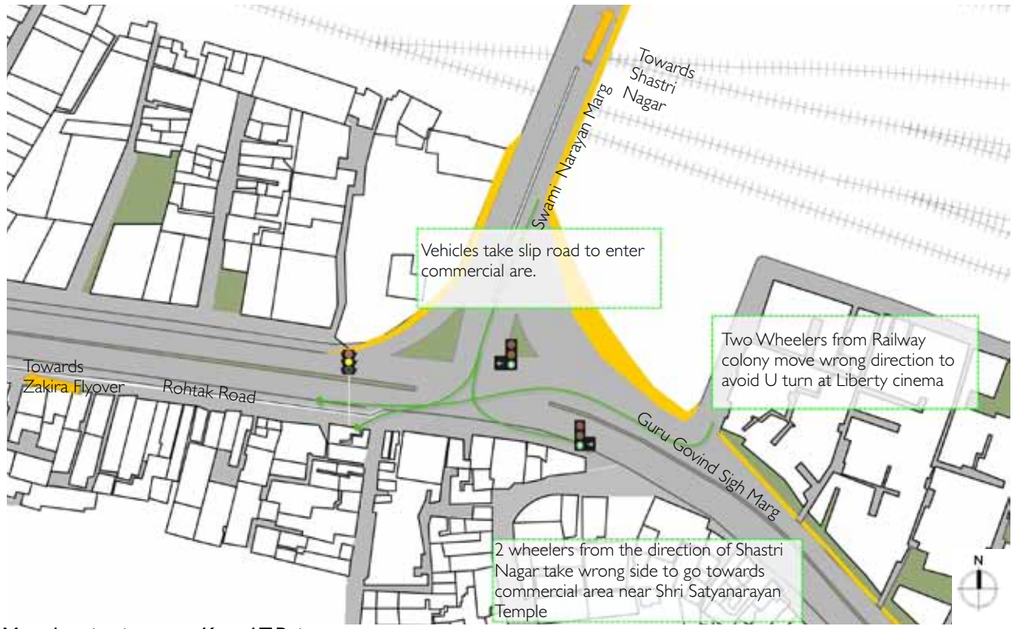
Section 04: Proposed section before Kamal T-Point



Section 05: Existing section after Kamal T-Point

Section 05: Proposed section after Kamal T-Point

Strategy followed at Kamal T-Point

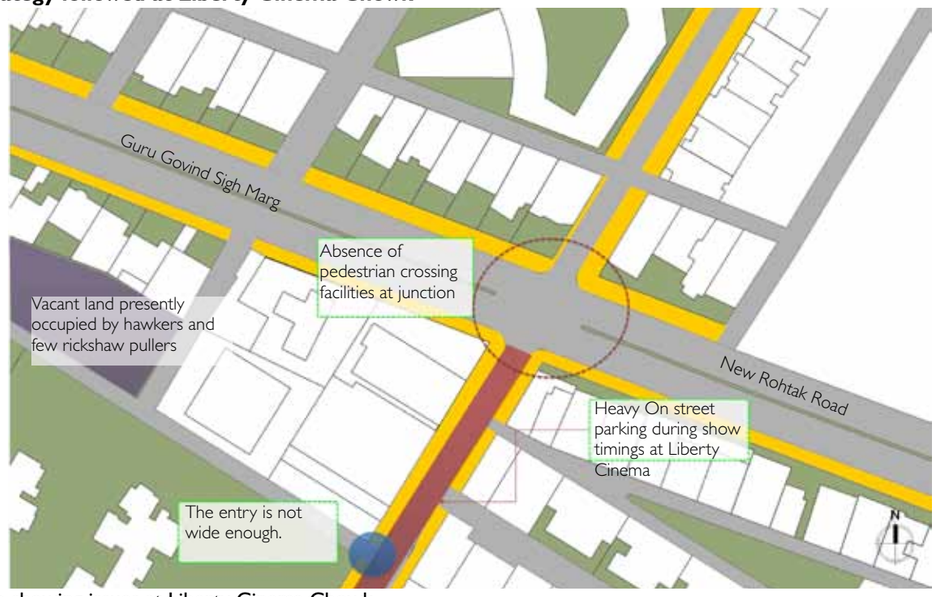


Map showing issues at Kamal T-Point

Major Issue at the junction is the traffic moving in wrong direction to avoid u-turn at the Liberty Chowk,

To prevent this a roundabout geometry was designed at the junction. Since the traffic flow at the junction is higher than 3600PCU/hr the roundabout should be signalised in order to prevent congestion at the weaving section. There shall be free left turn lane on Swami Narayan Marg and segregated lane for straight traffic from Liberty Cinema Chowk to Zakhira flyover on New Rohtak Road.

Strategy followed at Liberty Cinema Chowk



Map showing issues at Liberty Cinema Chowk

Major Issue at the junction is during show timings at the Liberty cinema due to heavy on street parking.

To solve this issue the vacant land adjacent to the cinema can be converted into parking space to accommodate the parking requirement generated by the theatre.

KAMAL T-POINT & LIBERTY CINEMA CHOWK

Proposal - Design Layout at Kamal T-Point

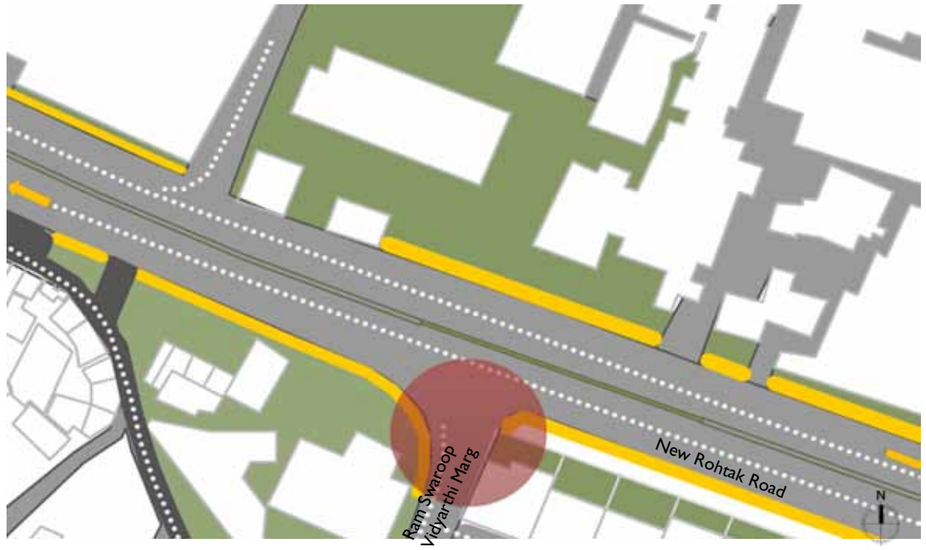
Map Showing proposed Junction Design for Kamal T-Point

Proposal - Design Layout at Liberty Cinema Chowk

Map Showing proposed Junction Design for Liberty Cinemas

	ISSUES			PROPOSALS		
Location	Kamal T-Point	Liberty Chowk	1.1km stretch	Kamal T-Point	Liberty Chowk	1.1km stretch
Geometry	Large road widths at the junction allowing vehicular traffic to encroach and move in wrong direction	Left turn on Guru Ravi Das Road from behind the Liberty Chowk has narrow entry point and needs to changed		Provide signalised Roundabout geometry to junction to prevent traffic from moving in wrong direction	Provide proper turning radius at the left turn to ensure vehicles use the left road behind Liberty cinema	
Flow	Right turning traffic from Shastri Nagar metro station towards DB Gupta Road tends to take wrong direction to avoid U-turn at Liberty. This interrupts straight traffic towards Zakira			Provide segregated space for straight moving traffic in order to prevent any movement of traffic in the opposite direction. Close the opening of service road at the junction to prevent vehicle entry from junction.		
PT/ IPT Pick up/ Drop off			Autos parked near the bus stop as there are no designated IPT parking areas			Autos parked near the bus stop as there are no designated IPT parking areas
Hawking			A small settlement of Lohars behind the Bus-Stop encroaches road space for Hawking Activities			Option-1 provide resettlement to the Lohars and remove their shop; Option2: Provide stalls at bus stop resettle the lohars to near by vacant land.
Parking	Heavy On street parking at the junction	Heavy on street parking during show timmings at Liberty cinema	Residential as well as Commercial spaces along the road tends to use footpath for parking.	The road space must be reclaimed for providing raised pedestrian pathways in order to prevent on-street parking	Provide designated parking space adjacent to Liberty cinema.	Provide continuous greens or grills along road to segregate pedestrian movement from vehicular traffic.
Pedestrians contributing to congestion			During peak hour heavy pedestrian flow from Sarai Roahilla Railway Station Tends to hinder Traffic flow			Provide table-top crossing with pedestrian signal at the junction with heavy pedestrian flow
Issues faced by Pedestrians	No Proper Pedestrian Crossing at junction	No Proper Pedestrian Crossing at junction	No Proper Pedestrian Crossing throughout the stretch	Provide table top crossing at the junction for pedestrian crossing	Provide table top crossing at the junction for pedestrian crossing	Provide table top crossing with pedestrian signal at every 250m

Proposal - Design Layout at entry to Ram Swaroop Vidyarthi Marg



Map showing issues at entry from Ram Swaroop Vidyarthi Marg

Existing condition

The Ram Swaroop Vidyarthi Marg is suppose to be one way and allow only exit vehicles on to Rohtak Road. Due to wide turning space at junction vehicles halt to enter into the road This causes heavy jam on this road and creates bottle neck along the New Rohtak Road.

Map Showing proposed changes at entry from Ram Swaroop Vidyarthi Marg

Proposal

Ram Swaroop Vidyarthi Marg joins the New Rohtak Road midway in the concerned stretch.(1.1 km stretch joining the two junctions). A channelizing island is proposed at the intersection to strictly facilitate one-way traffic flow into from Ram Swaroop Vidyarthi Marg to New Rohtak Road.

3-D Views of The Proposal

View of Kamal T-Point from Anand Parbat towards Sarai Rohilla Railway station

View shows segregated lane for straight and left turning traffic at the junction and provisions for the Pedestrian crossing

View of Kamal T-point from Sarai Rohilla Railway towards Anand Parbat

View shows Table Top crossing at the junction and segregated lane for straight moving traffic towards Zakhira.

KAMAL T-POINT & LIBERTY CINEMA CHOWK

View of bus stop on New Rohtak Road

Typical Table Top Crossing for pedestrians

CHAPTER 5
S-BLOCK JUNCTION, MANGOLPURI

S-BLOCK JUNCTION, MANGOLPURI

5.1 Site Context

S-block, Mangolpuri junction is located at the intersection of Hospital Road and the Y block Road. Major Arterial roads adjoining the site are Outer Ring Road,(nearly 2 kms away) and Rohtak Road,(nearly 1 km away). Nearest metro station is Udyog Nagar that lies on Green line running along Rohtak Road. The most prominent building in the vicinity of the junction is the Sanjay Gandhi Memorial Hospital which is a multi speciality 100 bed hospital. Sultanpur Majra urban village lies towards south west while Mangolpuri industrial area and Udyog Nagar industrial area form the southern boundary. Junction is immediately surrounded by planned residential pockets.

Map showing areas surrounding (context) S - Block Mangolpuri Junction

Image showing congestion at S - Block Mangolpuri junction

5.2 Existing Scenario

Map showing areas surrounding the junction and their land use

LEGEND

- Residential
- Commercial
- Mixed use
- Green/ Open spaces
- Vacant land
- Public/ Semi-public
- (H) Hospital
- (PS) Primary school
- (SS) Senior Sec. school
- (R) Religious
- (PO) Post office
- (P) Police station

Predominant land use in the study area is residential with mixed use along two major roads:

- Y-Block Road
- Hospital Road.

A number of primary & senior secondary schools exist in the area. Activities around the junction are mainly dictated by the presence of Sanjay Gandhi Memorial hospital. The residential pockets are mostly planned settlement but rampant encroachment exists in the surrounding.

Image showing arm of the junction that leads to Nangloi Sultanpuri Road

Image showing Sanjay Gandhi Hospital behind the junction

Temporal Changes in Junction geometry since year 2001

2001

- Bus terminal located at the junction - Location 1
- Staggered intersections
- 90 degree turn with insufficient turning radius on all arms

2004

- Bus terminal re-located
- Adequate turning radii provided at locations 1 & 2
- Location 1 serves as bus stop

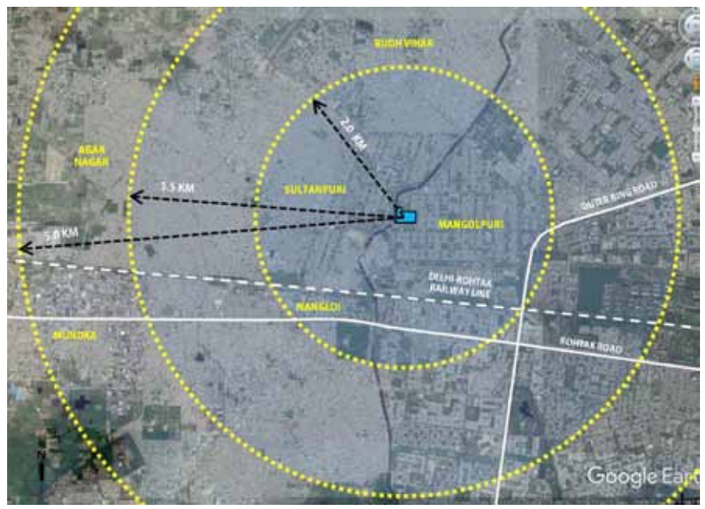
2010

- Location 1 redesigned to streamline circulation to & from the bus stop

2016

- Location 1 walled off from the junction and lying vacant
- The area lies vacant right now and is under possession of the DDA

Observed influence of Sanjay Gandhi Memorial hospital on traffic characteristics



Map showing catchment areas of Sanjay Gandhi Memorial hospital

Sanjay Gandhi Memorial Hospital caters to the health needs of, a population of 15-20 lakh residing in JJ clusters & resettlement colonies of Mangolpuri, Sultanpuri, Nangloi, Mundka, Agar Nagar & Budh Vihar. Patients and their families reside in nearby areas for long term medical treatment.

Public and intermediate public transport has a significant modal share in the traffic attracted by the hospital, due to a predominant catchment of LIG and EWS category of population. Majority share is observed to be of shared modes of public and intermediate public transport systems like bus, Gramin Sewa, shared auto, shared electronic rickshaw. Personal rickshaw and auto also operate here.

5.3 Site Analysis

Issues

S - Block Mangolpuri Junction has a staggered geometry leading to lower sight distances. Signal at the junction has been disabled causing vehicle - vehicle as well as vehicle - pedestrian conflicts.

1

Auto repair market adjacent to junction causes spillover of vehicular parking on carriageway

2

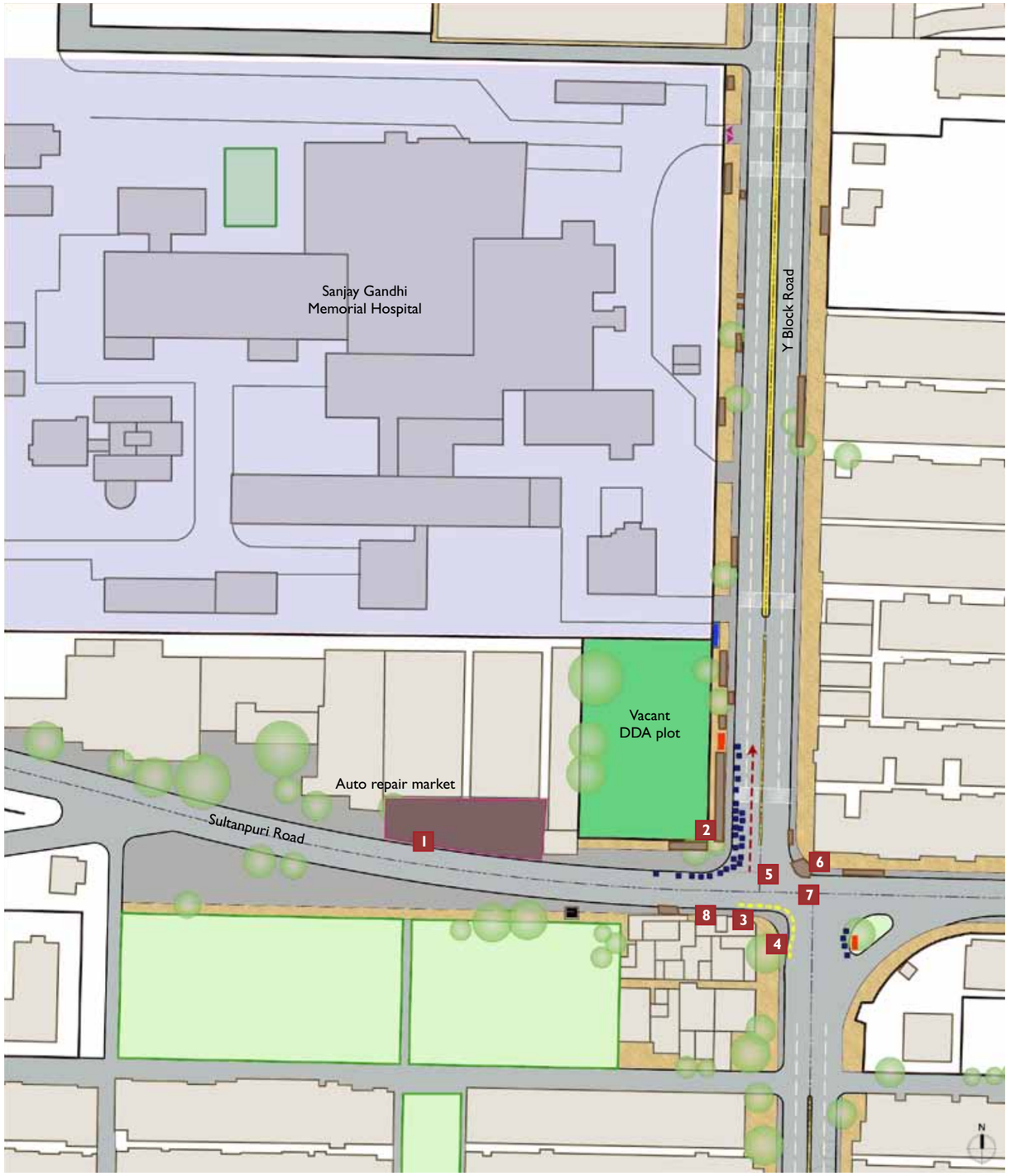
Informal vending and PT/ IPT stand at the junction

3

On-street Parking stand at the junction

4

Concrete structure on the corner leading to insufficient turning radius for vehicles



Map showing issues at the Junction

LEGEND

- Informal Vending Activities
- Idling IPT Vehicles
- Insufficient Turning Radius
- Insufficient distance of bus stop from intersection
- Bus Stops
- Utilities - Public Toilet Complex

Presence of the hospital has led to cropping up of auxilliary activities around the junction like piling up of IPT vehicles, vendor agglomeration, and increased pedestrian movement. Infrastructure for these activies has not been provided for leading to encroachment of the ROW.

Key Plan

5

Access to the hospital (even for emergencies) is highly encumbered due to chaos and congestion at the junction.

6

Vending encroachment at the junction

7

Without signals, the junction faces chaos and pedestrian crossing is a hazard

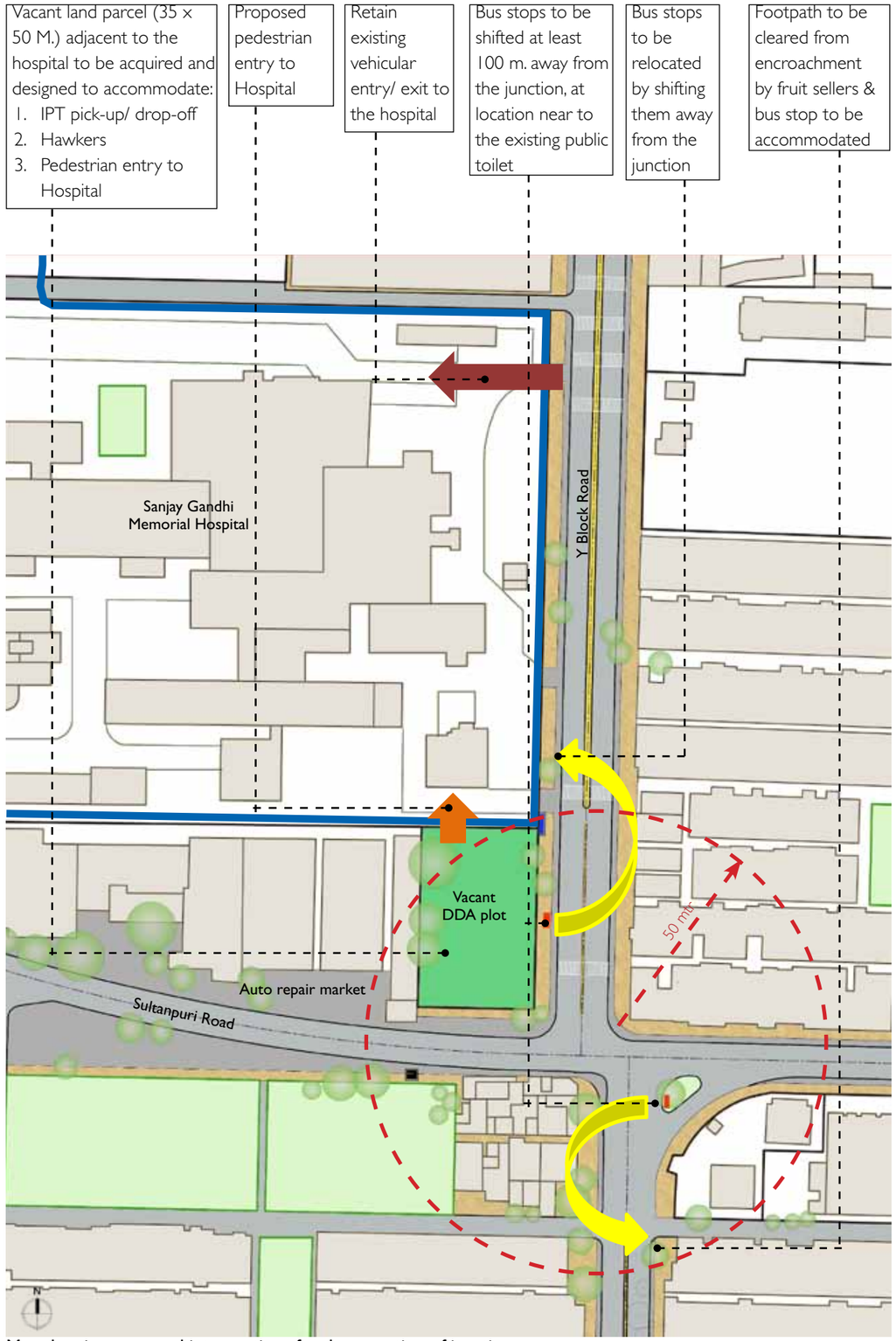
8

Onstreet parking, permanent encroachment by shops and unregulated IPT operation severely choking the junction

S-BLOCK JUNCTION, MANGOLPURI

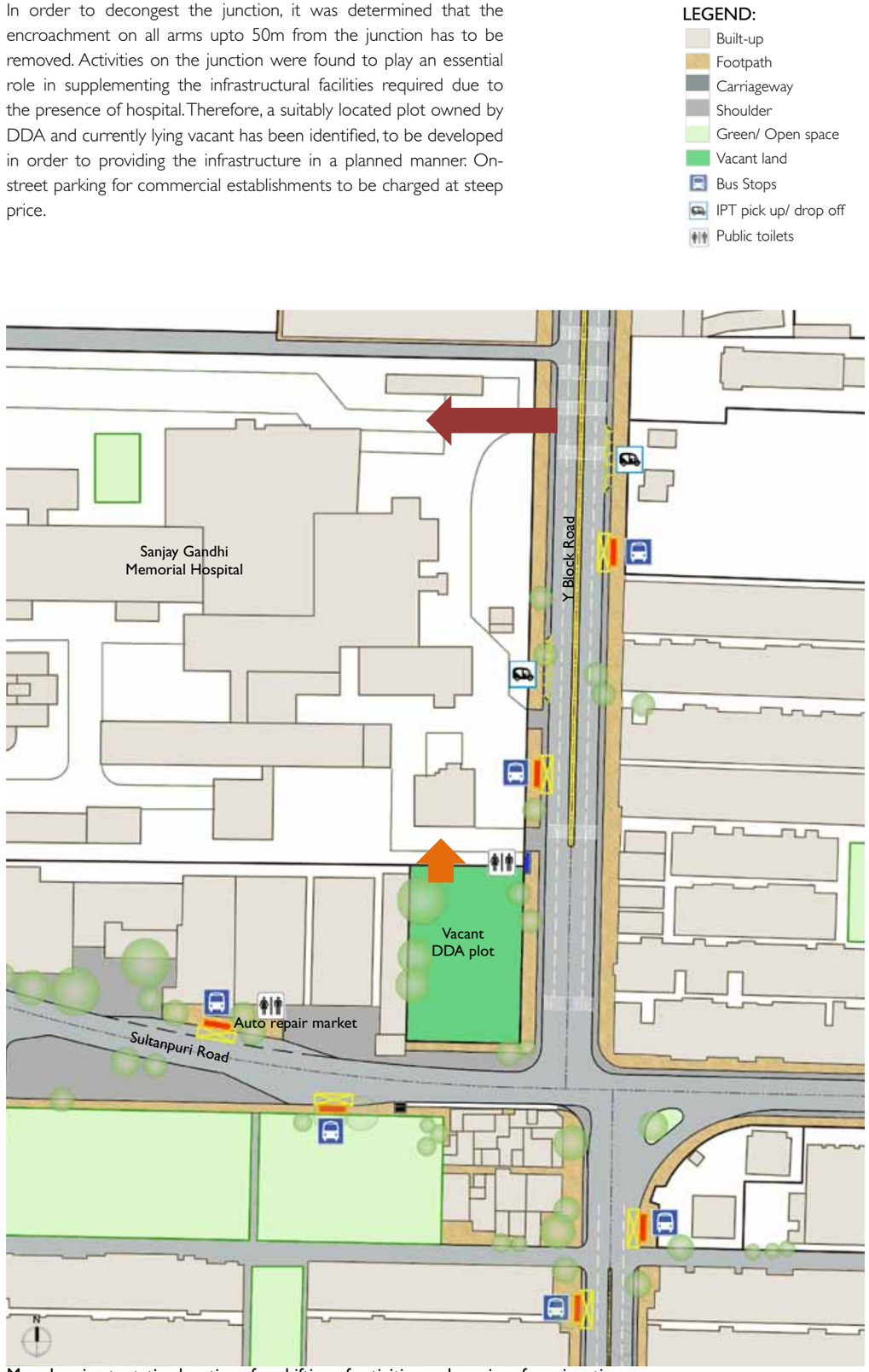
5.4 Proposal

Policy intervention with identification of suitable location for activities



Map showing proposed interventions for decongestion of junction

In order to decongest the junction, it was determined that the encroachment on all arms upto 50m from the junction has to be removed. Activities on the junction were found to play an essential role in supplementing the infrastructural facilities required due to the presence of hospital. Therefore, a suitably located plot owned by DDA and currently lying vacant has been identified, to be developed in order to providing the infrastructure in a planned manner. On-street parking for commercial establishments to be charged at steep price.



Map showing tentative locations for shifting of activities and services from junction

Accomodation of IPT and vendors catering to demand due to Hospital

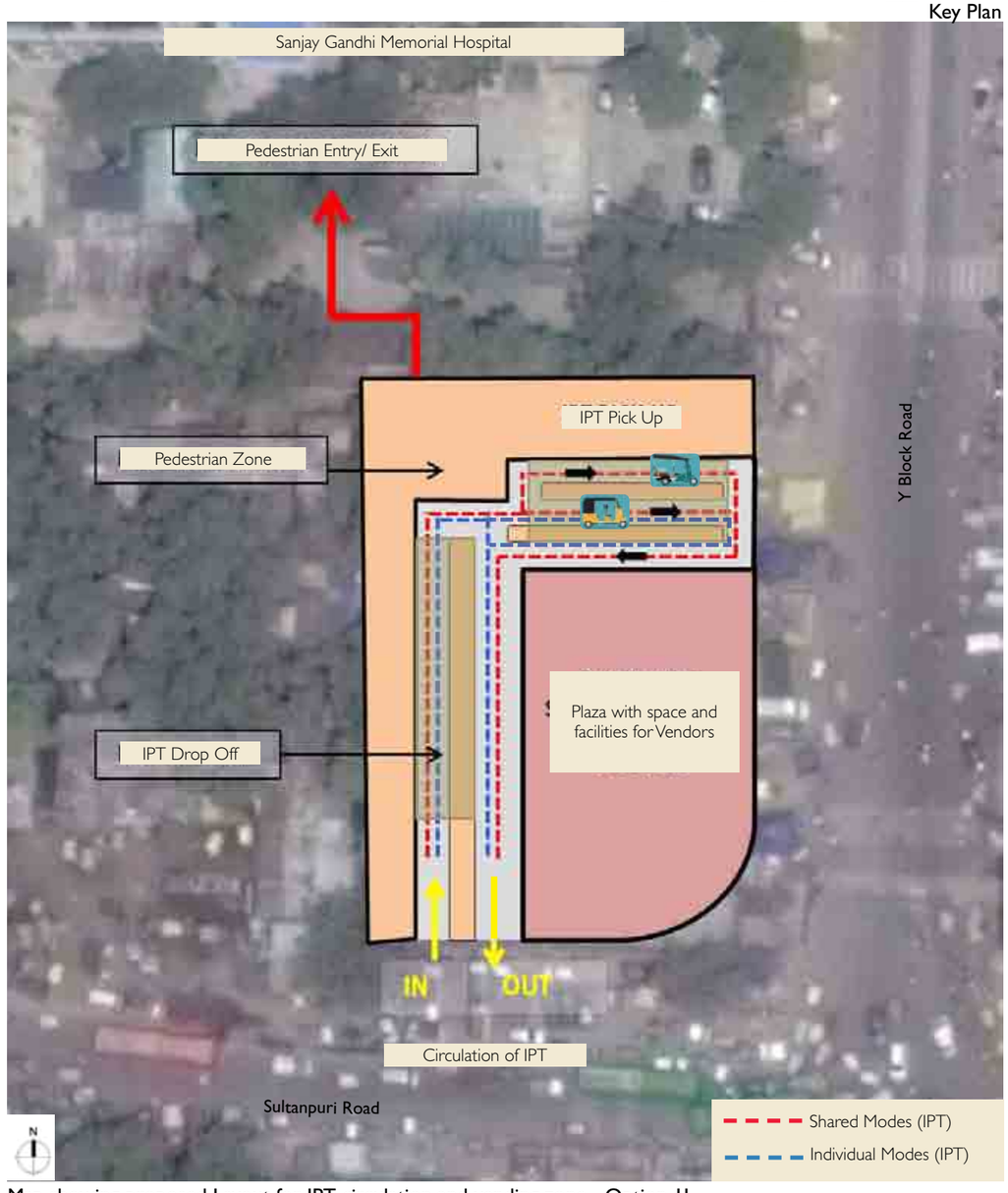
As seen in the timeline earlier, the 35m X 50m plot at the junction corner is lying vacant and has not been repurposed yet. Proximity to the hospital, access from both adjoining roads, direct access to hospital premise, and the size make this plot ideal to be developed as a pedestrian plaza providing pick up/ drop off facilities as well as an organised space for kiosks catering to the needs of the floating population attracted by the hospital. A direct pedestrian entry from the plot edge to hospital premise would need to be created.

Two options have been provided below. One alternative for designing the space is to provide separate entry and exit for IPT vehicles with a streamlined circulation. This would enable a more efficient utilisation of space - less circulation (pedestrian and vehicular) requirement enabling bigger plaza.

Map showing proposed Layout for IPT circulation and vending zone - Option I

In another alternative, both entry and exit to the site are from Sultanpuri Road. Bays are provided for shared and individual modes with further segregation between different types of shared modes. This layout would affect a single arm instead of two. It would also facilitate enforcement of non idling zone upto 50 m from the junction. However, the entry/ exit to the site would be within 50 m on Sultanpuri Road hindering the traffic on that arm from navigating the junction. An option of utilising space from the auto repair market for segregated entry/ exit can be explored.

Key Plan



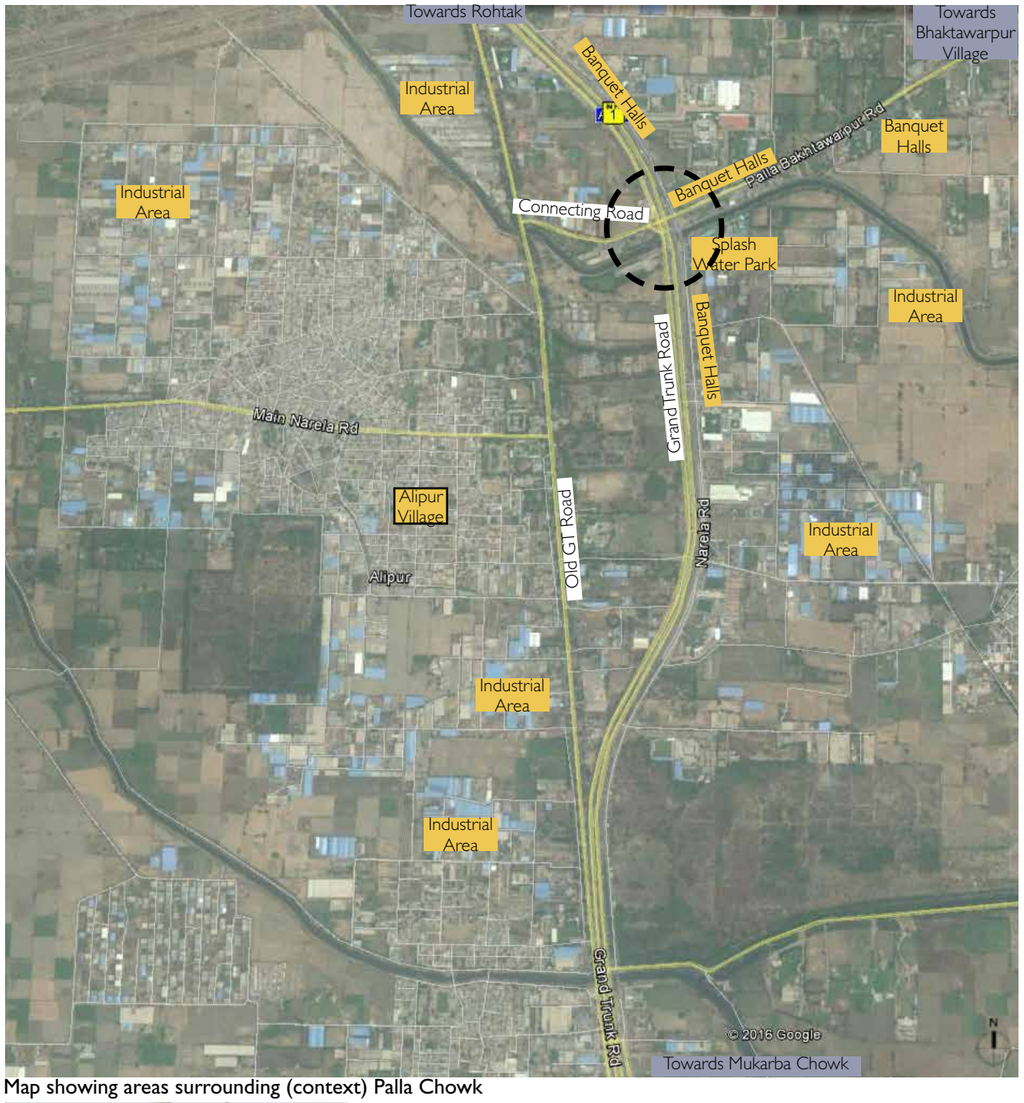
Map showing proposed Layout for IPT circulation and vending zone - Option II

S-BLOCK JUNCTION, MANGOLPURI

CHAPTER 6
PALLA CHOWK

6.1 Site Context

The Junction lies on Grand Trunk Road, also known as G.T. Karnal Road, which is a national highway leading to Haryana and Punjab. It carries heavy regional traffic from Punjab and surrounding areas. The Junction is located 9 km north of Mukarba Chowk towards city periphery. Junction is bound by industries on all sides, banquet halls towards Bhaktawarpur village and Alipur village on the other side. Banquet halls have been permitted through change of land use from industrial to public/ semi public. Splash water park is located at the junction corner and attracts traffic during summers. The junction lies on a small by-pass of Alipur Village.

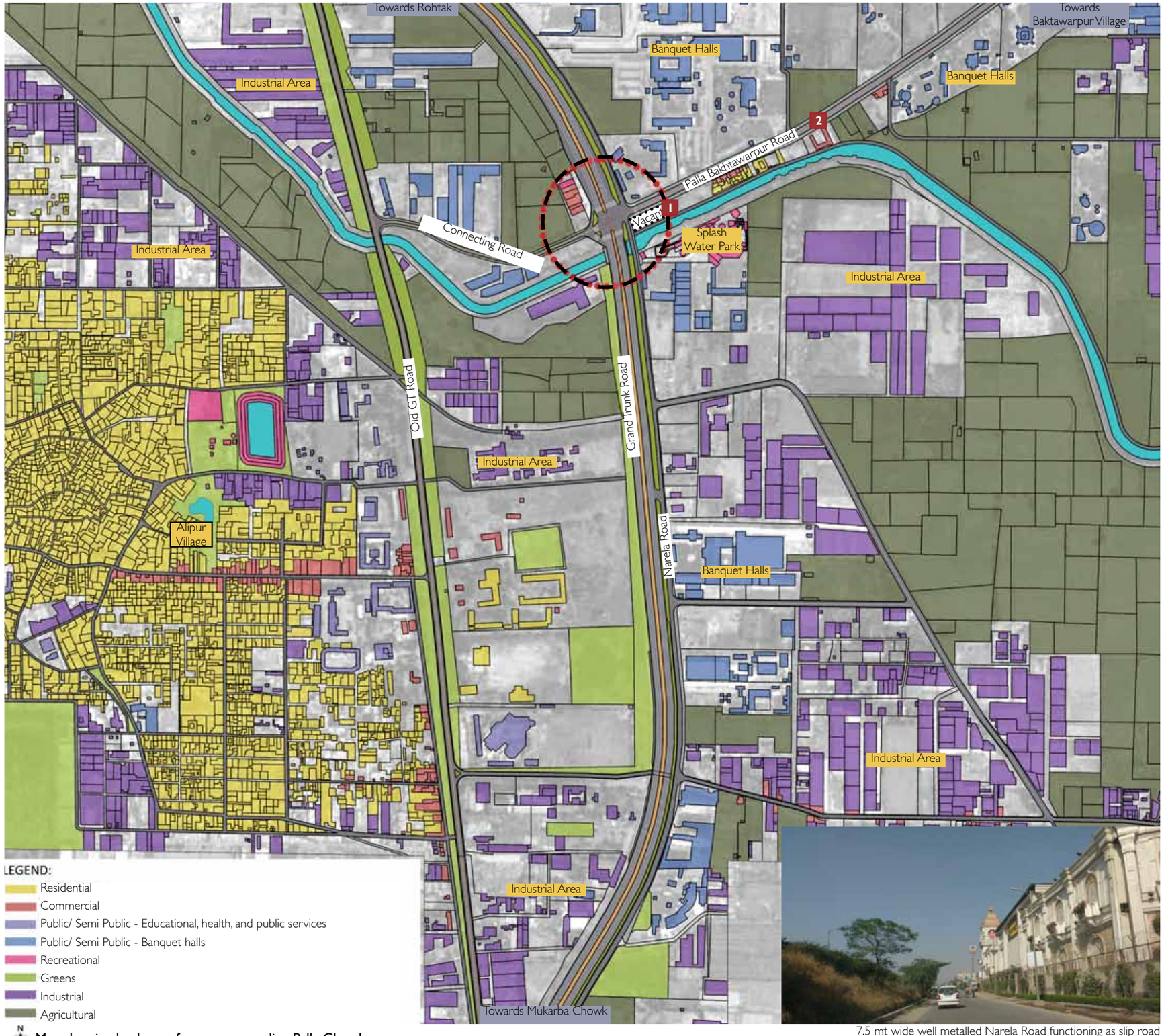


Map showing areas surrounding (context) Palla Chowk

Junction with direction hoardings for banquet halls

Adjoining landmarks at the junction - Splash water park, Aamantran Party Lawn

6.2 Existing Scenario



LEGEND:
- Residential
- Commercial
- Public/ Semi Public - Educational, health, and public services
- Public/ Semi Public - Banquet halls
- Recreational
- Greens
- Industrial
- Agricultural

Map showing land use of areas surrounding Palla Chowk

7.5 mt wide well metalled Narela Road functioning as slip road to GT Karnal Road

Vacant plot adjoining junction on Palla Bhaktawarpur Road used by trucks for idling/ parking

Truck movement and location of banquet halls on Palla Bhaktawarpur Road

With increased development in recent times, the intersection has started functioning as an urban junction instead of peri-urban as it had been designed for.The by-pass on GT Road was designed as a regional high speed, grade separated corridor with a slip road called Narela Road for accessing plots along the road.

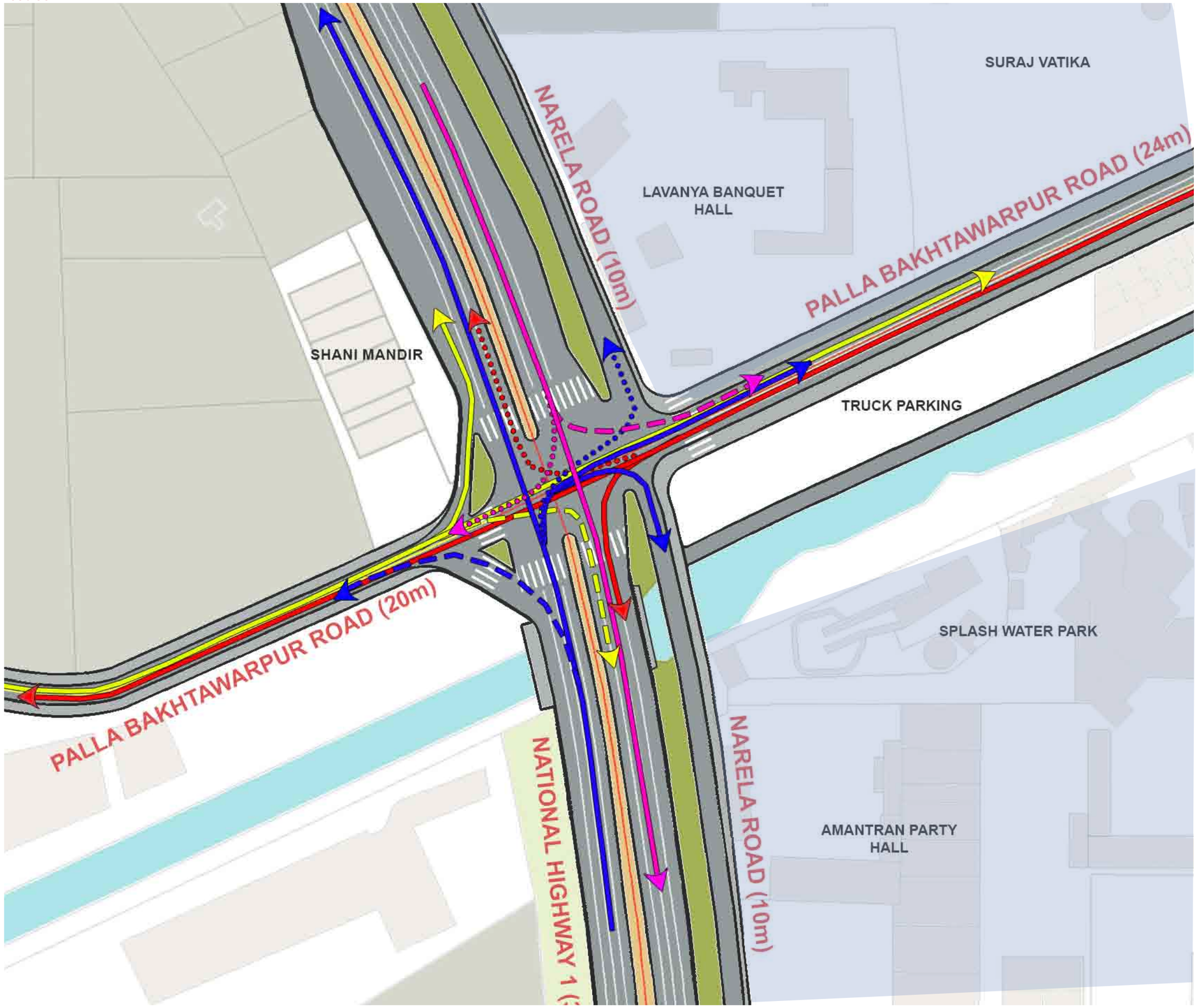
2006 - GT Road At Grade with unmetalled slip road for plot access

2010 - Slip road metalled towards splash water park

2012 - Slip road metalled on the other end of junction

2015 - GT Road raised above adjoining land, slip road (Narela Road) connected to junction

6.3 Site Analysis
Issues



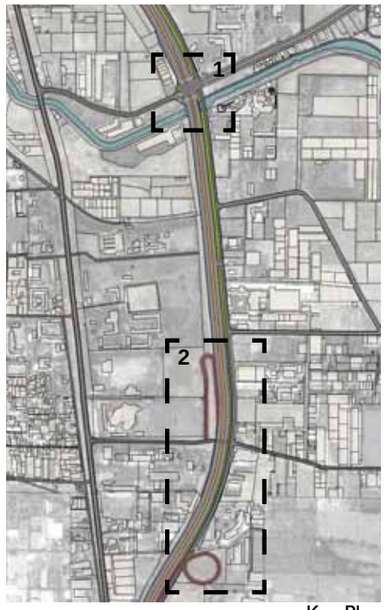
The Junction is heavily congested during wedding season, due to location of banquet halls in vicinity. The traffic destined for banquet halls disrupts regional movement as well as the city traffic which chokes the entire 9 km stretch upwards of Mukarba Chowk.
Also, there is considerable heavy vehicle movement across the junction due to location of industries on both sides. Traffic from Alipur and Bhaktawarpur village also adds to the congestion.

PALLA CHOWK

6.4 Proposal

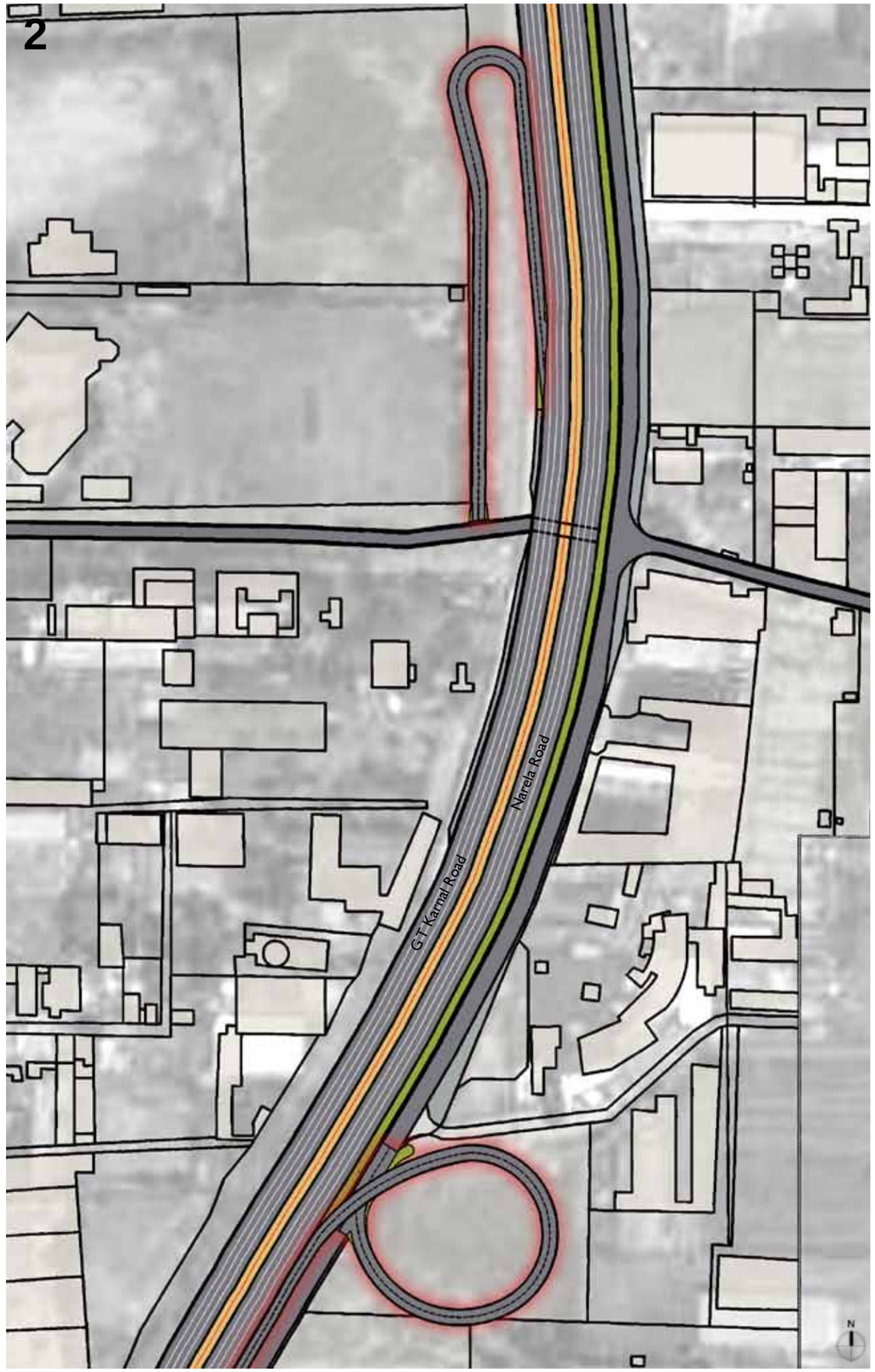
1. Junction needs grade separation for through moving regional traffic
   - To be analysed based on traffic study

2. Diversion of traffic destined to the banquet halls located before the junction.
   - Via loops connecting GT Road and Narela Road
   - Additional phase in signal for traffic moving on Narela Road (Service road)



Key Plan

Map showing proposed flows at Junction during peak hour



Map showing proposed Layout of loops connecting GT Road and Narela Road

CHAPTER 7
NSG ROUNDABOUT, MEHRAM NAGAR

NSG ROUNDABOUT, MEHRAM NAGAR

7.1 Site Context

NSG roundabout is named after National Security Guard Headquarters located in the vicinity and was functioning as a roundabout up till 2009. It was then converted into a 4 arm signalised junction with a grade separated corridor for traffic from NH-8 moving towards Dwarka. The Junction is located near Indira Gandhi International Airport(IGIA) and is connected to NH-8 via an 8 km long collector. It provides primary connectivity to Dwarka from Gurugram and south Delhi, and to T3 terminal of IGIA from Delhi via NH-8

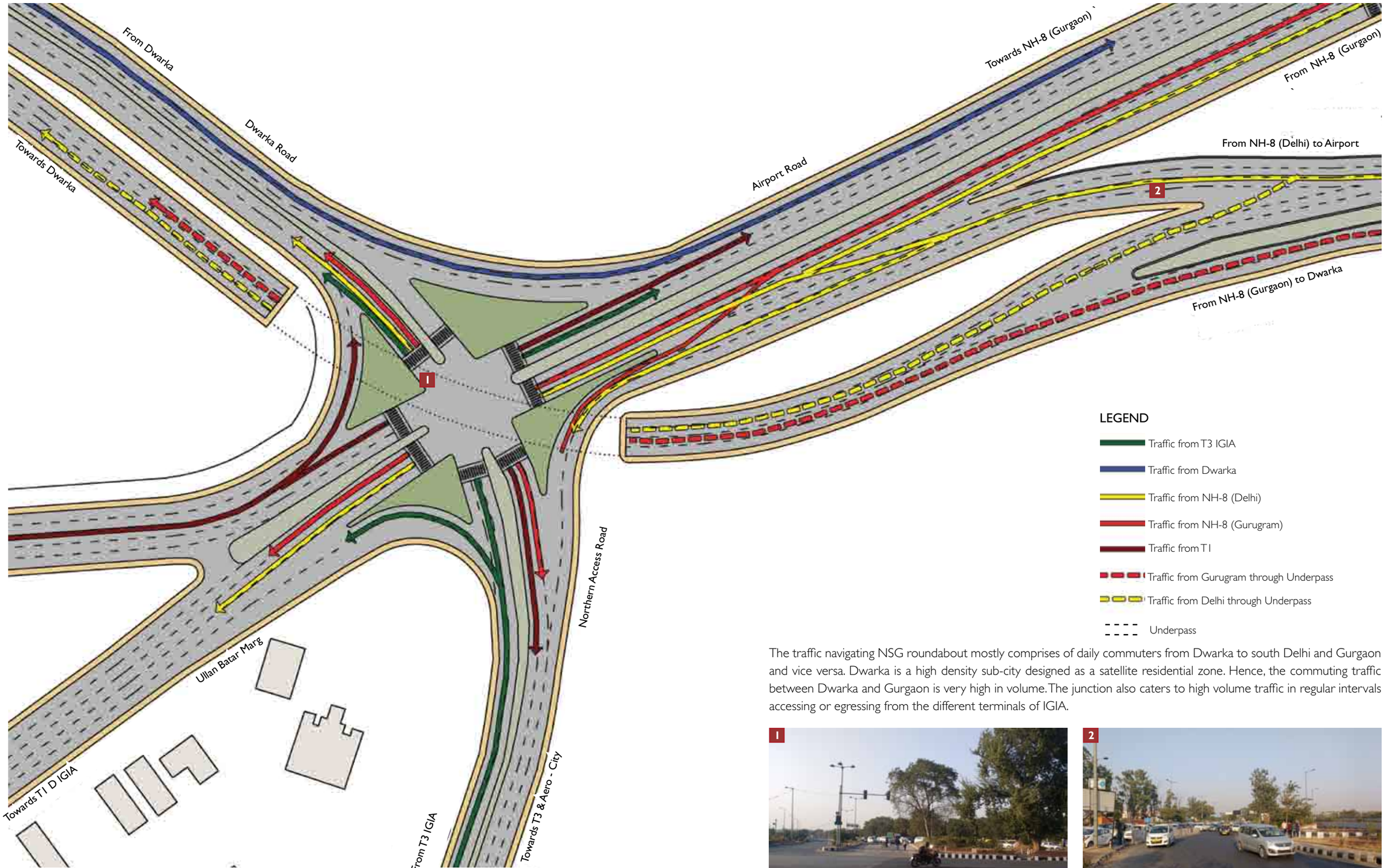
The Junction is bound by Cantonment area in North and East, Airport in West, and Residential area in South. The residential area mainly comprises of Mehram Nagar and army residential complexes. As the land near the junction is majorly army land, it cannot be encroached upon. Area under Delhi Cantonment Board (DCB) require special permission for any kind of construction activities. The surrounding area is mostly vacant, providing possibility for network expansion. Close proximity to the airport also ensures that vertical expansion near the junction is not feasible.

Map showing areas surrounding (context) NSG Roundabout

NH-8

Underpass leading to Dwarka from NH-8

7.2 Existing Scenario



Map showing existing flow of traffic at the junction

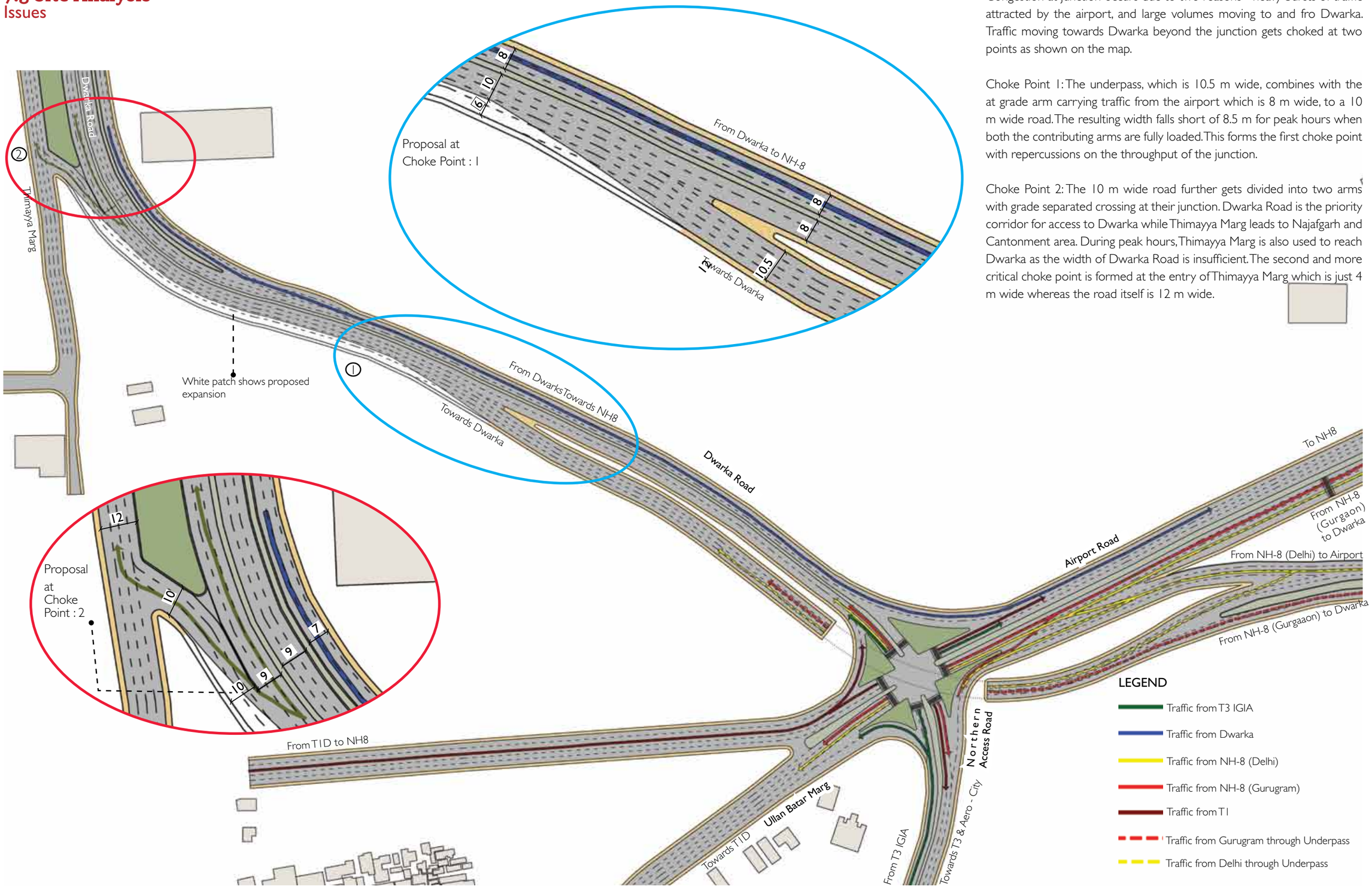
The traffic navigating NSG roundabout mostly comprises of daily commuters from Dwarka to south Delhi and Gurgaon and vice versa. Dwarka is a high density sub-city designed as a satellite residential zone. Hence, the commuting traffic between Dwarka and Gurgaon is very high in volume. The junction also caters to high volume traffic in regular intervals accessing or egressing from the different terminals of IGIA.

1 At grade arm at Junction leading to Dwarka : access to junction from the arm is blocked to reduce the signal cycle time as well as prevent heavy vehicles from entering the T3 underpass further ahead of the junction

2 Road from NH-8 (Gurugram) to NSG Roundabout

NSG ROUNDABOUT, MEHRAM NAGAR

7.3 Site Analysis
Issues



Map showing choke points on Dwarka Road causing congestion at junction

Congestion at junction occurs due to two reasons - heavy bursts of traffic attracted by the airport, and large volumes moving to and fro Dwarka. Traffic moving towards Dwarka beyond the junction gets choked at two points as shown on the map.

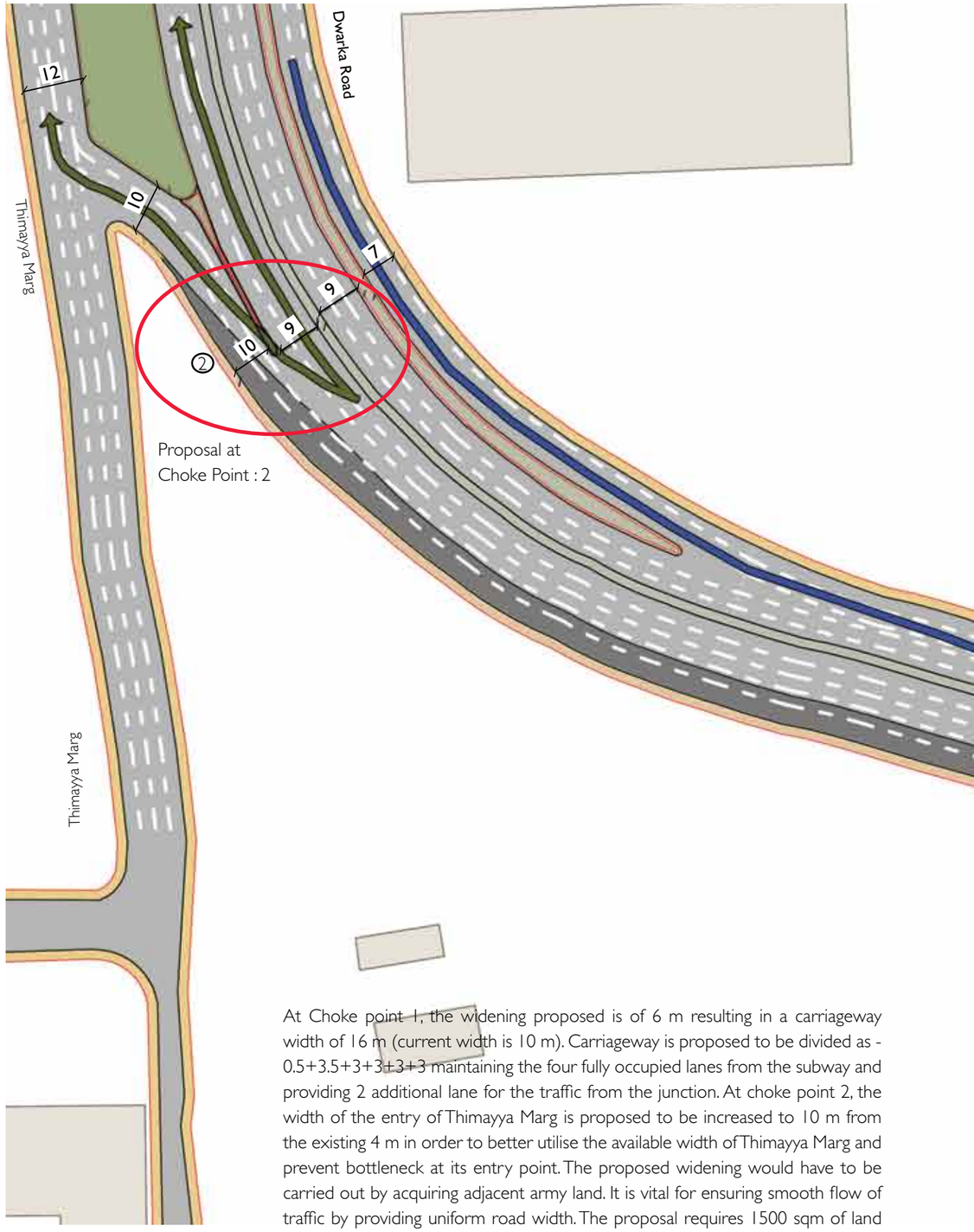
Choke Point 1: The underpass, which is 10.5 m wide, combines with the at grade arm carrying traffic from the airport which is 8 m wide, to a 10 m wide road. The resulting width falls short of 8.5 m for peak hours when both the contributing arms are fully loaded. This forms the first choke point with repercussions on the throughput of the junction.

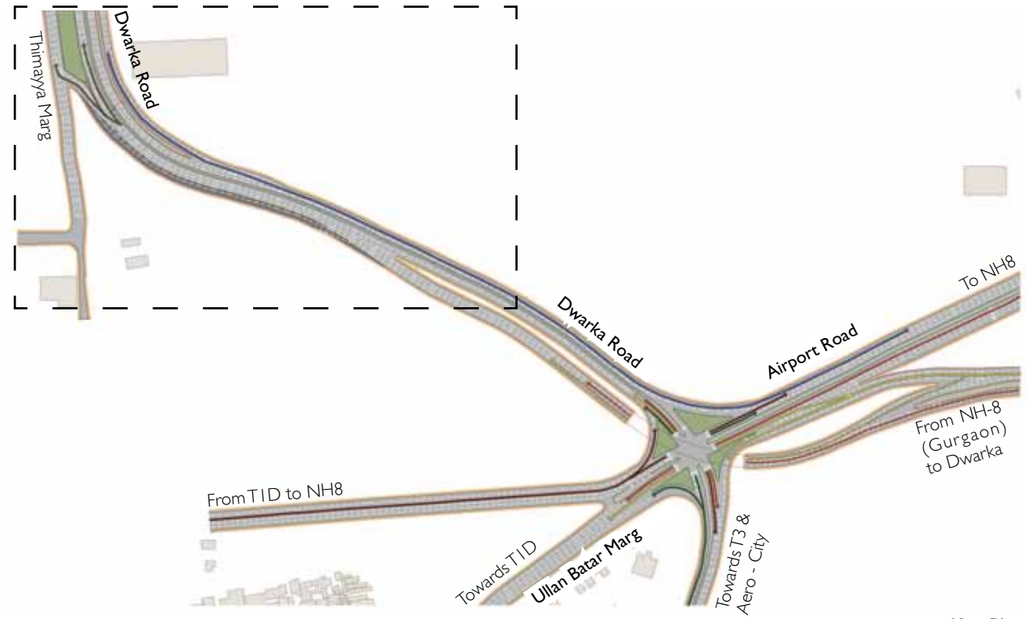
Choke Point 2: The 10 m wide road further gets divided into two arms with grade separated crossing at their junction. Dwarka Road is the priority corridor for access to Dwarka while Thimayya Marg leads to Najafgarh and Cantonment area. During peak hours, Thimayya Marg is also used to reach Dwarka as the width of Dwarka Road is insufficient. The second and more critical choke point is formed at the entry of Thimayya Marg which is just 4 m wide whereas the road itself is 12 m wide.

NSG ROUNDABOUT, MEHRAM NAGAR

7.4 Proposal

7.4.1 Road Widening to Remove bottlenecks on road leading to Dwarka





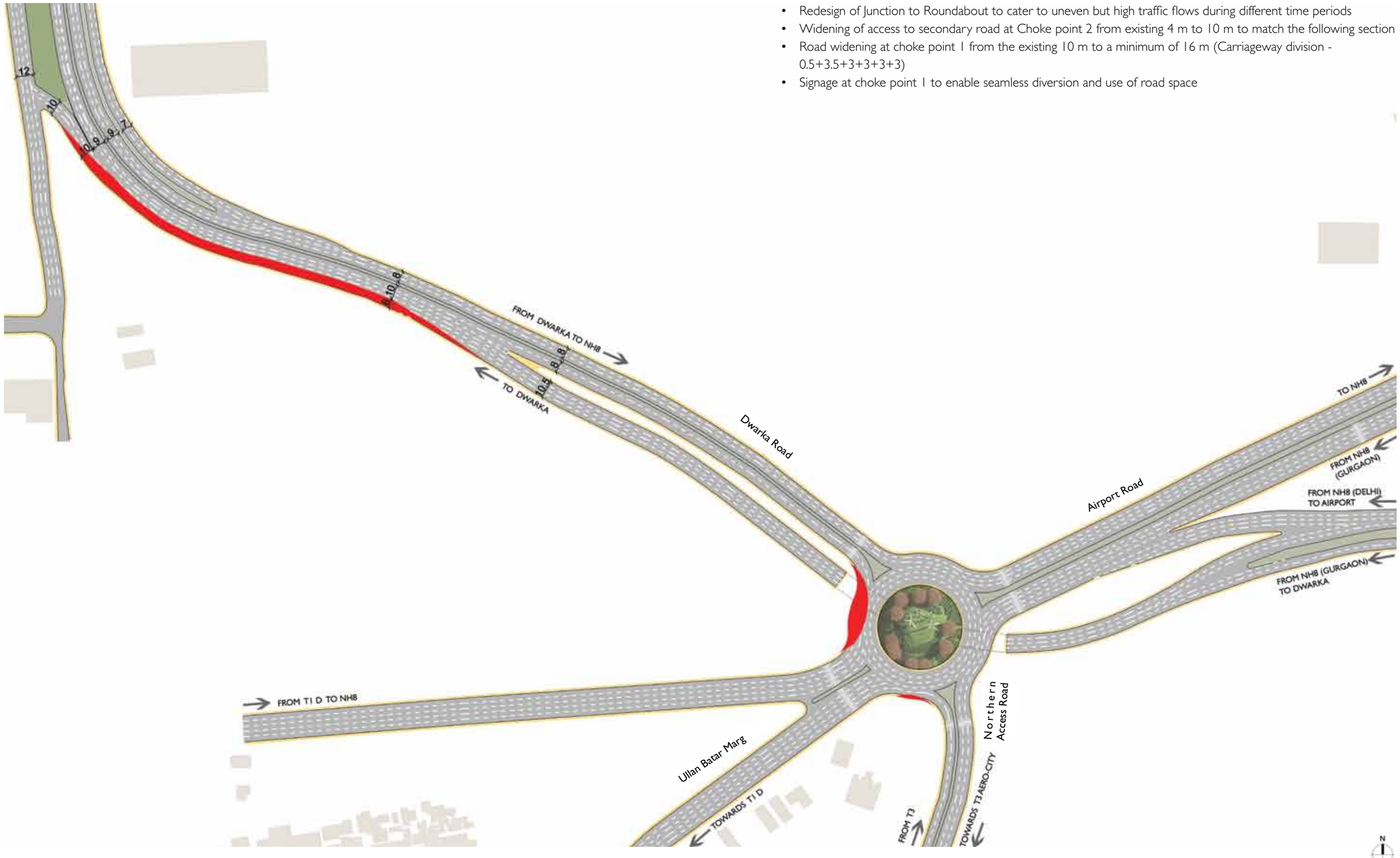
Map showing proposed road widening for ensuring smooth flow of traffic

At Choke point 1, the widening proposed is of 6 m resulting in a carriageway width of 16 m (current width is 10 m). Carriageway is proposed to be divided as - 0.5+3.5+3+3+3+3 maintaining the four fully occupied lanes from the subway and providing 2 additional lane for the traffic from the junction. At choke point 2, the width of the entry of Thimayya Marg is proposed to be increased to 10 m from the existing 4 m in order to better utilise the available width of Thimayya Marg and prevent bottleneck at its entry point. The proposed widening would have to be carried out by acquiring adjacent army land. It is vital for ensuring smooth flow of traffic by providing uniform road width. The proposal requires 1500 sqm of land to be acquired along a 250 m stretch. After widening, it should be ensured that a prominent sign directs the diversion for seamless movement and optimum use of road space.

NSG ROUNDABOUT, MEHRAM NAGAR

7.4.2 Junction Redesign

- Redesign of Junction to Roundabout to cater to uneven but high traffic flows during different time periods
- Widening of access to secondary road at Choke point 2 from existing 4 m to 10 m to match the following section
- Road widening at choke point 1 from the existing 10 m to a minimum of 16 m (Carriageway division - 0.5+3.5+3+3+3+3)
- Signage at choke point 1 to enable seamless diversion and use of road space



Map showing overall proposal

CHAPTER 8
ESCORTS JUNCTION, NEW FRIENDS COLONY

ESCORTS JUNCTION, NEW FRIENDS COLONY

8.1 Site Context

Map showing roads adjoining the site
Source: Google Earth

- Major Arterial roads adjoining the site are Ring Road, Mathura Road and MP Road.
- Proposed metro line is from Janakpuri to Noida Botanical Graden (Phase 3).
- The nearest metro station to the junction is Sukhdev Vihar metro station (upcoming).
- The roads leading to the escort junction act as distributor road to the three major Arterial roads.

Escorts Junction is a four arm signalised junction adjoining Fortis Hospital in south east Sarai Jullena Village. Junction lies in the south west the intersection consisting of C V Raman Marg and Maulana Mohammad Ali Jauhar Marg. The area comprises a large number of public spaces including hospitals, schools, and commercial establishments. Presently there are 2 hospitals Fortis and Holy Family Hospital located along Maulana Mohammad Ali Jauhar Marg. Jamia Millia Islamia ia also located at 1.5km from the junction. The major issue at the junction is lack of pedestrian facilities and irregular carriage way width caused by commercial encroachments.

Map showing landmarks around the site
Source: Google Earth

8.2 Existing Scenario

Land Use Map of the Junction

The junction is located adjacent to Fortis hospital whose emergency gate opens on to Maulana Mohammad Ali Jauhar Marg, it was seen on ground that the entry to hospital has been shifted and this entrance only used for pedestrian entry and in case of emergency.

There ia large amount of commercial as well as mixed land use with frontage to the roads. Presence of commercial activities has resulted in heavy encroachment and heavy on street parking. The commercial shops here mainly consists of photocopiers, chemists, groceries shops and eateries, it can be noted that clientele has short waiting times which results on people parking on road while they visit the shops.

Sarai Jullena is a urban village adjacent to the junction. It was seen that there are large number of drivers settled in this residential pocket who park their vehicles along the CV Raman Road when not in service.

Other prominent landuse feature is the DDA parking which isn't functional yet. The entry and exit point of this basement parking are designed perpendicular to the traffic flow.

Legend

- Residential development
- Green / Open spaces
- Public / semi public development
- Mixed use development
- Commercial development

DDA Parking entry

Neighbourhood Park Entry

8.3 Site Analysis

Issues

Maulana Mohammad Ali Jauhar Marg

Map Showing Issues along Maulana Mohammad Ali Jauhar Marg

1 Encroachment

Encroachment by commercial establishments along Maulana Mohammad Ali Jauhar Marg thus reducing the road width.

2 On Street Parking

Auto parking / idling along Sarai Jullena edge.
These are undesignated spots encroached on the carriageway.

3 Auto Idling/Parking

On - street parking on either side of the road due to the market , leaving only 1 lane for movement of traffic.

1 Commercial Encroachment

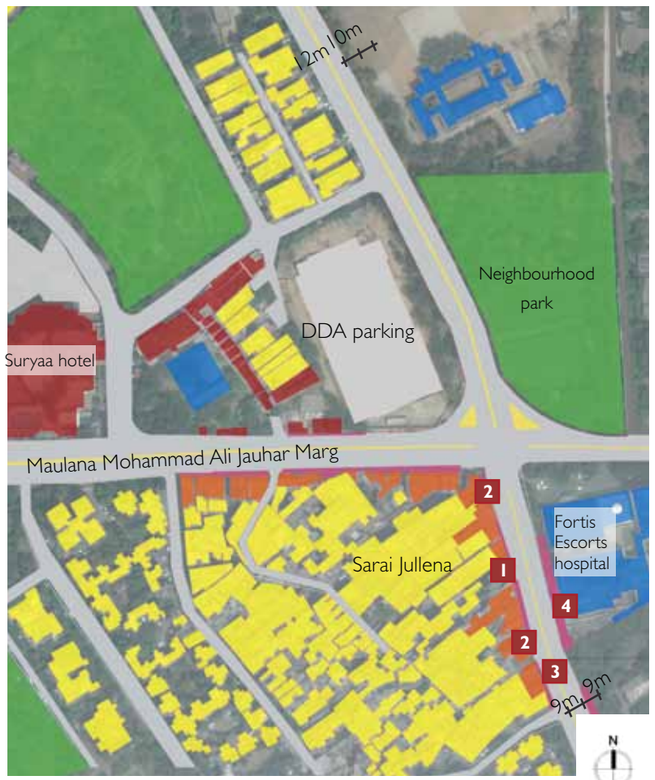
2 On Street Parking

3 Auto Parking

4 Street view showing under utilised road carriageway

ESCORTS JUNCTION, NEW FRIENDS COLONY

CV Raman road



Map Showing Issues along CV Raman Road

1 Encroachment

Encroachment by commercial establishments along Sarai Julenna edge. This leads to narrowing of road at various points causing bottlenecks.

2 Junction Design

The Median ends 18m before junction. This causes traffic pile up onto the opposite traffic lane as traffic from the opposite direction starts queuing up

3 On Street Parking

On - street parking of cabs and taxis on either side of the road causes hindrance in the traffic movement.

4 Bottleneck

U-Turn Provided at the narrowest section on road causing congestion.

Commercial Encroachment

Junction Design

On Street Parking

Crossectional View of Bottleneck

Junction

Map Showing Issues at Junction`

1 Entry/Exit To DDA Parking

- Entry / exit to DDA parking is at the the junction which would cause further congestion once the parking is operational.

2 Lack of Designated Parking Space For Rickshaws

- Rickshaw's park around islands at the junction as there are no earmarked spaces for the same.
- This causes the traffic to slow down at the junction.

3 Pedestrian Infrastructure

- Pedestrian crossings are not marked properly.
- No pedestrian infrastructure like table tops etc. for safe pedestrian crossings.

Surface Drainage

- Since the junction is a low - lying area , it gets flooded during monsoons.

Pedestrian Infrastructure

Lack of Designated parking space for Rickshaws

Entry to DDA Parking at the junction

ESCORTS JUNCTION, NEW FRIENDS COLONY

8.4 Proposals

Maulana Mohammad Ali Jauhar Marg

Map showing proposal for Maulama Mohammed Ali Marg

Reclaimed space for pedestrian infrastructure

- Encroachment by the commercial establishments needs to be removed.
- The reclaimed pathway to be used for pedestrian infrastructure including continuous pathways, seatings, signages, street lighting etc.
- Removal of on-street parking in and around the junction. DDA parking to be used for long term and short term parking with subsidized parking rates.

Provide designated auto stands

- Parking / idling space designed for autos so that they do not queue up on the road.

CV Raman road

Map showing proposal for CV Raman Marg

Road geometry realignment

- Road realignment to maintain same widths on both sides of the road.
- This would also enable realigning the median which at present is not centered and thus creates bottlenecks.
- The median at the junction to be extended to discourage traffic to pile up from CV Raman Marg.

Remove encroachments

- Removing the encroachments by the commercial shops on either side of the road and reclaiming the space for pedestrian movement and related infrastructure.

Removal of on-street parking

- Removal of on-street parking on Fortis Escorts hospital edge to maintain homogeneous traffic movement.

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Junction

Proposal for Junction and entry to DDA parking (Option1)

Improve pedestrian infrastructure

- Continuous pedestrian crossings with table top to be provided for safe and seamless access by the pedestrians.

Entry/ exit of DDA parking

- The entry / exit of DDA parking to be changed as per Option-01/ 02

Bus stop and supporting infrastructure

- Bus stop shifted approximately 60 m away from the junction so that it does not hinder junction clearance.
- Kiosk for basic necessity like water etc. to be provided near the bus stop.

Designated space for IPT parking

- To avoid IPT's to queue up on the road, designated IPT stand inset in the neighborhood park near Holy Family hospital.

Proposal for entry to DDA parking (Option 2)

Conclusion

Parameters	Issues	Proposal	Implementation
Geometry	The Median ends 18m before junction causing traffic pile up.	Realign the median to equally distribute carriage way widths.	Design intervention
Encroachment	Encroachment by commercial establishments along the edge causing bottlenecks.	Removing the encroachments by the commercial shops on either side of the road and reclaiming the space for pedestrian movement and related infrastructure.	Strict enforcement policy
IPT parking	Rickshaw's park around islands at the junction as there are no earmarked spaces causing the traffic to slow down at the the junction.	Designated space for IPT idling / parking provided.	Design intervention + Strict enforcement policy
Pedestrian Infrastructure	Absence of viable pedestrian crossing facilities	Table top crossings along with relevant pedestrian infrastructure provided.	Design intervention
On - street parking	On - street parking of cabs and taxis on either side of the road causes hindrance in the traffic movement.	Removal of surface parking from CV Raman Marg and Maulana Mohammad Marg to maintain homogeneous movement.	Strict enforcement policy
Others	Entry / exit to DDA parking is at the the junction which would cause further congestion once the parking is operational.	Relocate entry / exit points for DDA parking. DDA parking to function with subsidized rates to discourage all kinds of on - street parking.	Design intervention + Strict enforcement policy

Summary of proposals at the junction

Remove Encroachments On Sarai Jullena Egde
- Utilize reclaimed space for pedestrians.

Improve Pedestrian Infrastructure
- Pedestrian crossings with table tops.
- Upgrade pedestrian infrastructure to current design standards.

Enforce Zero Tolerance Zones
Strictly prohibit parking / idling on carriage way up to 50m from junction.

DDA Parking Entry / Exit
- Relocate entry / exit points for DDA parking.

Road Geometry - CV Raman Marg
- Realign the median to equally distribute carriage way widths.

IPT Parking
- Designated space for IPT idling.

On - Street Parking
- Removal of surface parking from CV Raman Marg and Maulana Mohammad Marg to maintain homogeneous movement.

Overall Proposal for study area

Continuous footpath of 2m

IPT idle/parking bay

Pedestrian Refuge area/ Sitting facility

Redesign DDA parking entry and exit

Relocate Bus stop

Extended median

Gramin Sewa parking

Map showing all proposals at junction

ESCORTS JUNCTION, NEW FRIENDS COLONY

CHAPTER 9
NIZAMMUDDIN KHATTA

9.1 Site Context

Map showing the Nizamuddin Khatta
Source: Google Earth

Nizammuddin Khatta junction is a three arm signalised junction connecting East Delhi to South & Central Delhi. There is an existing flyover at the junction for free movement of traffic from ITO towards Sarai Kale Khan. It is flanked by Indraprastha Park in the west and DTC Millennium depot & Yamuna River in the east. The Sarai Kale Khan ISBT and Nizammuddin Railway station are within 1km of the junction.

The junction is of major significance at city level as it connects the traffic from East Delhi to South and Central Delhi. Keeping in mind the significance of the junction, constant effort has been made by transport authorities to keep it congestion free. Presently there are 4 transport proposals underway in the vicinity of the junction:

- 8-lane Delhi Meerut Expressway (work already in progress)
- Metro phase 3 (Shiv Vihar - Mukundpur line)
- Delhi-Ghaziabad-Meerut RRTS route with station at Nizammuddin
- Proposal for making Sarai Kale Khan a Multi Modal Interchange

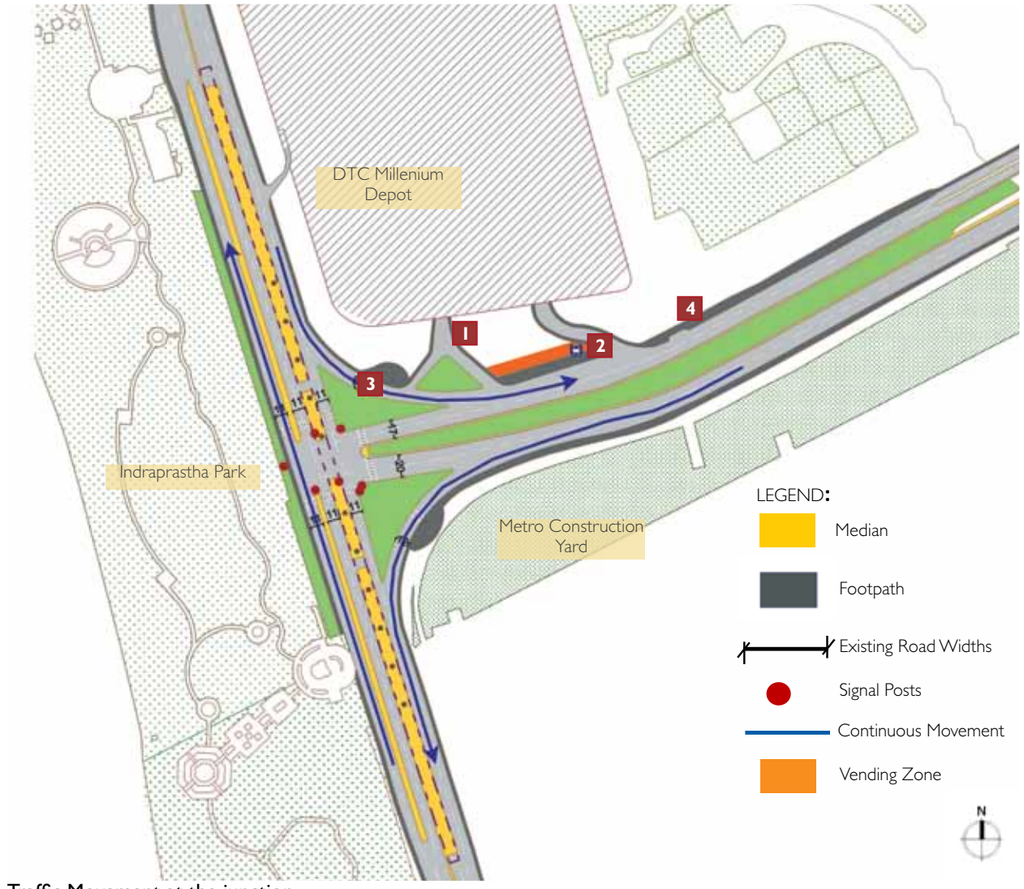
Free Left Turn towards Akshardham

The junction connects NH-24 to the Grand Trunk Road/ Mahatma Gandhi Road. Presently both roads are proposed to be converted to an expressway to provide seamless connectivity.
All left and straight movements are segregated and signal-free

Image of the junction at 10:30am: Showing traffic moving towards ITO

Image road section under the flyover

9.2 Existing Scenario



Traffic Movement at the junction

Existing traffic movement pattern

The junction is designed so that all the left turning traffic and straight traffic movements are free and unsignalised. These traffic movements are marked in blue arrows.

During morning peak hours there is heavy traffic movement from East Delhi to ITO and Sarai Kale Khan ISBT owing to working population residing in East Delhi. During the evening peak hours, there is heavy return traffic flow.

Even though all the traffic movements are segregated during peak hours often the junction has to be supervised manually to ensure smooth traffic flow.

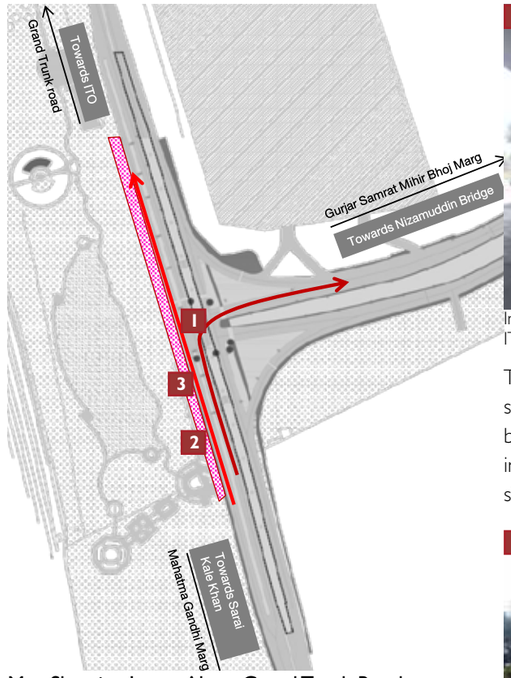
Entry to DTC Millenium Depot at Junction

Vendors along the Road

Pedestrian Crossing at the free left lane

Bus stop along NH-24

9.3 Site Analysis



Map Showing Issues Along Grand Trunk Road towards ITO

Another issue noted on site along this stretch are broken bollards and pedestrian pathway. allowing two-wheeler traffic to ply on pedestrian pathway

Along Grand Trunk Road towards ITO

Image showing right turning traffic queued up in lane for traffic towards ITO

The straight moving traffic towards ITO from ISBT has a segregated lane for seamless movement but this lane is often blocked by the right turning vehicles. Lack of signages for indicating segregated lane for the traffic movement can be sited as the cause

Two wheelers lying on footpath

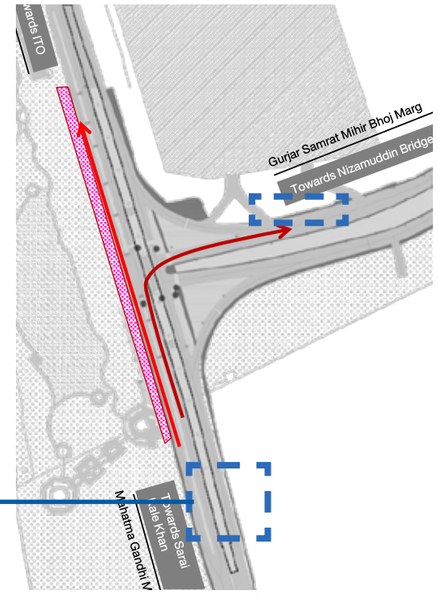
Broken bollards provide acess points

Along Grand Trunk Road from ITO towards Akshardham and ISBT

During the evening peak hour there is a heavy traffic flow from ITO towards East Delhi. Adding to this vendors start putting up stalls which adjacent to bus stop. the close spacing of bus stop and vending zone causes a chaotic situation causing the a heavy queueing up of the traffic.

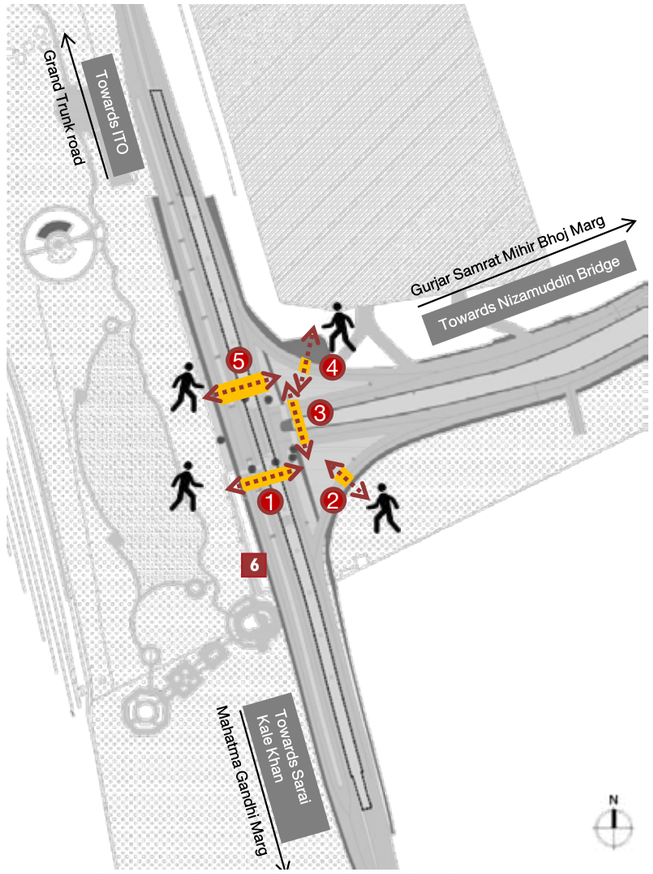
The metro construction at the junction has created bottle neck after the ITO flyover on Mahatma Gandhi Marg . The traffic moving from Nizamuddin bridge merges with the traffic from ITO flyover at this narrow section which leads into a grid lock at the junction during peak hours

Inadequate merging length for traffic



Map Showing Issues Along Grand Trunk Road towards Akshardham

Pedestrian Issues



Map showing pedestrian crossing locations at junction

The study area is a major city node and has a Public Park, Bus depot, 2 bus Stops ,ISBT and a railway station all located within 1km radius making it of utmost importance to provide proper pedestrian facilities at the junction.

In the present scenario all the left turning movements are unsignalised which means there is no provisions for pedestrian crossing even though table top crossing have been provided its design is not sufficient to cause the fast moving vehicular traffic to slow down. As a result pedestrian are at high risk while crossing these sections.

The pavement material on footpaths are broken at places and bollards are broken for access of 2 wheeler traffic. All these make footpaths under utilised by pedestrians even though sufficient width is available throughout the stretch.

Broken and un-maintained footpaths

Bikes plying on footpath

Pedestrian Crossing at 1

Pedestrian Crossing at 2

Pedestrian Crossing at 3

Pedestrian Crossing at 4

9.4 Proposal

Map showing proposals at junction

RECOMMENDATIONS:

- For Pedestrian facilities: Table-top crossing must be coupled with pedestrian signals to make these crossings pedestrian friendly.
- The street vendors should be removed and relocated beyond the Nizamuddin bridge.
- 1 JC Decaux kiosk should be installed at bus stop along Gujjar Samrat Road towards Akshardham
- Side walks should be resurfaced, and the spacing between the bollards to be reduced in order to avoid entry of the two- wheelers.
- Proper signages to be installed 100m before the junction (minimum) to ensure continuous movement of traffic from Sarai Kale Khan to ITO.

Image Reference for providing Kiosk
Source: https://www.jcdecaux.co.in/images/img_07advertising.jpg

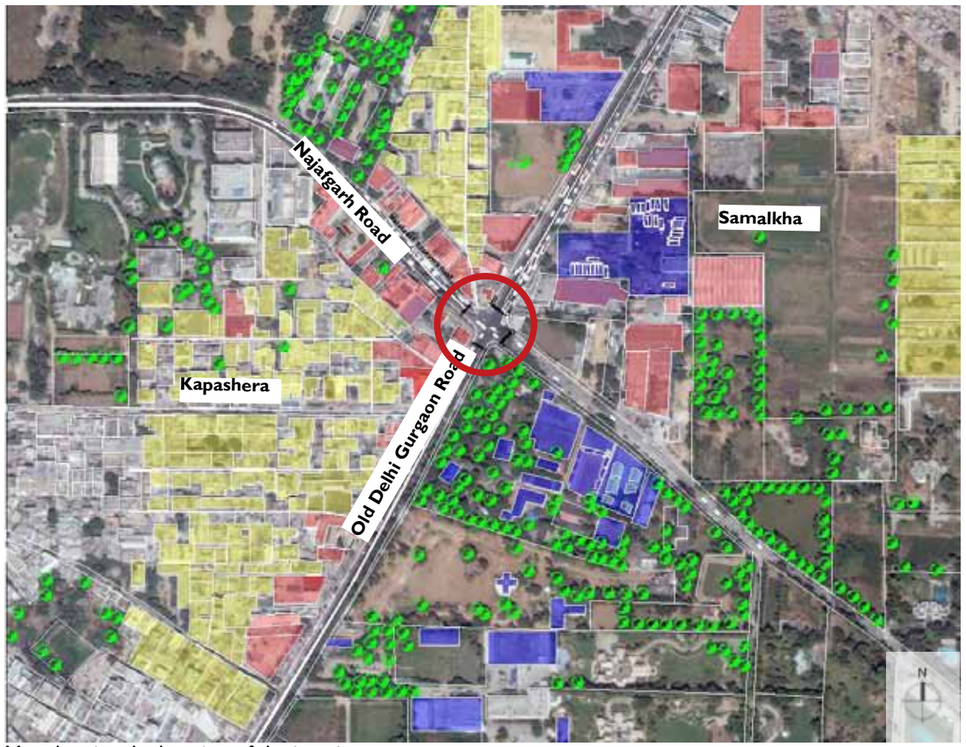
CHAPTER 10
KAPASHERA CHOWK

KAPASHERA CHOWK

10.1 Site Context

Kapasera Chowk is a 4-arm signalised junction located at the intersection of Old Delhi-Gurgaon road and the Najafgarh-Kapashera road. There are number of banquet halls and farmhouses located along both the roads which acts as a huge traffic attraction zone during wedding season.

The junction has thorough movement of heavy commercial vehicles due to the presence of industrial area along the road. There are large number of auto rickshaws and trucks idling within 50m of the junction. This causes chaos and congestion at the junction

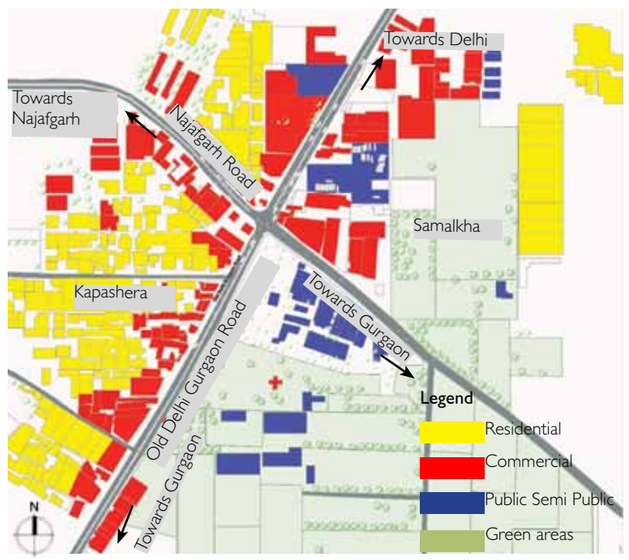


Map showing the location of the junction
Source: Google Earth

Landuse

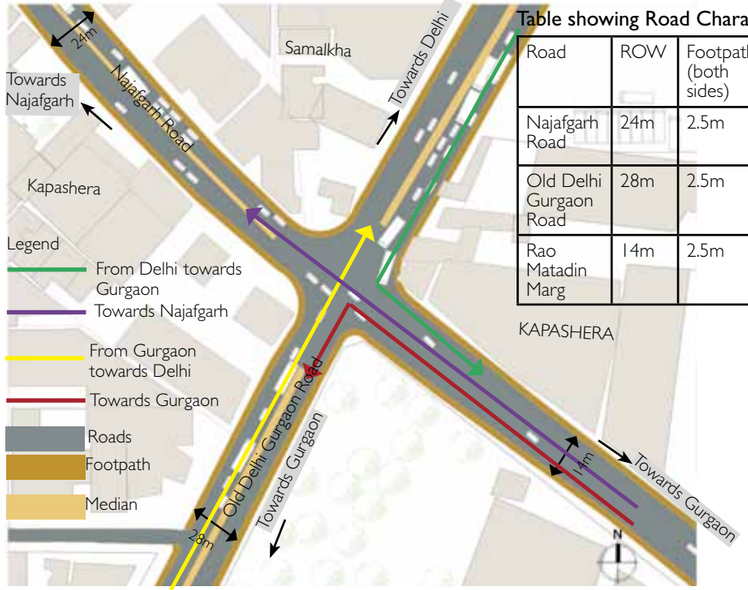
The junction is located at the cross section of Old Delhi Gurgaon road and the Najafgarh-Kapashera road where the junction is bounded by commercial activities on three sides .The study area is bounded by transportation related commercial activities on the north like warehousing, supply chain vendors etc. The southern side of the junction is occupied by banquet halls. There are commercial activities to the east and Kapashera residential area to the west of the junction.

Presence of Banquet Halls around the junction and Kapashera being the border of Gurgaon and Delhi the junction attracts a lot of traffic from all sides especially heavy and light commercial vehicles .



Map showing Landuse around the junction

10.2 Existing Scenario



Map showing Traffic flow around the junction

Table showing Road Characteristics

Road	ROW	Footpath (both sides)	Median	Carriage way	Effective Carriage way
Najafgarh Road	24m	2.5m	1m	18m	8m
Old Delhi Gurgaon Road	28m	2.5m	1m	22m	10m
Rao Matadin Marg	14m	2.5m	-	9m	8m

10.3 Site Analysis

Issues

Map showing Issues at junction

On street parking

Heavy pedestrian movement around the junction

The junction is bounded by commercial activities on all sides. Different activities happening right at the junction create bottlenecks for entering as well as exiting the junction like vendors, PT and IPT pick up/ drop off,on-street parking (outside the police station).
The effective/ resulting Junction geometry impedes turning of large vehicles causing the entire traffic flow to halt.
Also there is heavy pedestrian movement at the junction and it is difficult to cross the junction due to non-functional traffic light and absence of designated pedestrian crossing

10.4 Proposal

The junction needs to be decongested by earmarking space for ongoing activities

1. BUS STOP - The Bus stops present right at the junction need to be pushed atleast 50 m away to stop halting of traffic

2. INFORMAL VENDING - A Radius of 50 m around the junction needs to be restriction of vending zone as vending around the junction reduces turning radius for heavy vehicles and causes congestion at the junction

3. INTERMEDIATE PUBLIC TRANSPORT - IPT pick up/drop off needs to be shifted along with Bus stops i.e. Minimum 50m away from the junction

4. ON STREET PARKING - The on street parking in front of the police station needs to be shifted away from the junction

Map Showing Proposal at the junction

List of References

1. GNCTD, "*Transport Demand Forecast Study*", 2011
2. Delhi Development Authority, "*Master Plan Delhi - 2021*", Reprint 2017
3. Harry Raymond Joseph, Gaurav Raina and Krishna Jagannathan, "*Cost estimates for road congestion in Delhi: projections and recommendations*", 2015, Communication Systems and Networks (COMSNETS), 7th International Conference
4. UTTIPEC, "*Pedestrian Design Guidelines*", 2009

(An ISO 9001 : 2008 Certified Organisation)

दिल्ली नगर कला आयोग

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