RETROFITTING PLAN

TO PROMOTE

NON MOTORISED TRANSPORT AND PEDESTRIANISATION

JASOLA – SARITA VIHAR

TOWN AND COUNTRY PLANNING ORGANISATION
MINISTRY OF URBAN DEVELOPMENT,
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SUSTAINABLE TRANSPORT RELIES ON EFFICIENT USE OF RESOURCES.
NMT MODES LIKE WALKING AND CYCLING ARE ENERGY AND RESOURCE EFFICIENT.

NATIONAL URBAN TRANSPORT POLICY (NUTP), 2006

RECOGNIZES NON-MOTORISED TRANSPORT SUCH AS BICYCLE / CYCLE RICKSHAW AND PEDESTRIANISATION AS AN INTEGRAL PART OF URBAN TRANSPORT AND MOBILITY

NMT BENEFITS

- **ECONOMICAL**
- **INCLUSIVE – ALL CLASSES, GENDER, AGE**
- **LOW CARBON FOOTPRINT – NO FOSSIL FUELS**
- **COMMUNITY BUILDING – PROVIDES OPPORTUNITY FOR SOCIAL INTERACTION**
- **INCREASED EMPLOYMENT AVENUES DUE TO GREATER ACCESSIBILITY**
- **DECREASED DEMAND FOR PARKING SPACE, CONGESTION**
- **CITY IMAGE IMPROVEMENT - INCREASED EXPERIENCE DUE TO REDUCED SPEED**
- **IMPROVED PHYSICAL AND PSYCHOLOGICAL HEALTH OF POPULATION**

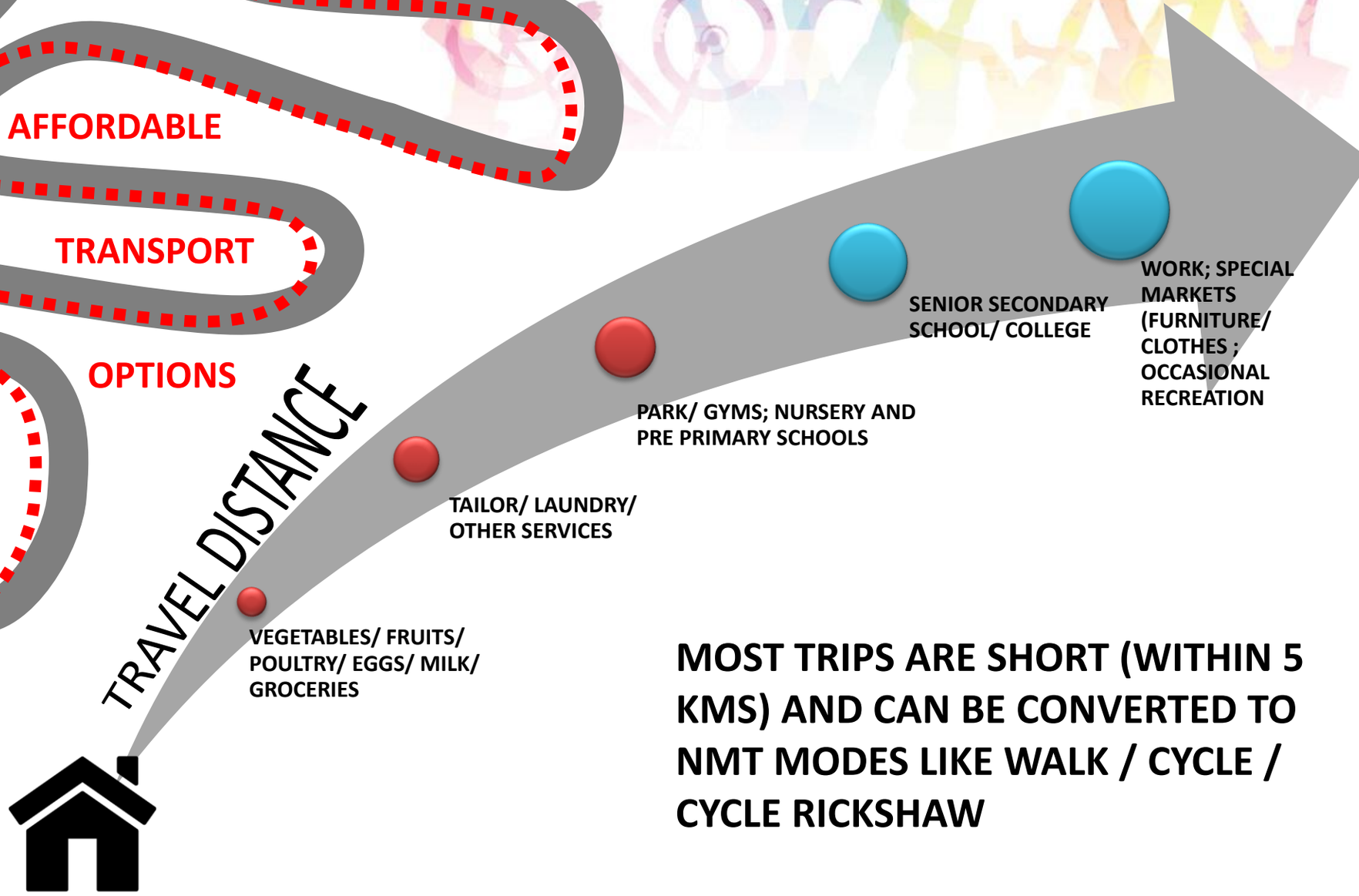
LAST MILE CONNECTIVITY TO PUBLIC TRANSPORT NETWORKS (BUS/ TRAIN/ METRO) IS PROVIDED BY NMT MODES

PUBLIC TRANSPORT

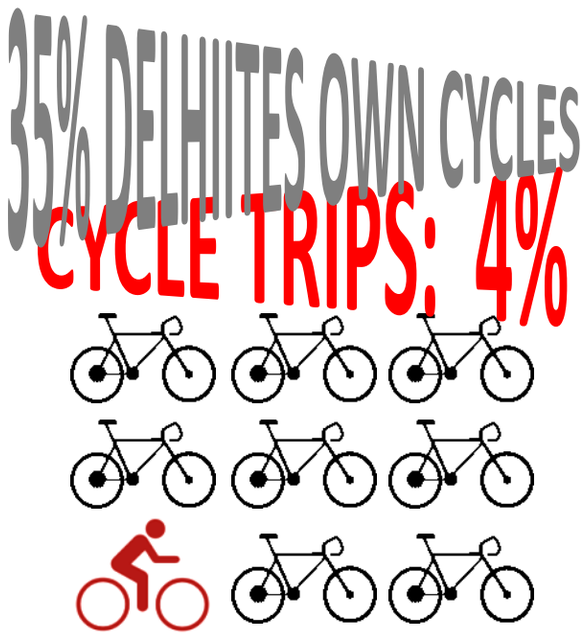
AFFORDABLE

TRANSPORT

OPTIONS



MOST TRIPS ARE SHORT (WITHIN 5 KMS) AND CAN BE CONVERTED TO NMT MODES LIKE WALK / CYCLE / CYCLE RICKSHAW



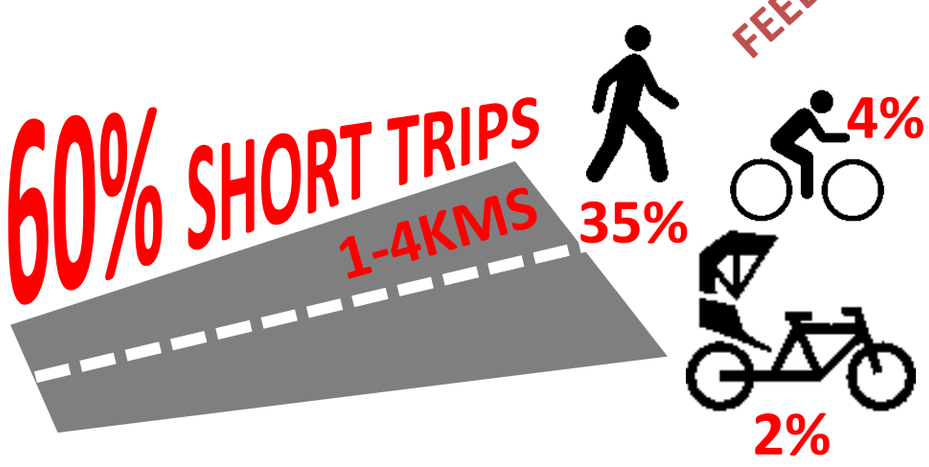
POOR NMT INFRASTRUCTURE

50% + CASUALTY IN FATAL ACCIDENTS: PEDESTRIANS & CYCLISTS

DELHI AS THE CITY FOR NMT BECAUSE:

- PLANNED CITY
- DEVELOPED TRANSPORT NETWORKS INCLUDE BUS, LOCAL TRAIN AND METRO
- STRONG PRESENCE OF NMT MODES – WALK, CYCLE AND CYCLE RICKSHAW

NMT MODES ARE IDEAL FOR SHORT TRIPS AND AS FEEDERS FOR PUBLIC TRANSPORT



61% WALK TO METRO & **78%** WALK FROM METRO

12% HAIL A CYCLE RICKSHA TO METRO & **9%** HAIL A CYCLE RICKSHA FROM METRO

*PERCENTAGE SHARE OF TRIPS IN THE SPECIFIC MODE FOR DELHI

Source: RITES Data, 2010

National Urban Transport Policy 2006 recommends :

- Safe
- Affordable
- Quick
- Comfortable
- Reliable
- Sustainable

Sought to be achieved by (Relevant points):

- **Integrated land use and transport planning** to minimize travel distances and improve access, especially for the marginal urban segments
- **Equitable allocation of road space with people, rather than vehicles, as its main focus.**
- Encourage greater **use of public transport and non-motorized modes by offering Central finance**
- Establishment of **multi-modal public transport systems** with seamless travel across modes
- Ensuring enhanced **safety and trauma** response
- Reducing **pollution levels** and promoting the use of cleaner technologies
- Raising finances that tap land as a resource, **involve the private sector**
- Taking up **pilot projects that demonstrate the potential of possible best practices** in sustainable urban transport

National Mission on Sustainable Habitat

The **parameters** addressed through NMSH are :

- Public health
- Vehicle emissions
- Vulnerability of walkers and cyclists to road side exposure
- Transport and climate
- Equity and access for the poor

The National Mission for Sustainable Habitat on urban transport addresses the issue of **mitigating climate change** by taking **appropriate action with respect to the transport sector** such as:

- Evolving integrated land use and transportation plans
- Achieving a modal shift from private to public mode of transportation
- **Encouraging the use of non-motorised transport**
- Improving fuel efficiency and encouraging the use of alternate fuels
- Evolving strategies for adaptation in terms of realignment and relocation, design standards and planning for roads, rail and other infrastructure to cope with warming and climate change.

Indian Penal Code (sec 283), sec 34 of Delhi Police Act -- Obstruction in public space punishable. Danger or obstruction in public way or line of navigation: Whoever, by doing any act, or by omitting to take order with any property in his possession or under his charge, causes danger, obstruction or injury to any person in any public way or public line of navigation, shall be punished with fine which may extend to two hundred rupees.

Central Motor Vehicles rules (CMVR) 1989 Safety Rules provide passive protection for pedestrians, stating that **motorists cannot enter pedestrian way and are liable to penalty.**

Urban Street Vendor policy, 2007, to protect livelihood rights – recommend Guidelines for proper vending zones, as they are service providers on sidewalks…

The National Policy on Urban Street Vendors, 2009,. `` The national policy gives street vendors a legal status and aims at providing legitimate vending/hawking zones in city/town master or development plans."

Police Act provides for penalty for jaywalking**.**

Persons with Disabilities Act 1995 (Sec 44) recommends guidelines for the disabled persons.

IRC Guidelines for Pedestrian and Cycle track design provide basis standards for pedestrian and cycle oriented design

IUT Manuals: inclusive mobility is reflected in the proposed design standards with special attention to the details required in infrastructure and its various design components.

Street Design Guidelines, UTTIPEC, DDA - A set of 10 non-negotiable Street Design Components as well as additional guidelines for world class streets.

Supreme Court directive on increased use of Public Transport in Delhi.

"Over the years, it has become clear that each city is fighting a losing battle against air pollution and growing congestion — because of the growing numbers of vehicles. Economic progress of our cities will depend on their environmental health. A turnaround is only possible when cities recognize the need for a transition to public transport and adopt it."

Delhi High Court directives on lanes for NMV (29th May 2014)

Delhi High Court directed Delhi Government to submit plan for NMV. ***" You have hundreds of areas where you can have pilot projects……. Road space is democratic everybody must have a share. If you can address BRT, you can take care of NMV also".***

Master Plan of Delhi 2021 provisions:

- All roads should be made pedestrian, disabled and bicycle friendly.
- Provision of adequate pedestrian facilities.
- Removal of encroachments from sidewalks.
- Provision for introducing cycle tracks, pedestrian and disabled friendly features in arterial and sub-arterial roads.
- In urban extension, cycle tracks should be provided at the sub-arterial and local level roads and streets.
- In specific areas, like the Walled City / Chandni Chowk / Sadar Bazar / Karol Bagh / Lajpat Nagar and Trans Yamuna Area, the use of cycles/rickshaw as a non-motorised mode of transport should be consciously planned along with pedestrianisation.

RESPONSIBILITY AND MULTIPLICITY OF ORGANISATIONS

Police

Telephone Exchange

DISCOMS: DUAC

DDA/MCD:

MPLAD Fund:

Horticulture Deptt:

DTC:

PWD:

DDA

Horticulture Deptt

Traffic Police

Electric Poles

Public Toilet

Foot Path with paved surface

MPLAD Fund

Trees and soft-scapes

Bus Stop

Row design + median, carraigeway ...

NGO

Jal Board

DTC

MCD

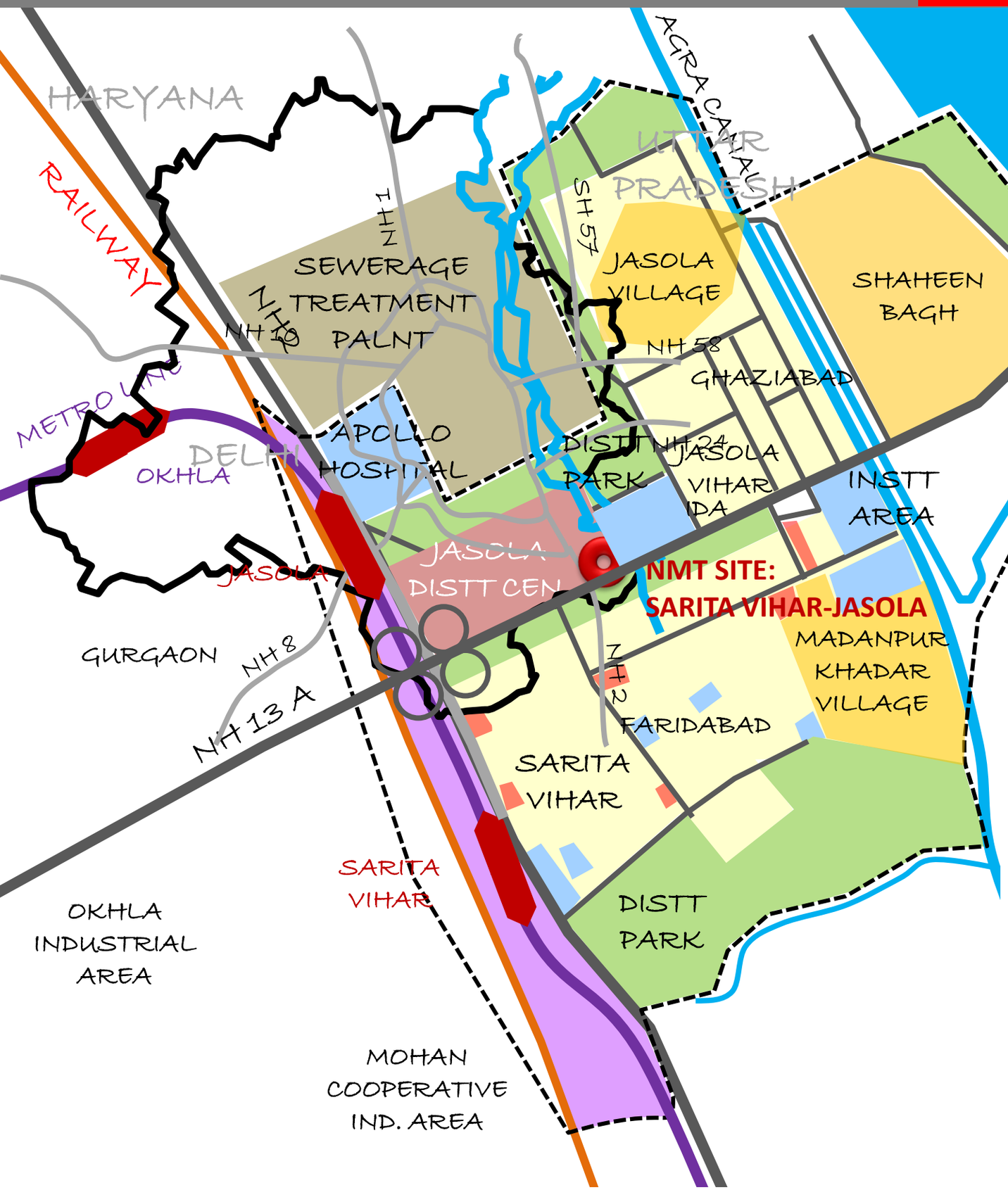
DIS-COMS

PWD

RETROFITTING FOR NON MOTORISED TRANSPORT

PLIGHT OF A CYCLIST ON A DELHI ROAD

SITE SELECTION:
JASOLA AND SARITA VIHAR CRITERIA

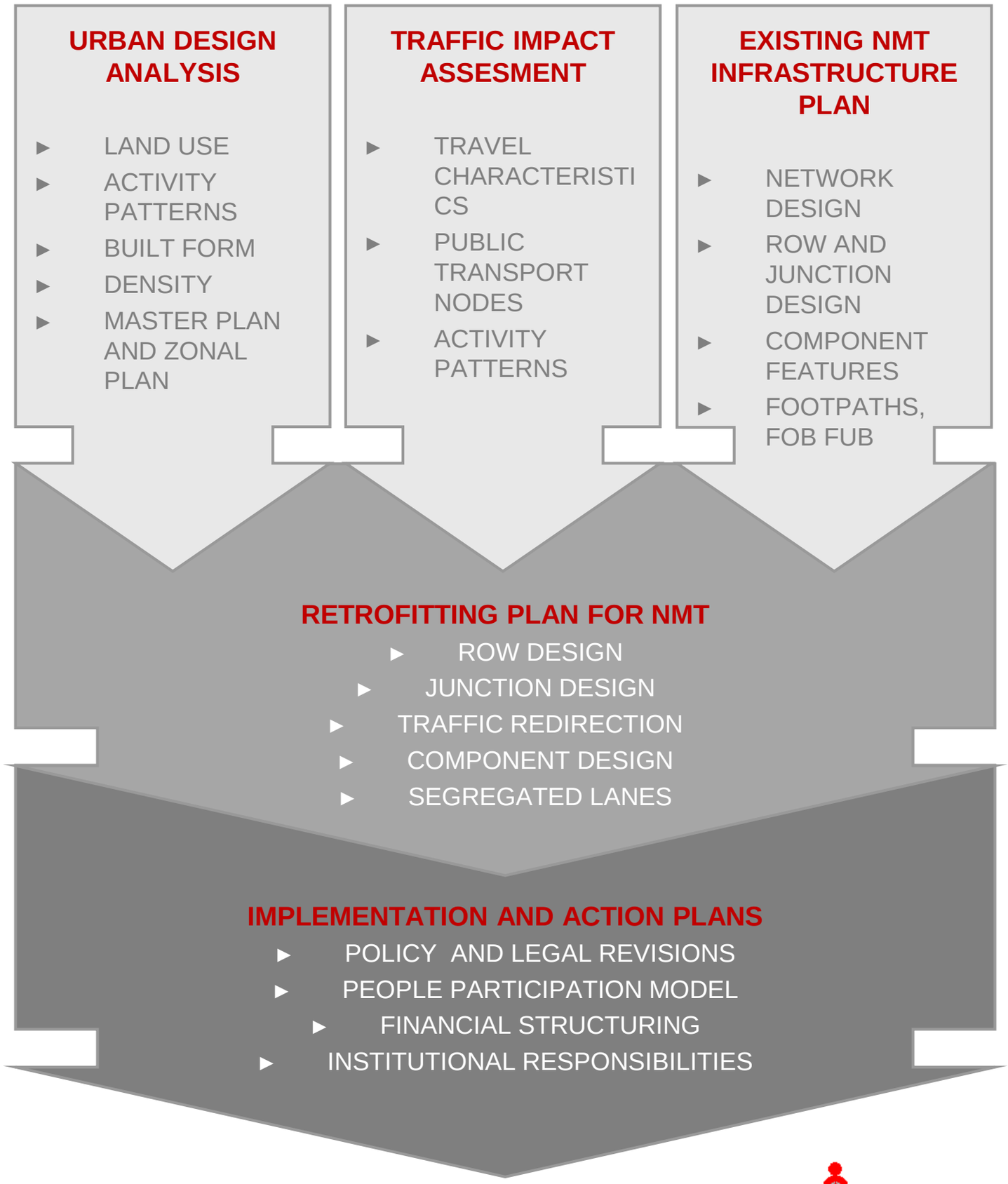


- ENVIRONMENTALLY ACTIVE: RIVER YAMUNA BORDERS THE SITE, AGRA CANAL CUTS ACROSS THE SITE, STP IN THE VICINITY AND DISTRICT PARK IN THE SITE
- OKHLA BIRD SANCTUARY BORDERS THE SITE
- DIVERSE LAND USES AND DEVELOPMENT TYPOLOGIES: JASOLA DISTRICT CENTRE, MOHAN CO-OP INDUSTRIAL AREA, APOLLO HOSPITAL, PLOTTED ANDFLATTED RESIDENTAIL COLONIES OF HIG, MIG, LIG, EWS AND SFS FLATS AS WELL AS VILLAGES AND AN UNAUTHORISED COLONY

STREET AUDIT: QUESTIONNAIRE DEVELOPED ON BASIS OF UTTPEC GUIDELINES, IUT MANUALS AND INTERNATIONAL CASE STUDIES

FEATURES:
FOOTPATH
MEDIAN
CARRAIGEWAY
SPEED REGULATING MECHANISMS
SIGNAGES AND ROAD MARKINGS
LIGHTING
JUNCTIONS
PEDESTRIAN CROSSINGS (FOB/SUBWAY)
STREET FURNITURE
TREES
TRAFFIC NODES – BUS/METRO/RICK
PARKING

CHARACTERISTICS
LOCATION / STRETCH
DIMENSIONS: WIDTH/HEIGHT WITH VARIATIONS
MATERIAL: COLOUR AND TEXTURE
FUNCTIONAL INTEGRITY
CONDITION OF MAINTENANCE
SUPPORTED BY PHOTOGRAPHS



STREET AUDIT TEAMS

- 3 TEAMS: 4 PERSONNEL EACH
- STREETS FOR AUDIT IDENTIFIED AND ASSIGNED TO EACH TEAM
- INTENSIVE SURVEY SCHEDULE OF 4 WEEKS
- PHOTOGRAPHIC AND VIDEOGRAPHIC RECORDING OF ACTIVITIES ALONG ROADS
- PARTIALLY COMPLETED QUESTIONNAIRES CARRIED TO SITE
- EQUIPMENTS USED: SAFETY JACKETS, TRAFFIC CONES, STOPPING TAPE, LASER MEASURING INSTRUMENT AND OTHERS…

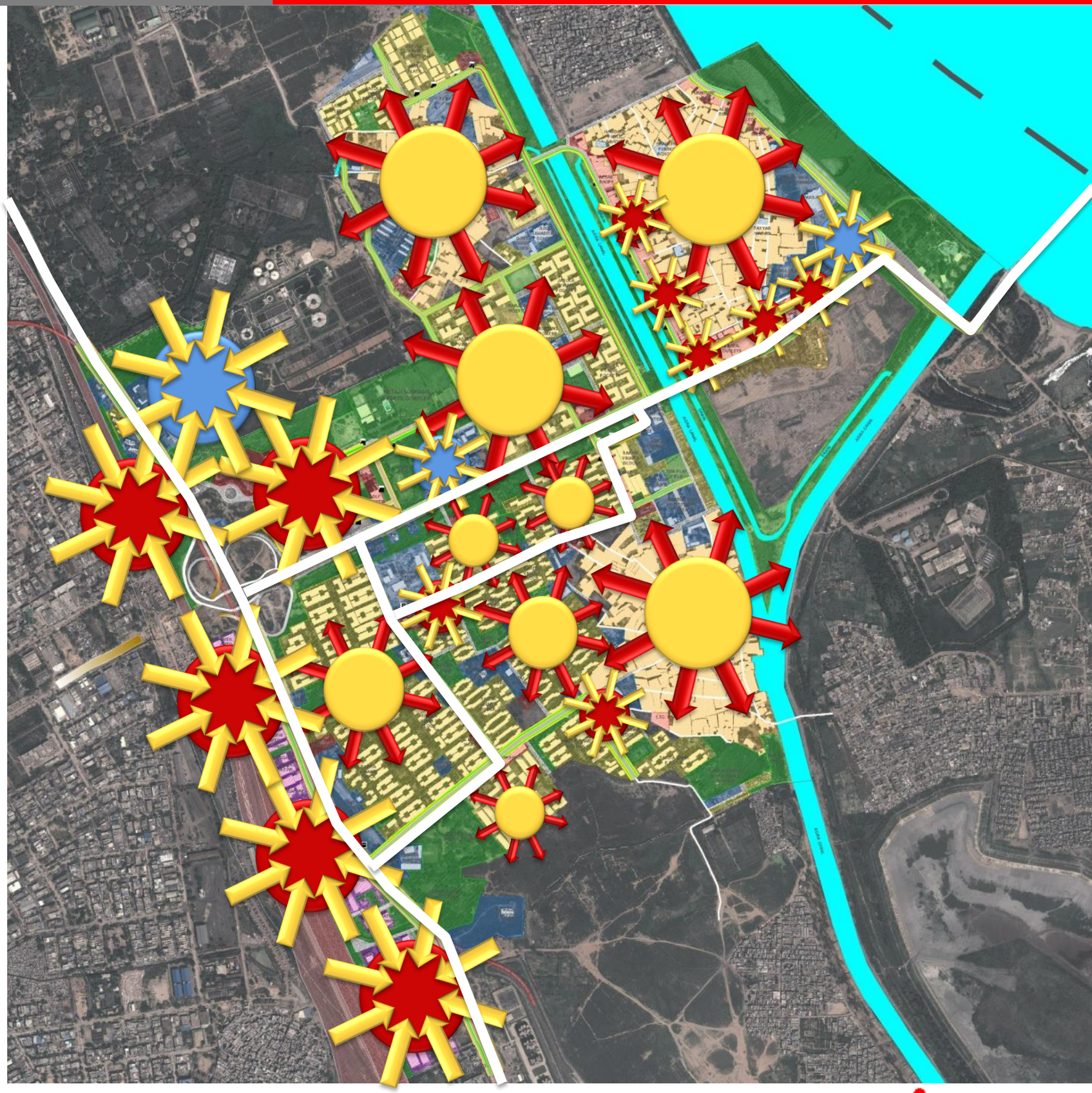
BUILT UP AREA AND LAND USE PLAN OF THE SITE GENERATED ON AUTO CADD

THIS IDENTIFIES AREAS THAT ATTRACT TRAFFIC AND THOSE THAT GENERATE TRAFFIC.

RESIDENTIAL AREAS GENERATE TRAFFIC TOWARDS THE LOCAL SHOPPING AREAS, PARKS AND INDUSTRIAL AREA IN THE MORNING

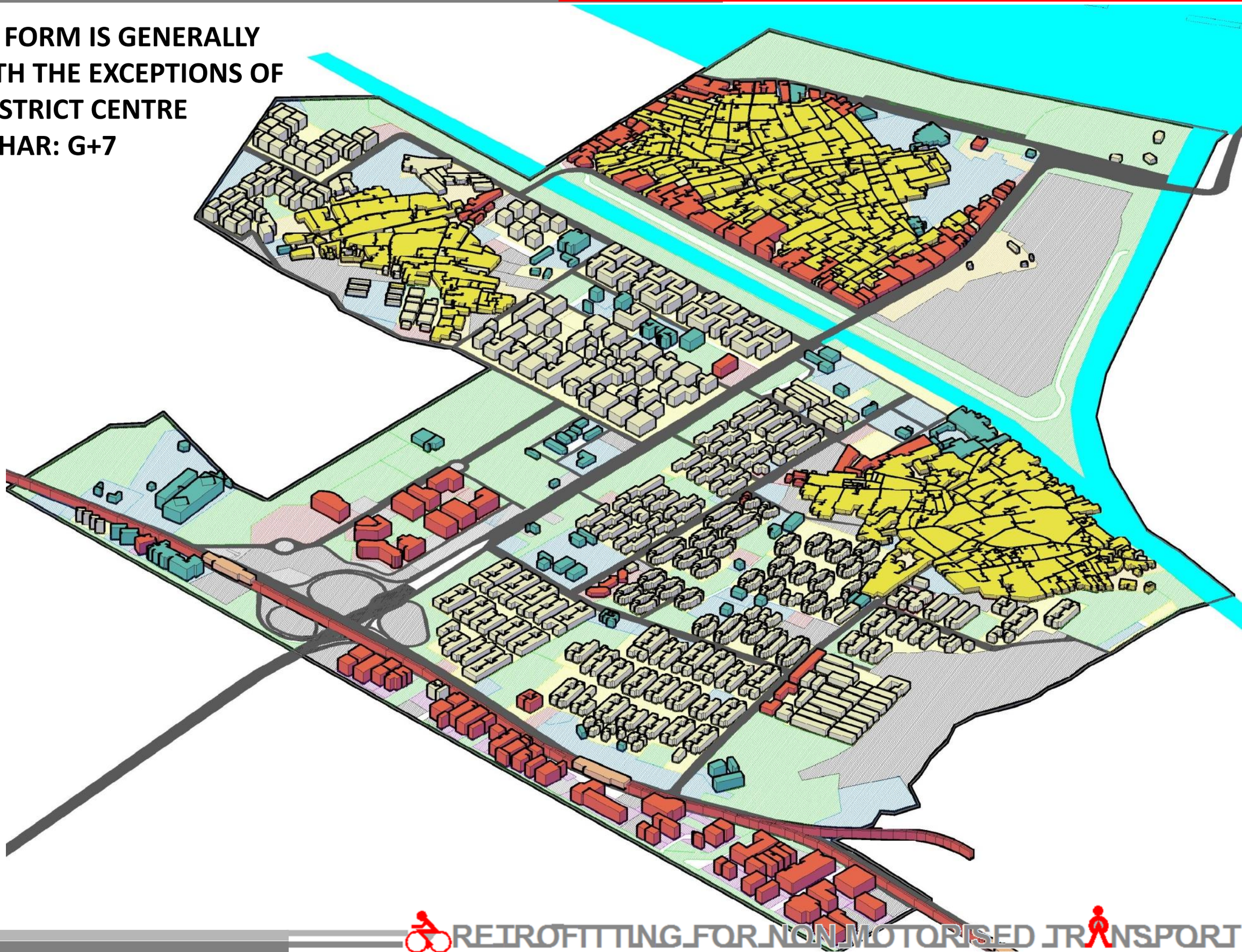
TRAFFIC FLOW IS REVERSED IN THE EVENING AND IS DIRECTED TOWARDS RESIDENTIAL AREAS

THROUGH TRAFFIC OF FARIDABAD, DELHI AND NOIDA CURRENTLY FLOWS ALONG NH2, GD BIRLA MARG AND ROAD NO. 3, 6



SITE ANALYSIS:
BUILT FORM AND DENSITY

THE BUILT FORM IS GENERALLY G+3/4 WITH THE EXCEPTIONS OF JASOLA DISTRICT CENTRE
JASOLA VIHAR: G+7



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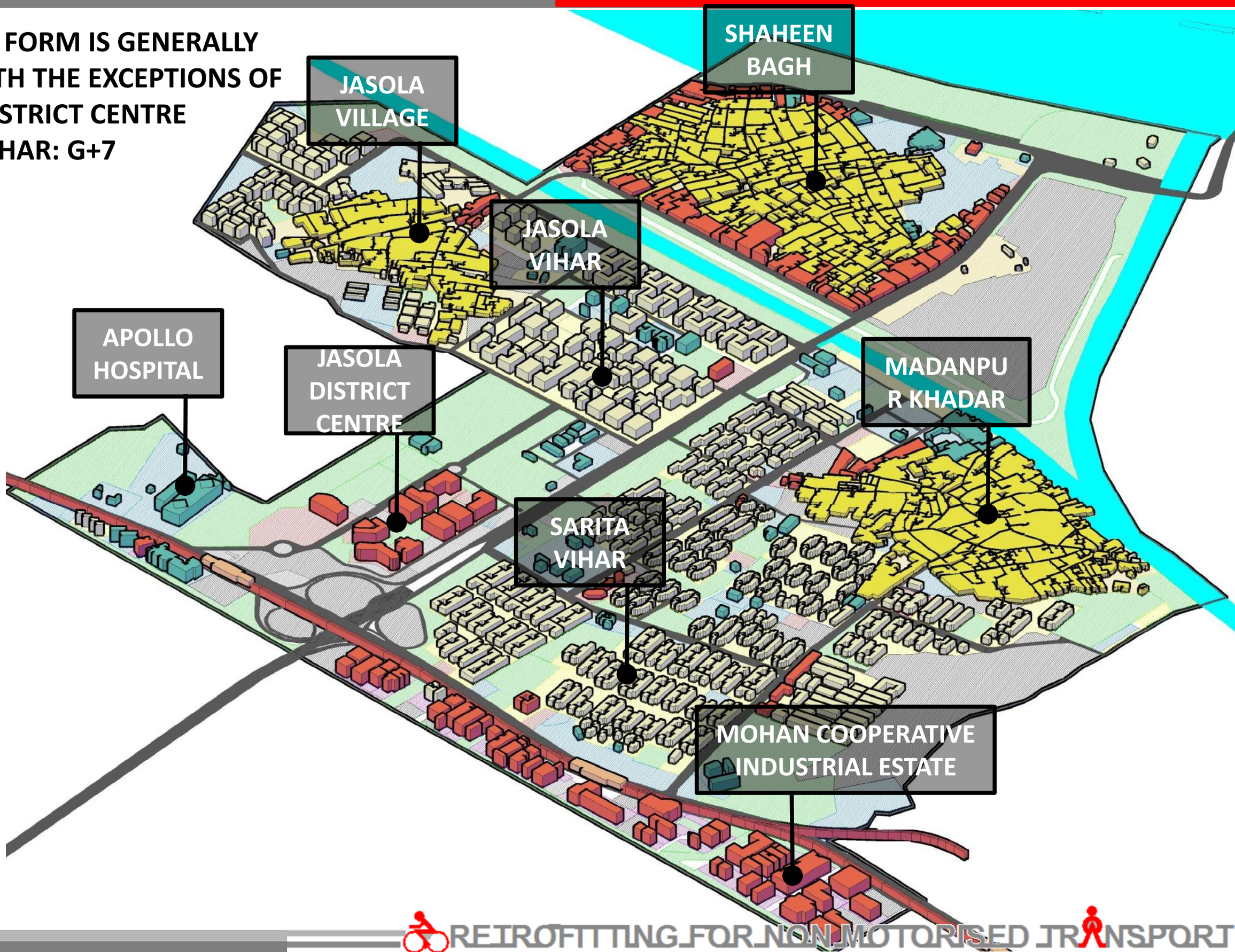
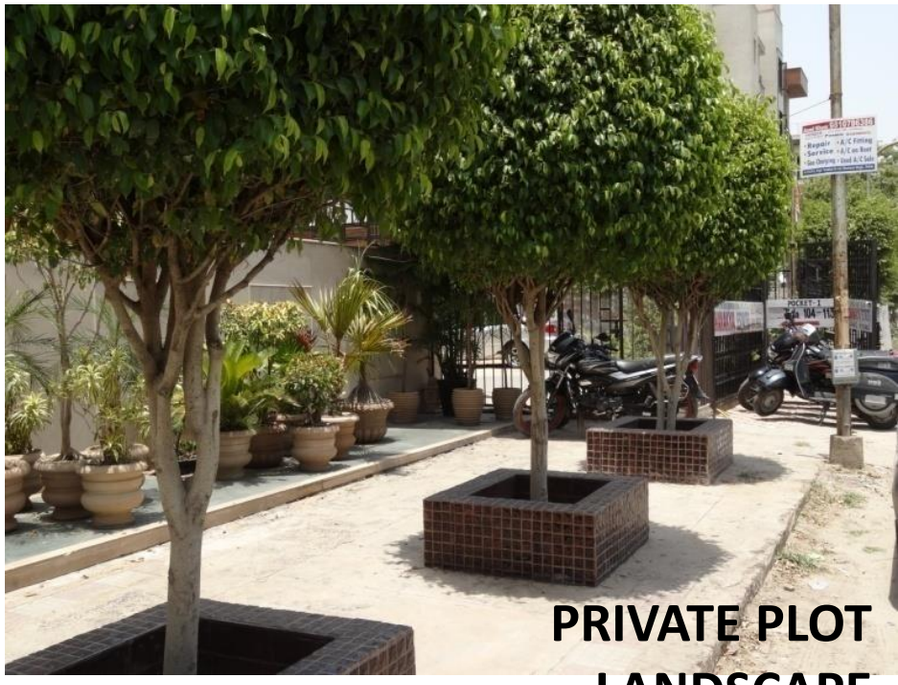


FOOTPATHS – POOR MAINTENANCE, DESIGN

OBSTRUCTIONS ON FOOTPATHS



CONDITION OF FOOTPATH AND PUBLIC TOILETS

FOOT OVER BRIDGE – ELEVATED ENTRY ON RAMP

UNPAVED FOOTPATH

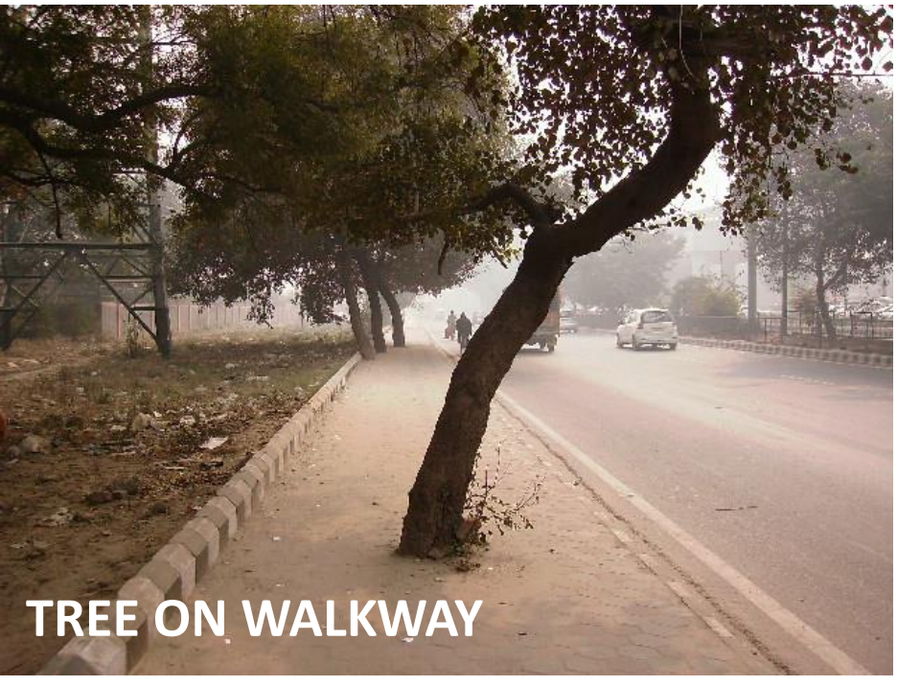
UNPAVED FOOTPATH OBSTRUCTED BY PUBLIC TOILET (NON FUNCTIONAL)

UNDEVELOPED FOOTPATH

DEBRIS ON WALKWAY

NEGATIVE SPACE BEHIND PUBLIC TOILET

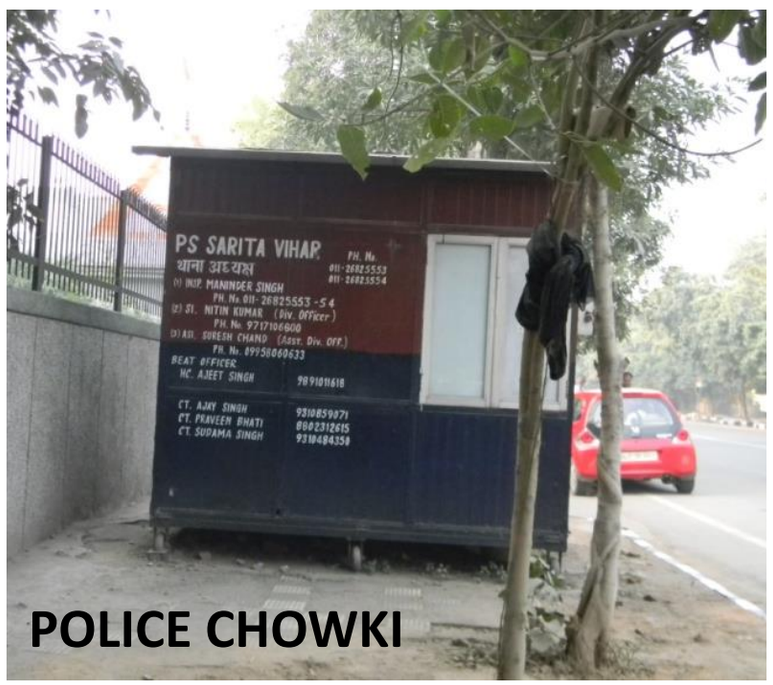
DISCONTINUIOTY OF FOOTPATH


TREE ON WALKWAY

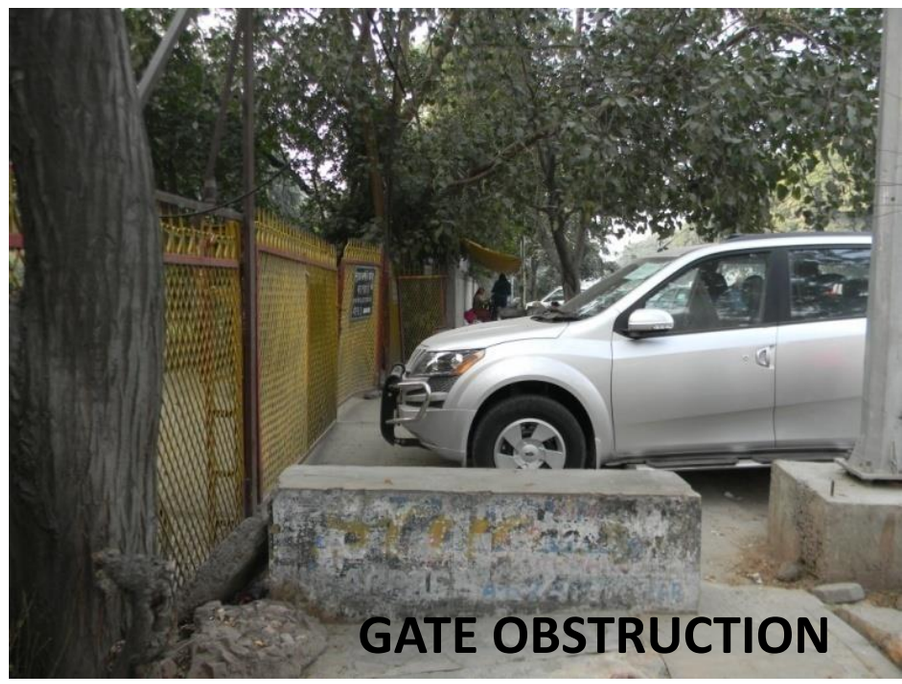
JUNCTION DESIGN

MISSING FOOTPATH

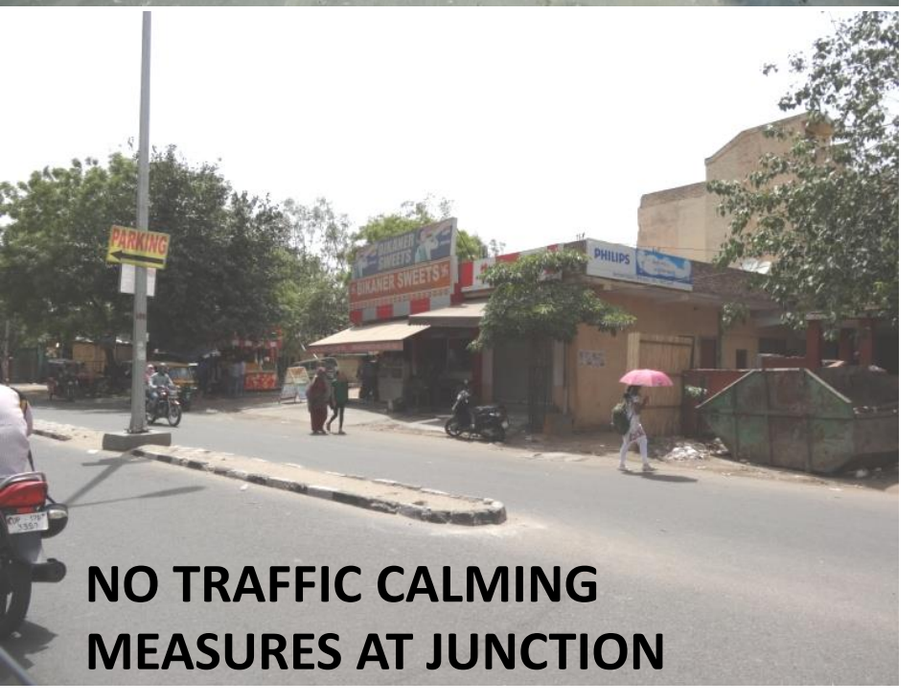
SHOPS ON FOOTPATH

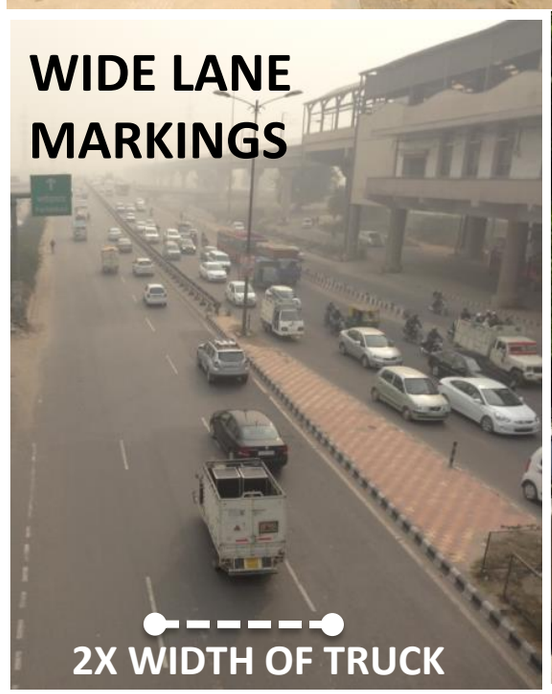


POLICE CHOWKI


GATE OBSTRUCTION

FAULTY LANE MARKINGS, MISSING COMPONENTS OF NMT INFRASTRUCTURE





NMT NETWORK:
PROPOSED NMT TRACKS, FOOT PATHS

NMT TRACK HAS BEEN DESIGNED ALONG ALL ARTERIAL AND COLLECTOR ROADS

NMT TRACKS RUN ON BOTH SIDES OF THE ROADS OR ON JUST ONE SIDE (DOUBLE LINE INDICATES TRACK ON BOTH SIDES)

TWO WAY TRACKS ARE INDICATED IN BLACK
UIDIRECTIONAL TRACKS ARE INDICATED IN RED

STRETCHES HIGHLIGHTED IN WHITE ARE EXCLUSIVELY FOR NMT TRAFFIC

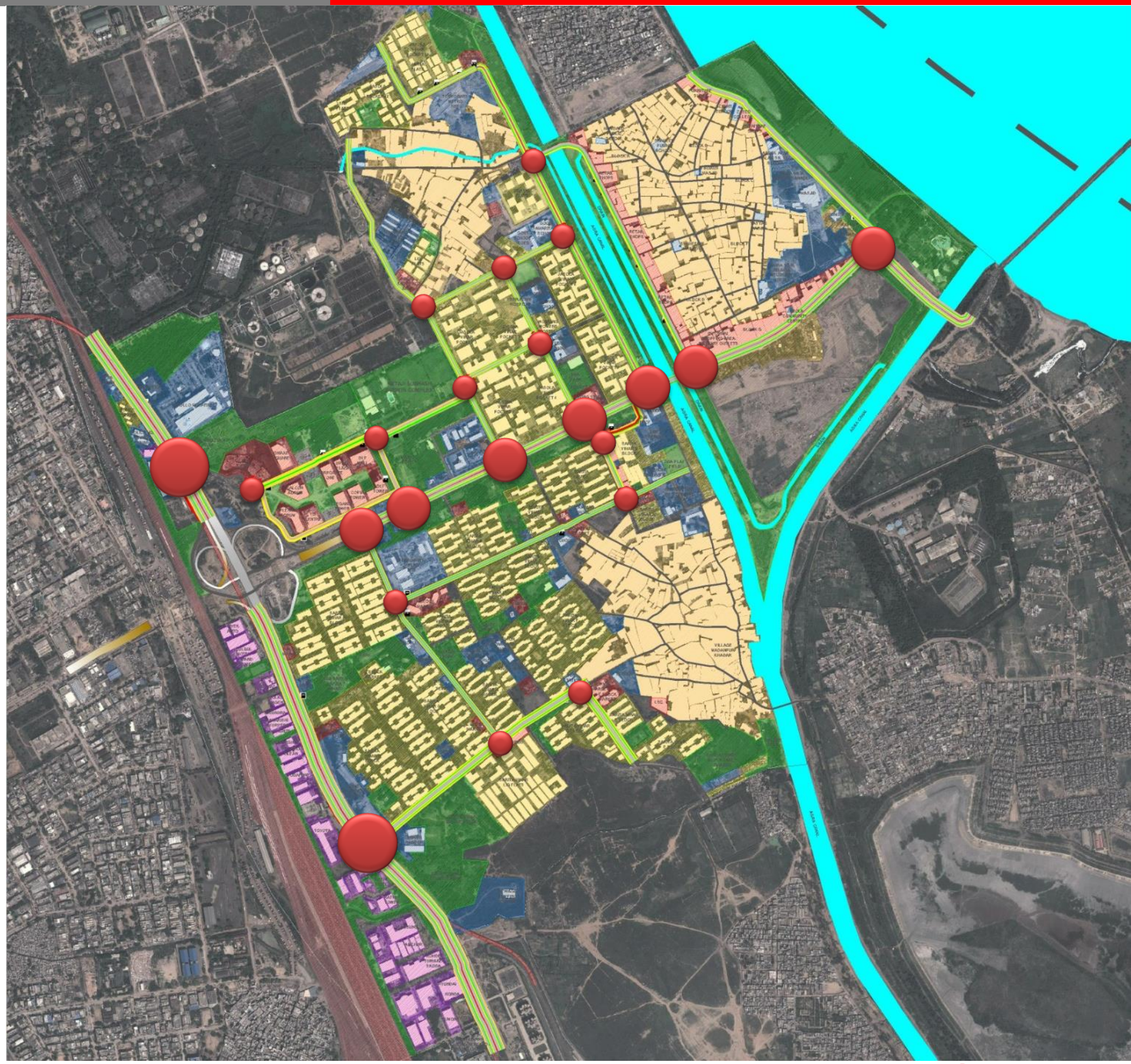
FOOT PATHS RUN ON BOTH SIDES OF THE ROADS OTHER THAN THE STRETCHES IN BLACK DOTS (SINGLE SIDE)

NMT NETWORK:
PROPOSED JUNCTION DESIGN

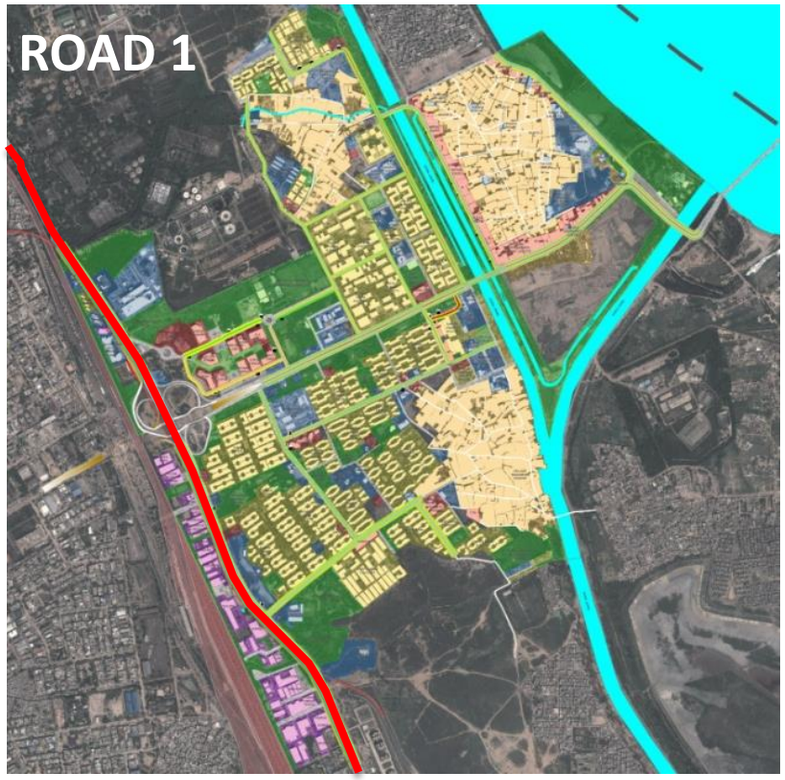
JUNCTIONS ON NH2 ARE SIGNALISED WITH TABLE TOP SPEED REGULATION MECHANISMS COUPLED WITH A RUMBLE STRIP

JUNCTIONS ON G D BIRLA MARG ARE SIGNALISED WITH TABLE TOP SPEED REGULATION MECHANISMS COUPLED WITH A RUMBLE STRIP. SOME INTERSECTIONS HAVE BEEN RESTRICTED FOR MOTOR VEHICLES OR DIRECTIONAL CONTROLS

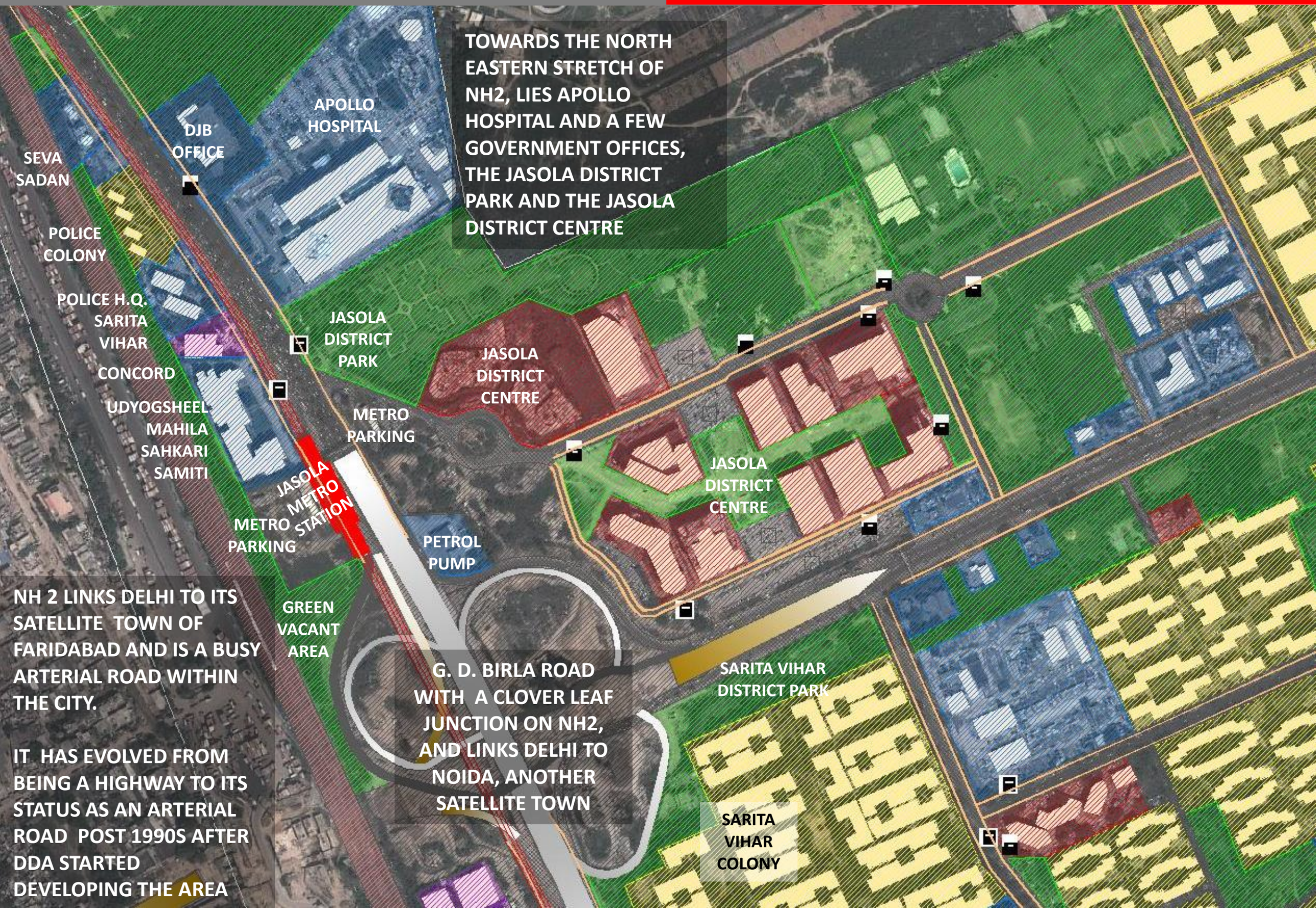
COLLECTOR ROADS HAVE INTERSECTIONS WHICH ONLY HAVE A TABLE TOP AND NO SIGNAL OR RUMBLE STRIP. ROUNDABOUT IS RETAINED NEAR JASOLA DISTRICT CENTRE.



ROAD NUMBER 1 (NH 2): EXISTING ROW DETAILS



ROAD NUMBER 1 (NH 2): EXISTING ACTIVITIES



ROAD NUMBER 1 (NH 2): EXISTING ACTIVITIES

NH 2 IS FLANKED BY THE ERSTWHILE INDUSTRIAL AREA OF MOHAN COOPERATIVE TO ITS WEST.

THIS CURRENTLY HAS NUMEROUS OFFICES, RESTAURANTS, BANQUET HALLS AND AUTOMOBILE SHOWROOMS WITH TOP BRANDS LIKE LAMBORGHINI, HONDA, VOLKSWAGEN, SKODA AND HYUNDAI, MARUTI, ETC ….

BEYOND THIS COMMERCIAL STRIP RUNS THE BROAD GAUGE RAILWAY LINE FROM DELHI TO MUMBAI. OKHLA INDUSTRIAL ESTATE IS LOCATED BEYOND THE RAILWAY LAND TO THE WEST

TOWARDS THE SOUTH EASTERN STRETCH OF NH2, LIES THE RESIDENTIAL COLONY OF SARITA VIHAR, ITS LOCAL MARKETS AND AT THE VERY EXTREME SOUTH, AN INSTITUTIONAL AREA – THE SHANITI BAHAVAN AND A DDA PARK

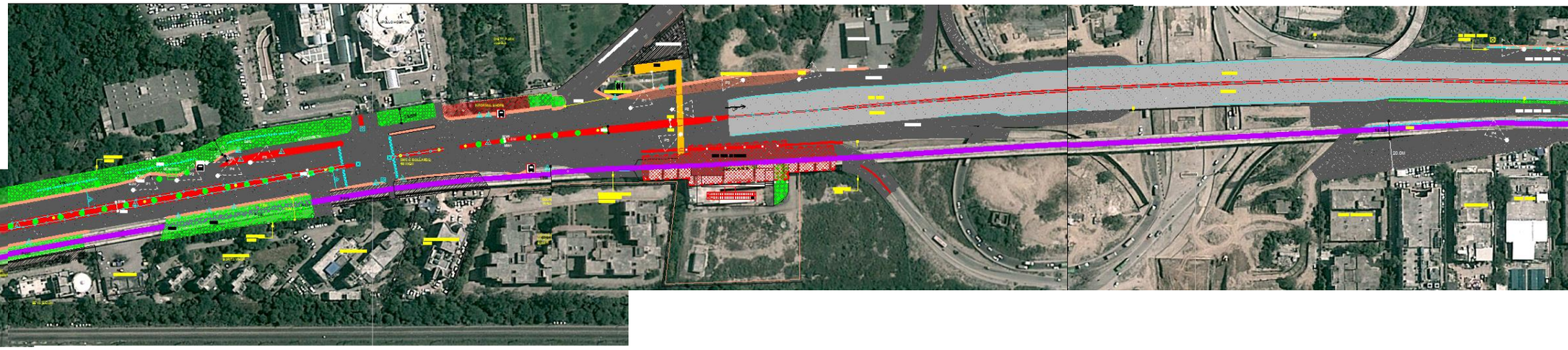
ROAD NUMBER 1 (NH 2): EXISTING ACTIVITIES

THE DRAIN FLOWING UNDER NH2 FROM WEST TO EAST TOWARDS THE YAMUNA MARKS THE END OF THE NMT SITE. A SEWERAGE TREATMENT PLANT IS LOCATED ALONG NH2 TO ITS EAST AND NORTH OF THE DRAIN

THE SOUTHERN END OF MOHAN COOPERATIVE HAS THE OFFICES OF SAMSUNG, ANCHOR, SHWARZ, SIMON AND OTHER PROMINENT BRANDS IN THE IT SECTOR

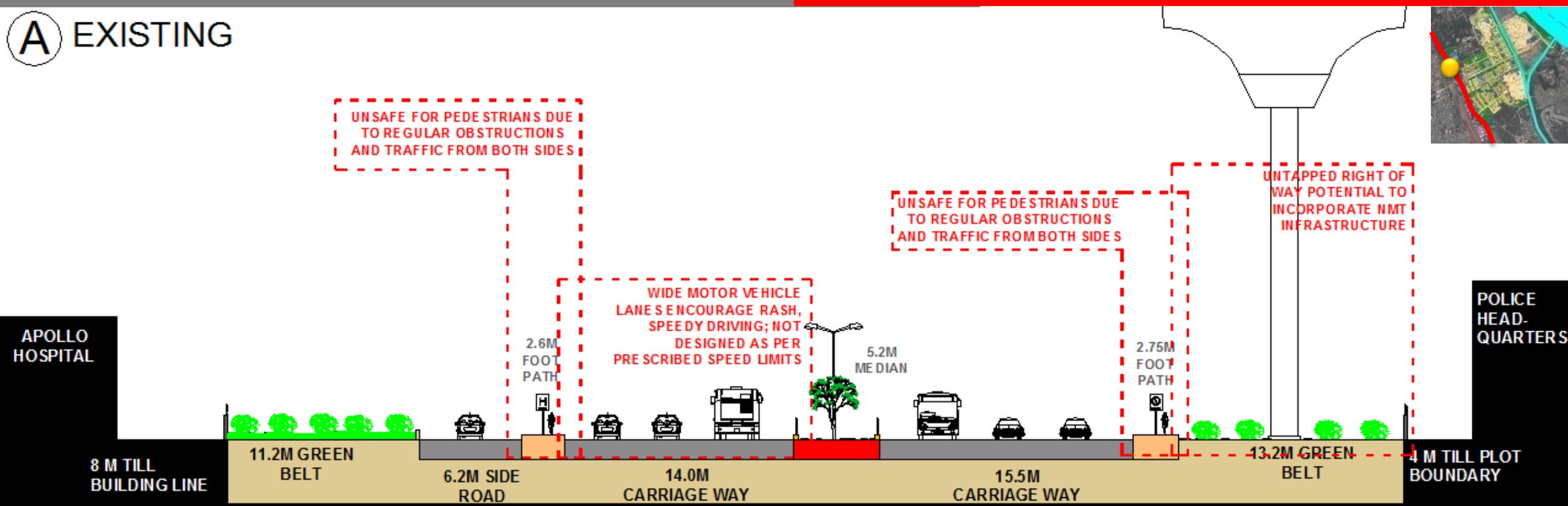
SOUTH OF THE DRAIN AND TO THE EAST OF NH 2 LIES THE DMRC METRO YARD

ROAD NUMBER 1 (NH 2): EXISTING ROW DESIGN



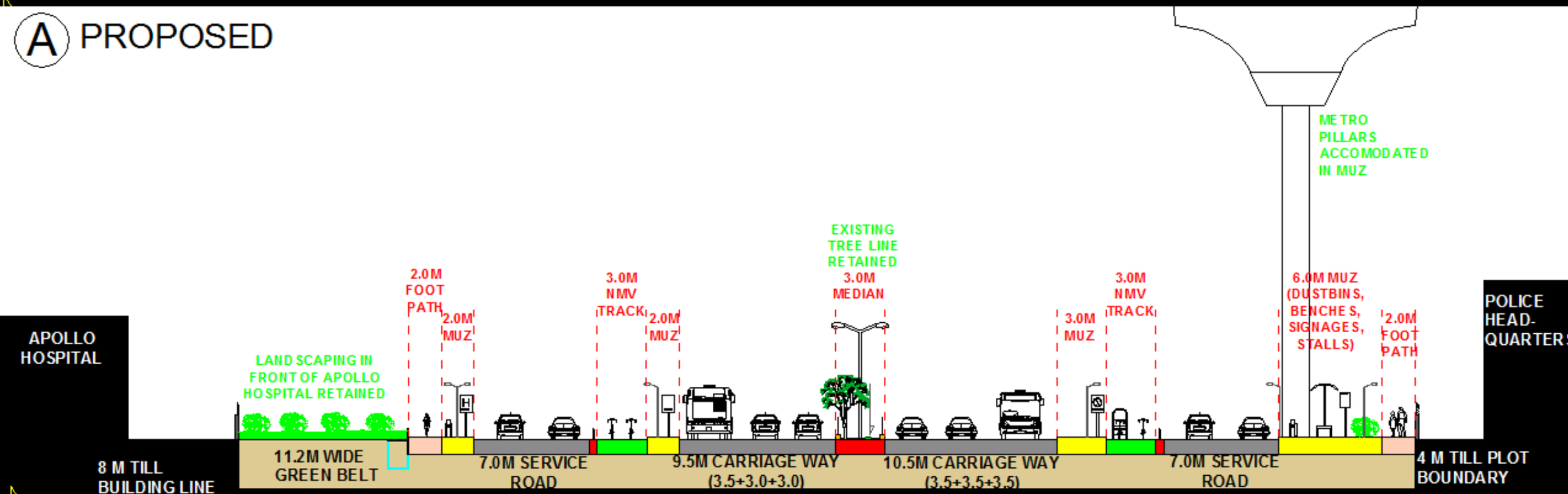
ROAD NUMBER 1 (NH 2): PROPOSALS

A EXISTING



RoW 70.65 METERS

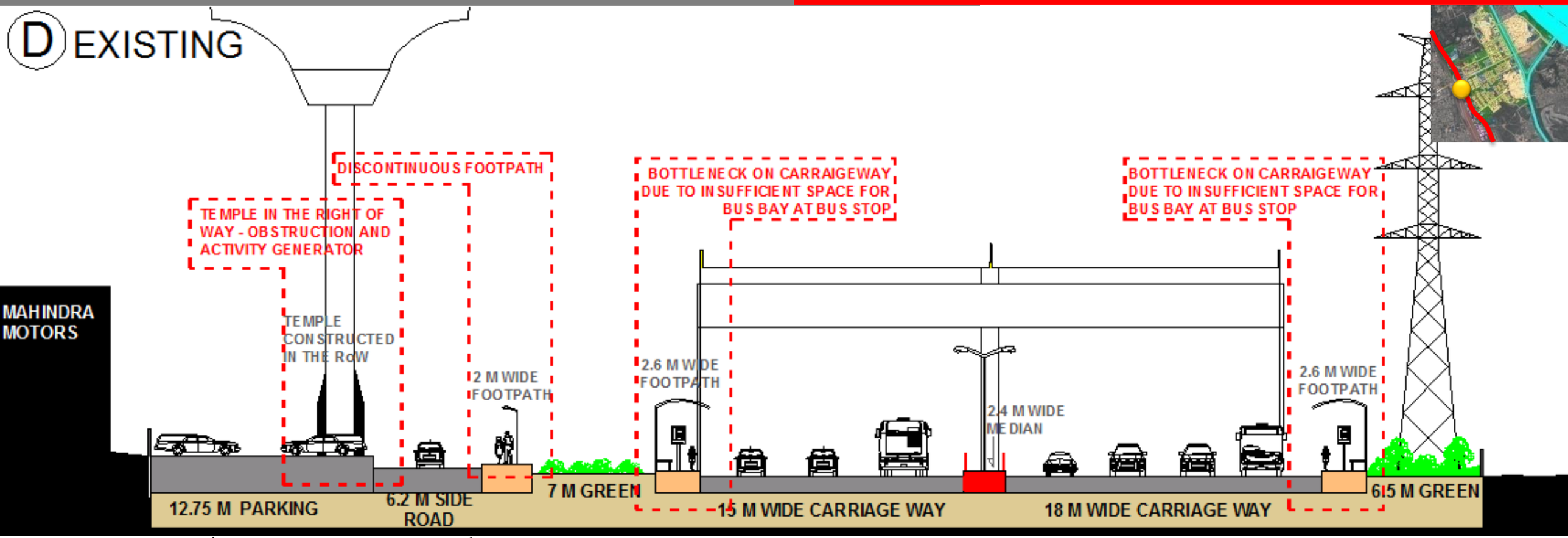
A PROPOSED



RoW 70.65 METERS

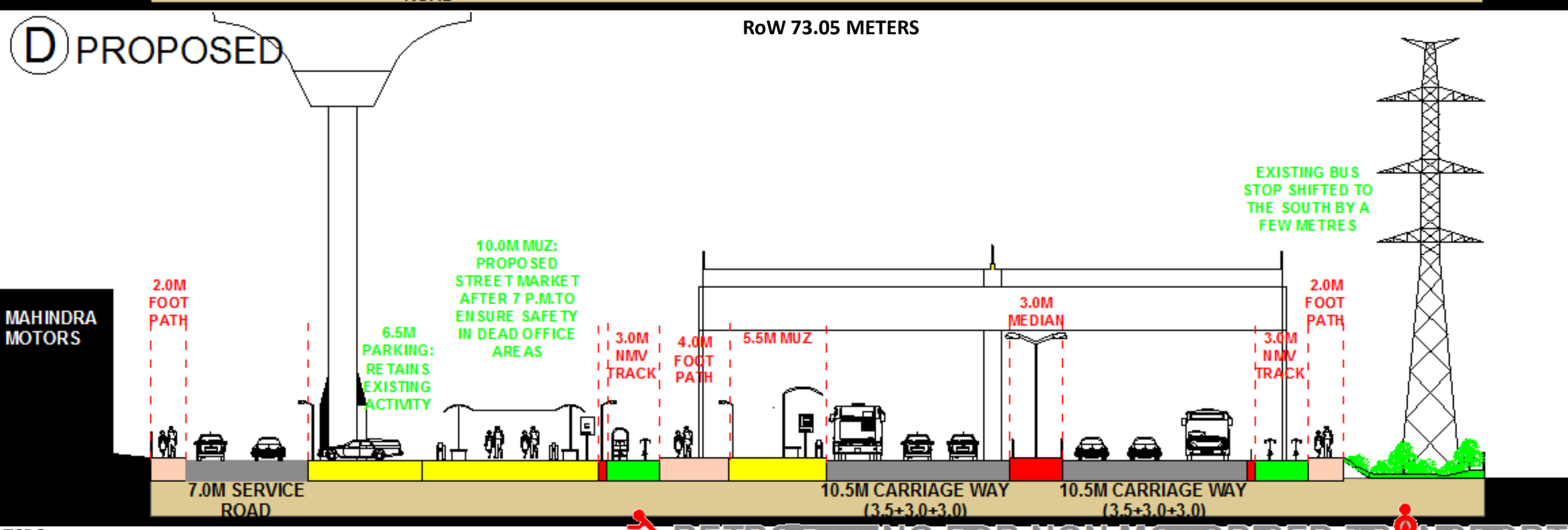
ROAD NUMBER 1 (NH 2): PROPOSALS

D EXISTING

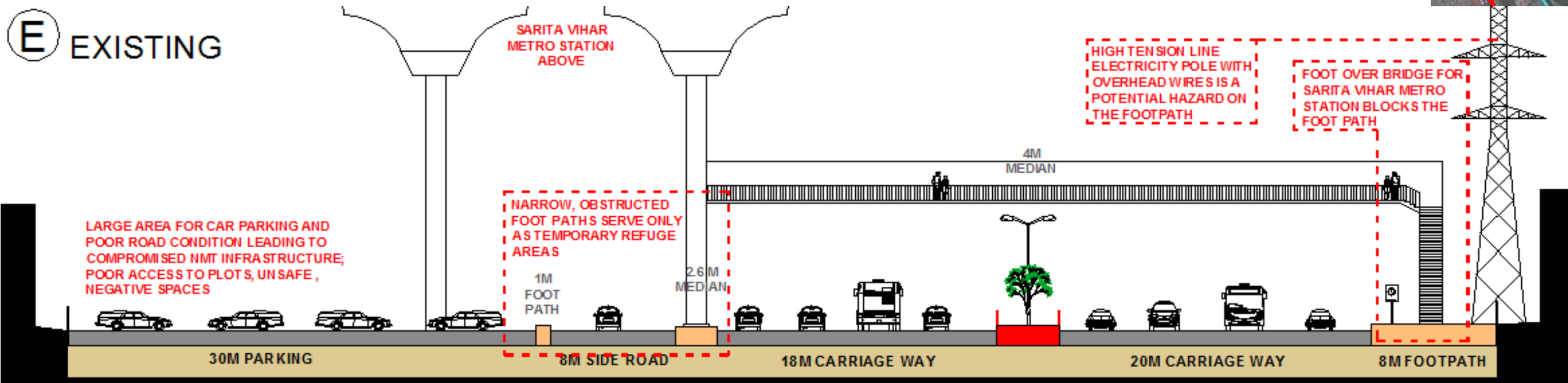


D PROPOSED

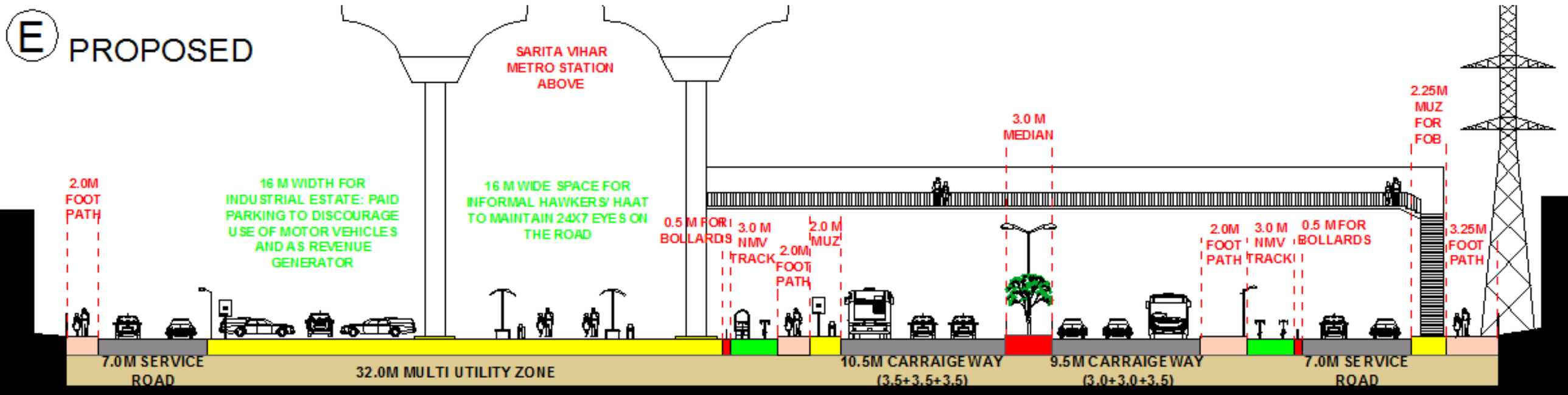
RoW 73.05 METERS



ROAD NUMBER 1 (NH 2): PROPOSALS

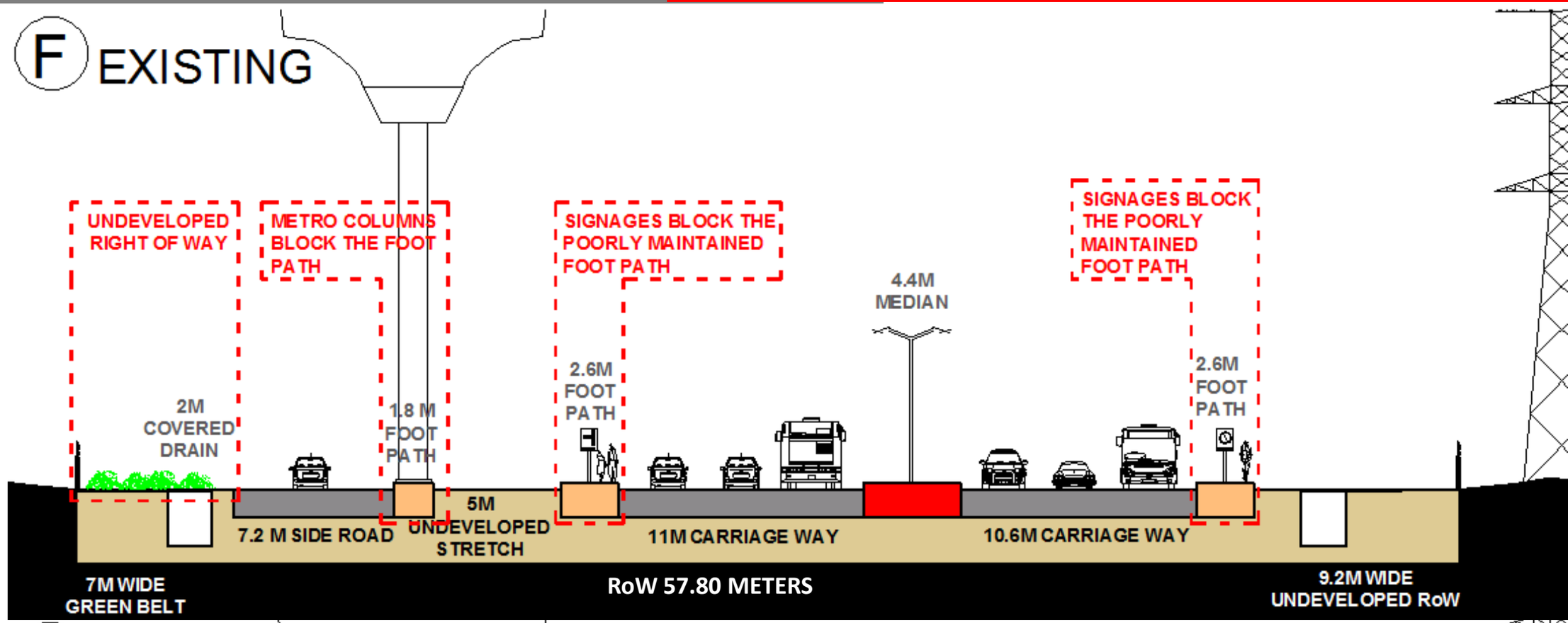


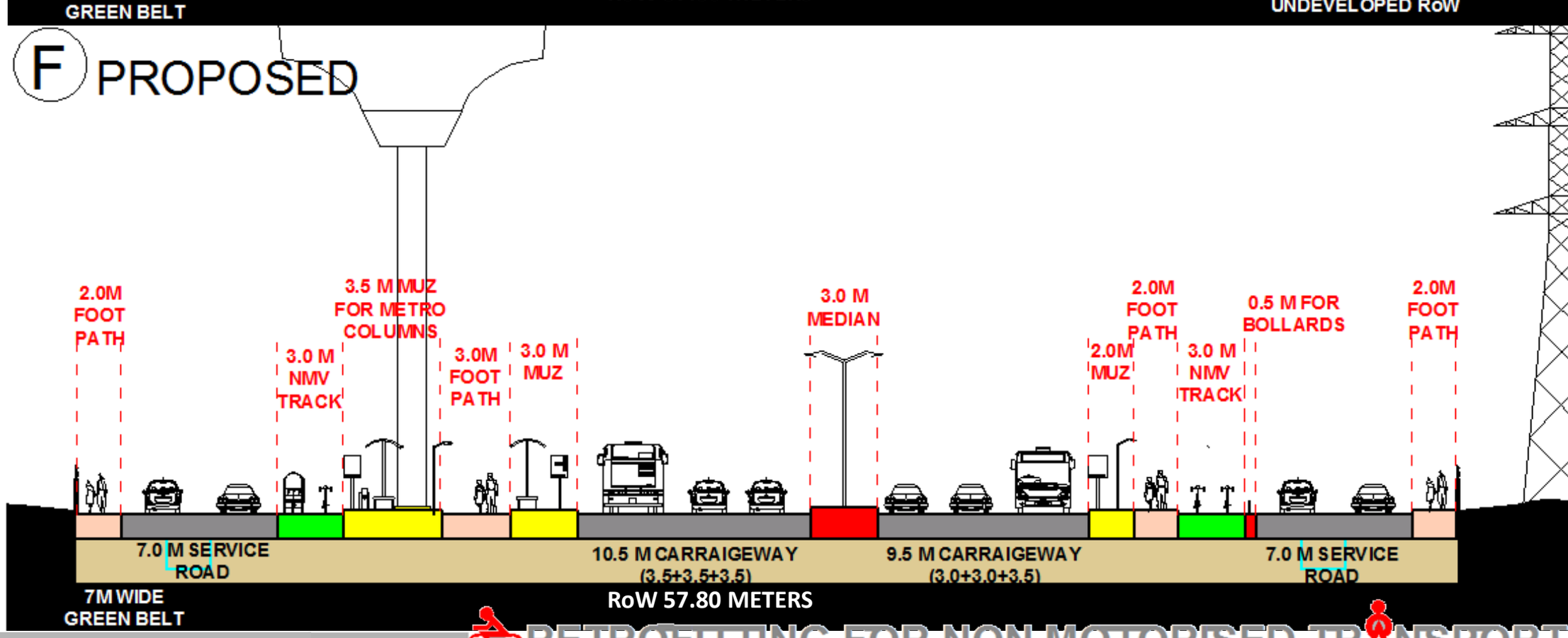
RoW 111.60 METERS



RoW 111.60 METERS

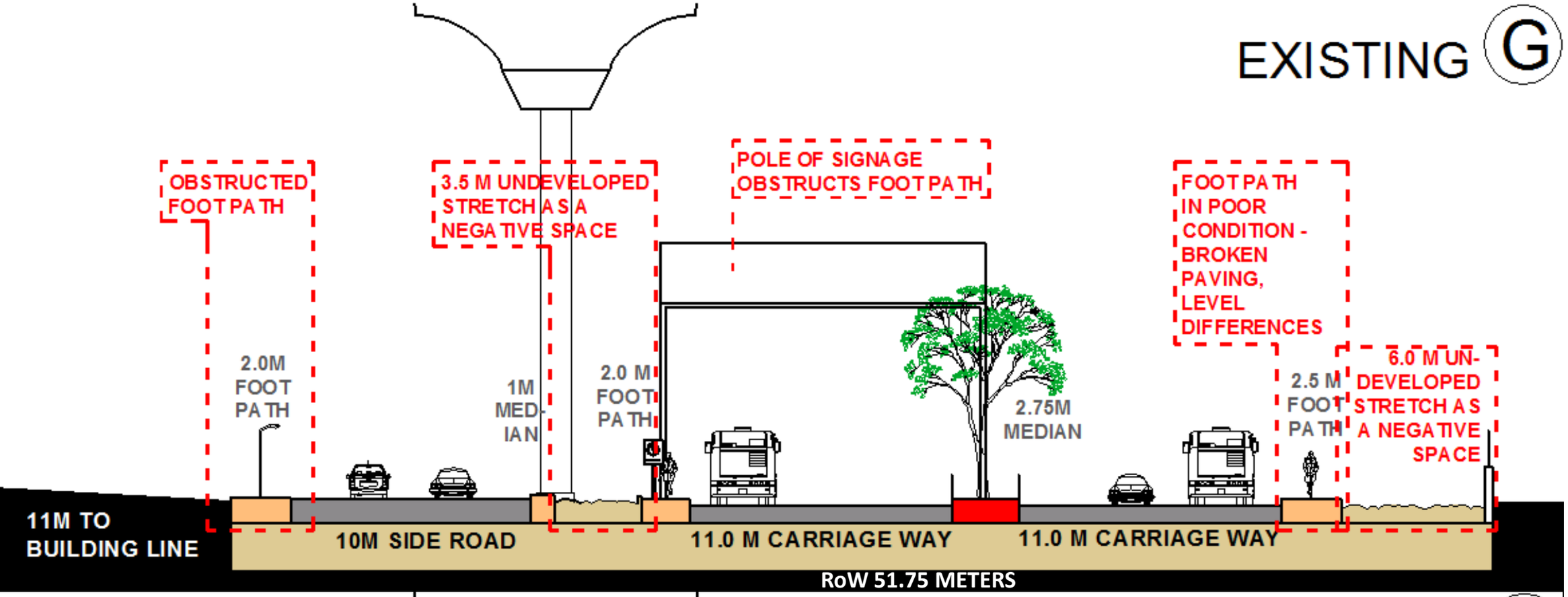
ROAD NUMBER 1 (NH 2): PROPOSALS



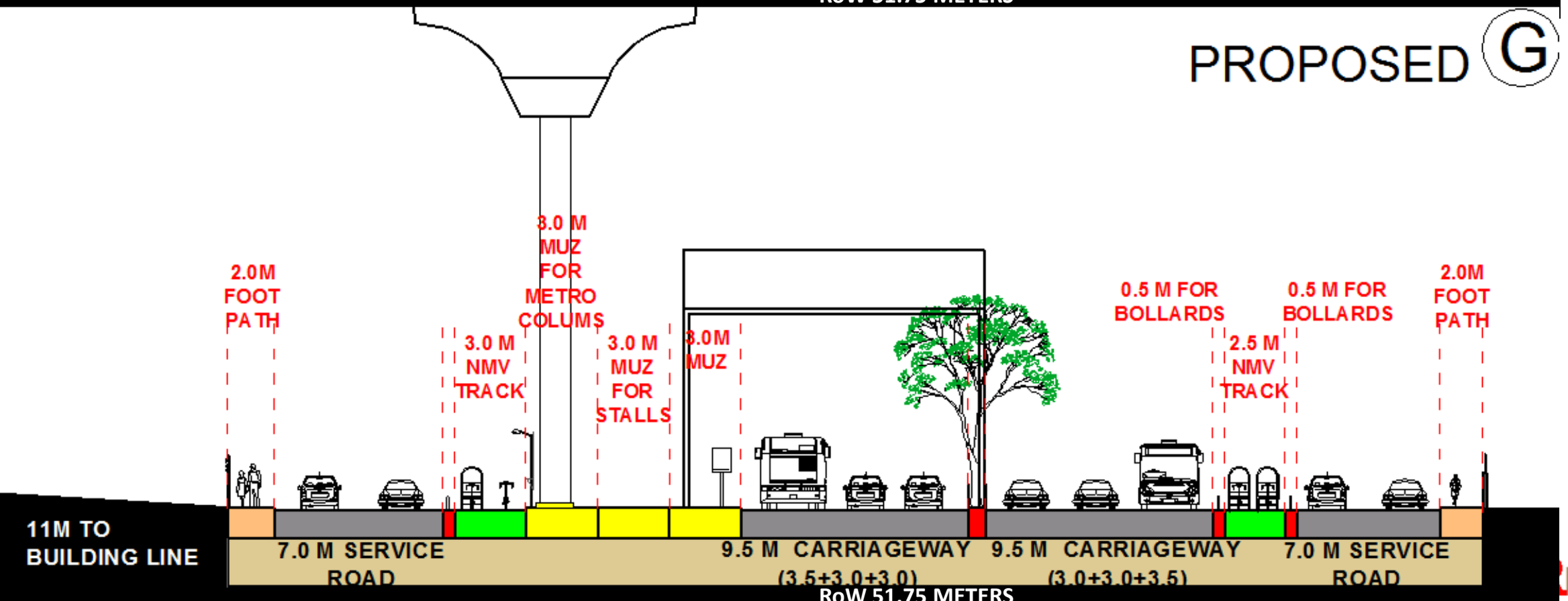


ROAD NUMBER 1 (NH 2): PROPOSALS

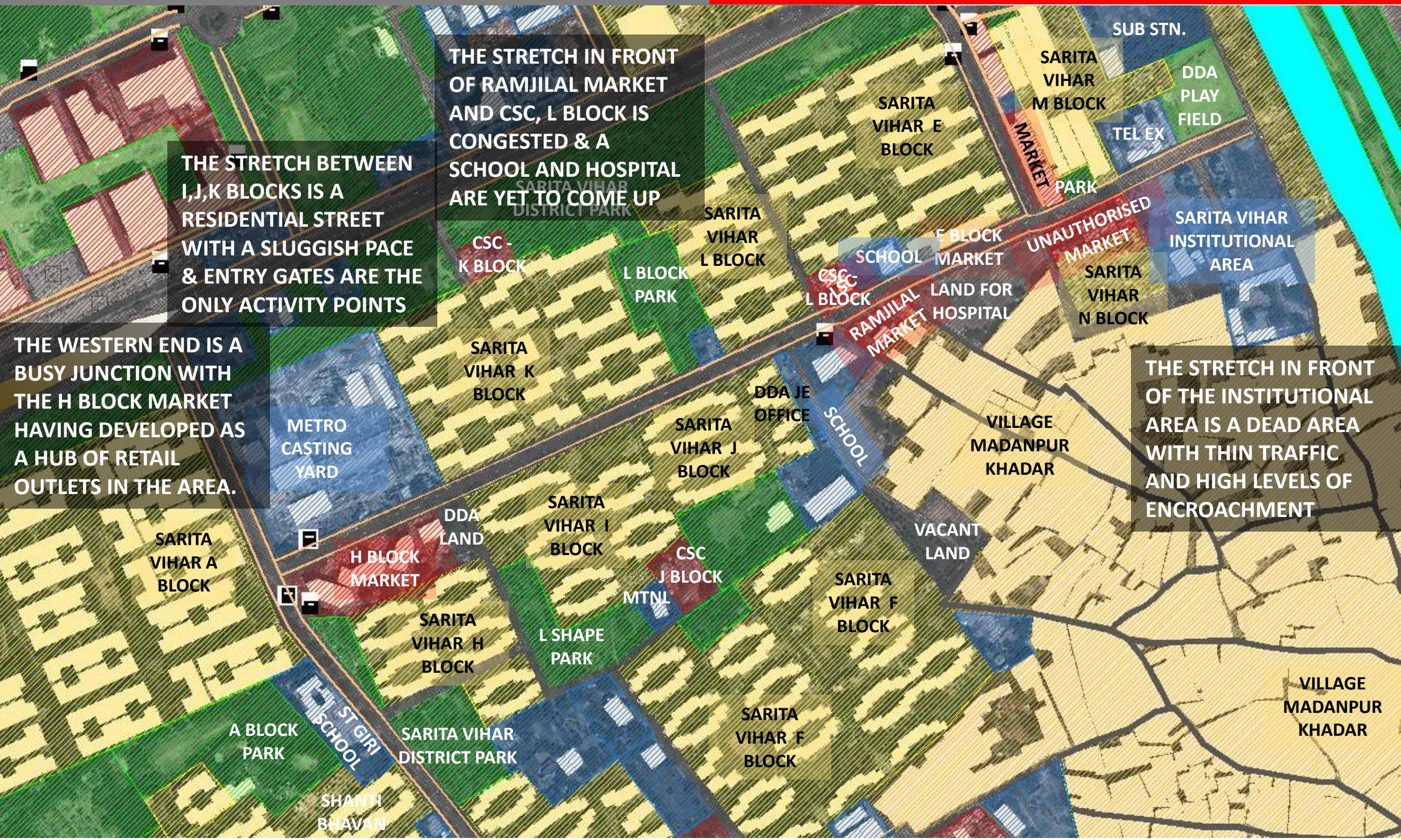
EXISTING G



PROPOSED G



ROAD NUMBER 5:
EXISTING LAND USE



THE ROAD RUNS SOUTH EAST – NORTH WEST, CONNECTING THE SARITA VIHAR RESIDENTIAL COLONY & ITS ALLIED ACTIVITIES, INTERNALLY THE NATURE OF THE RAOD VARIES IN FOUR DISTINCT PHASES IN TANDEM WITH THE ACTIVITY ALONG THE ROAD
CARRIES THROUGH TRAFFIC OF NOIDA-DELHI-FARIDABD DUE TO ROUTE DIVERSION EFFECTED DURING NH2 JUNCTION CONSTRUCTION

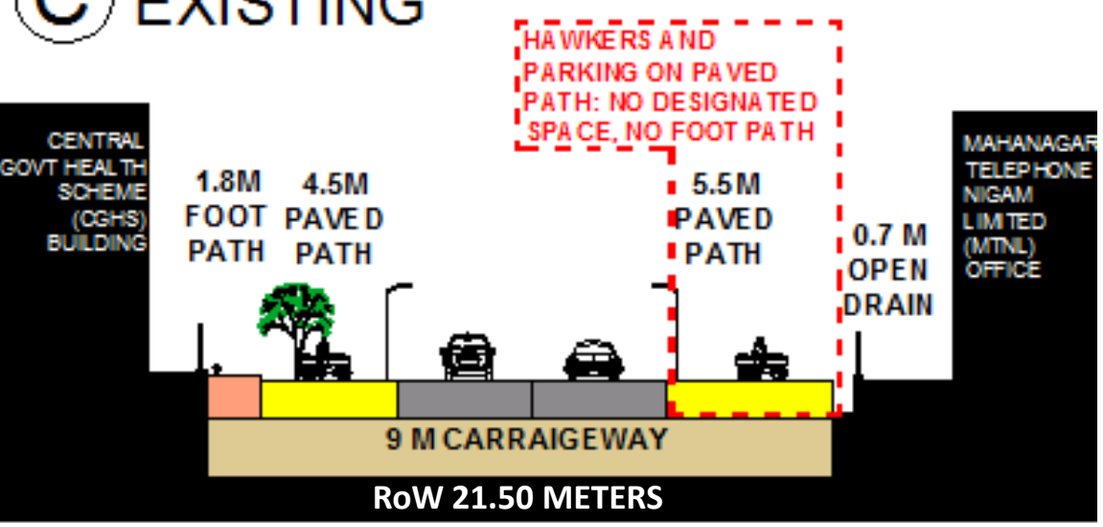
ROAD NUMBER 5:
EXISTING ROW DETAILS

PRODUCED BY AN AUTODESK EDUCATIONAL PRODUCT

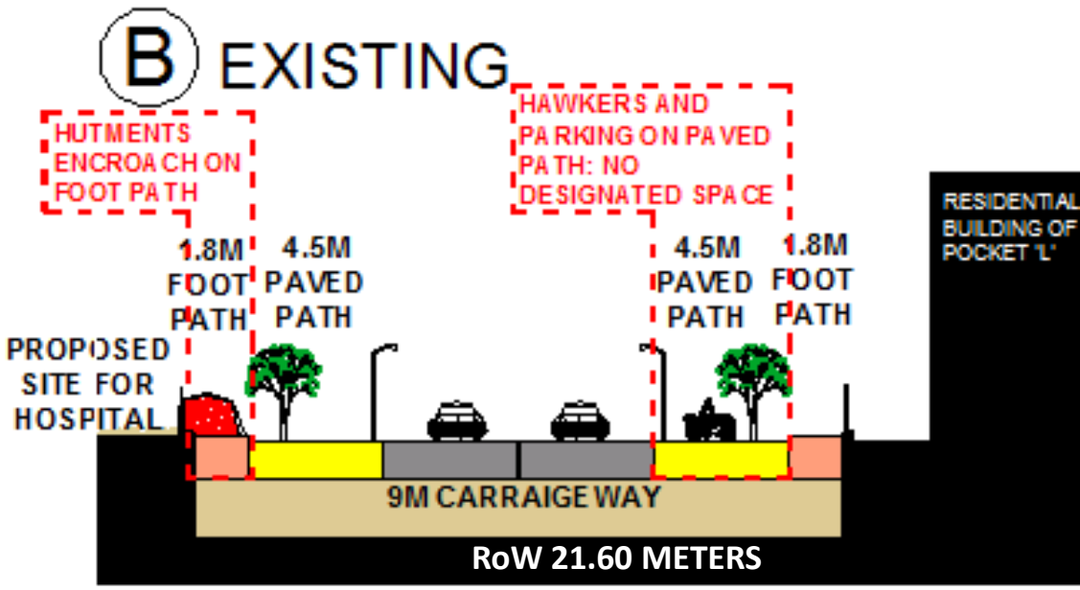
ROAD NUMBER 5:
EXISTING ROW DETAILS

ROAD NUMBER 5: PROPOSALS

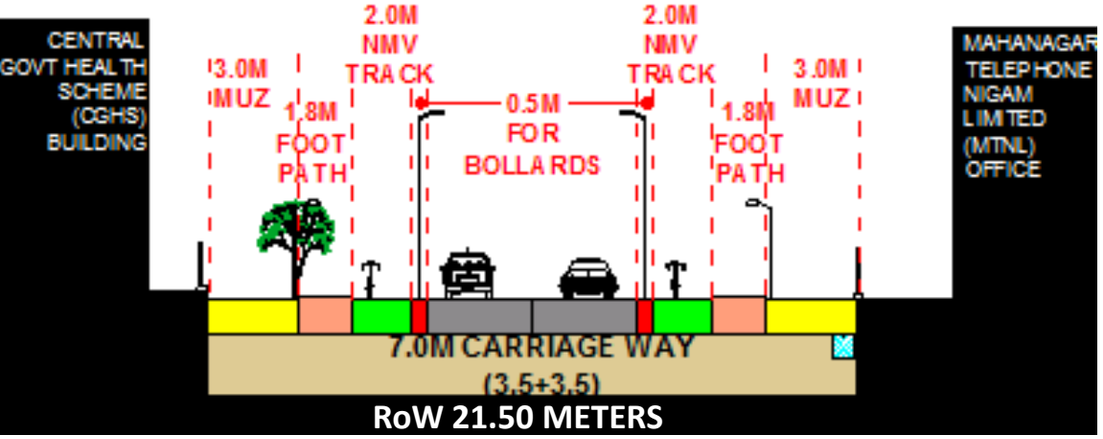
C EXISTING



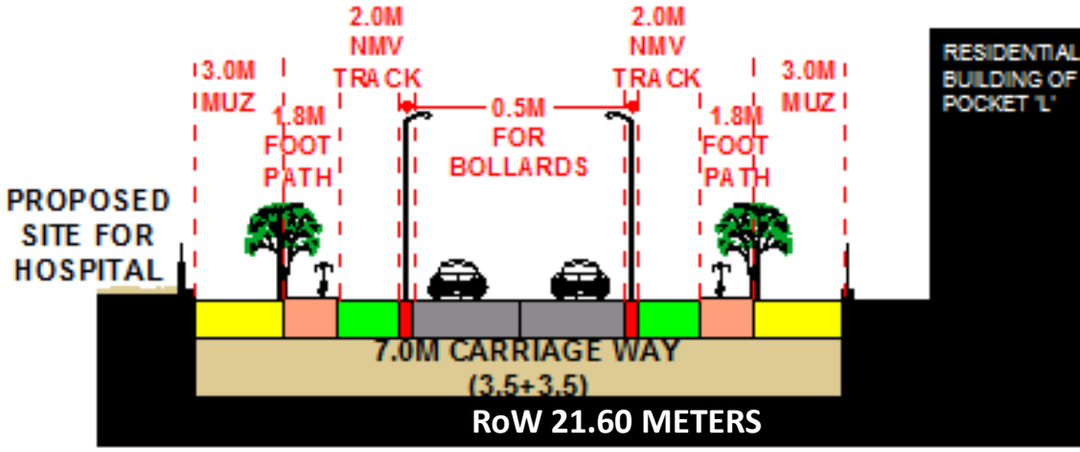
B EXISTING



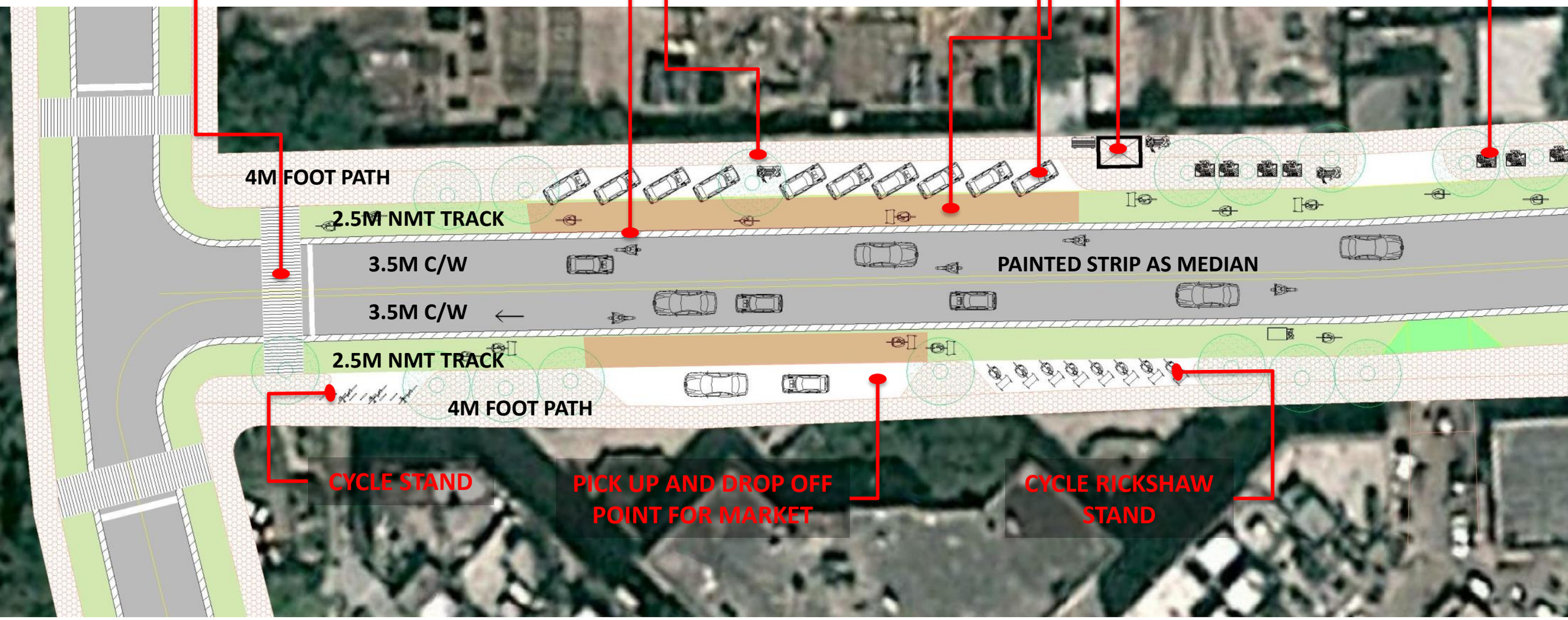
C PROPOSED



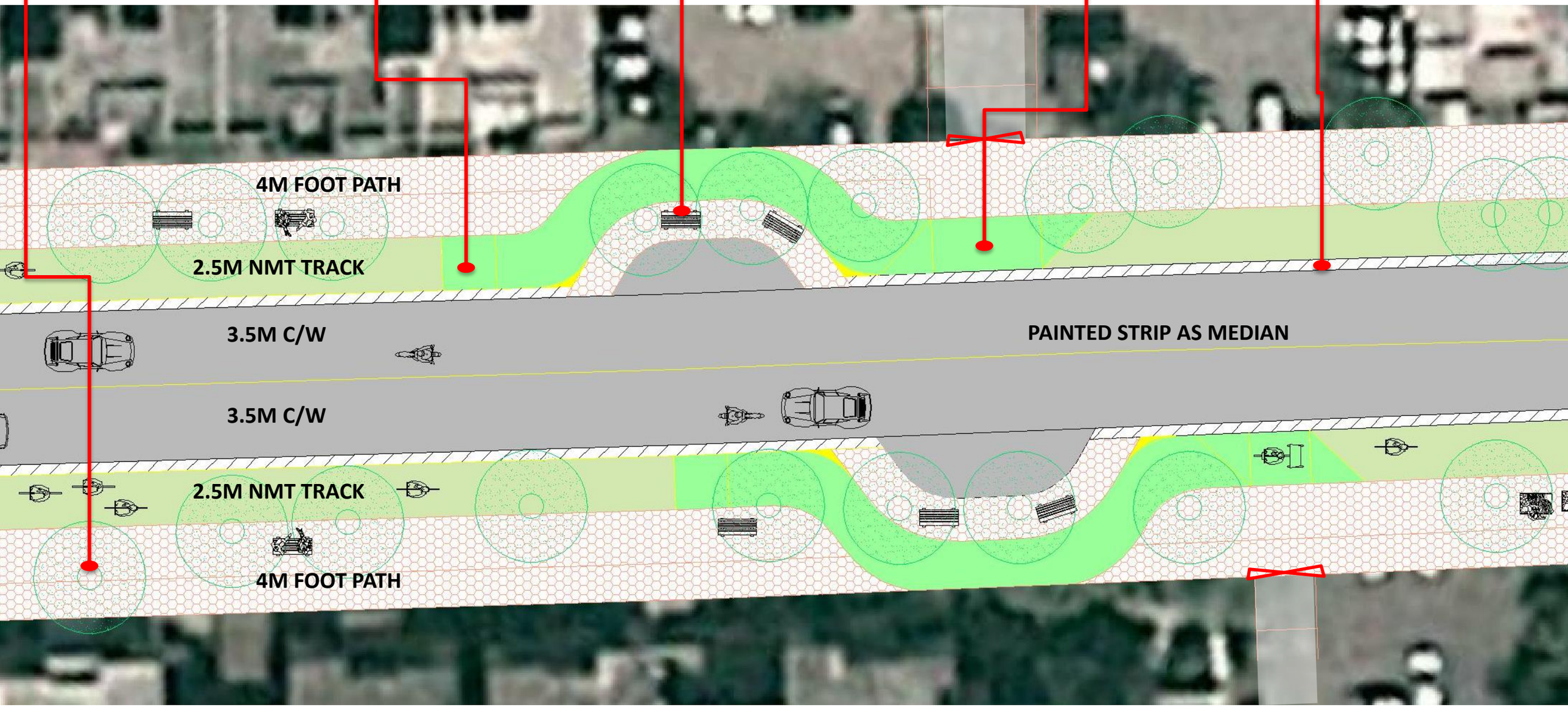
B PROPOSED



ROAD NUMBER 5:
PROPOSED H BLOCK MARKET



ROAD NUMBER 5:
PROPOSED ENTRY FOR COLONIES



ROAD NUMBER 5:
PROPOSED JUNCTION OF ROADS 5, 6

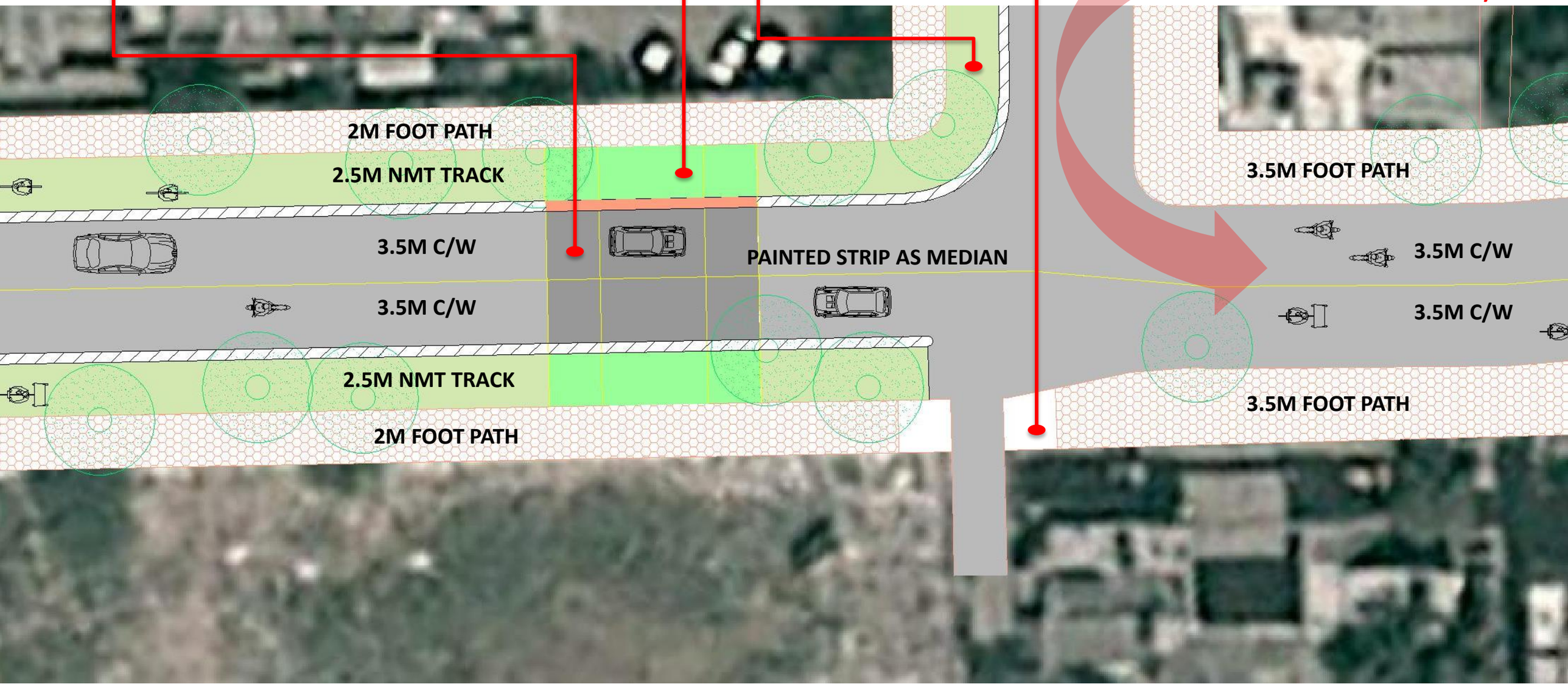
CARRIAGEWAY ELEVATED BY 10CMS FLUSH WITH THE FOOT PATH FOR TABLE TOP JUNCTION WITH ROAD NUMBER 6

NMT TRACK ELEVATED BY 10CMS FLUSH WITH THE FOOT PATH FOR TABLE TOP JUNCTION WITH ROAD NUMBER 6

CONTINUOUS FOOT PATH AND NMT TRACK ALONG ROAD 6

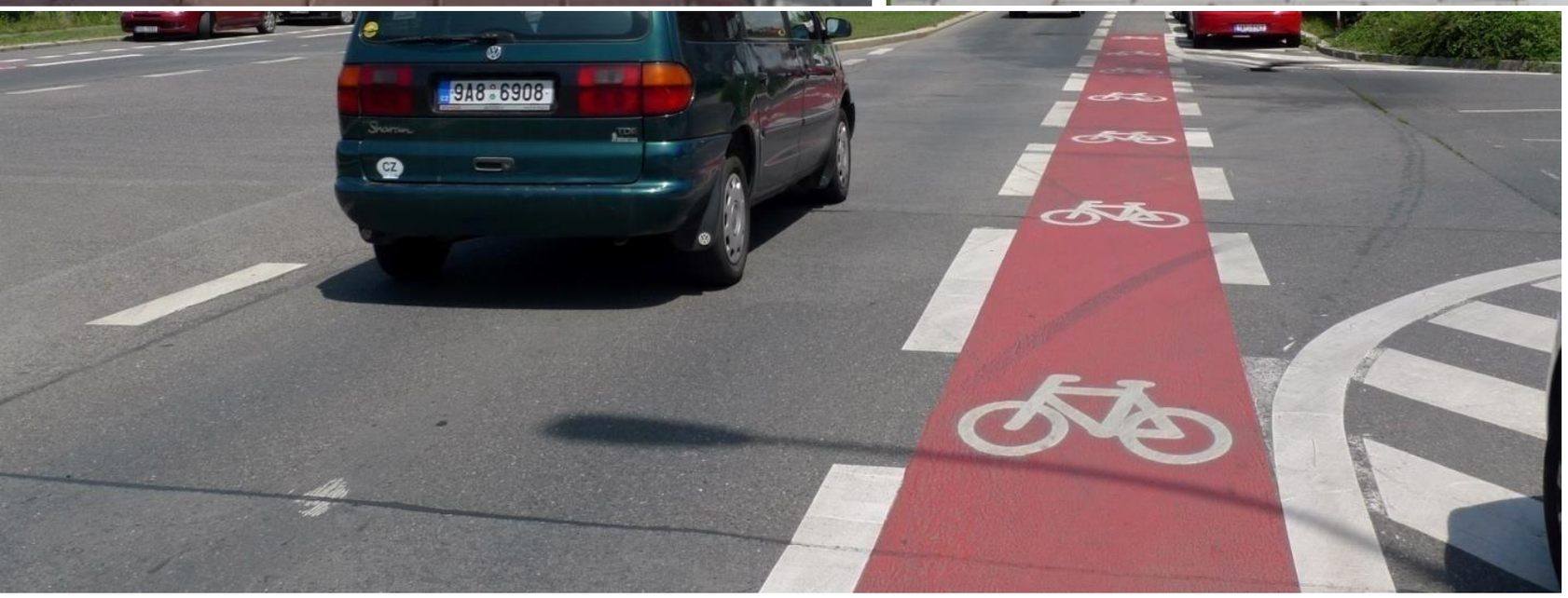
RAMP DOWN FOR ENTRY TO LOCAL ROADS

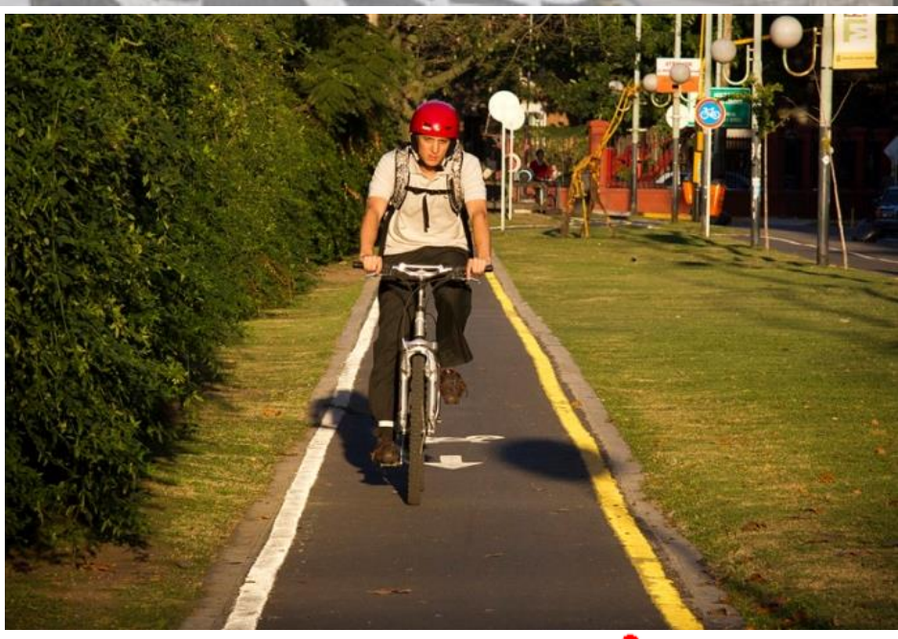
LOCAL ROAD WITH MIXED TRAFFIC DUE TO LOW TRAFFIC VOLUME. (INSTITUTIONAL ACTIVITY ALONG A DEAD END ROAD.)

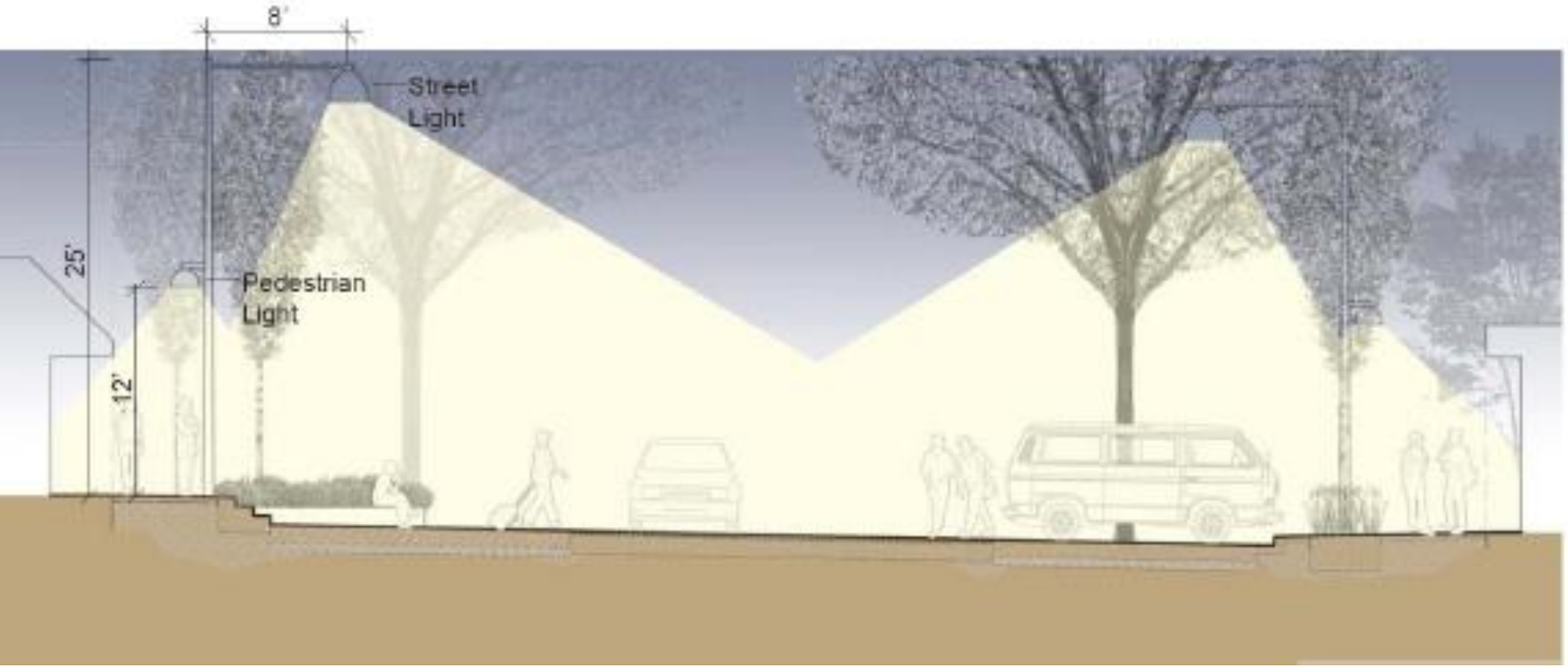


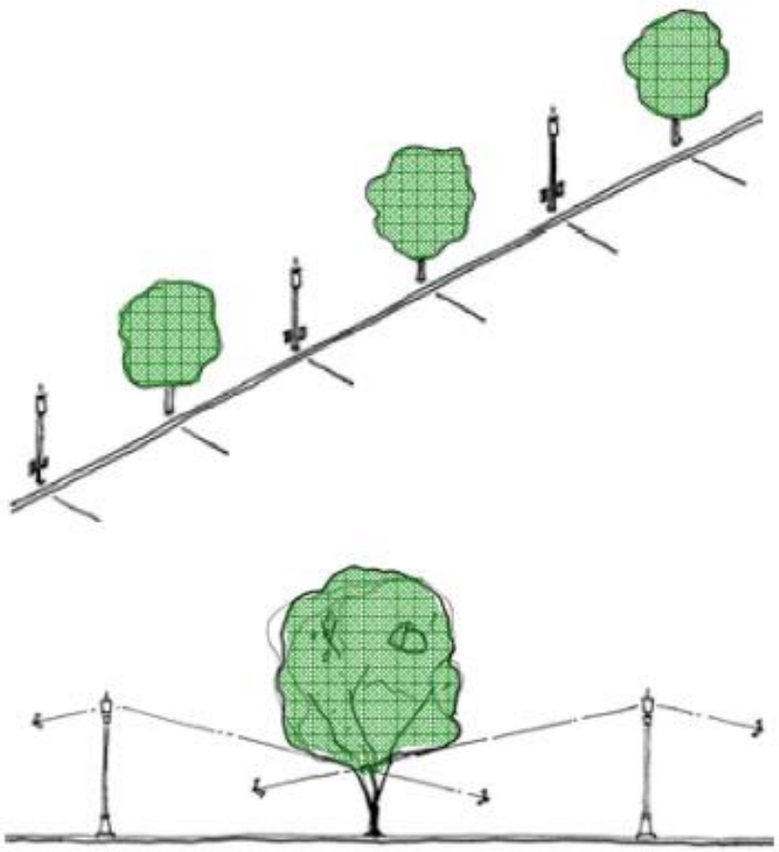
NMT SIGNAGES

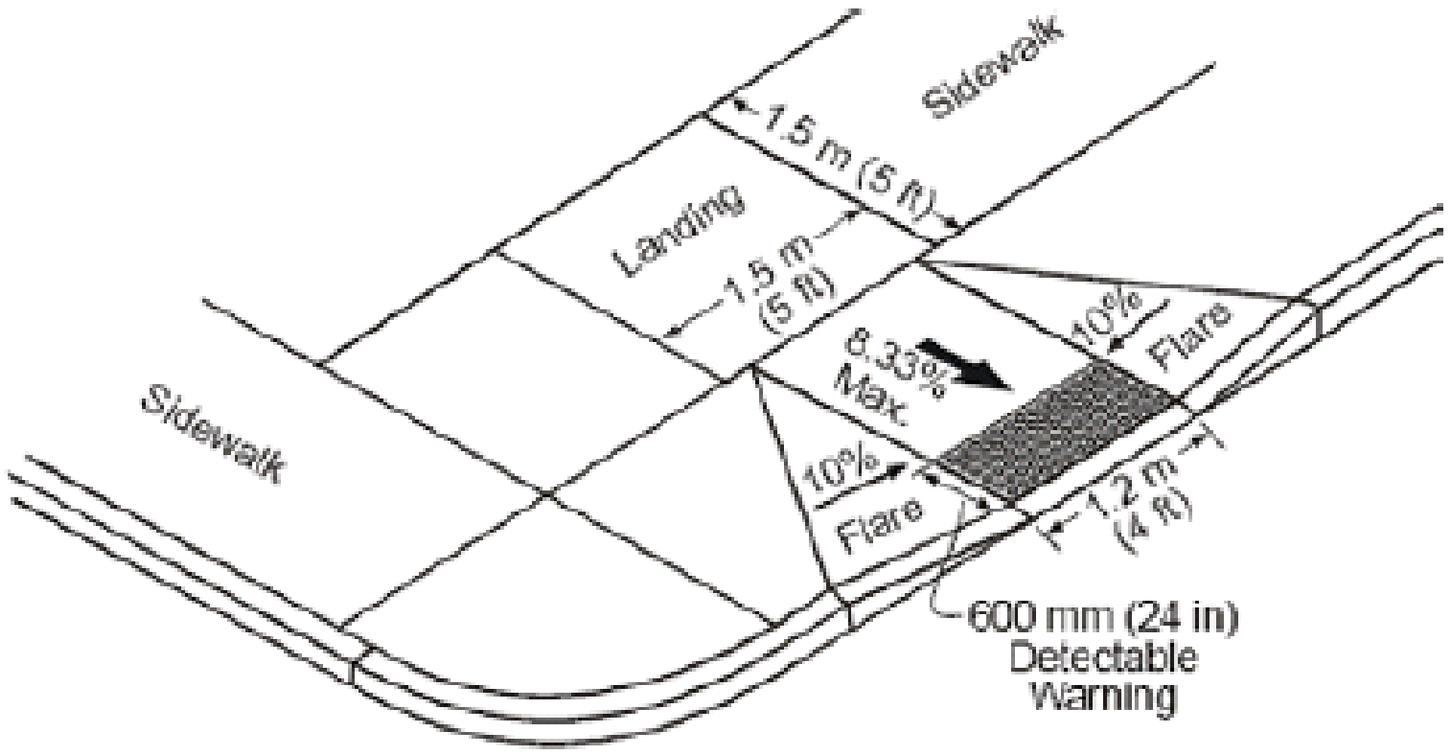
NMT COLOR, TEXTURES

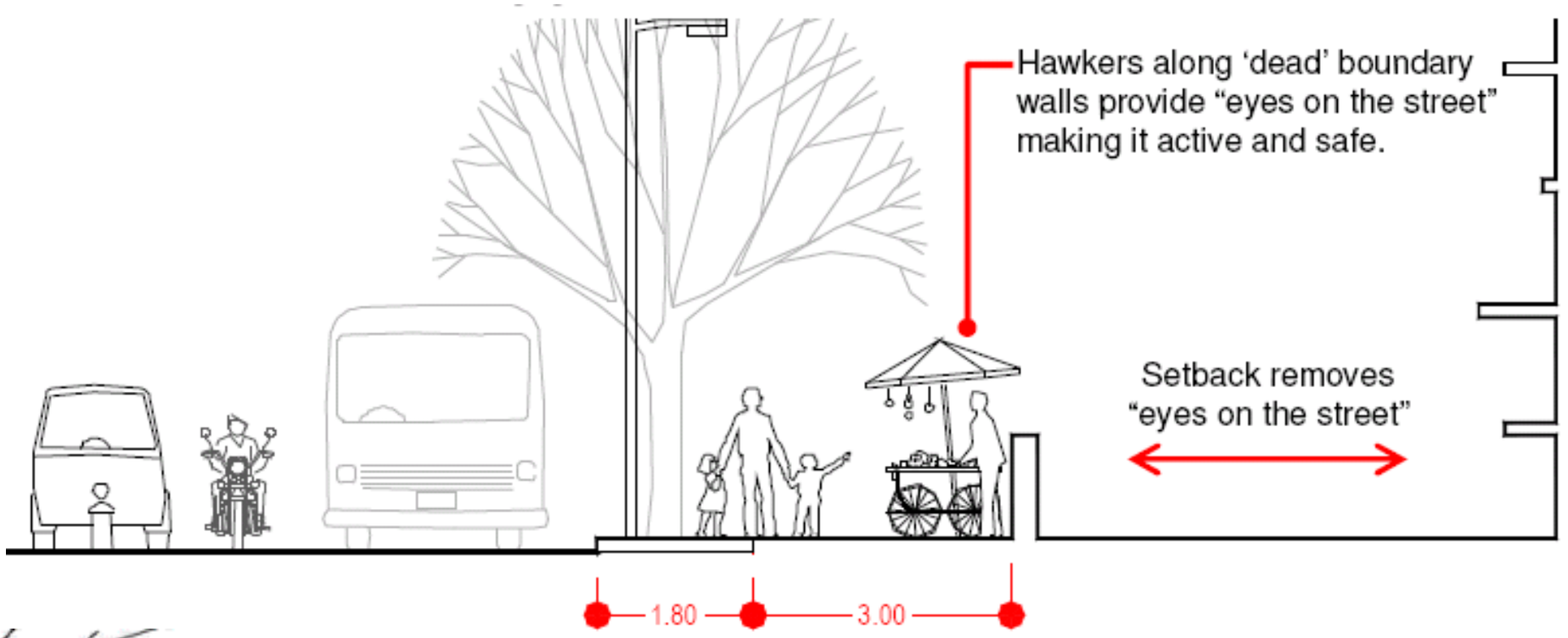


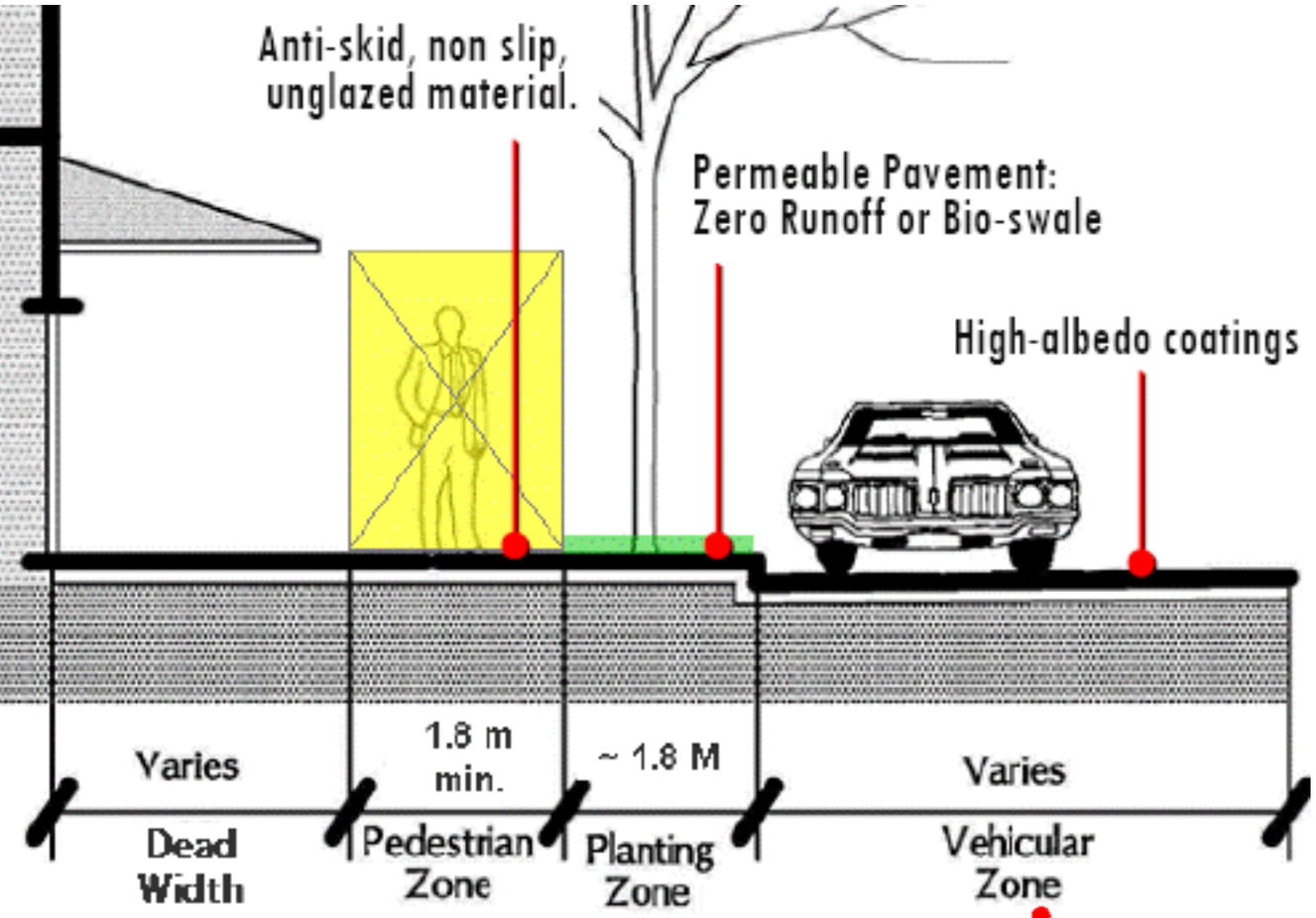


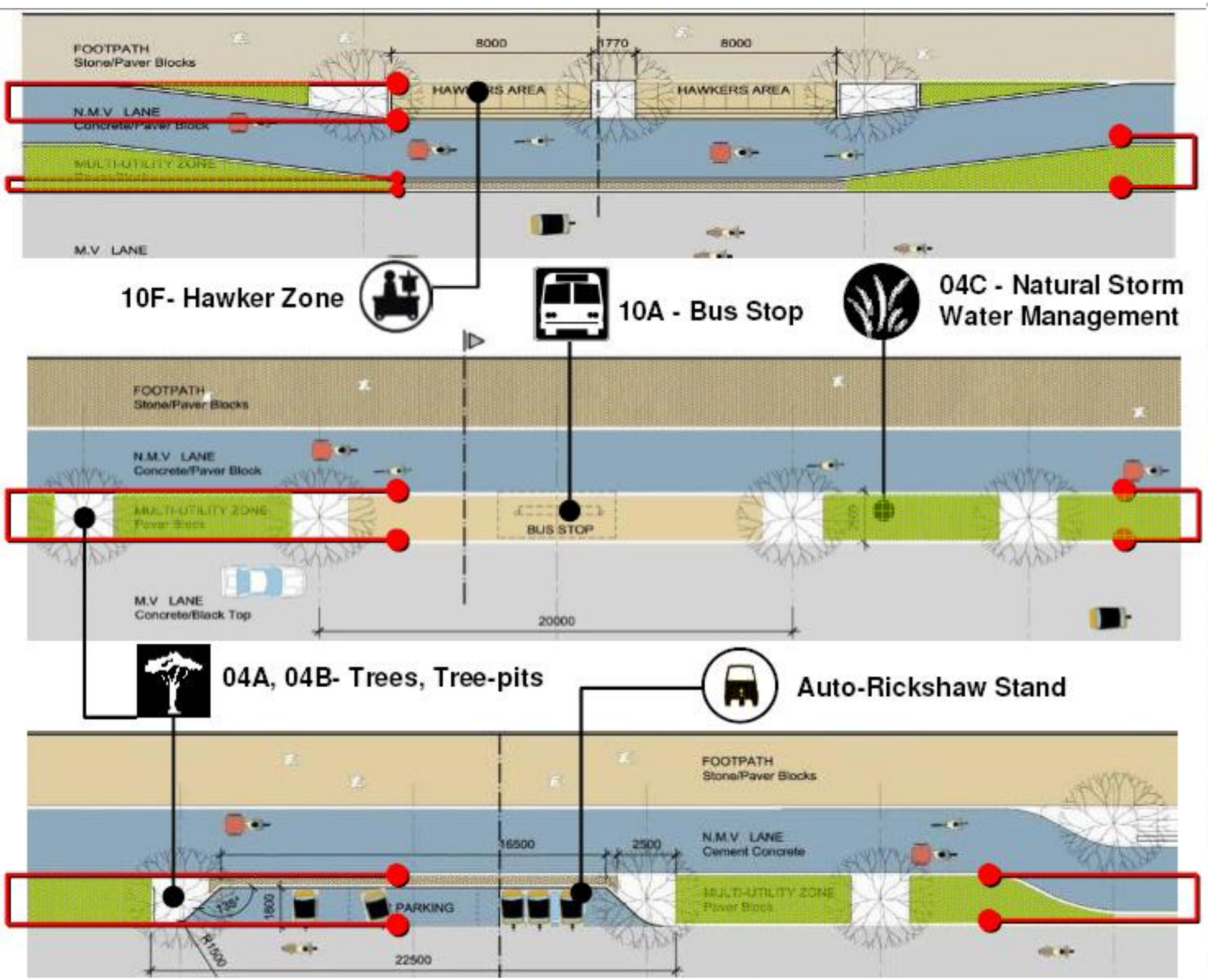

8'
Street Light
Pedestrian Light
25'
12'




Sidewalk
1.5 m (5 ft)
Landing
1.5 m (5 ft)
8.33% Max.
10%
Flare
10%
Flare
1.2 m (4 ft)
600 mm (24 in) Detectable Warning
Sidewalk


Hawkers along 'dead' boundary walls provide "eyes on the street" making it active and safe.
Setback removes "eyes on the street"
1.80
3.00


Anti-skid, non slip, unglazed material.
Permeable Pavement: Zero Runoff or Bio-swale
High-albedo coatings
Varies
1.8 m min.
~ 1.8 M
Varies
Dead Width
Pedestrian Zone
Planting Zone
Vehicular Zone


FOOTPATH
Stone/Paver Blocks
8000
1770
8000
HAWKERS AREA
HAWKERS AREA
N.M.V LANE
Concrete/Paver Block
MULTI-UTILITY ZONE
M.V LANE
10F- Hawker Zone
10A - Bus Stop
04C - Natural Storm Water Management
FOOTPATH
Stone/Paver Blocks
N.M.V LANE
Concrete/Paver Block
MULTI-UTILITY ZONE
Paver Blocks
BUS STOP
M.V LANE
Concrete/Black Top
20000
04A, 04B- Trees, Tree-pits
Auto-Rickshaw Stand
FOOTPATH
Stone/Paver Blocks
16500
2500
N.M.V LANE
Cement Concrete
MULTI-UTILITY ZONE
Paver Blocks
PARKING
1800
R1500
22500

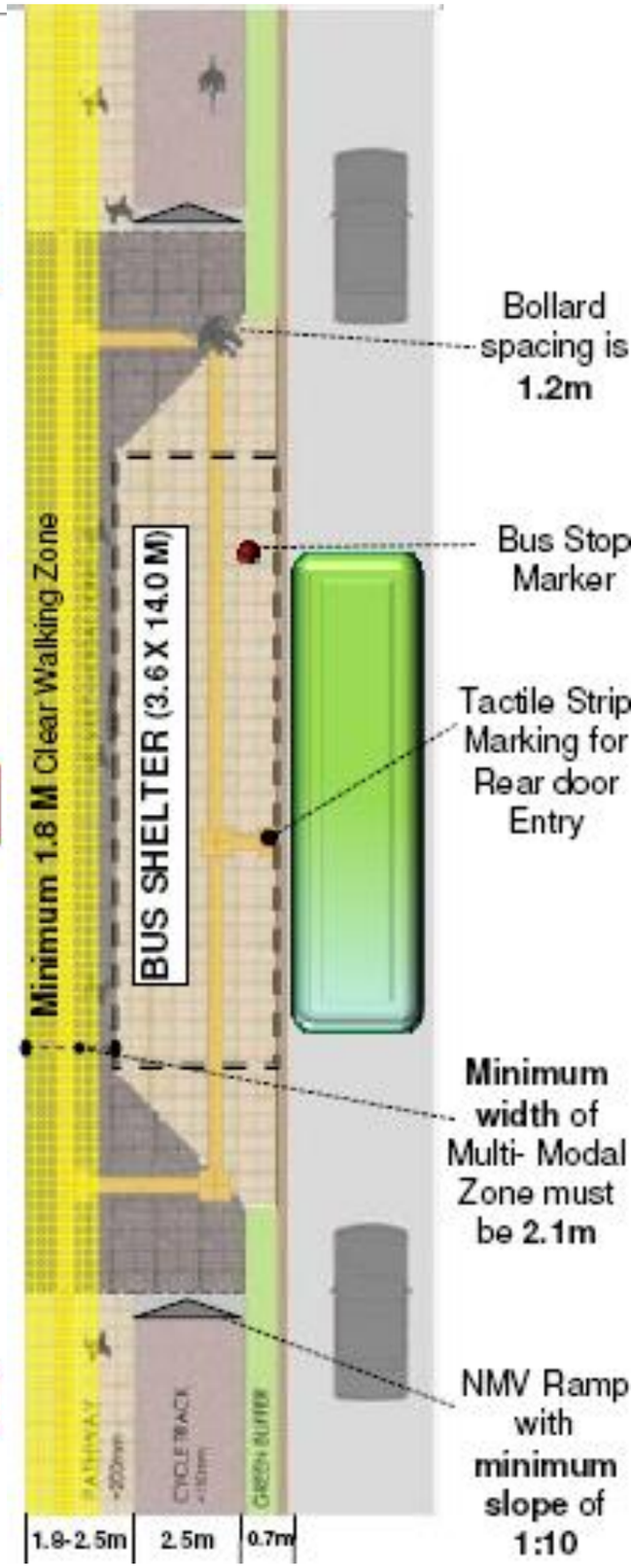

Minimum 1.8 M Clear Walking Zone
BUS SHELTER (3.6 X 14.0 M)
Bollard spacing is 1.2m
Bus Stop Marker
Tactile Strip Marking for Rear door Entry
Minimum width of Multi- Modal Zone must be 2.1m
NMV Ramp with minimum slope of 1:10
1.8-2.5m
2.5m
0.7m

Table : Sample cost calculation for segregated cycle track

Cycle Track Development (for arterial roads, and special condition on distributory roads) Cost in Lakhs INR			
Component	Independent Track	New Road Development	Upgradation of existing road
Dismantling of existing surface and structures	0.00	0.00	1.79
Excavation	0.67	0.67	0.67
Base courses (GSB+DLC)	57.72	57.72	57.72
M40 CC pavement+pavement marking	81.55	81.55	81.55
CC Kerb stone segregator	0.00	3.60	3.60
Total	**139.94**	**143.54**	**145.33**

Table : Sample cost calculation for footpath

Development of Footpath (Cost in Lakhs INR)			
Component	Independent Track	New Road Development	Upgradation of existing road
Dismantling of existing surface and structures	0.00	0.00	4.13
Excavation	0.78	0.78	0.00
Base courses (GSB+DLC)	25.03	25.03	25.03
60mm thick CC paver blocks on sand bed	29.70	29.70	29.70
CC Kerb stone edges	7.20	7.20	7.20
Total	**62.70**	**62.70**	**66.06**

Source: Planning and Design Guideline for Cycle Infrastructure, TRIPP, IIT-D

Table : Sample costing for provision of functional lighting

Provision of Functional Lighting (Cost in Lakhs INR)			
Component	Independent Track	New Road Development	Upgradation of existing road
Foundations, including excavation	4.26	0.11	0.11
Provision of new light poles, with fittings, wires, etc.	24.75	74.50	74.50
Dismantling of existing light poles	0.00	0.00	6.00
Total	**29.01**	**74.61**	**80.61**

Table : Sample costing for Storm water drainage

Provsion of New Storm Water Drain - average pipe dia. of 900mm (NP2) (Cost in Lakhs INR)			
Component	Independent Track	New Road Development	Upgradation of existing road
Excavation, filling and preperation base for pipes	20.34	20.34	20.83
Laying of pipes	8.00	8.00	8.00
Development of Manholes	85.07	85.07	85.07
Provision og Gully chambers, including connection to Manholes, using 300mm dia., NP2 pipes	40.25	40.25	40.25
Total	**153.66**	**153.66**	**154.15**

Source: Planning and Design Guideline for Cycle Infrastructure, TRIPP, IIT-D

Table : Sample costing for Electrical & Telephone services

Provision of services such as light poles, telephone poles, junction boxes, etc., (Cost in Lakhs INR)			
Component	Independent Track	New Road Development	Upgradation of existing road
Shifting of Existing overground services	0.00	0.00	8.80
Provision of new overground services	0.00	40.00	0.00
Provision of new underground electrical cables (both HT and LT)	0.00	261.20	261.20
Total	**0.00**	**301.20**	**270.00**

Source: Planning and Design Guideline for Cycle Infrastructure, TRIPP, IIT-D

TENTATIVE PROJECT COST PER KILOMETER (AT CURRENT PRICE) = INR 9.34 CR.

TENTATIVE PROJECT COST (ALL 13 ROADS: 17.60 KM) =INR 164.41 CR.

TENTATIVE COST ROAD 1 (2.64 KM) = INR 24.53 CR.

TENTATIVE COST ROAD 5 (1.1 KM) = INR 9.16CR.

COMPONENTS CONSIDERED FOR COSTING:

FOOTPATH
NMT TRACK
STORM WATER DRAINAGE
LIGHTING
SERVICES

COMPONENTS NOT CONSIDERED FOR PRESENT COSTING:

SIGNAGES, ROAD MARKINGS , REFLECTORS
TOILET BLOCKS, BUS STOPS
PARKING, HAWKERS' ZONE, KIOSKS, SIGNALS

Source: Planning and Design Guideline for Cycle Infrastructure, TRIPP, IIT-D

THANK YOU