



CITY LEVEL PROJECTS

CHITTARANJAN PARK

Site Specific Design Study Ward Number 190





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Acknowledgements

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

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

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

Raj Rewal
Chairman

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Preface

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

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

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

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

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

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

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

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

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

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

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

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



Raj Rewal
Chairman, DUAC

January 2014

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Summary

Local Area Planning (LAP), which is part of the 74th Constitutional Amendment, was introduced by Master Plan Delhi (MPD) 2021, in order to achieve a better planning process which is inclusive, participatory and has a bottom-up and top-down approach to make it comprehensive. Thus, LAP also caters to the need to bridge the disconnect between “Zonal Plan” and “Local Area Plan”.

The Delhi Urban Art Commission (DUAC) has undertaken a site-specific ward design study under LAP. Delhi has a total number of 272 municipal wards out of which the DUAC has identified few for detailed study. This report deals in detail with Ward 190 that comprises Chittaranjan Park, Kalkaji DDA flats and the Alaknanda area. Although each of the three areas have a distinct nature of urban fabric, analysis reveals that the major issues witnessed by residents of Ward 190 are related to transport, parking, urban design, parks, stormwater and solid-waste management. Each of these issues has been analyzed and recommendations and proposals have been made.

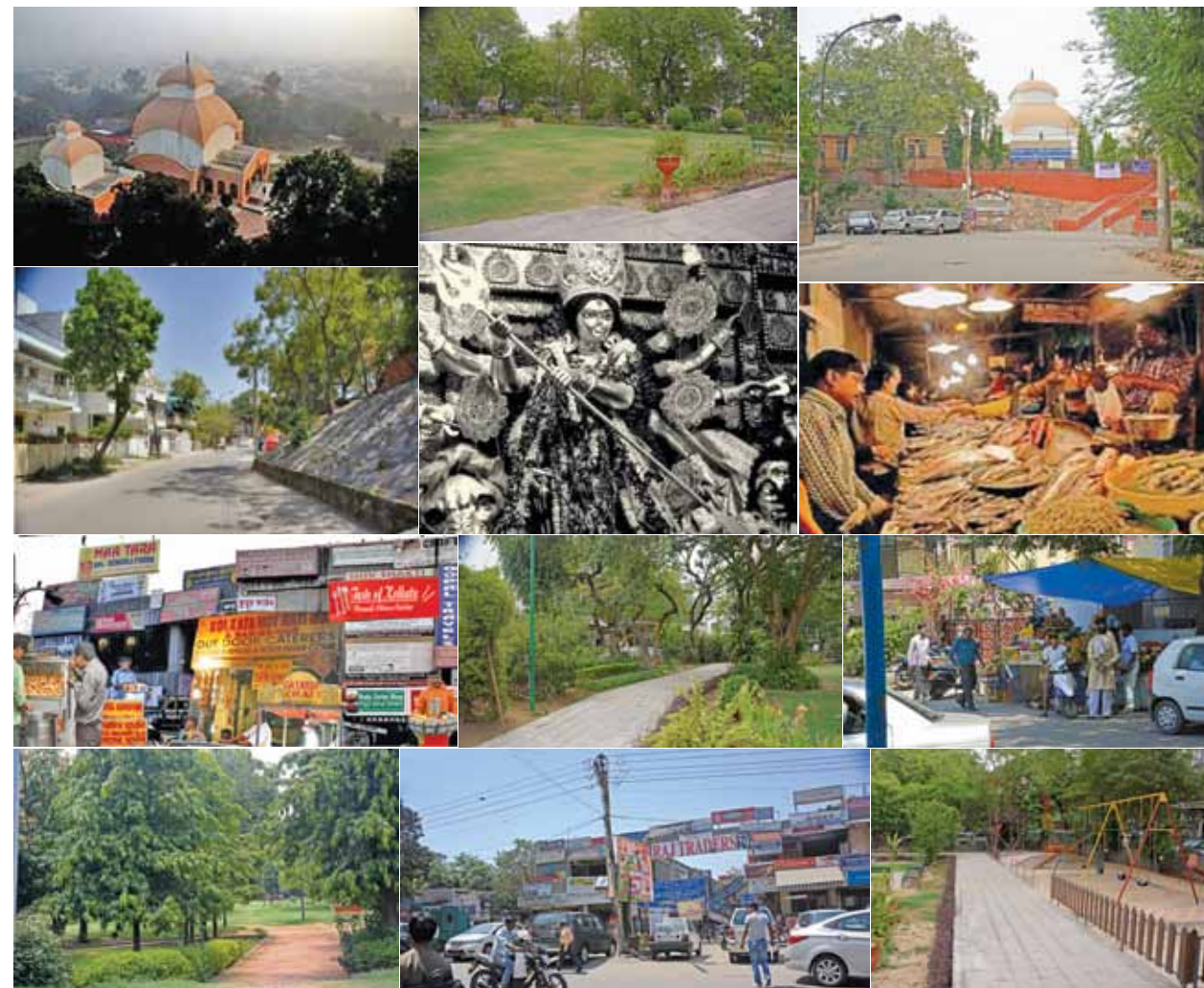
It was also observed that the issues faced by the residents of Ward 190 are generic in nature and similar to those of others in Delhi with similar density, population and socioeconomic character; thus the findings, recommendations and proposals made can be applicable to other Wards as well. Hence this study can be envisaged as a model for other Wards of Delhi.

1.1 Project Overview

Ward 190 has a distinct character, as major part of the ward is a planned development. It lies in the Central Zone of Delhi (Jurisdiction of MCD), located in its posh suburbs, surrounded by a mixed urban fabric such as planned area (Kalkaji, Greater Kailash, Nehru Place), unplanned areas (Govindpuri) and green areas (Jahanpanah Forest). It has an area of 174.5 ha and a population of 78,000 approximately. According to MPD 2021 the land use is residential. Ward 190 comprises of three areas namely Chittaranjan Park, Kalkaji DDA flats and the Alaknada area. All three areas are distinct in population, density and socio-economic status. The project was conceived in consultation with RWAs and resident stakeholders.

During analysis of the ward it was observed that the issues are common in all three areas of the ward. Issues are related to transport, urban design, stormwater and solid-waste management. Thus an approach towards Urban Renewal by following a brief prepared by the DUAC as well as the mandate for “Green Cities” was adopted in preparing the proposals and recommendations for Ward No. 190.

It is envisaged that by initiating “Urban Renewal” projects at ward level, along with a Decentralized City Management framework that allows for people’s participation and democratic decentralization, could be the way forward for our cities.



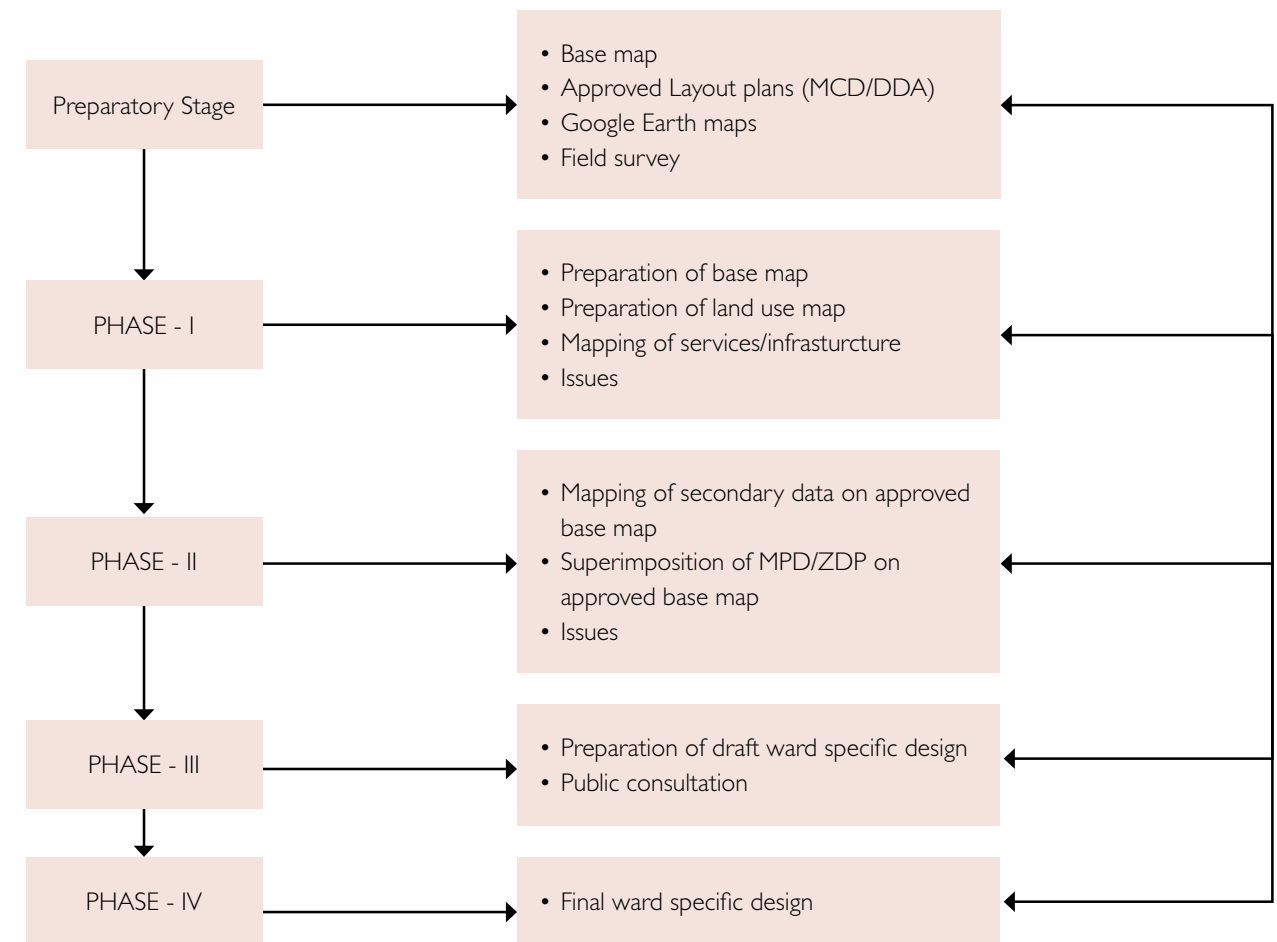
1.2 Objectives

The Delhi Urban Art Commission envisions undertaking area specific ward design under the local area planning domain in order to present comprehensive planning policies and proposals for the upgradation of the wards. The objectives are listed below:

- Urban design interventions for upgrading the urban environment and for ecological restoration – urban parks, greens, water bodies, wetlands and urban agriculture.
- Conservation of heritage and enhancement of original character/environment.
- Upgrading of social infrastructure – schools, sports facilities, dispensaries, community centres, cultural centres, etc.
- Earmarking of livelihood generating areas for informal sectors – vending zones, weekly markets.
- Redevelopment/ revitalization of unused/ underutilized and degraded areas.
- Transportation – road space allocation, and parking facilities for different modes of transport such as cycles, rickshaws, other non- motorized vehicles (NMTs), and pedestrians including senior citizens and differently-abled people.
- Physical infrastructure – civic infrastructure upgradation and removal of disfunctionalities:
 - Stormwater management/ rainwater harvesting at community/local area level.
 - Decentralized wastewater treatment systems (DEWATS) for untreated/surplus sewage/wastewater for recovery of resources and recycled water at local levels.
 - Segregation and collection of solid-waste at source in segregated sections, as a step towards achievement of ‘zero-waste’.
 - Ensure complete separation of storm-water and sewerage.
 - Solutions for local traffic bottlenecks, and vehicular parking related issues.
 - “First and last mile” connectivity for access to public transport.
- Energy efficiency, renewable energy applications, conservation and efficiency in use of water, and other “sustainability” measures, as well as awareness promotion at local area levels, for “greenhouse gas” and “climate change” mitigation.

Adequate importance must be provided to the consultative/participatory process with stakeholders within the ward.

1.3 Methodology



Methodology for Ward Specific Design

1.4 Location

Delhi is divided into various municipal zones such as Southwest, West, South, East, Northeast, North and Central. Out of these, the study area falls in the Central Zone.

The NCT of Delhi has been divided into 15 planning zones from A to P, of which 8 zones are in urban areas, one in riverbed and the remaining 6 in rural areas. The study area is situated in Zone-F which is to the south of Zone D (New Delhi).

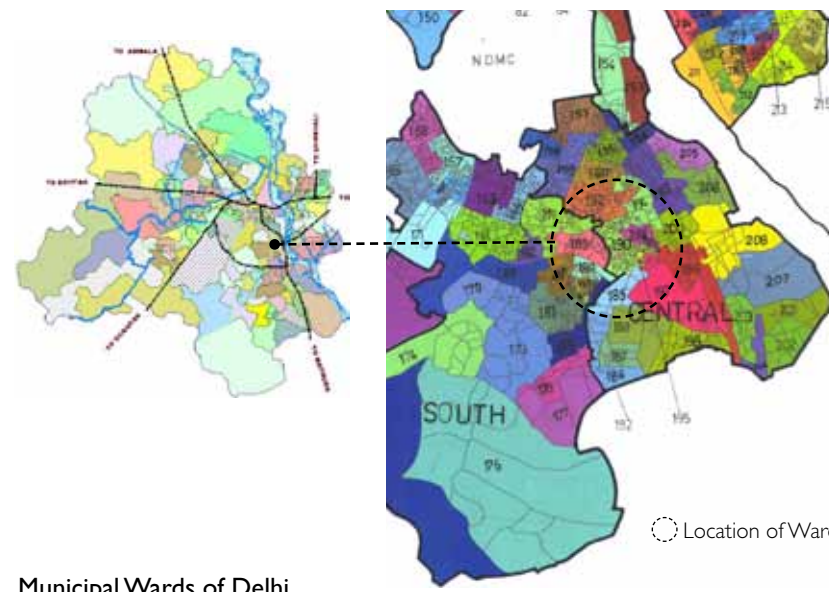
In the context of urban Delhi, Zone-F is identifiable with its low density and green character. West, South, East, Northeast, North and Central Zone.

This zone mainly comprises planned, well maintained posh residential localities including rehabilitation colonies and government housing areas. There are number of developed parks under green areas which also include two city forests and the Ridge area.

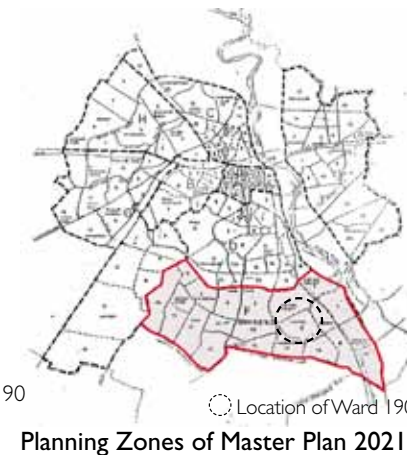
Zone-F is further subdivided into subzones. Ward 190 falls under Subzone F-9. It is located in the posh suburbs of South Delhi surrounded by mixed urban fabric such as planned areas (Kalkaji, G.K, Nehru Place), unplanned areas (Govindpuri) and green areas (Jahanpanah Forest).



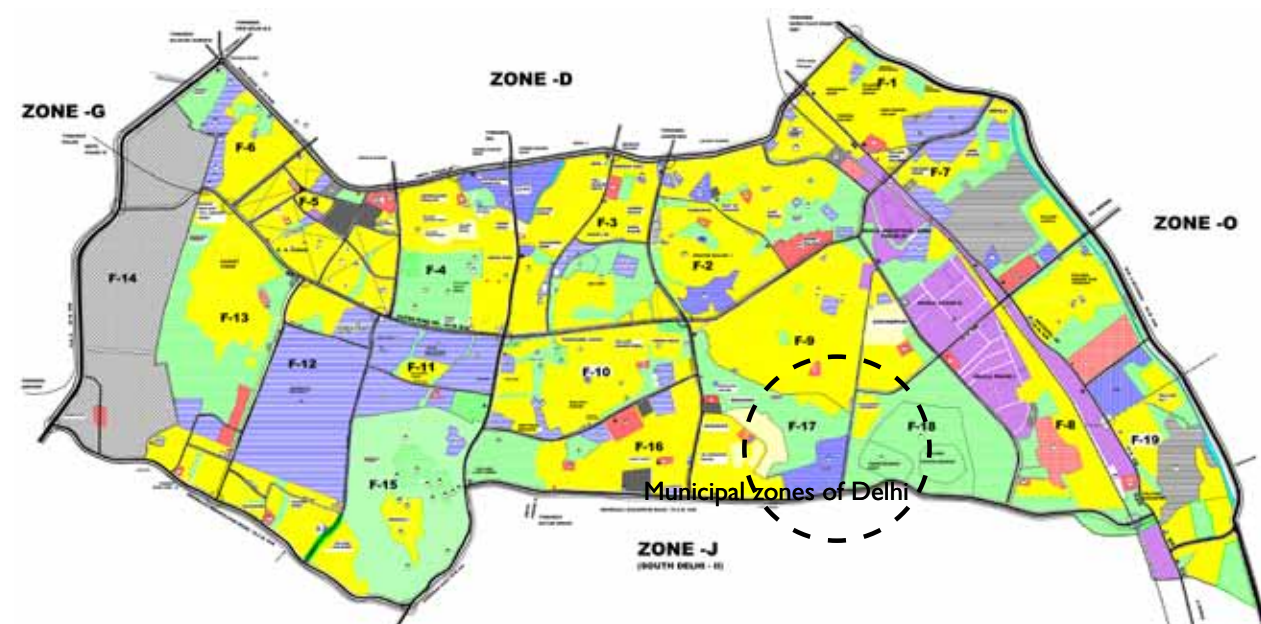
Municipal Zones of Delhi



Municipal Wards of Delhi

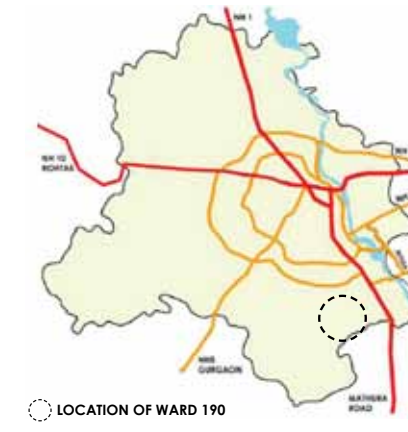


Planning Zones of Master Plan 2021



Land Use map of Zone-F

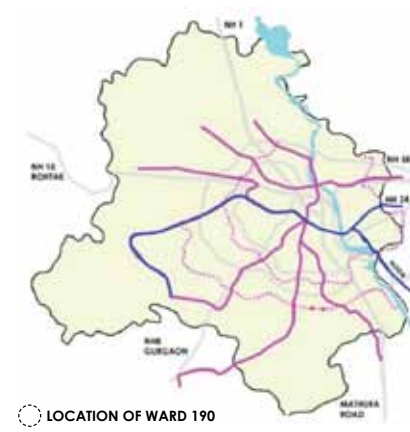
1.5 Connectivity



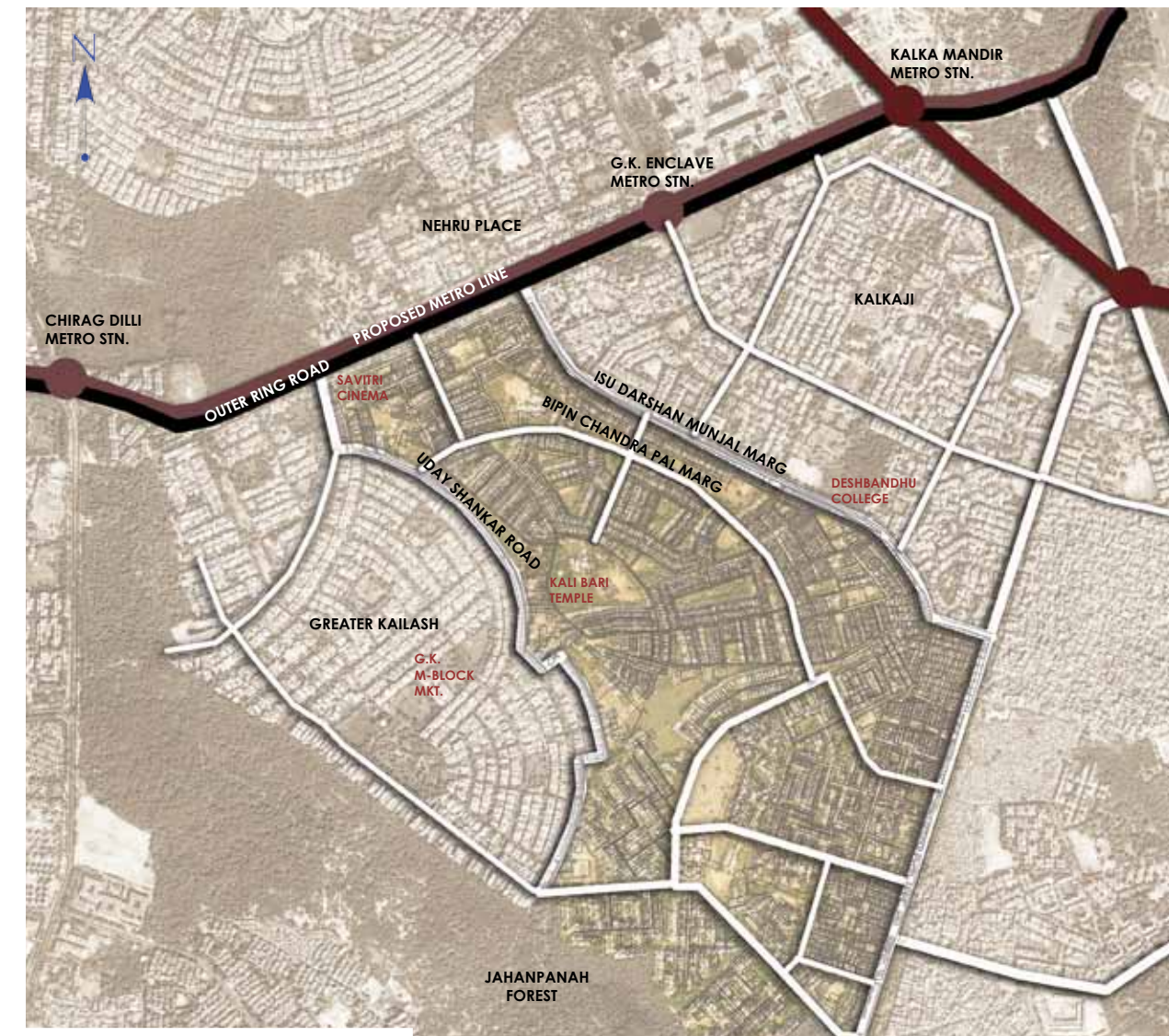
Road Network of Delhi



Connectivity



Proposed and Existing Metro Network



Road and Metro Network



Govindpuri Metro Station



Kalkaji Metro Station

1.6 Area Context



Nehru Place



Kalkaji Temple



Giri Nagar



Location and Area Context of Ward 190



Greater Kailash



Jahanpanah Forest



Govindpuri

1.7 Evolution

Chittaranjan Das, popularly called 'Deshbandhu', was a major figure in the Indian independence movement. He was a believer of nonviolence and constitutional methods for attaining independence. Chittaranjan Das supported Gandhiji's Non-cooperation Movement.

In 1914, he published *Narayan*, a literary magazine, and composed several poems. His first collection of poetry titled *Malancha* received protest from the members of the Brahmo Samaj. He received the title of 'Deshbandhu' (friend of the nation) for his devotion to the cause of self-rule.

In 1954, an association was formed for refugees from East Bengal who had lost their original homes in East Pakistan in the years around the Partition of India and the associated Partition of Bengal (1947). A large group of government officers hailing from the former East Bengal came together, and lobbied for a colony.

In the 1960s, land was assigned in a barren rocky area in the then distant Southern areas of New Delhi. This was named the 'East Pakistan Displaced Persons Colony' or EPDP Colony.

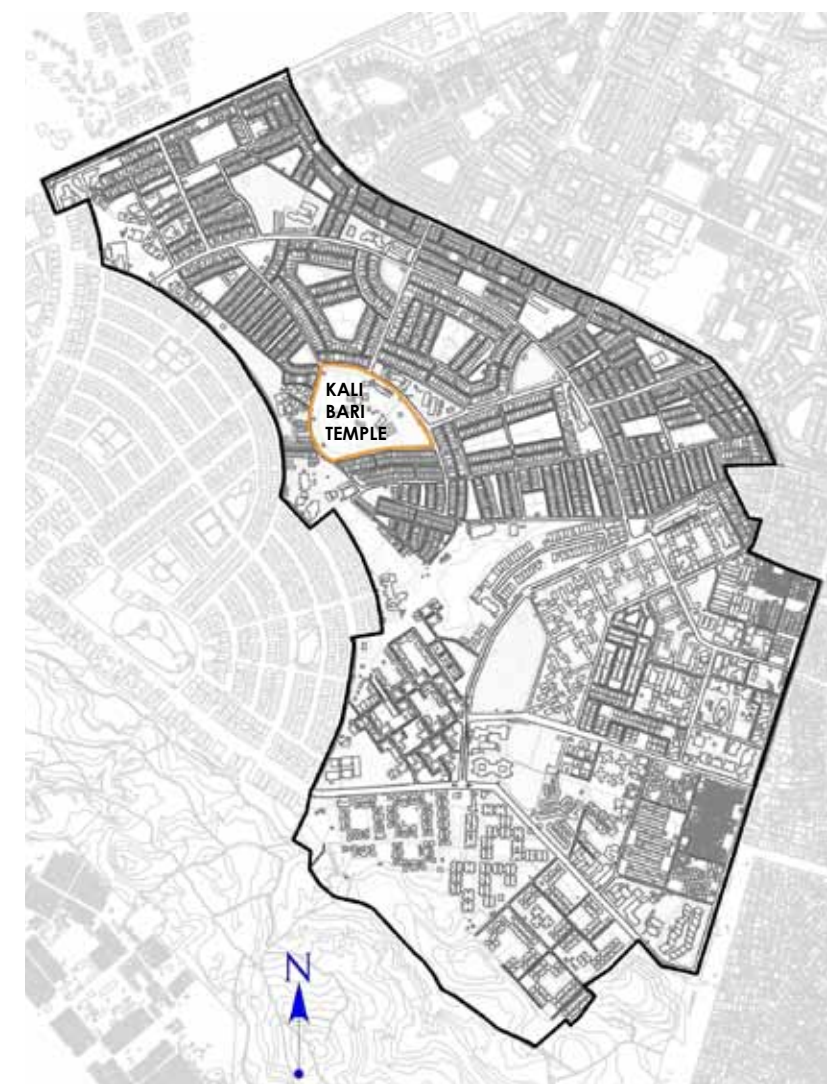
Members were required to provide documentation of their refugee status & were required to be "already

residing in Noida and gainfully employed in the capital". Based on this, 2147 people were given plots of land, initially on lease for 99 years, later converted into freehold ownership.

The original layout had 2000 odd plots, divided into eleven blocks A-K, along with markets & cultural spaces. However, in the 1990s, 714 displaced families were accommodated among those who had not been able to meet the earlier deadline. This resulted in new blocks, called M, N, O, K-1, K-2, Pocket 40 (referred to as Navapalli), Pocket 52 (referred to as Dakhinpalli) and Pocket-K. The main thoroughfare of the colony is Bipin Chandra Pal Marg.

The colony was re-named as 'Chittaranjan Park' in the early 1980's after the famous freedom fighter from Bengal, 'Deshbandhu Chittaranjan Das.

Kali Bari founded in 1973, a small temple to Shiva was consecrated on a small hill at the edge of the colony. The tradition of Durga Puja started in the same year. Expansion of the devotee base enabled the construction of an imposing Kali temple in February 1984 in Bengal terracotta temple architecture.



Map of CR Park



'Deshabandhu' Chittaranjan Das



Kali Bari Temple

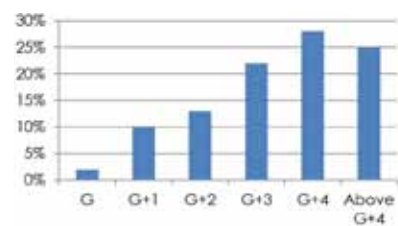
2.1 Land Use

The images shown below depict that in the three consecutive Master Plans of Delhi, the main land use of Ward 190 has been residential.

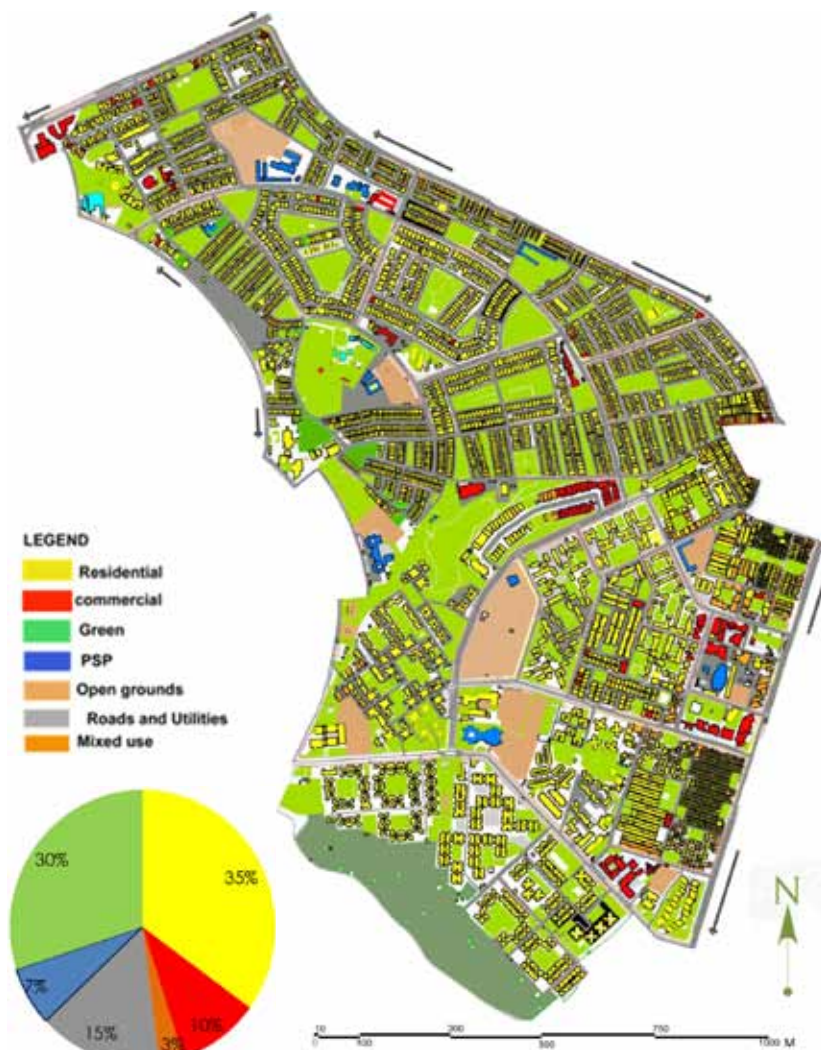
In MPD 2001, land for social infrastructure was marked, at the edge of the ward. At present Deshbandu College lies on that very same land. In MPD 2021, a plot of 3.76 acres between Kalka Public School and Anup Petrol Pump in Alaknanda has been proposed for commercial use.

Primarily the land use of Ward 190 is residential. It has approximately 30% area under green cover. Every pocket/ locality has a park or Tot Lot (small housing level parks for kids to play).

The graph shown below depicts that 28% of the buildings in Ward 190 are built higher than G+4, most of these have been constructed recently, while only 10% of the buildings have G+1 height. They are those buildings which were built initially.



Building Heights



% of land use in ward 190

Landuse Plan



MPD 1962



MPD 2001



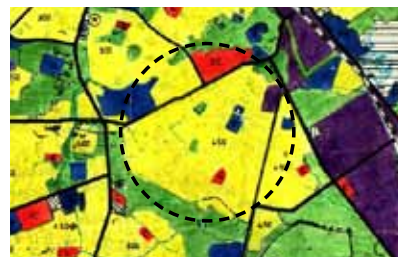
MPD 2021



MPD 1962

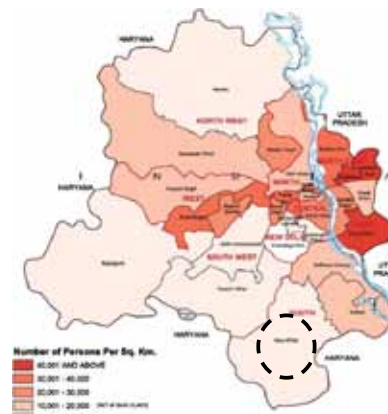


MPD 2001



MPD 2021

2.2 Residential Character



Varying Densities in Delhi



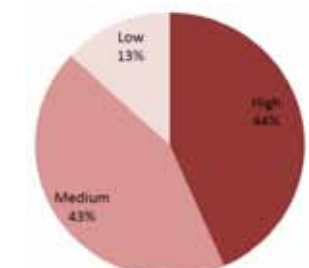
Chittaranjan Park: Area: 101 ha



Kalkaji DDA Flats: Area: 36 ha



Alaknanda Area: 36.5Ha



% of Densities in Ward 190

The map of Delhi on the left shows the varying densities prevalent in Delhi.

The area of Ward 190 is 174.5 ha. It has a population of 78,000 persons residing in it. Therefore, the density of the area can be calculated to be 447 ppha.

The residential area of Ward 190 can be categorized as Planned Area which can be subdivided as:

- Residential plots: 61.2 ha
- Residential flats: 113.3 ha

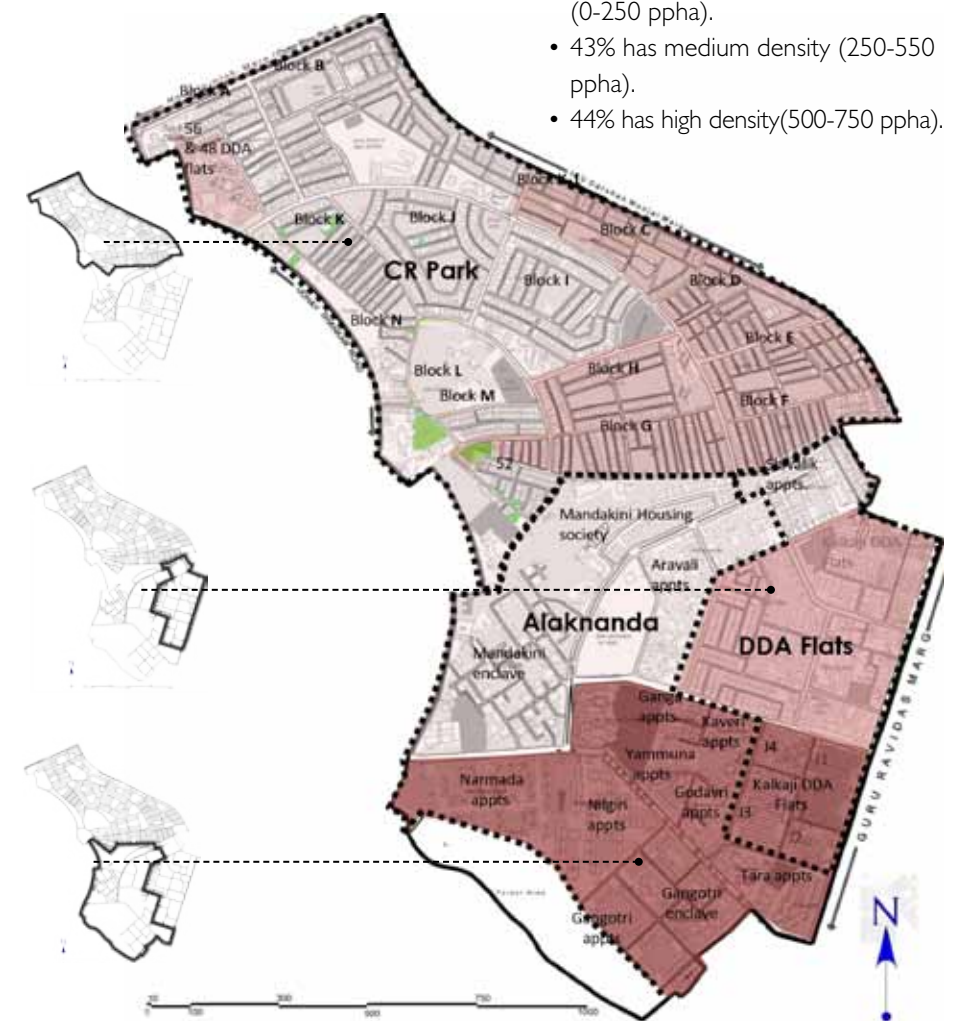
From the plan shown below, it can be clearly stated that the ward can be subdivided into:

- CR Park
- DDA flats
- Alaknanda

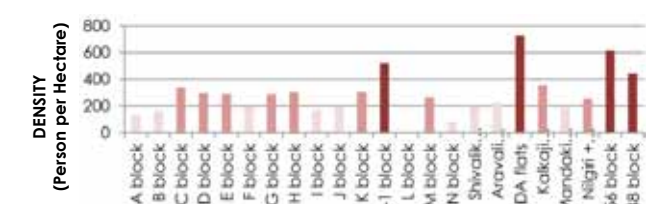
Each of these areas have different densities and distinct residential characters. The densities in the ward vary from 10 ppha to 729 ppha approximately. Kalkaji DDA flats have high density, while Chittaranjan Park has comparatively low density.

As per the pie-chart shown below:

- 13% of the ward has low density (0-250 ppha).
- 43% has medium density (250-550 ppha).
- 44% has high density (500-750 ppha).



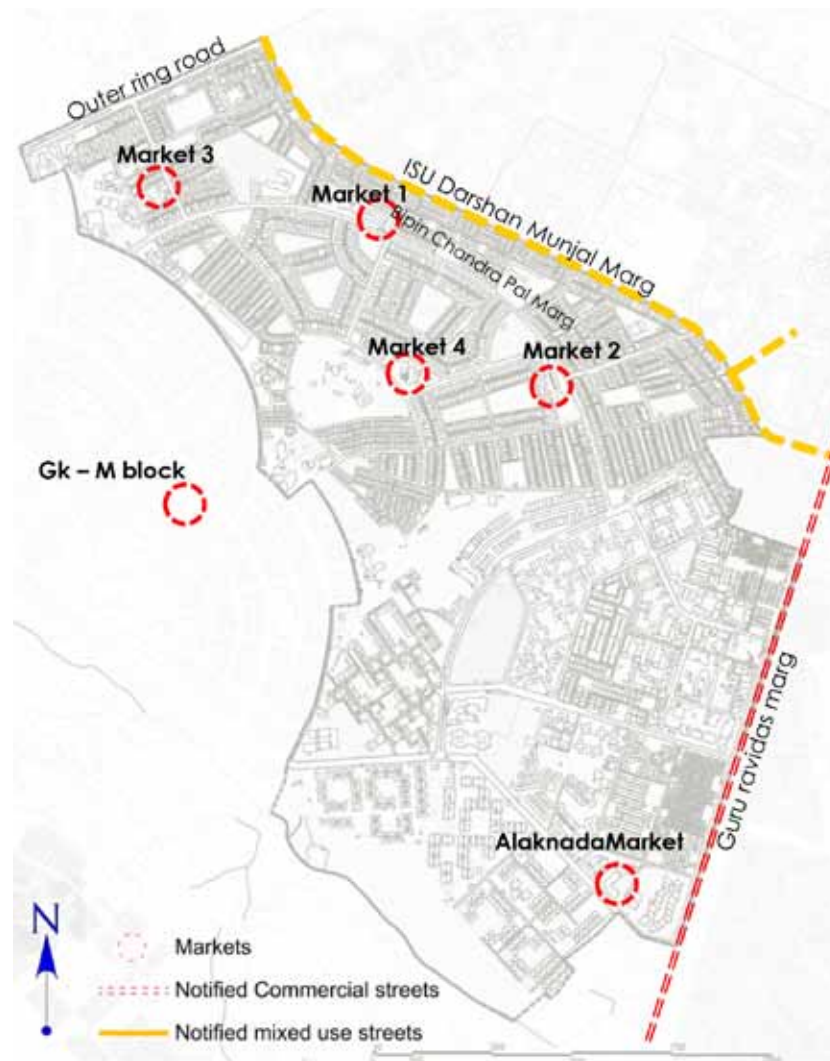
Varying Densities in Ward 190



Densities in Ward 190

2.3. Commercial Character

There are five local shopping centres in Ward 190: Market-1, 2, 3, 4 in Chittaranjan Park and Alaknanda Market in Alaknanda. The location of these markets is given in the plan shown on the right. As Chittaranjan Park is home to one of the city's main markets for freshwater fish (an integral part of Bengali cuisine), Bengali sweets and Calcutta-style street food, these markets are used by residents of this ward as well as customers residing in other parts of Delhi. As the parking for these markets is not planned, it results in traffic congestion especially during peak hours in the mornings and evenings. It has also been noticed that the parking area in front of these markets is not only used by the customers, but also by the residents and shopkeepers. Due to lack of parking space they have made it a permanent place to park their vehicles.



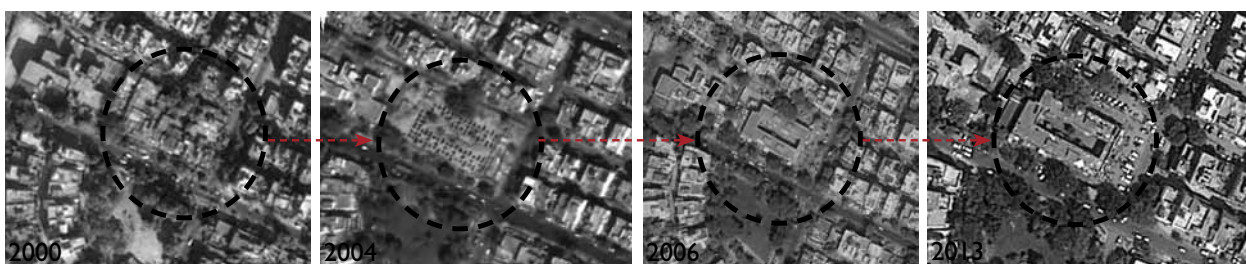
Markets and Notified Commercial Streets in and around Ward 190



Market-I



Fish Market, Market-I



Evolution of Market-I

2.4. Green Areas

Thirty percent of the ward is designated as green area. These green areas have been further classified as open land, garden/parks, playground, scrub, barren land and forest area. The table and pie-chart shown below present the area of each category and its percentage with respect to all other categories.

Jahanpanah Forest forms the southern edge of the ward. thirty eight percent land out of total green is under gardens and parks.

These gardens and parks are equally distributed in the ward. All gated pockets in Chittaranjan Park have their individual parks. Alaknanda and Kalkaji DDA flats have tot lots and zonal parks.

Most of the green area is underutilized or misused.

Potential for green areas:

- Jahanpanah Park, behind Jahanpanah Club, has potential to be developed into a more dynamic urban space for the residents of the ward. It can be converted into an Eco-Theme Park, which has been elaborated upon in the later part of this report.
- A Mall is expected to come up on the 3.7 acres barren land available between Kalka Public School and Anup Petrol Pump.



Distribution of Green Spaces in Ward 190



Jahanpanah Park



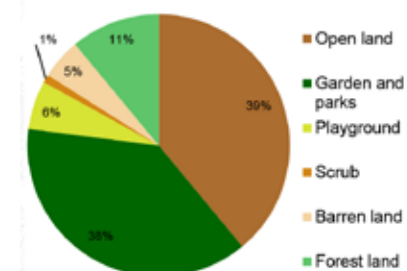
Park Opposite Market-I



High Boundary Wall around Parks



Site for Upcoming Mall



Percentage of Green

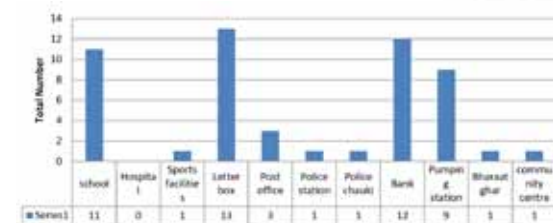
	Area (in sqm)
Open land	358443
Garden and parks	355585
Playground	52479
Scrub	9541
Barren land	50175
Forest land	99213

Area of Various Categories of Green Areas

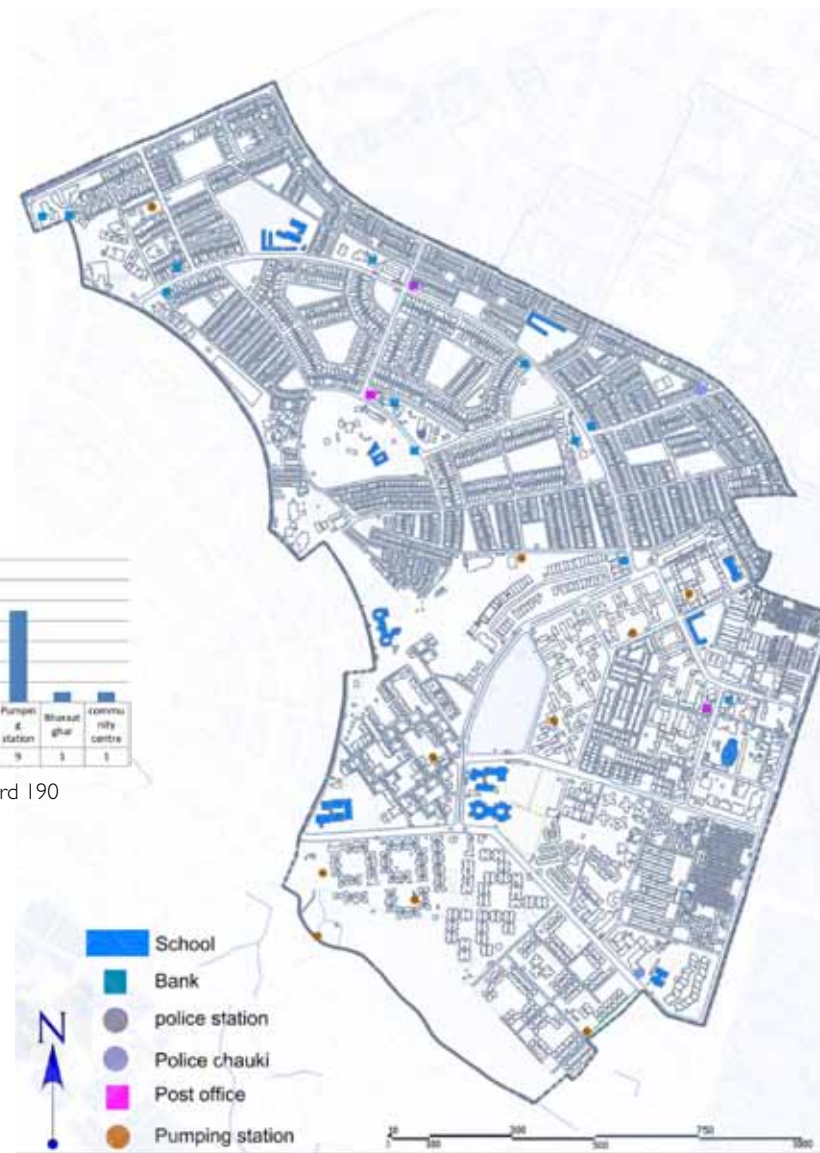
2.5. Social Infrastructure

The bar graph shown below presents the statistics of social infrastructure in the ward. The location of the same is depicted in the plan shown on the right. As per the plan and bar graph:

- Ward 190 has as many as 12 banks, 1 police station, 3 post offices.
- There are 11 schools in the ward which cater to all levels of education.
- The ward also has a community hall.
- Ward 190 lacks healthcare facilities. The nearest hospital is AIIMS.



Bar Graph showing Social Infrastructure in Ward 190



Social Infrastructure in Ward 190



Jahanpanah Club



Raisina School



Upcoming Community Centre

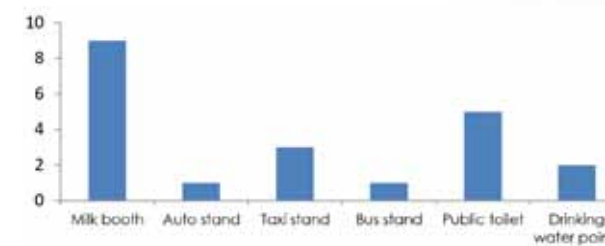


Community Hall

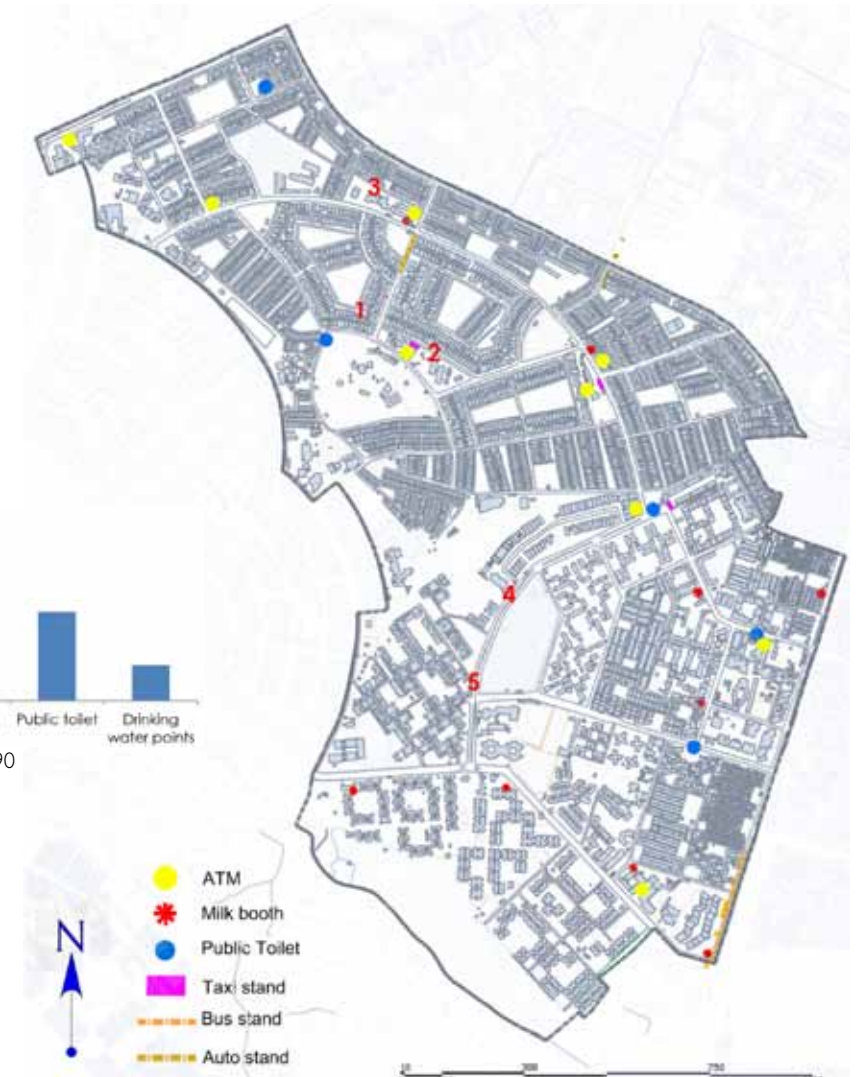
2.6. Public Utilities

The bar graph shown below presents the statistics of available public utilities in the ward. The location of the same is depicted in the plan shown on the right. As per the plan and bar graph:

- Ward 190 lacks basic public amenities like drinking water facilities, public toilets and street furniture.



Bar Graph showing Public Utilities in Ward 190



Public Utilities in Ward 190



Petrol Pump



Milk Booth, Market-4



Bus Stand

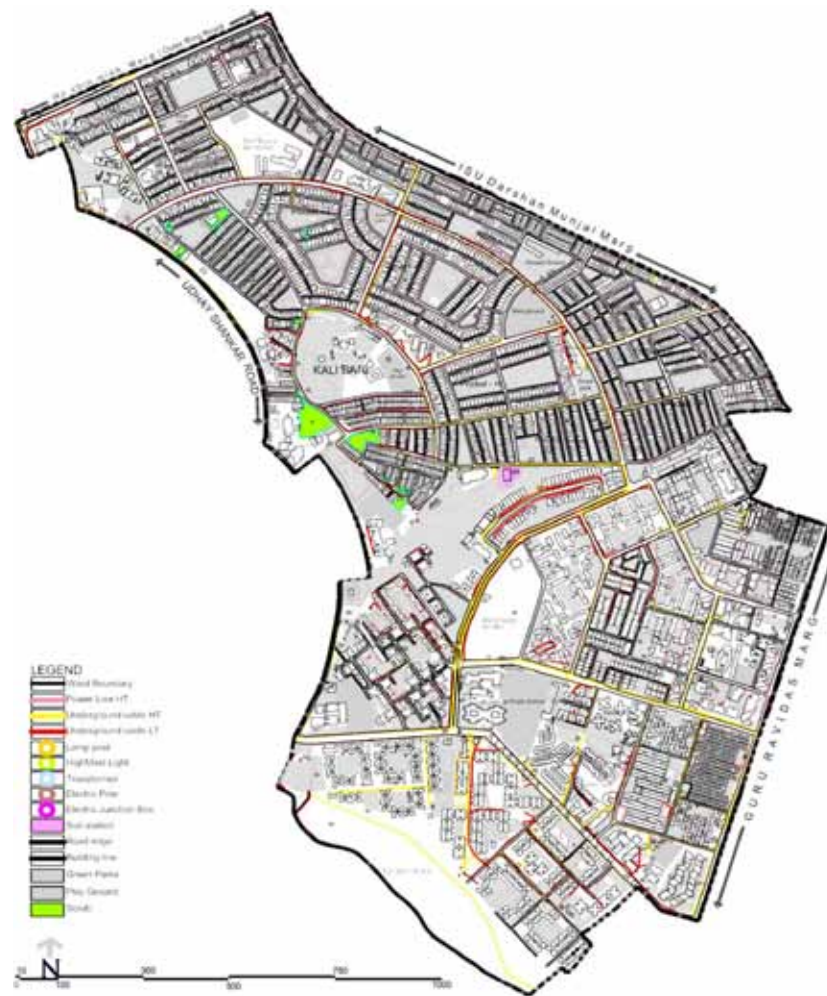


Dustbin, Market-1

2.7. Physical Infrastructure

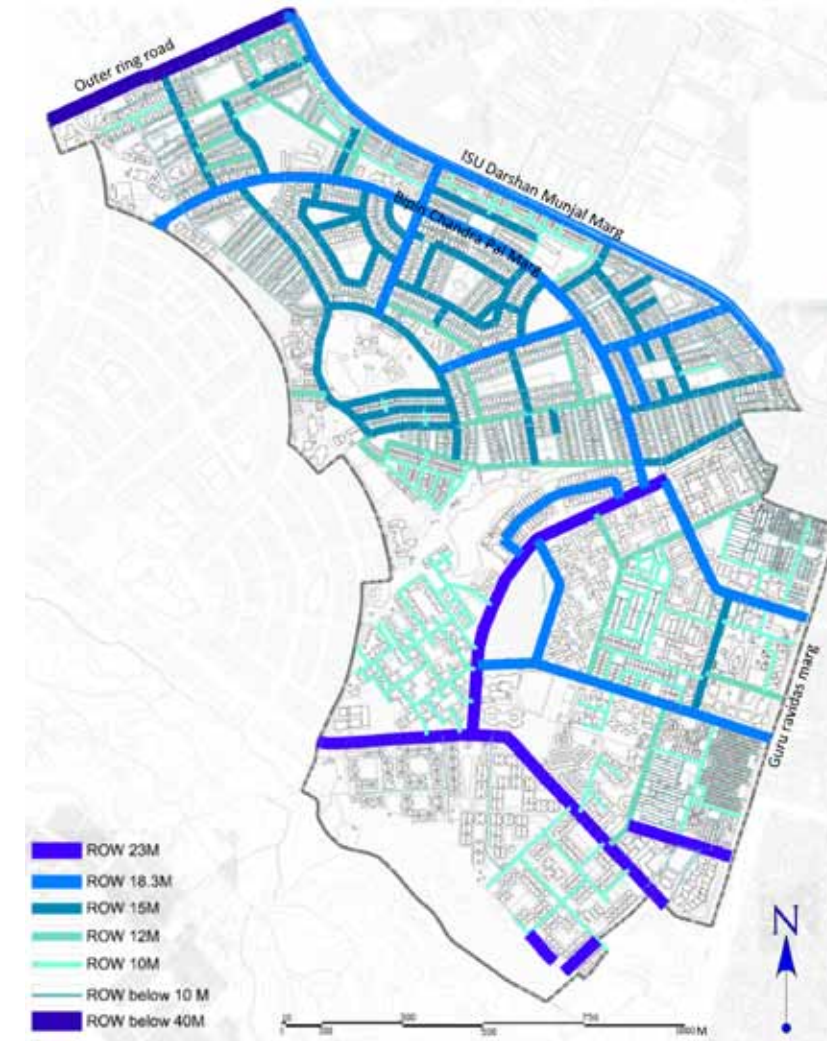
Ward 190 faces various issues regarding its physical infrastructure:

- Stormwater drain inlets are not covered with grating, which allows all sorts of solid-waste to enter the drains hence choking them.
- In certain parts of the ward, due to acute seasonal water shortage, there is dependence on Delhi Jal Board (DJB) tankers.
- Overhead electric cables in the ward are an eyesore.
- A solid-waste disposal scheme which aims at waste segregation at household levels, proper collection and storage is not in place.



Distribution of Physical Infrastructure

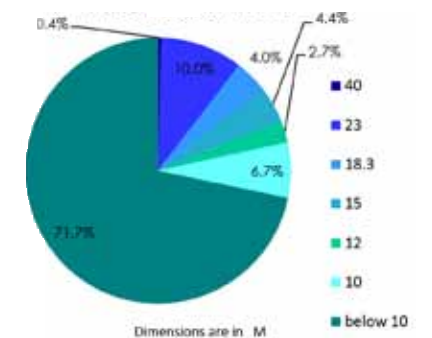
2.8. Road Typology



Road Typology and Network

In Ward 190, the Right of Way (ROW) ranges from 6.6 m to 40 m. The same is depicted in the plan shown on the left. The pie-chart presents the percentage of different ROWs in the ward. The images below depict streets of varying ROWs.

In several places, the ROW designated in MPD is not available on site. It is either encroached upon by vehicular parking, street hawkers/vendors or by construction. This encroachment leads to chaos and traffic congestion especially during peak hours.



Percentage of Different Row in Ward 190



Pitholes on Roads



Cables protruding from Ground



6.6 M ROW (Side Lane)



15 M ROW



Waterlogging near Alaknanda



No Solid-Waste Management – Market-2



12 M ROW



18.3 M ROW

Transportation

- Lack of connectivity from Ward 190 to the nearest Metro station.
- Absence of para-transit connectivity from Ward 190 to Metro station.
- Congestion on major roads at peak hours.
- On street parking near markets/ temples/schools leads to congestion and traffic jams.
- Absence of planned auto and taxi stands again leads to congestion on roads.
- Parking facilities lacking in the ward
- Absence of designated parking lots in ward results in vehicles being parked on pavements and roads.



Traffic Congestion during Peak Hours

Urban Design

A. Streets

- Encroachment on ROWs designated in Master Plan – vehicles, hawkers, vendors.
- Lack of proper lane division for motorized and nonmotorized vehicles leading to traffic jams.
- Inadequate footpaths.
- Absence of facilities for the disabled and elderly.
- Absence of dedicated lanes for cyclists and pedestrians.
- Lack of proper signages, streetlights, street furniture and grating at base of trees.
- Absence of organized hoardings, signage and street furniture.
- Dirty back lanes behind houses.



Vehicles Parked in Front of the Temple – Encroachment on ROW

B. Markets

- No guidelines for façade control.
- Absence of organized hoardings, signage and street furniture.
- Underutilized terrace space.



Haphazard Hoardings and Lack of Street Furniture

C. Parks

- High fencing around the parks and playgrounds act as physical and visual barriers.
- Restricted children's play area.
- Underutilized green spaces.
- Many linear patches of open spaces are being used as parking by residents.
- Open land is being used as dumping grounds.

Physical Infrastructure

- Overhead electric cables look aesthetically unappealing.

Public Utilities

- Lack of public utilities such as toilets and drinking water facilities.

Stormwater Management

- Stormwater drains are clogged due to lack of maintenance resulting in water overflowing on to streets during the monsoon season.

Solid-Waste Management

- No scheme for waste segregation at source.
- The dhalao in the ward are so designed that waste segregation is not possible.

Wastewater Management

- Wastewater from market areas especially from the fish market seeps on to the road and flows into the stormwater drains.
- Wastewater is being treated at the city level which has chances of getting mixed with stormwater, leading to inadequate treatment and lack of recycling and resource recovery.

City Management Structure

- Lack of democratic decentralization and people's participation in management of the ward's affairs.



Tree without Grating at Base



Waterlogging



Waste Collection

Transportation

- Para-transit modes such as autos, taxis, Metro feeders, rickshaws etc. should be integrated with the existing public transport system for better connectivity to nearest metro station, for last mile connectivity.
- Ward should have designated taxi/auto/feeder/bus/rickshaw stands.
- Community level parking sites should be developed.
- Location for underpass to facilitate pedestrian crossing should be identified.
- A Mobility Plan should be developed at ward level in consultation with RWA/Residents/Counsellors and other stakeholders. The plan should include all bus routes/bus stands/auto stands/feeder stands. It should provide basic information's about bus timings, their origin, destination etc. It should mark pedestrian streets, cycle tracks, one-way roads, two-way roads etc. It should also indicate information regarding modified routes during peak hours and Durga Puja time.
- Air quality monitoring system should be placed in every ward.

Urban Design

A. Streets

- Encroachment on ROW in any form (hawkers/vendors/parking/milk booths/electric feeder pillars) should be removed.
- Street section should be designed with proper lane division for motorized and non-motorized vehicles.
- The ward should be made pedestrian friendly by providing adequate footpaths on all roads and underpass wherever applicable.
- While designing, care should be taken to provide facilities for the disabled and elderly.
- The ward should become cyclable with provision of a dedicated lane for cyclists.
- The streets in the ward should have proper streetlights, signages and street furniture.
- Trees should have proper gratings at base.
- Pedestrian and disabled friendly crossings/junctions should be designed.
- Public spaces and streets should be made more interesting/dynamic by giving them certain character through landscaping, wall murals, wall paintings, statues etc.
- The back lanes of houses should be cleaned and maintained regularly. Certain activities should be developed in these lanes to make them lively so that they are not treated as just back lanes.

B. Markets

- Guidelines for signages should be formulated which will be applicable to markets, all public buildings etc.
- As markets form an important part of Ward 190, these should be redeveloped/renovated.
- Multilevel underground car park to cater to growing need of car parking should be addressed.
- Unused market terraces can be converted into open-air food courts with solar photo voltaic trellis.

C. Parks

- High fencing around the parks and playgrounds should be replaced with low height boundary walls.
- Underutilized green spaces should be redesigned.
- A hindrance free walkable green network should be chalked out to utilize the abundantly available parks.
- Underground multilevel car park could be developed under playgrounds and green areas.
- A sustainability park can be developed where residents can learn about sustainability features and can incorporate the same in their lifestyle.

Physical Infrastructure

- Common utility ducts should be made an integral part of streetscaping.
- All services such as electric, cable, gas, telecom lines and other such should be put underground in common utility ducts.

Public Utilities

- Public utilities such as toilets and drinking water points should be available at regular intervals with proper signage.

Stormwater Management

- Stormwater drains should have proper grating to avoid waterlogging.
- A de-silting chamber should be incorporated to avoid silt from clogging the stormwater drains.
- The drains should be maintained and cleaned regularly.
- Bioswales and groundwater recharging pits should be built at regular intervals to facilitate stormwater management within the ward.

Solid-Waste Management

- Solid-waste management scheme which facilitates waste segregation at all levels – household, storage, collection and transportation should be developed.
- Wastebins, collection trolleys, dhalaos and collection trucks should all be designed with segregated chambers.
- For a start, the RWA should involve certain NGOs to help in waste segregation and collection.
- Biogas plants should be installed within the ward for generating energy and compost from organic waste produced in the ward.

Wastewater Management

- Wastewater lines should be laid properly in market areas as wastewater from the fish market seeps on to the road and flows into the stormwater drains.
- Wastewater should be treated at ward level to reduce the volume of untreated wastewater discharge to city level drains.
- The treated water should then be reused for landscaping of urban greens within the ward, for flushing in public toilets and for cleaning roads.
- Instead of the conventional sewage treatment plants, decentralized wastewater treatment systems should be used for treatment.

Water Supply

- Water shortage in the ward can be reduced by demand side management.
- Treated wastewater can be reused for landscaping, for flushing in public toilets and for cleaning roads.
- Stormwater, instead of going into city level drains, can recharge groundwater within the ward.

Energy Efficiency & Renewable Energy

- In case of new construction/renovation of buildings in the ward, various energy efficiency measures can be incorporated.
- Solar photo voltaic panels can be installed at community level (public buildings, markets, toilets etc) and household level for renewable energy generations.

Decentralized City Management Structure

- For democratic decentralization and people's participation in management of the ward's affairs, a combination of bottom-up and top-down approach should be followed in the whole city.

5.1 Transportation

5.1.1 Interventions in Public Transportation Network

Buses Plying in Ward 190:

Route No: 480

(Kendriya Terminal – Kalkaji DDA Flats)

Total Distance: 15 km

Frequency: 15 min

Additional Distance: 0.7 km

Route No: 490

(Arya Samaj Road – Kalkaji DDA Flats)

Total Distance: 18 km

Frequency: 18 min

Additional Distance: 1.8 km

Route No: 445

(NDRS Gate 2 – Gk Part II)

Total Distance: 17 km

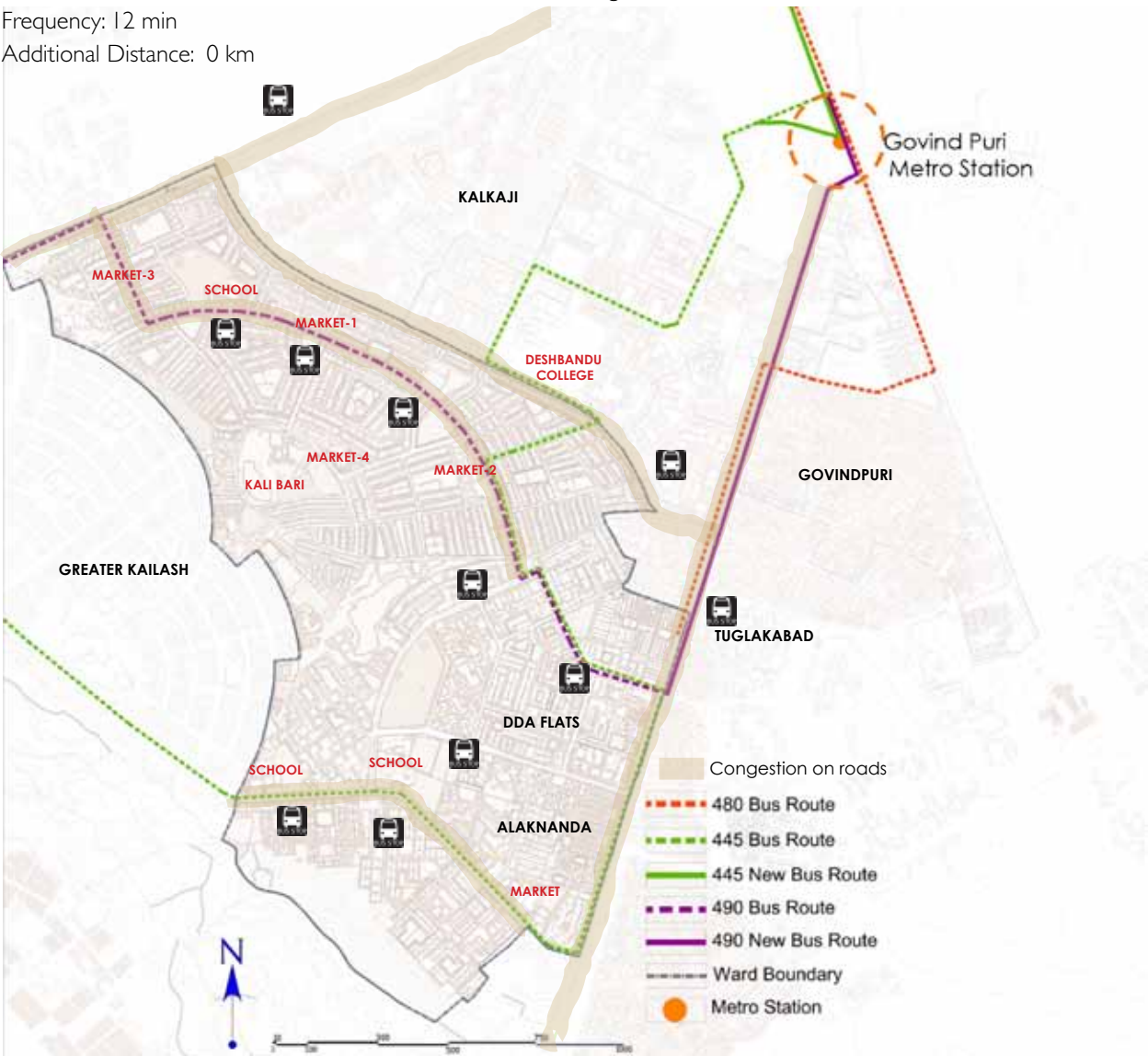
Frequency: 12 min

Additional Distance: 0 km

Ward 190 lacks para-transit connectivity. Due to the large number of private vehicles being used in the ward, there is a lot of traffic congestion. The roads that are affected the most due to congestion are marked on the plan shown below.

The buses plying in the ward, shown in dotted line in the plan below, do not cater to all the major roads. Also, the ward is not well connected to any of the nearest Metro stations. Metro feeder service is not available in the area. Out of the many DTC buses plying on this route, the nearest metro station (Govindpuri Metro station) lies only on Bus No. 445's route. There are no designated taxi/auto stands in the ward.

With respect to the above, it is proposed to re-route few of the existing bus routes in the ward, so that the residents can use them to reach the Govindpuri Metro station. The continuous line, in the plan, represents the additional distance the buses will have to travel to include Govindpuri Metro station on their existing route.



Proposed Re Route of Buses

Bus Stops



Bus Stops in Delhi: Advertisement Boards

The public transport system in the ward needs attention. At present passengers are clueless about arrival of buses and they tend to take private transport which is expensive and also leads to traffic congestion.

Intelligent Transportation System (ITS) is one way to make public transport facilities more efficient and safer by use of information, communications and control technologies.

ITS showing bus route and current location of bus approaching the bus stop should be installed at every bus stop. This system will give commuters precise information of arrival and departure of buses at bus stops. This

apart, the passengers can avail service details on their mobile phones by sending an SMS. This will cut down waiting time of passengers at bus stops.

It will also help officers to track movement of buses like driving speed and delay in departure from bus stand on real-time basis. Information about bus routes and timing must be displayed at all bus stops in the form of static signage as well.

For the assistance of residents and visitors in the ward, bus stops should also display a bilingual Local Area Map showing local roads and important civic destinations. The remaining panels on the bus stop should be used for advertisements.

Advertisement Boards

A well designed, bilingual "Local Area Map" should be displayed at all bus stops – showing local roads and important civic destinations.



Bus Stop in Chittaranjan Park



Bus Stop near Market-1



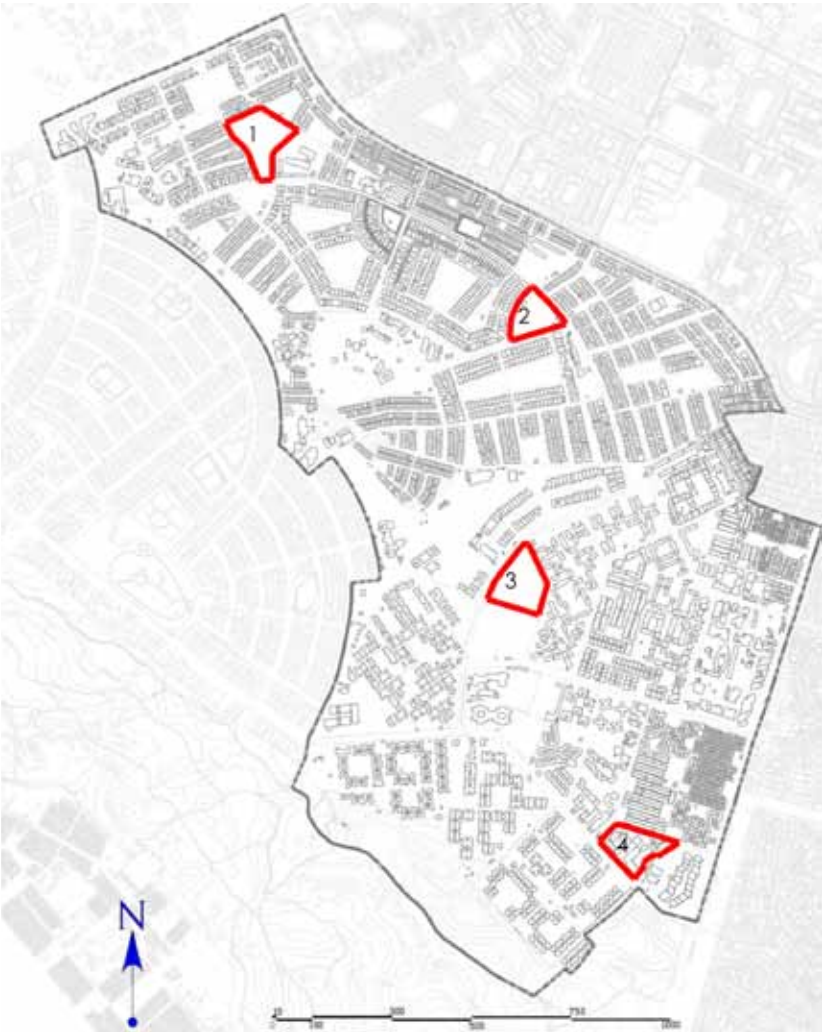
Intelligent transport system (ITS) showing bus route and current location of bus approaching the bus stop

Current location of bus approaching the bus stop

Bus nos. available at this bus stop (with origin and destination)

Display of Route Map at Bus Stands

5.1.2 Underground Multilevel Parking



Location of four Identified Sites for Underground Multilevel Parking

Ward 190 lacks parking facilities. Vehicles are parked on the pavements and on streets which leads to traffic congestion. Absence of planned auto and taxi stands also leads to congestion on roads.

In lieu of the above, it is proposed to develop 4 underground multilevel parking facilities in the ward.

Benefits of underground parking lots:

- Protection from harsh weather
- Security

Facilities provided in underground parking lots:

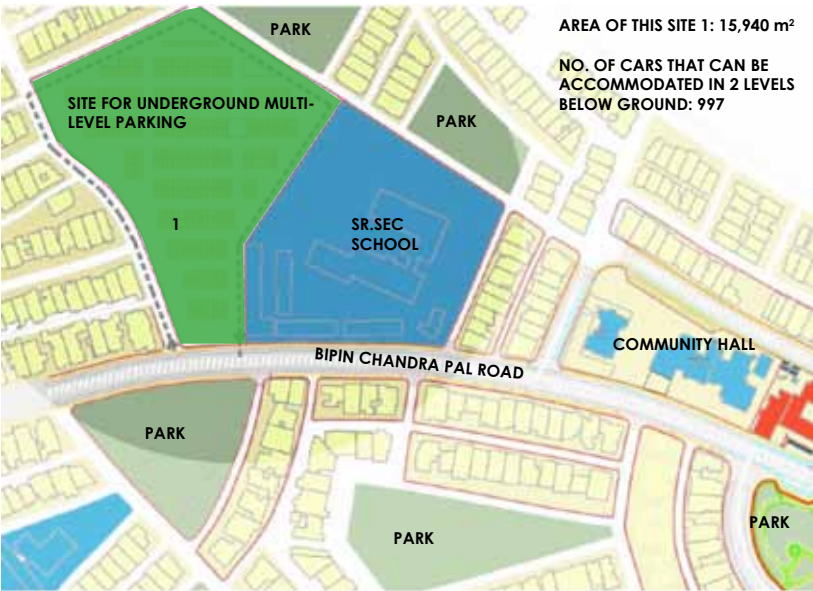
- Toilets
- Drinking water facility
- Car wash & mechanic facilities
- Integrated taxi/auto stand
- Cycle stands
- Electric charging points for electric cars
- Cafeteria

These underground multilevel parking lots will be well connected to the nearest civic destinations in the ward, like markets, schools etc. with shaded pedestrian walkways and cycle tracks.

For designing underground car parking, the area required per car is 32m². This takes into consideration the area required for ramps and other services. The table below gives the site area and number of cars that can be accommodated in each of the four identified sites, with a double basement.

Site	Area (m2)	No. of cars in double basement
1	15,940	997
2	10,618	664
3	15,557	972
4	12,764	800
Total	54,879	3433

Cars Accommodated in Underground Multilevel Parking



One of the Sites Identified for Underground Multilevel Parking

Redevelopment of Alaknanda Market



Location of Alaknanda Market

As part of the proposal for underground multilevel parking, the Alaknanda market has been taken up for redevelopment. The issues in the existing market are:

- Traffic congestion
- Lack of parking facility
- No designated parking area
- Haphazard signages and hoardings
- Underutilized open spaces
- Encroachment by hawkers in open space
- Waterlogging

The same have been highlighted in the images shown below.

For redevelopment of Alaknanda market, FAR of 125 should be considered as per MPD 2021. To resolve the problem of parking, a double basement parking has been proposed on site.

With a double basement, 800 cars can be accommodated in the underground parking lot.



Unorganized Signages and Hoardings



Underutilized Open Spaces in Market



Traffic Congestion at Don Bosco School



Haphazard Parking at Alaknanda Market

5.2 Urban Design

5.2.1 Streetscaping of Typical Road Sections



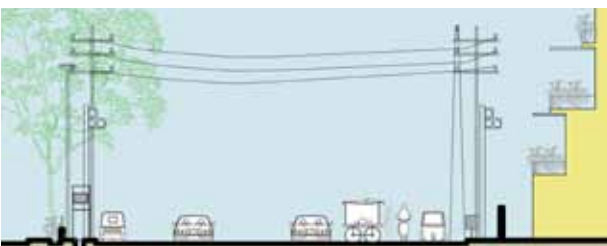
Existing Section (ROW 12 M)



Parking on Footpath



Existing Section (ROW 15 M)



Existing Section (ROW 18.3 M)

Thorough analysis of the ward resulted in a few observations regarding the status of streets in the ward. The observations are as follows:

- Encroachment on Right of Way (ROW) mentioned on Master Plan.
- Lack of proper lane division for motorized and non-motorized vehicles leading to traffic jams.
- Inadequate footpaths.
- Inadequate parking areas which results in vehicles being parked on footpaths hindering pedestrian movement.
- Encroachment on footpath by vendors and hawkers.
- Absence of facilities for the disabled and elderly.
- Absence of dedicated lane for cyclists.
- Lack of proper signages.
- Absence of wastebins at regular intervals.



Lack of Maintenance – Footpath



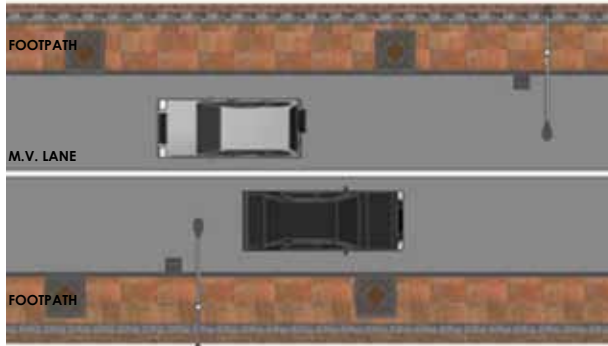
No Provision for Pedestrians/Cyclists



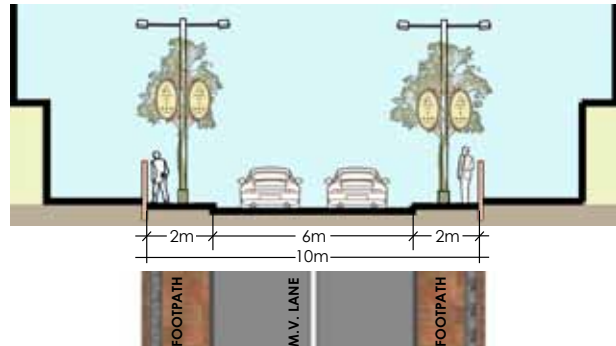
Lack of Maintenance – Signages



Lack of Proper Signages



Proposed Plan: ROW 10 m



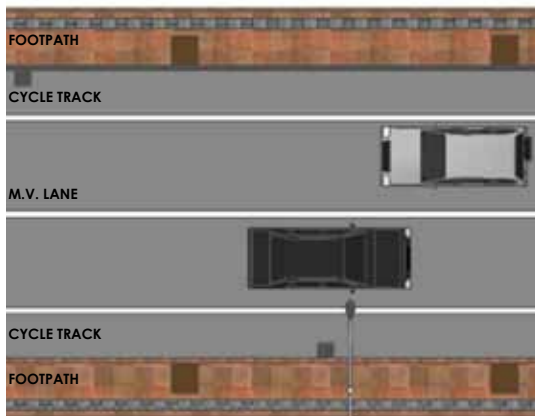
Proposed Section: ROW 10 m

The following has been proposed to take care of the observations regarding status of streets in the ward:

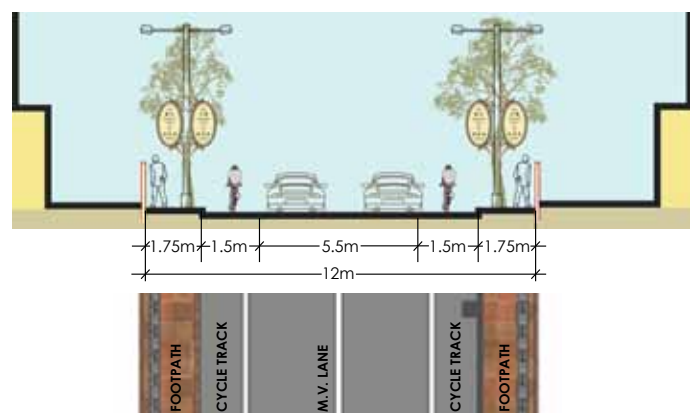
- The ROW to be cleared of all encroachment - hawkers, vendors, vehicles and construction.
- Proper lane division for motorized and non-motorized vehicles will be applied.
- Well designed footpaths with proper consideration given to disabled and elderly will be implemented.
- Dedicated lane for cyclists will be provided wherever applicable.
- Proper signages and segregated wastebins will be installed at regular intervals.



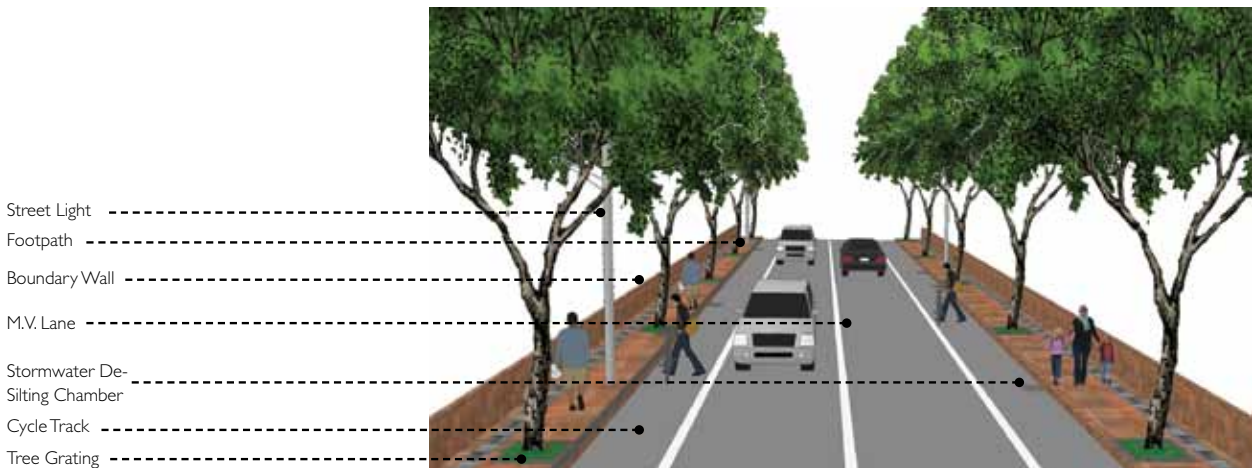
Proposed view: ROW 10 m



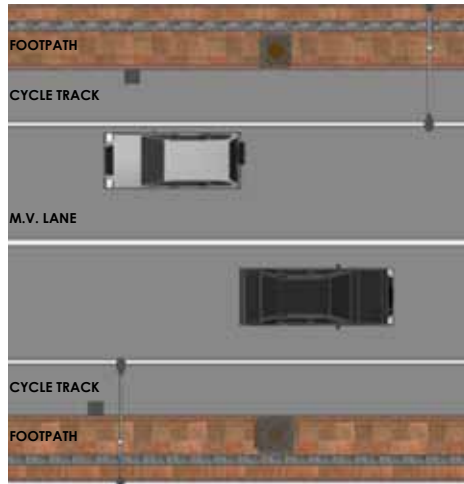
Proposed Plan: ROW 12 m



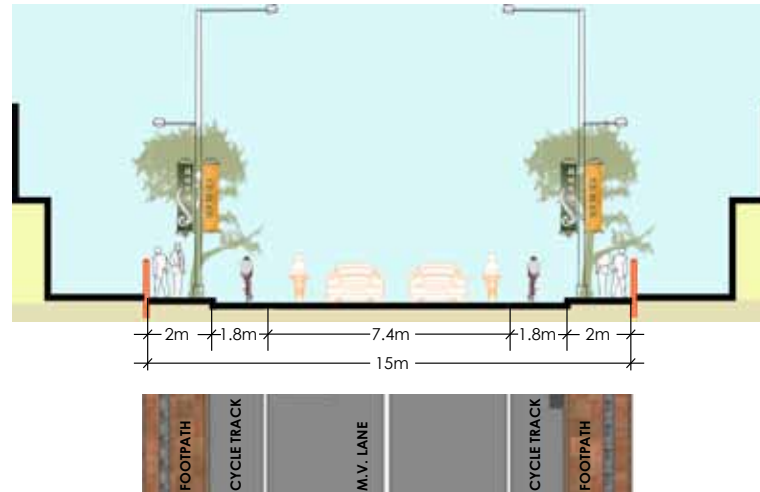
Proposed Section: ROW 12 m



Proposed View: ROW 12 m



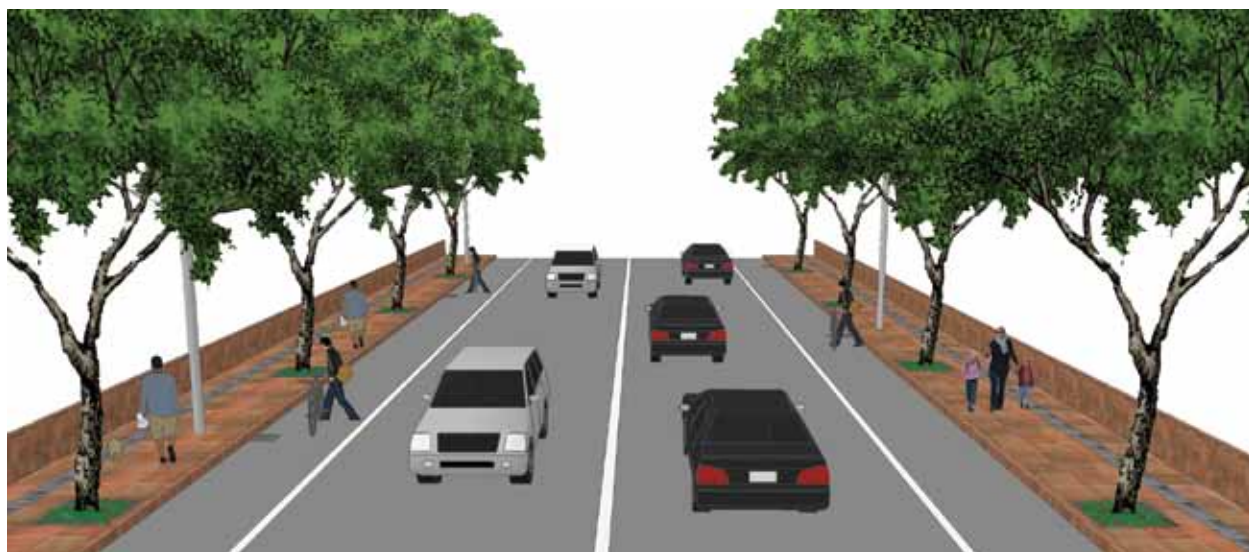
Proposed Plan: ROW 15 m



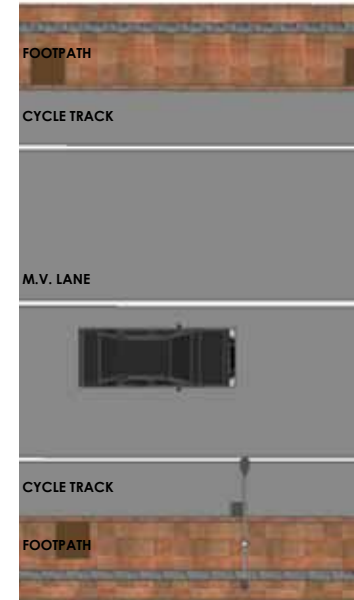
Proposed Section: ROW 15 m



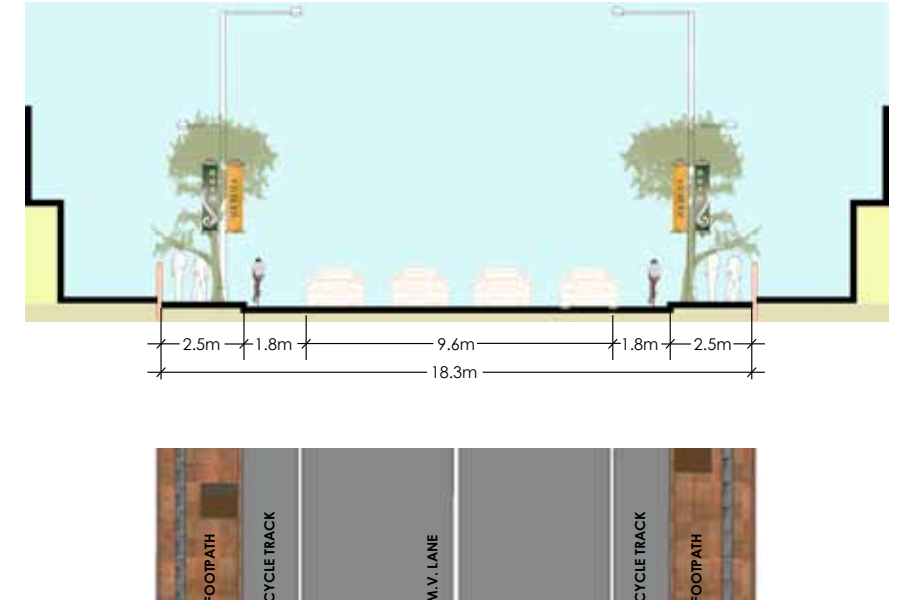
Proposed View: ROW 15 m



Proposed View: ROW 18.3 m



Proposed Plan: ROW 18.3 m



Proposed Section: ROW 18.3 m

Details

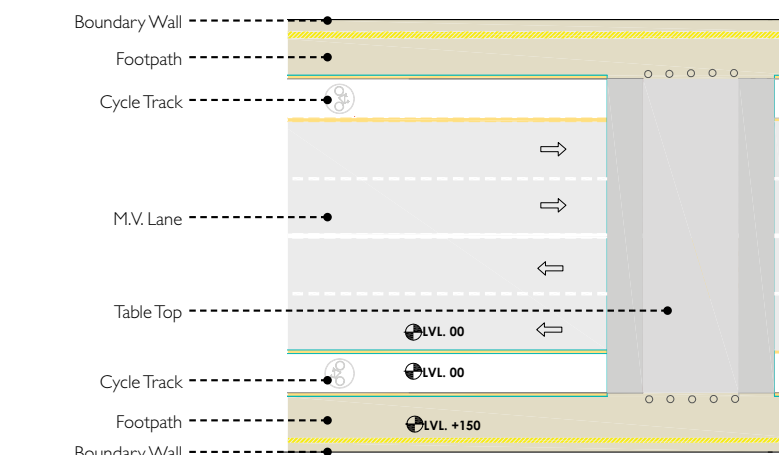
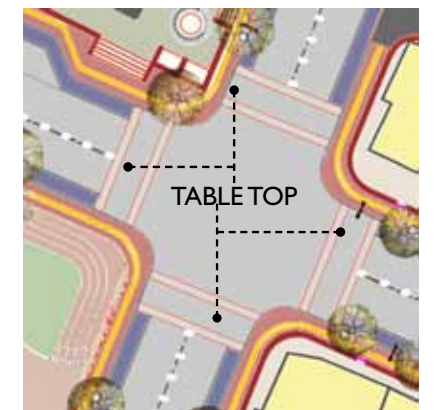
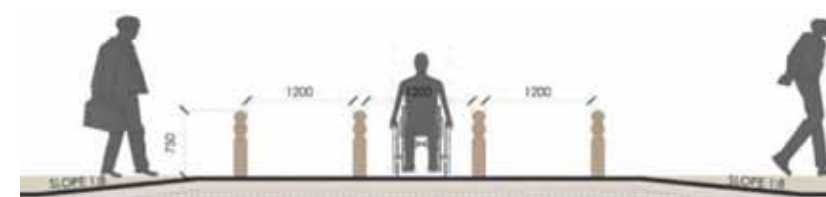


Table Top



Junction



Section: Table Top



Proposed Ramp for Individual House Entry

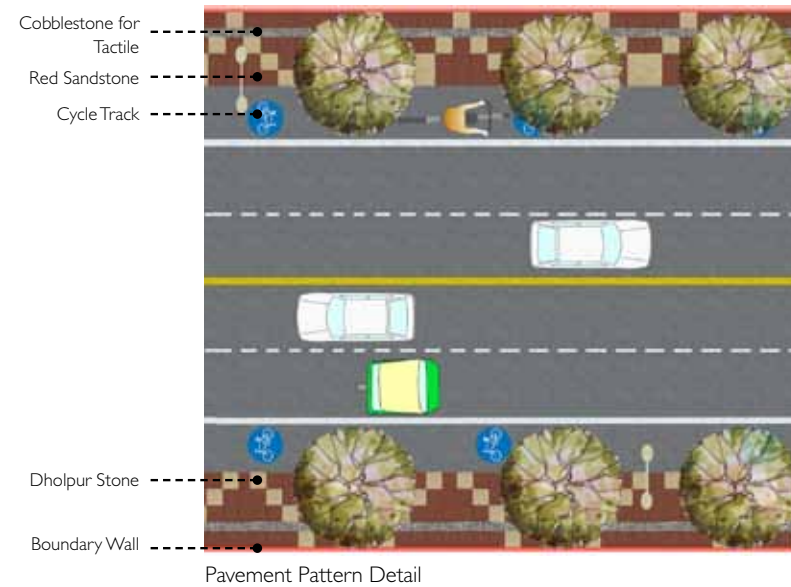


Table Top

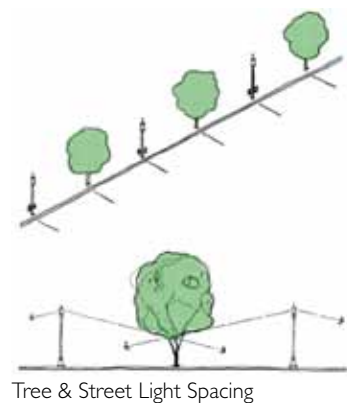


Tactile Paving on Footpath

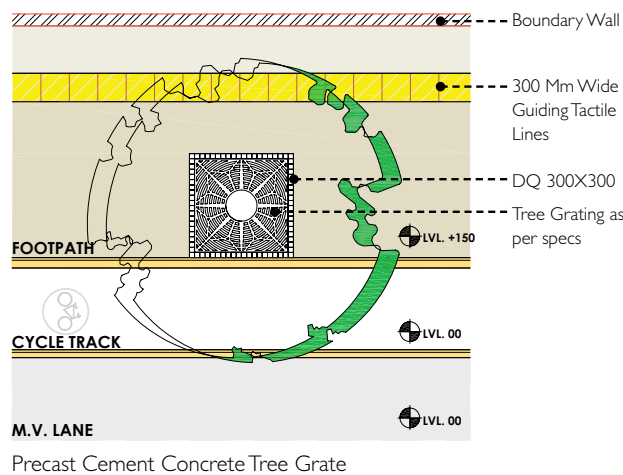
Details



Consideration has also been given to materials to be used on the pavement. The pavement pattern will be a combination of red sandstone and Dholpur stone. A tactile path has been designed for assisting the blind. The same will be made of cobblestone. The kerb stone will be in red sandstone. The pavement pattern detail is depicted in the image on the left.



The location of trees and streetlights have been designed in conjunction, so that the tree canopies do not obstruct light. Wherever applicable, narrow “columnar” trees will be used in case of limited pavement space. Trees should be “pruned bottom up” regularly to allow vision clearance. Deciduous trees will be used to allow access of sunlight to street in winter. New and additional trees will only be of native species in order to minimize irrigation requirements and for prolonged tree life. Trees like Eucalyptus, Australian Acacia, Lantana, Lucena, Mast (false Ashoka) should be avoided. Avenue and accent trees like Arjun, Kusum, Imli, Chikrassy, Mahua, Kachnar, Barna, Tesu, Tota etc. should be planted.



Kachnar



Arjun



Tesu

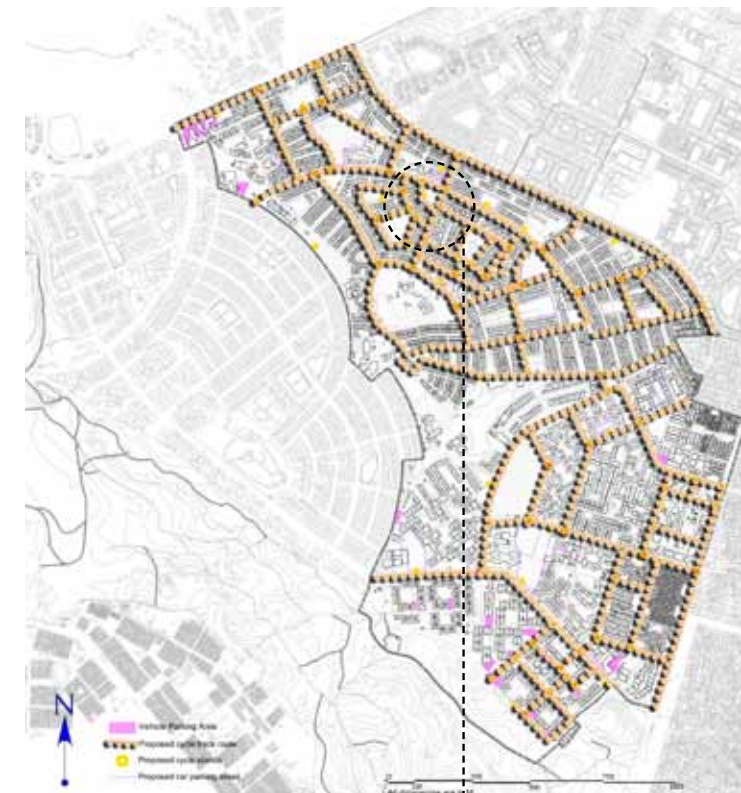


Imli



Kusum

Cycle Track



Cyclable Roads in Ward 190

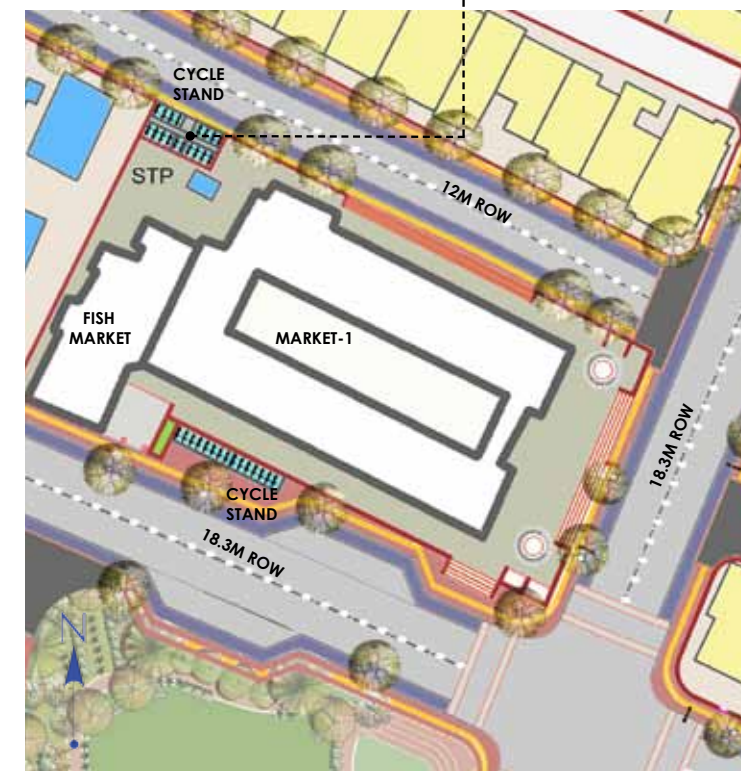
As part of the proposal for streetscaping it was considered to make Ward 190 cyclable. The yellow dots visible on the plan shown on the left represent the streets that can be made cyclable. As per the previous section, all streets of 18.3 m, 15 m and few of 12 m have been redesigned to incorporate a cycle track. This will result in making fifteen percent of the ward cyclable.

Cycles are a very desirable, affordable and environment friendly private mode of transportation. To encourage their usage, safe and secure cycle tracks must be provided. The cycle parking must also be secure.

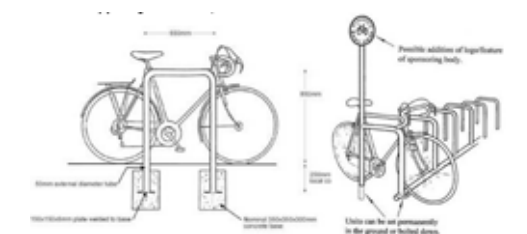
Cycle stands are recommended to be provided at all Metro stations, markets, huge parking lots (underground multilevel parking lots) and near green areas.

Long-stay parking: Cycle parking lots must be enclosed, ticketed (like car parking lots) and shaded from weather. Short-stay parking should be open to view and close to entrances of destinations.

Provision can also be made for residents to be able to take cycles from one stand at minimal rental and drop it at the other stand near the destination.



Conceptual Sketch of Cycle Stands around Market-1



Standards for Cycle Parking



Standards for Cycle Parking

5.2.2 Streetscaping of Pilot Stretch



Plan of Existing Pilot Stretch

For the purpose of detailed study, a stretch was selected from the ward. The selected stretch is dynamic in terms of the various activities that occur on it. It connects the Kali Bari temple to Market-I. Opposite Market I, there is a zonal park. The selected stretch includes all typical rights of way. To formulate proposals, the pilot stretch has been split into 4 parts:

- Typical stretch
- Kali Bari temple
- Park
- Market-I



Market-I



Encroachment on Pilot Stretch



Section I-I



Section 2-2

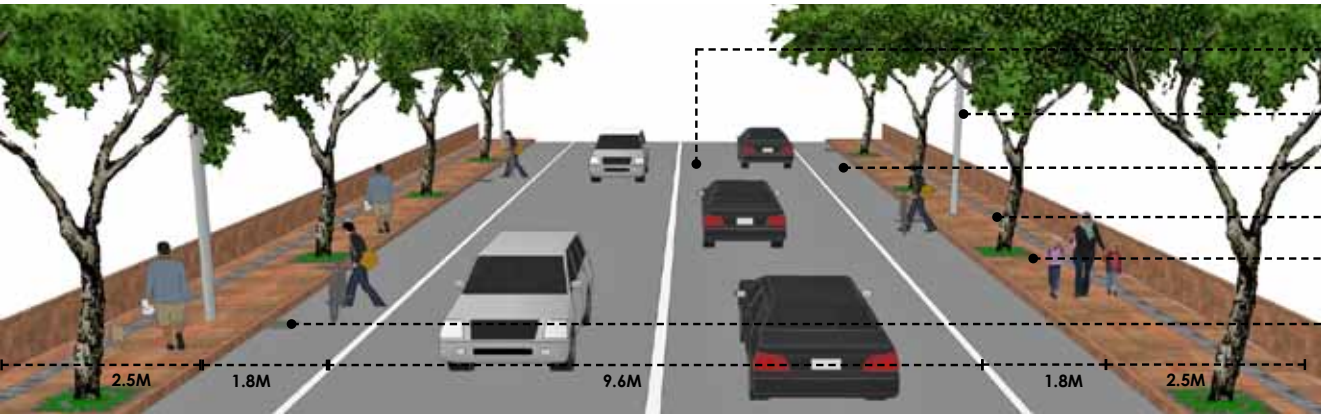


Plan of Proposed Pilot Stretch

5.2.3 Typical Stretch



Existing Plan of Road edge



Proposed View of 18.3 M ROW



Streetlight



Cycle lane

Tactile Flooring

Pavement to be done in Natural Materials such as Stone

Grating for Stormwater Drains

Tree Grating



Existing Section of ROW 18.3 M ROW



Proposed Table Top for Junction



Proposed Ramp for Individual House Entry

The following issues were observed in the typical stretch:

- Encroachment on Right of Way (ROW), designated on MPD, by vehicles, hawkers and vendors.
- Lack of proper lane division for motorized and non-motorized vehicles leading to traffic jams.
- Inadequate footpaths.
- Absence of facilities for the disabled and elderly.
- Absence of dedicated lane for cyclists.
- Lack of proper signages.

The following was proposed:

- Revised street section with proper lane division.
- Table tops for slow movement of vehicles at junctions.
- Ramps for individual house entry.
- Paving in natural materials. Tactile flooring to be integrated in footpath for assisting the blind.
- Proper signage on roads.
- Street furniture at regular intervals.



Proposed Plan of Typical Stretch

5.2.4 Kali Bari Area

Kali Bari is a temple of great importance for all the Bengalis in Delhi.

The entry to the temple is not very pleasing. It falls on an important T-junction in Chittaranjan Park, where there is an electric pole, a defunct drinking water fountain and a staircase leading to the temple. Cars are parked in front of the temple, encroaching upon the Right of Way.

To enhance the entry to the temple, it is being proposed to install a statue of 'The Son of Bengal', Deshbandhu Chittaranjan Das, in front of the temple.

Also, as the people from Bengal are known to have interest in all art forms, the same is proposed to be reflected through a mural (behind the statue on the current dead retaining wall of the temple complex). The concept development for the statue and mural is depicted in the images on the right.



Existing Plan of Kali Bari Area



Proposed Plan of Kali Bari Area



Existing



Concept for Mural



Concept Development



Proposed Mural



Existing Entry to Kali Bari Temple



Proposed Entry to Kali Bari Temple

5.2.5 Park

The zonal parks in the ward are not very well designed and in a few cases not well kept either. It was decided to take up redevelopment of the park falling in the pilot stretch as a prototype. Various issues as depicted in the images shown below were observed.

Although this park is well maintained, there are a few design related issues. There is only one entry to the park which is hidden from pedestrian walking on the main 18.3 M wide road. The boundary wall of the park is a physical and visual barrier. The play area is very restricted and in all the park is very ordinary. The footpath around the park is encroached upon by cars, hawkers and a bus stop.



The proposal, as shown in the image above, had to be sensitive towards the existing development as the park was only missing a few elements. All encroachment has been removed from the pavement and the bus stop has been re-designed. Another entry has been proposed on the 18.3 m wide road. The play area has been increased in size. The central planter is retained in the proposal while another line of plants has been added to the planter on the eastern side. A small nursery has been incorporated in the design to encourage residents to buy plants at subsidised rates for their homes to promote urban agriculture. Stepped seating and a mound have been created in the park.

Park – Boundary Wall Detail

The boundary walls of the zonal parks in the ward act as physical and visual barriers. Due to the boundary wall shown in the image on the right, the parks are not welcoming.

The boundary wall of the zonal park near Market-I lying in the pilot stretch, is proposed to be redesigned so that the park becomes more open to the residents of the ward.

The proposed boundary wall will be of low height. As per the images and sections shown below, it will act as seating and planter at the same time. It will reduce the visual and physical barrier and welcome more residents to use the park.



Boundary wall – a visual and physical barrier



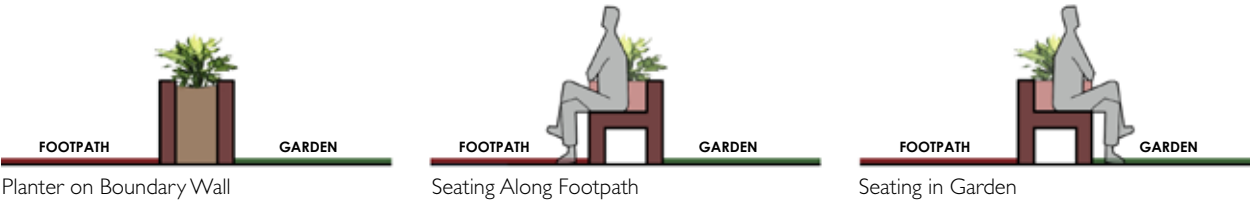
Proposed Boundary Wall



Seating along Footpath



Seating in Garden



Park Edge



Existing



Proposed

Park Edge

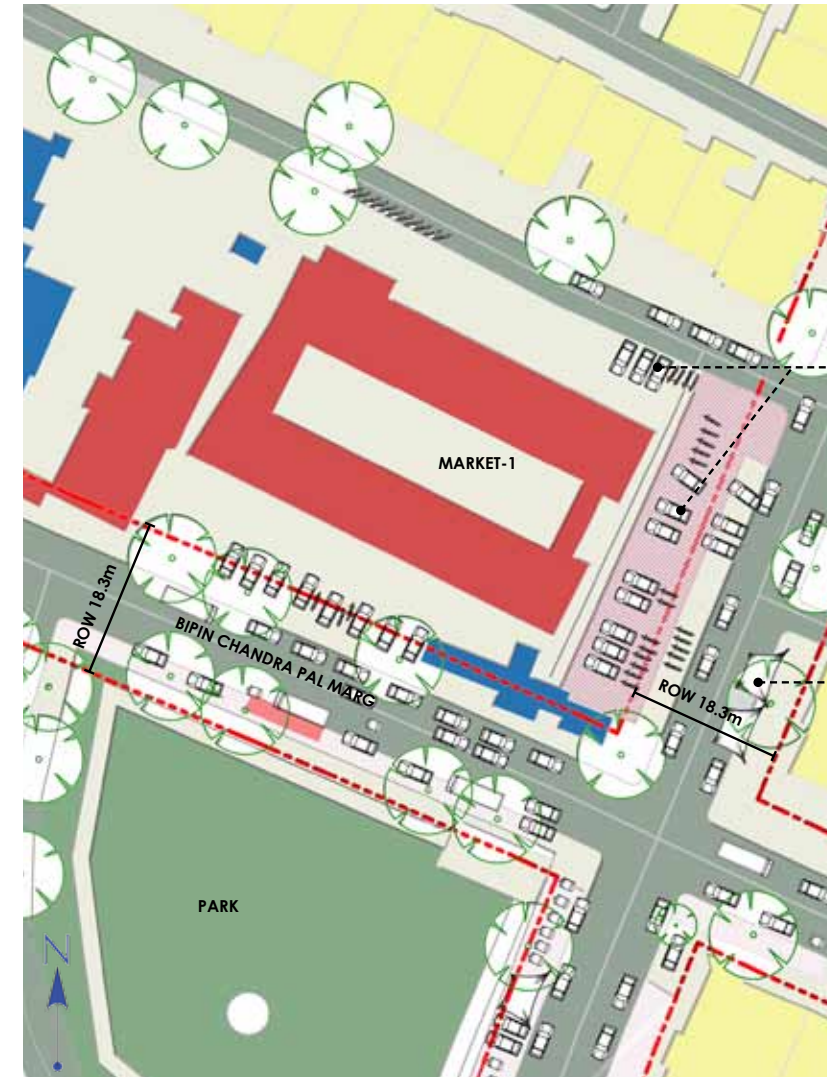


Existing



Proposed

5.2.6 Market-I



Existing Plan of Market-I



Parking in Front of Market-I



Hawkers Opposite Market-I

Market-I in Chittaranjan Park is one of the four local shopping centres of the area. It is opposite the zonal park. People from all around Delhi visit this market for its freshwater fish and traditional Bengali sweets. Thus, the foot-fall in the market is quite high. Various issues related to the market and its surroundings are listed below:

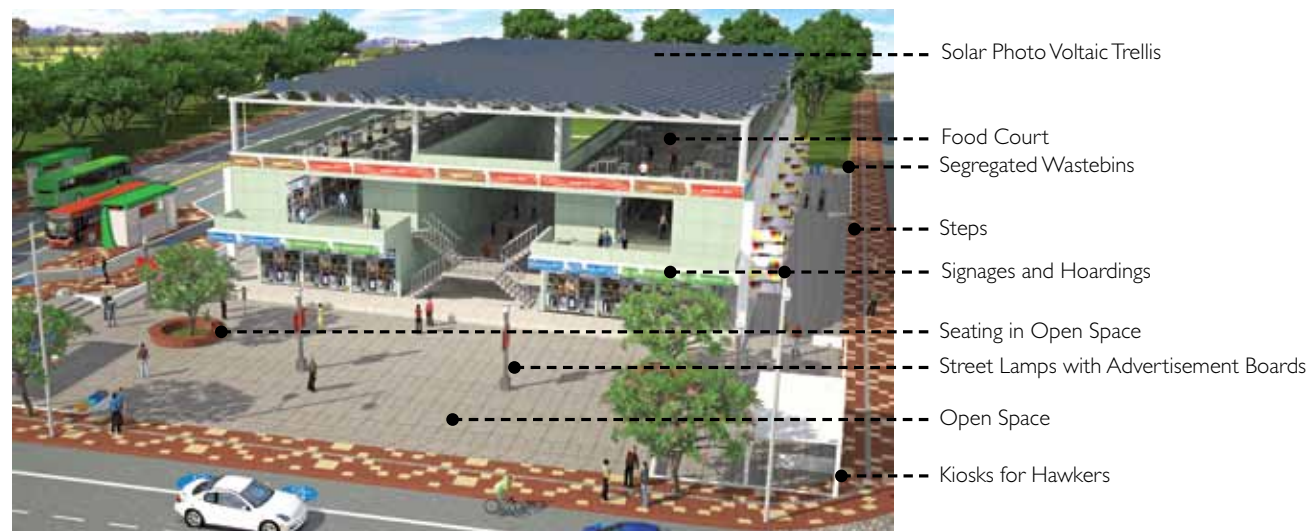
- There is no parking space in and around the market.
- The plethora of hoardings/banners is aesthetically unappealing.
- There is no designated time and place for loading and unloading of goods in the market, which causes a lot of traffic congestion.
- Absence of a proper bus stop (designated in MPD)
- No provision for solid-waste management in and around the market.



Plethora of signages



Proposed plan for Market-I



Proposed view of Market-I

As part of the design proposal, the following changes have been proposed around the market area:

- Proper steps and ramp for better approach to the market.
- Designated cycle stands and vehicular parking.
- Façade control: designated space for hoardings/banners and signages for easy directions and legibility
- Proper seating space, segregated wastebins in open spaces in the market area,
- Kiosks are proposed in the market for relocation of vendors and hawkers who otherwise encroach upon footpaths.
- Redesigning of junction, street cross section and bus stops.
- Photo voltaic panels (generating 100 KVA) on terrace.
- Food court under the solar photo voltaic trellis.



Existing View of Market-I



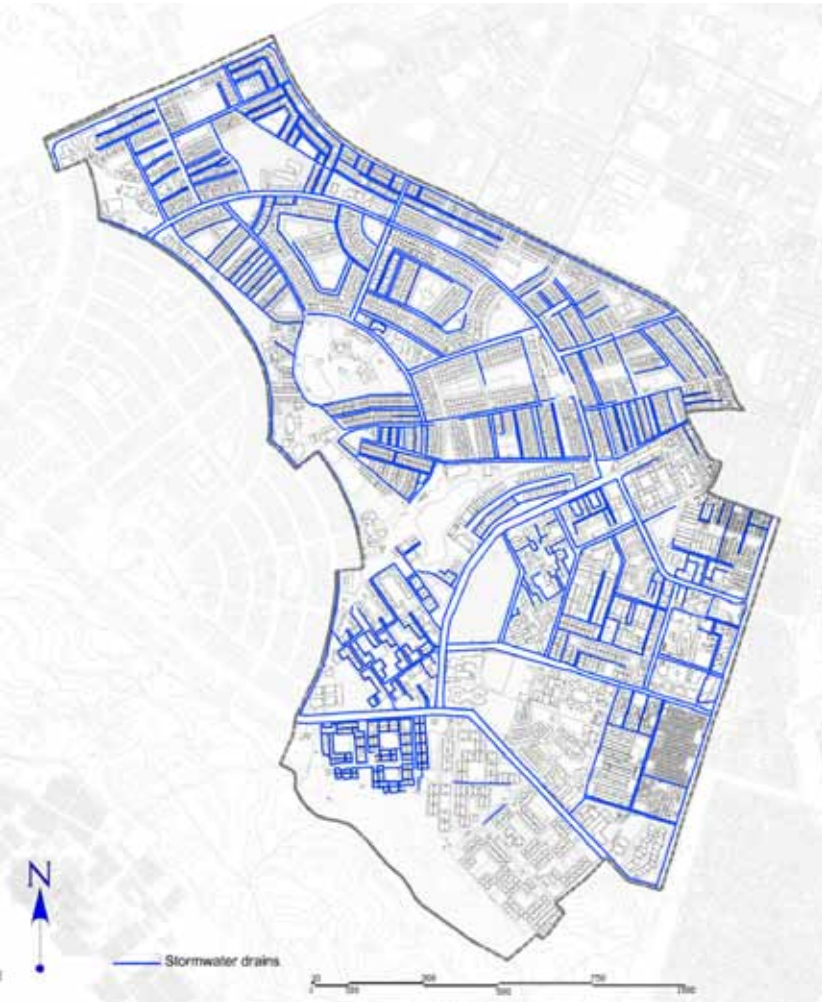
Proposed View of Market-I

5.3 Stormwater Management

Thorough analysis of the stormwater management system in the ward was conducted. As part of the existing strategy, stormwater from all hard surfaces flows into the ward level stormwater drains which further connect to the city level drains.

As there is no grating on drain inlets and de-silting chambers, silt, leaves and a lot of garbage flows directly into the stormwater drains. This drains get clogged due to garbage and silt and results in water overflowing on to streets. Cleaning these drains is a tedious process as the whole length of the drain needs to be cleaned.

As is visible from the images on the right, the drains in the ward are in a very bad state. They are not being maintained and cleaned regularly. Also, as they are not cleaned before the monsoon season, there is a major problem of waterlogging on the streets which causes traffic jams and accidents. The condition of the drains can also result in health problems.



Stormwater Drains



Condition of Stormwater Drain



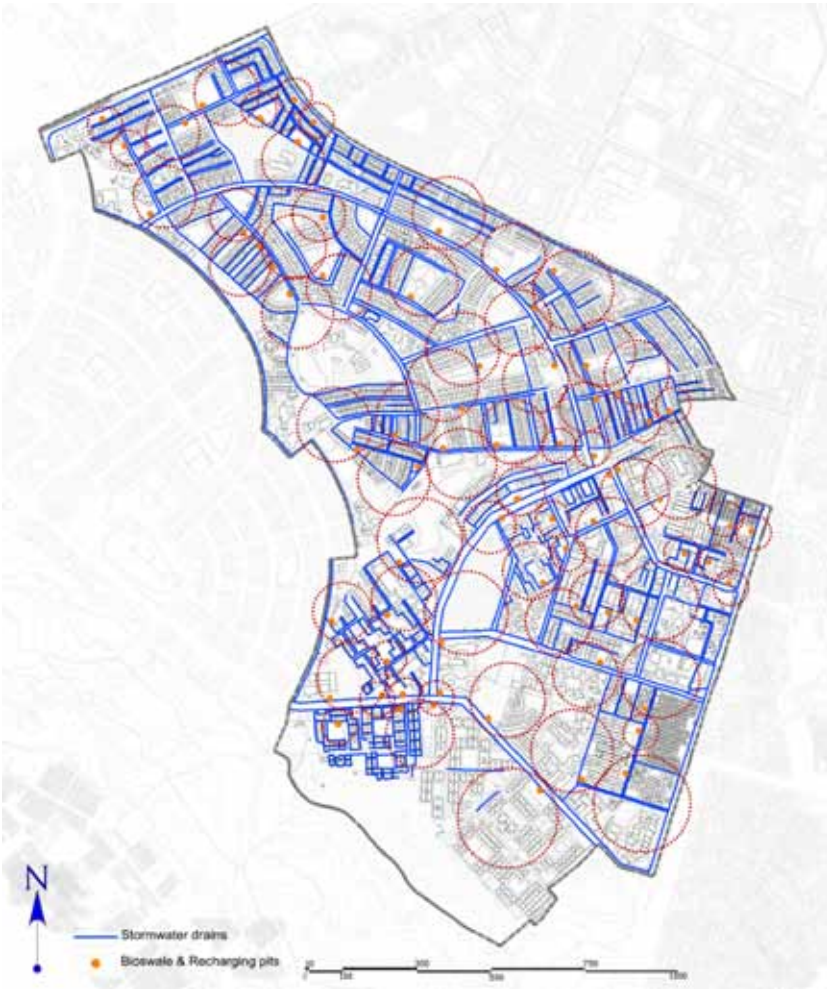
Clogged Stormwater Drain



Condition of Stormwater Drain



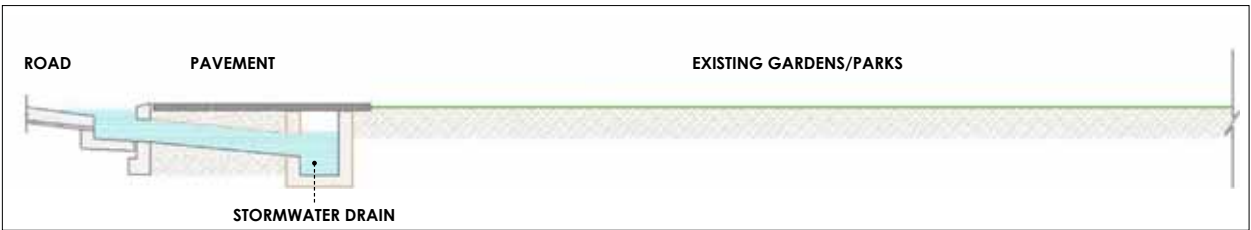
Water Overflowing on Streets



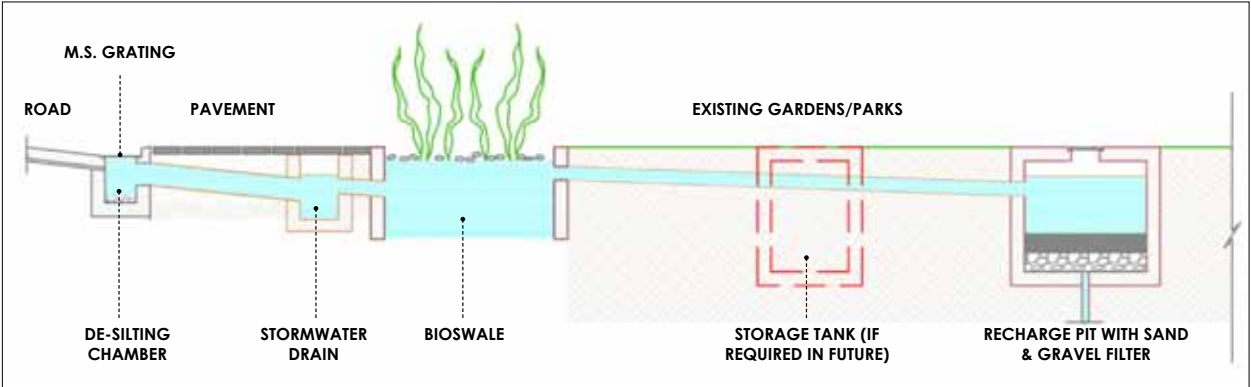
Location of Bioswales & Catchment Zones

Strategy for stormwater management in the ward:

- Based on natural topography, catchment zones will have to be identified.
- The parks and green strips in the ward can have bioswales and recharging pits which will receive water from all hard paved areas in the ward.
- The stormwater will flow into the de-silting chamber with grating, where the silt settles down and can be easily cleaned regularly. As the chamber has a grating over it, the other waste like leaves etc. will not go into the drain.
- From the stormwater drain, the water will flow into a bioswale (located in parks and green strips), where it will be retained and infiltrated.
- This water can then be recharged into the ground.
- In case of space constraints, the water from the drain can directly flow into the recharging pit.
- This would allow stormwater to be managed within each locality of a ward, with complete stormwater management within a ward.



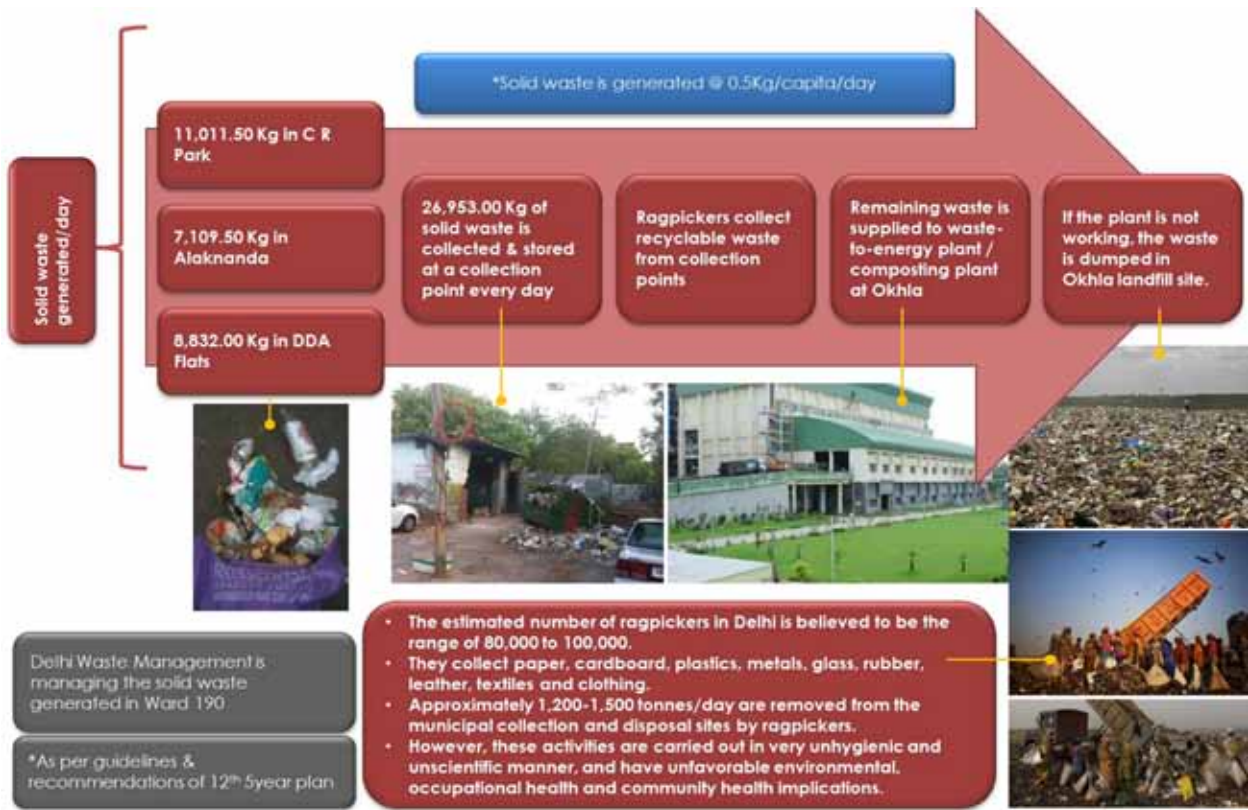
Existing Strategy for Stormwater Management



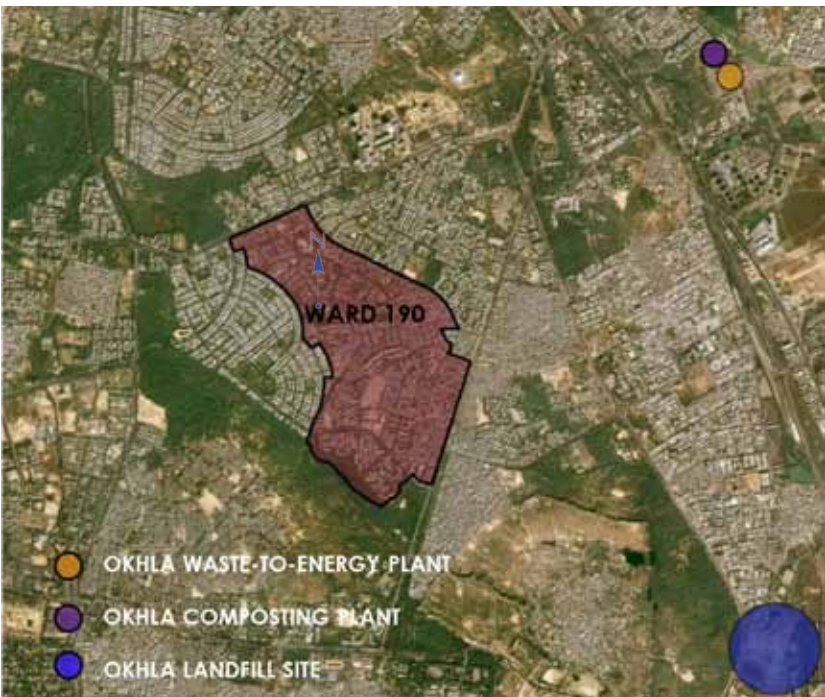
Proposed Strategy for Stormwater Management

5.4 Solid-Waste Management

About 27,444.00 kg of solid-waste is collected from all households in Ward 190 and stored in dhalaos/dustbins. The stored waste is transferred from these collection points to Okhla. Waste-to-energy plant and composting plant daily. In case, the plant is not working, the waste is taken to Okhla landfill site. The flow-chart shown above depicts this existing strategy of solid-waste disposal in the ward.



Existing Strategy for Solid-Waste Disposal in Ward 190



Location of Okhla Waste-To-Energy, Composting Plant and Landfill Site with respect to the Ward



Existing location of Dhalaos and dustbins



Condition of Dhalaos in Ward 190



Proposed Strategy for Solid-Waste Disposal



Steps Involved in Proposed Strategy for Solid-Waste Disposal

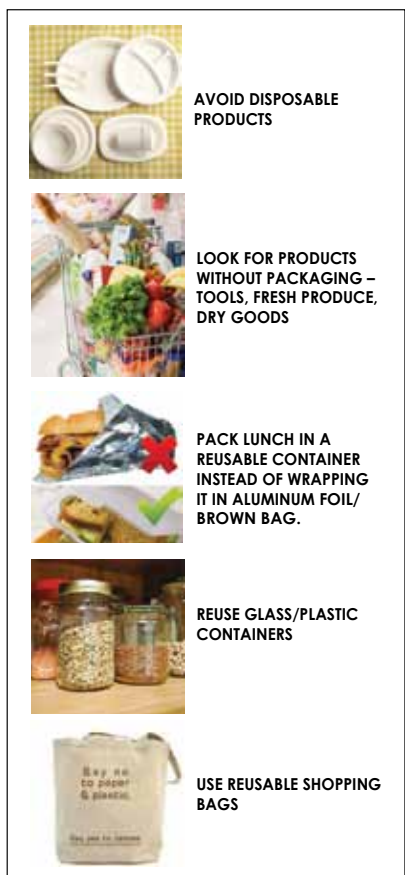
The proposed strategy for solid-waste management will be based on the principles of 3 Rs – Reduce, Reuse, Recycle.

Solid-waste management is a step-by-step process and each step holds equal importance.

As the first step, it is essential to reduce waste generation. Various ways in which waste reduction can be achieved is depicted in the images on the right.

The next step is to segregate waste which can be achieved by keeping colour-coded segregated wastebins. Storage and collection of this waste from households should be done in segregated chambers. The waste can then be transported and treated to be reused or recycled according to its category.

The complete process from segregation to resource recovery is depicted in the image on the extreme right.



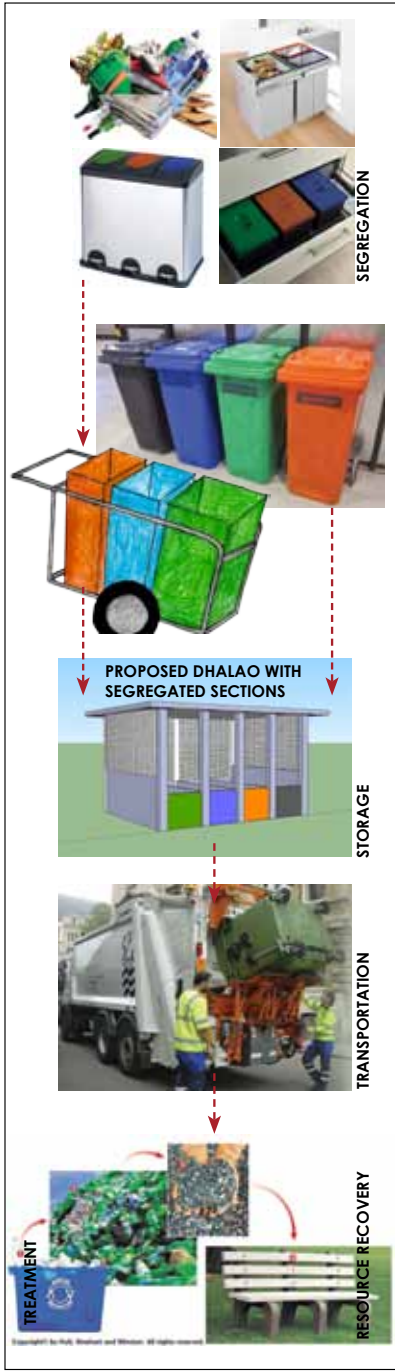
Reduce Waste Generation



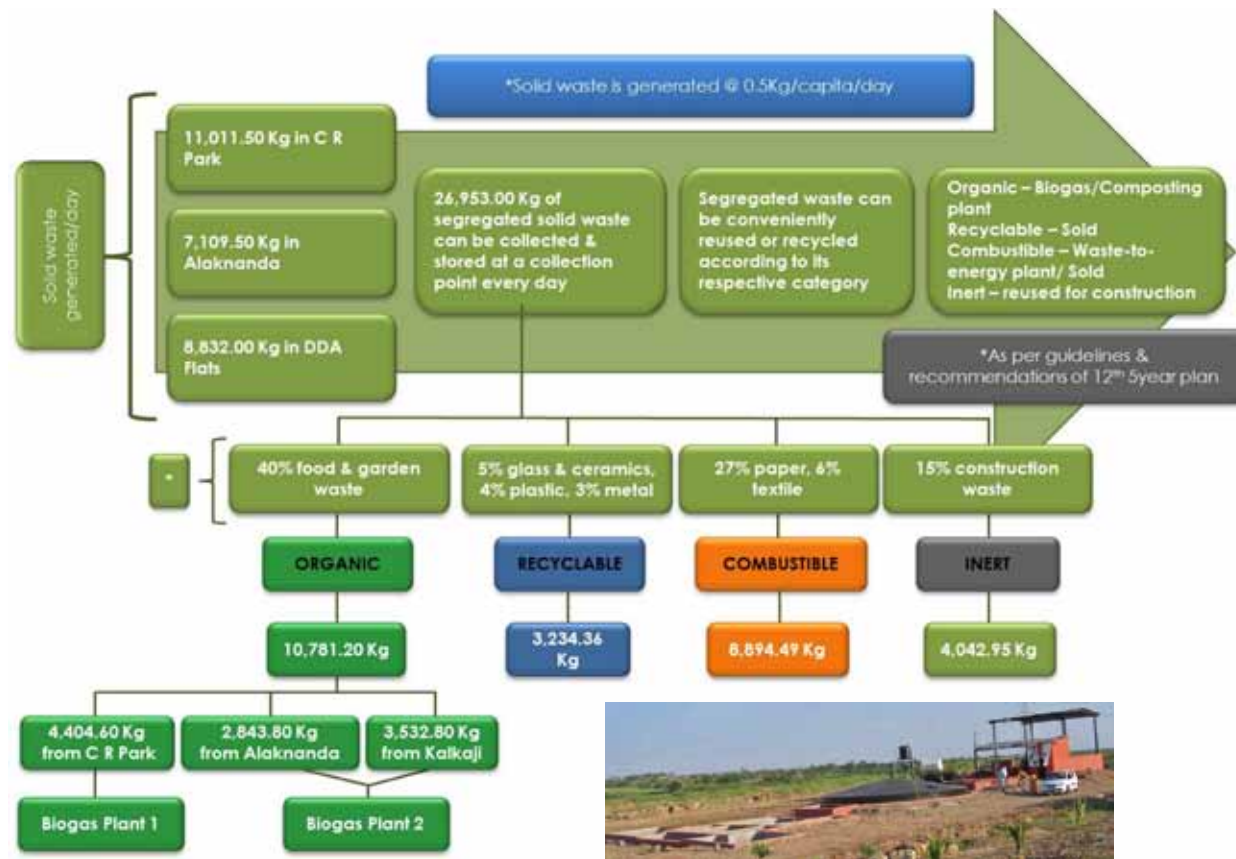
Waste Category



Resource Recovery



Proposed Process for Solid-Waste Disposal



Proposed Strategy for Solid-Waste Disposal in Ward 190

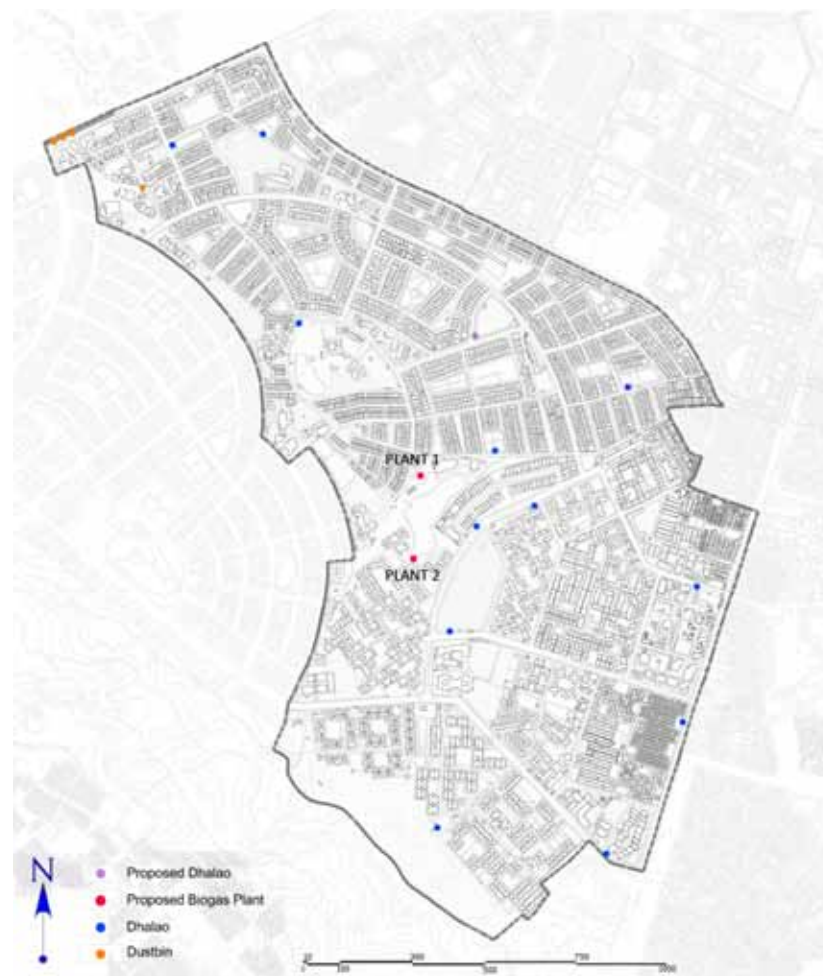
The flow chart shown above depicts the proposed strategy for solid-waste disposal in the ward.

The waste will be segregated at source, collected and stored in separate chambers in the dhalao. This segregated waste can be conveniently reused or recycled according to its respective category. The recycled waste can be sold in the market, combustibles can be sent to waste-to-energy plants and the inert can be reused for construction.

For treating the organic waste generated in the ward, 2 biogas plants are being proposed in the ward itself. The energy generated can be used for street lighting in the ward, while compost, a by-product, can be used for landscaping.

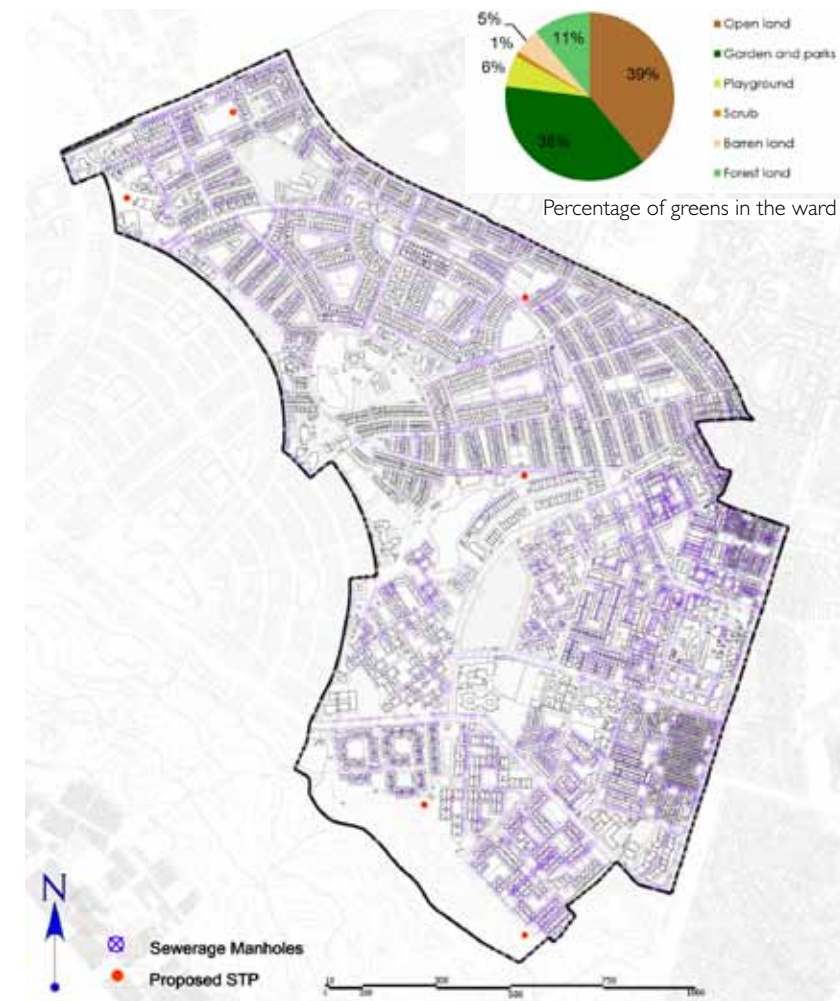
In Pune, 5 pilot biogas plants are already operational and 20 more are being implemented around the city.

Each plant takes 5 TPD of organic waste and converts it to 400 M³ of biogas i.e. 400 kwh of energy. Each plant requires 6,000 sq. ft. for installation.

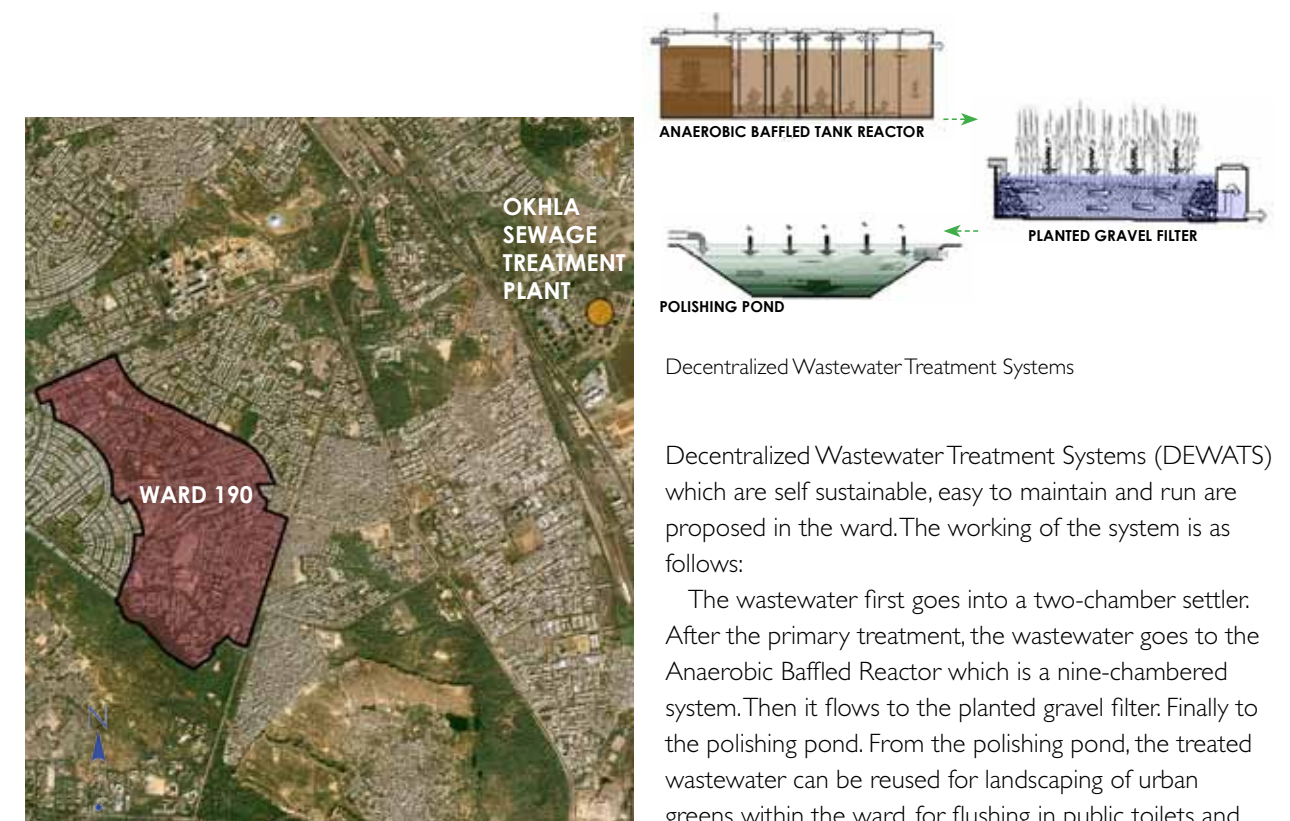


Proposed Location of Dhalao & Biogas Plants

5.5 Wastewater Management



Existing Sewerage Manholes & Proposed STP Locations



Okhla Sewage Treatment Plant with respect to Ward

At present, all wastewater generated in the ward flows into the city level Okhla Sewage Treatment Plant (STP).

It is possible that the wastewater generated in the ward can be treated in the ward itself and can be used for landscaping, washing roads, car washing etc.

Treated wastewater that can be generated from all dwelling units = 4,139,980.80 Lit.

Area of gardens, parks & playgrounds = 408,062.50 M²

Water required for landscaping (@ 5Lit./M²/day) = 2,040,312.50 Lit./day

Adding 10% extra for other requirements = 2,244,343.75 Lit./day

For meeting the above water requirements, 54% of the wastewater needs to be treated in the ward itself.

It is possible to install 6 sewage treatment plants on site and each of them can treat approximately 374.60 M³ of wastewater.

Area requirement for each STP (@ 7 M²/M³ of wastewater) = 2,618.40 M²

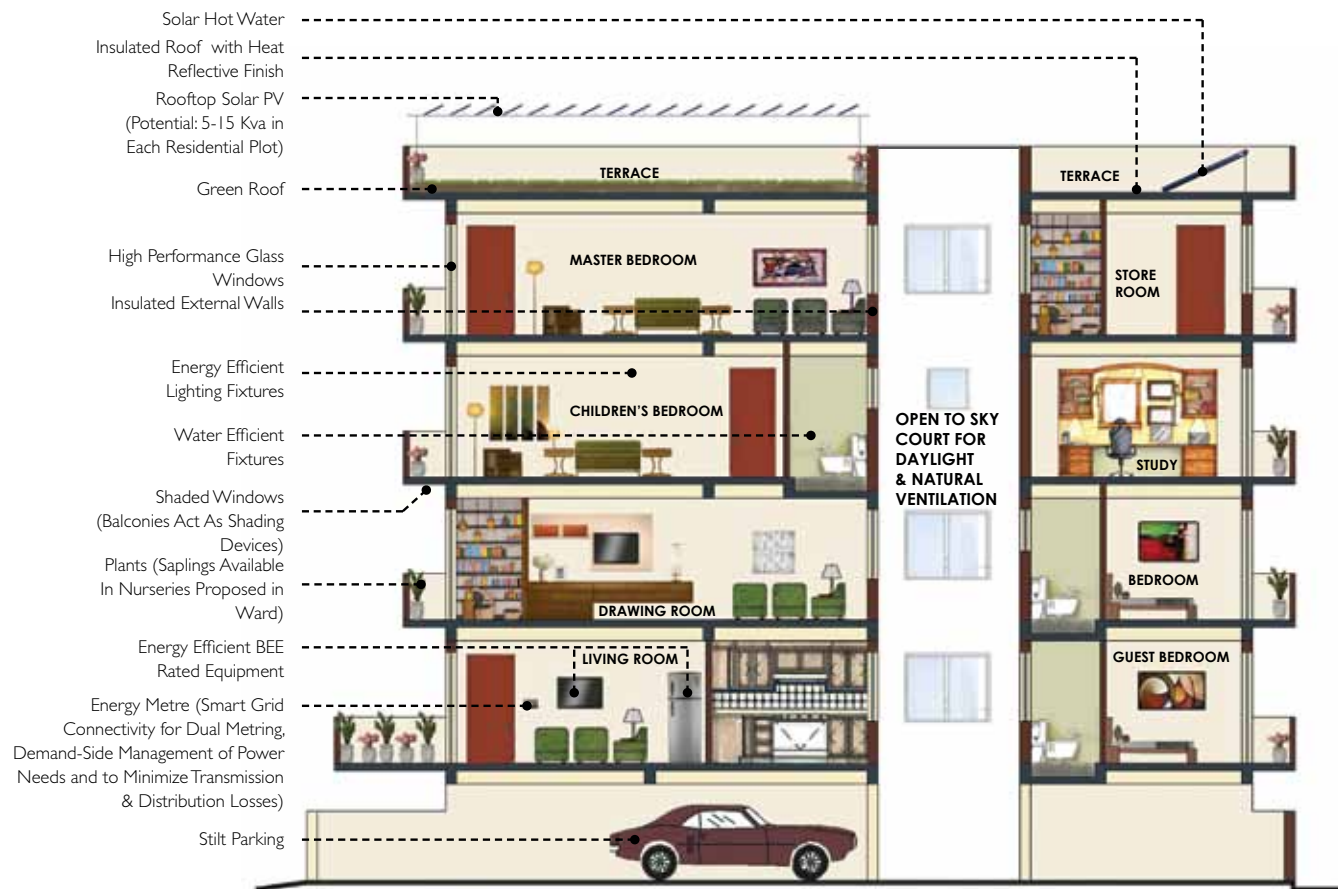
5.6 Energy Efficiency & Renewable Energy

It is proposed that energy efficiency and renewable energy is adopted at every dwelling unit and household.

Whenever residents of Ward 190 either build from scratch or renovate their houses, basic green building guidelines should be followed.

The images on the right show the various elements that help in reducing the load of the building, thus making it energy efficient.

The image shown below depicts the typical section for proposed residential buildings in the ward. These buildings will be compliant with energy efficiency codes and mandates.



Typical Section for Proposed Residential Buildings in Ward (Compliant with Energy Efficiency Codes & Mandate)

5.7 Eco-Theme Park



Location of Jahanpanah Park



Images of Jahanpanah Park

The existing Jahanpanah Park is at a central location in Ward 190 and has the potential to be developed into a major activity park for the community. Currently it comprises a jogging track and some random plantation.

It is being proposed that the existing park can be converted into an Eco-Theme Park. This project will be one of a kind in the country which can display various sustainability solutions like energy conservation, solid-waste, stormwater and wastewater management that are a part of the proposal for Ward 190.

This park will help in educating the community about sustainable practices.



Existing Jahanpanah Park



Concept for Jahanpanah park



Design Proposal for Jahanpanah Park

The Eco-Theme Park will be designed with 2 biogas plants, 1 Decentralized Wastewater Treatment Systems (DEWATS), activity areas for children, workshops for all age groups, a nursery, weather and air quality assessment equipment.

The currently defunctional Chanderlok cinema hall is proposed to be converted into an Information & Audio-Visual Centre. In this building, it is also proposed to add a business centre for promotion of ICT (Internet communication technology) for reducing travel and carbon footprint.

The activity areas will be designed on the principles of "Learning with Fun" to inculcate sustainable practices by practical demonstration.

The 2 biogas plants will convert organic waste generated in the ward to electricity and compost to be used within the ward.

Instead of a mechanically run Sewage Treatment Plant (STP), a Decentralized Wastewater Treatment Systems (DEWATS) is proposed in the park. This pilot project will act as a prototype for the development of other similar systems in the future.

6.1. Urban Environmental Accords

Signed on occasion of United Nations Environment Programme World Environment Day
June 5th, 2005 in San Francisco, California

Energy: Renewable Energy | Energy Efficiency | Climate Change

- Action 1** Adopt and implement a policy to increase the use of renewable energy to meet ten percent of the city's peak electrical load within seven years.
- Action 2** Adopt and implement a policy to reduce the city's peak electric load by ten percent within seven years through energy efficiency, shifting the timing of energy demands, and conservation measures.
- Action 3** Adopt a citywide greenhouse gas reduction plan that reduces the jurisdictions emissions by twenty five percent by 2030, and which includes a system for accounting and auditing greenhouse gas emissions.

Waste Reduction: Zero Waste | Manufacturer Responsibility | Consumer Responsibility

- Action 4** Establish a policy to achieve zero waste to landfills and incinerators by 2040.
- Action 5** Adopt a citywide law that reduces the use of a disposable, toxic or non-renewable product category by at least percent in seven years.
- Action 6** Implement "user-friendly" recycling and composting programs, with the goal of reducing by twenty percent per capita solid-waste disposal to landfill and incineration in seven years.

Urban Design: Green Building | Urban Planning | Slums

- Action 7** Adopt a policy that mandates a green building rating system standard that applies to all new municipal buildings.
- Action 8** Adopt urban planning principles that advance higher density, mixed use, walkable, bikeable and disabled-accessible neighborhoods which coordinate land use and transportation with open space systems for recreation and ecological restoration.
- Action 9** Adopt a policy or implement a program that creates environmentally beneficial jobs in slums and/or low-income neighborhoods.

Urban Nature: Parks | Habitat Restoration | Wildlife

- Action 10** Ensure that there is an accessible park or recreational open space within half-a-kilometer of every city resident by 2015.
- Action 11** Conduct an inventory of existing canopy coverage in the city; and then establish a goal based on ecological and community considerations to plant and maintain canopy coverage in not less than fifty percent of all available sidewalk plating sites.
- Action 12** Pass legislation that protects critical habitat corridors and other key habitat characteristics (e.g. water features, food bearing plants, shelter for wildlife, use of native species, etc.) from unsustainable development.

Transportation: Public Transportation | Clean Vehicles | Reducing Congestion

- Action 13** Develop and implement a policy which expands affordable public transportation coverage to within half-a-kilometer of all city residents in ten years.
- Action 14** Pass a law or implement a program that eliminates leaded gasoline (where it is still used); and that phases down sulfur levels in diesel and gasoline fuels, concurrent with using advanced emission controls on all buses, taxis, and public fleets to reduce particulate matter and smog-forming emissions from those fleets by fifty percent in seven years.
- Action 15** Implement a policy to reduce the percentage of commute trips by single occupancy vehicles by ten percent in seven years.

Environmental Health: Toxics Reduction | Healthy Food Systems | Clean Air

- Action 16** Every year, identify one product, chemicals, or compounds that is used within the city that represents the greatest risk to human health and adopt a law to provide incentives to reduce or eliminate its use by the municipal government.
- Action 17** Promote the public health and environmental benefits of supporting organic foods. Ensure that twenty percent of all city facilities (including schools) serve locally grown and organic food within seven years.
- Action 18** Establish an Air Quality Index (AQI) to measure the level of air pollution and set the goal of reducing by ten percent in seven years the number of days categorized in the AQI range as "unhealthy" to "hazardous."

Water: Water Access & Efficiency | Source Water Conservation | Waste Water Reduction

- Action 19** Develop policies to increase adequate access to safe drinking water, aiming at access for all by 2015. For cities with potable water consumption greater than 100 liters per capita per day, adopt and implement policies to reduce consumption by ten percent by 2015.
- Action 20** Protect the ecological integrity of the city's primary drinking water sources (i.e. aquifers, rivers, lakes, wetlands and associated eco-systems).
- Action 21** Adopt municipal wastewater management guidelines and reduce the volume of untreated wastewater discharge by ten percent in seven years through the expanded use of recycled water and the implementation of sustainable urban watershed planning process that includes participants of all affected communities and is based on sound economic, social, and environmental principles.

6.2. Existing Frameworks for Streetscaping - NUTP, MPD-2021

Source: UTTIPEC Streetscape Guidelines 2010

A. National Urban Transport Policy 2006 recommends ensuring safe, affordable, quick, comfortable, reliable and sustainable access for the growing number of city residents to jobs, education, recreation and other such needs within our cities. This is sought to be achieved by:

- Incorporating urban transportation as an important parameter at the urban planning stage rather than being a consequential requirement.
- Encouraging integrated land use and transport planning in all cities so that travel distances are minimized and access to livelihoods, education and other social needs, especially for the marginal segments of the urban population, is improved.
- Improving access of business to markets and the various factors of production.
- Bringing about a more 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 financial assistance for this purpose.
- Enabling the establishment of quality focused multi-modal public transport systems that are well integrated, providing seamless travel across modes.
- Establishing effective regulatory and enforcement mechanisms that allow a level playing field for all operators of transport services, and enhanced safety for the transport system users.
- Establishing institutional mechanisms for enhanced coordination in the planning and management of transport systems.
- Introducing intelligent transport systems for traffic management.
- Addressing concerns of road safety and trauma response.
- Reducing pollution levels through changes in travelling practices, better enforcement, stricter norms, technological improvements, etc.
- Building capacity (institutional and man power) to plan for sustainable urban transport and establishing knowledge management system that would service the needs of all urban transport professionals, such as planners, researchers, teachers, students, etc.
- Promoting the use of cleaner technologies.
- Raising finances through innovative mechanisms that tap land as a resource for investments in urban transport infrastructure.
- Associating the private sector in activities where their strengths can be beneficially tapped.
- Taking up pilot projects that demonstrate the potential of the best possible practices in sustainable urban transport.

B. Current Indian Road Congress for pedestrian and cycle track design provides basic standards for pedestrian and cycle design, but need more augmentation.

C. Master Plan of Delhi 2021 specifications:

- 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 extensions, 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/Trans- Yamuna area, the use of cycle rickshaws as a non- motorized mode of transport should be consciously planned along with pedestrianisation.
- On all roads the ROW greater than 30 m, exclusive bus lanes will be planned to implement the Bus Transit System (BRTS) in a phased manner to cover the whole city.

D. EPCA, 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 transition to public transport and adopt it."

6.3. Wastewater and Solid-Waste Calculations

Colony	Block	Population		Wastewater			
				Water usage @ 120 l per capita per day	Wastewater generated (80% of water used)	Treated Wastewater (80% of wastewater generated)	Reusable water
C R Park	Pocket A	990.00	22023.00	118800.00	95040.00	76032.00	1691366.40
	Pocket B	2531.00		303720.00	242976.00	194380.80	
	Pocket C	1012.00		121440.00	97152.00	77721.60	
	Pocket D	1589.00		190680.00	152544.00	122035.20	
	Pocket E	1746.00		209520.00	167616.00	134092.80	
	Pocket F	961.00		115320.00	92256.00	73804.80	
	Pocket G	1915.00		229800.00	183840.00	147072.00	
	Pocket H	1957.00		234840.00	187872.00	150297.60	
	Pocket I	1769.00		212280.00	169824.00	135859.20	
	Pocket J	1497.00		179640.00	143712.00	114969.60	
	Pocket K	2397.00		287640.00	230112.00	184089.60	
	Pocket K1	139.00		16680.00	13344.00	10675.20	
	Pocket L	32.00		3840.00	3072.00	2457.60	
	Pocket M	453.00		54360.00	43488.00	34790.40	
	Pocket N	125.00		15000.00	12000.00	9600.00	
	Pocket O	1091.00		130920.00	104736.00	83788.80	
	Pocket P	929.00		111480.00	89184.00	71347.20	
	Block 56	309.00		37080.00	29664.00	23731.20	
	Block 48	392.00		47040.00	37632.00	30105.60	
	Block 88	189.00		22680.00	18144.00	14515.20	
Kalkaji DDA Flats	A	1373.00	17664.00	164760.00	131808.00	105446.40	1356595.20
	B	1277.00		153240.00	122592.00	98073.60	
	C	1586.00		190320.00	152256.00	121804.80	
	D	1174.00		140880.00	112704.00	90163.20	
	J1	2942.00		353040.00	282432.00	225945.60	
	J2	1296.00		155520.00	124416.00	99532.80	
	J3	2194.00		263280.00	210624.00	168499.20	
	J4	1310.00		157200.00	125760.00	100608.00	
	L1	2748.00		329760.00	263808.00	211046.40	
	L2	1764.00		211680.00	169344.00	135475.20	
	DDA Flats	0.00		0.00	0.00	0.00	
Alaknanda	Mandakini Enclave + Mandakini Housing Soc.	4398.00	14219.00	527760.00	422208.00	337766.40	1092019.20
	Shivalik Apts	690.00		82800.00	66240.00	52992.00	
	Aravali Apts	1517.00		182040.00	145632.00	116505.60	
	Ganga Apts	320.00		38400.00	30720.00	24576.00	
	Yamuna Apts	581.00		69720.00	55776.00	44620.80	
	Kaveri Apts	372.00		44640.00	35712.00	28569.60	
	Godavari Apts	547.00		65640.00	52512.00	42009.60	
	Tara Apts	418.00		50160.00	40128.00	32102.40	
	Narmada Apts	1375.00		165000.00	132000.00	105600.00	
	Nilgiri Apts	1637.00		196440.00	157152.00	125721.60	
	Gangotri Enclave + Apts	2364.00		283680.00	226944.00	181555.20	
Total		53906.00					4139980.80

Solid Waste		Organic Waste		Recyclable Waste			Combustible Waste		Inert Waste
Solid waste generated @ 0.5Kg per capita per day		Food+Garden waste (40%)	For Composting/Biogas Plant	Glass+Ceramics (5%)	Metal (3%)	Plastic (4%)	Textile (6%)	Paper (27%)	Inert (15%)
495.00	11011.50	198.00	4404.60	24.75	14.85	19.80	29.70	133.65	74.25
1265.50		506.20		63.28	37.97	50.62	75.93	341.69	189.83
506.00		202.40		25.30	15.18	20.24	30.36	136.62	75.90
794.50		317.80		39.73	23.84	31.78	47.67	214.52	119.18
873.00		349.20		43.65	26.19	34.92	52.38	235.71	130.95
480.50		192.20		24.03	14.42	19.22	28.83	129.74	72.08
957.50		383.00		47.88	28.73	38.30	57.45	258.53	143.63
978.50		391.40		48.93	29.36	39.14	58.71	264.20	146.78
884.50		353.80		44.23	26.54	35.38	53.07	238.82	132.68
748.50		299.40		37.43	22.46	29.94	44.91	202.10	112.28
1198.50		479.40		59.93	35.96	47.94	71.91	323.60	179.78
69.50		27.80		3.48	2.09	2.78	4.17	18.77	10.43
16.00		6.40		0.80	0.48	0.64	0.96	4.32	2.40
226.50		90.60		11.33	6.80	9.06	13.59	61.16	33.98
62.50		25.00		3.13	1.88	2.50	3.75	16.88	9.38
545.50		218.20		27.28	16.37	21.82	32.73	147.29	81.83
464.50		185.80		23.23	13.94	18.58	27.87	125.42	69.68
154.50		61.80		7.73	4.64	6.18	9.27	41.72	23.18
196.00		78.40		9.80	5.88	7.84	11.76	52.92	29.40
94.50		37.80		4.73	2.84	3.78	5.67	25.52	14.18
686.50	8832.00	274.60	3532.80	34.33	20.60	27.46	41.19	185.36	102.98
638.50		255.40		31.93	19.16	25.54	38.31	172.40	95.78
793.00		317.20		39.65	23.79	31.72	47.58	214.11	118.95
587.00		234.80		29.35	17.61	23.48	35.22	158.49	88.05
1471.00		588.40		73.55	44.13	58.84	88.26	397.17	220.65
648.00		259.20		32.40	19.44	25.92	38.88	174.96	97.20
1097.00		438.80		54.85	32.91	43.88	65.82	296.19	164.55
655.00		262.00		32.75	19.65	26.20	39.30	176.85	98.25
1374.00		549.60		68.70	41.22	54.96	82.44	370.98	206.10
882.00		352.80		44.10	26.46	35.28	52.92	238.14	132.30
0.00		0.00		0.00	0.00	0.00	0.00	0.00	0.00
2199.00	7109.50	879.60	2843.80	109.95	65.97	87.96	131.94	593.73	329.85
345.00		138.00		17.25	10.35	13.80	20.70	93.15	51.75
758.50		303.40		37.93	22.76	30.34	45.51	204.80	113.78
160.00		64.00		8.00	4.80	6.40	9.60	43.20	24.00
290.50		116.20		14.53	8.72	11.62	17.43	78.44	43.58
186.00		74.40		9.30	5.58	7.44	11.16	50.22	27.90
273.50		109.40		13.68	8.21	10.94	16.41	73.85	41.03
209.00		83.60		10.45	6.27	8.36	12.54	56.43	31.35
687.50		275.00		34.38	20.63	27.50	41.25	185.63	103.13
818.50		327.40		40.93	24.56	32.74	49.11	221.00	122.78
1182.00		472.80		59.10	35.46	47.28	70.92	319.14	177.30
26953.00	26953.00	10781.20	10781.20	1347.65	808.59	1078.12	1617.18	7277.31	4042.95

