

# CITYNET SPONSORED PROJECT



## TRANSIT CORRIDOR DEVELOPMENT FRAMEWORK AND GUIDING PRINCIPLES



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## Contents

Sr.No.	Title	Page No.
<b>1</b>	<b>Chapter 1: Introduction of the Project</b>	
1.1	The Context	1
1.2	Introduction to Transit Corridor Development	1
1.3	The study	2
1.4	Objectives	3
1.5	Scope and limitations	3
1.6	Methodology	3
<b>2</b>	<b>Chapter 2: Transit Corridor Development- A Theoretical Framework</b>	
2.1	Evolution of the TOD concept	6
2.2	Transit Oriented Development	6
2.3	Transit Corridor Development	7
2.4	Transit Corridor Development , and Affordable housing	10
<b>3</b>	<b>Chapter 3: Transit Corridor Development– International experiences</b>	
3.1	The United States experience	12
3.2	TOD in Australia	16
3.3	Hong Kong Model	17
3.4	Brazil and TCD	19
3.6	Learning’s from the international experiences	20
<b>4</b>	<b>Chapter 4: Transit Oriented Development and Affordable Housing in India</b>	
4.1	Transit Corridor Development in India	24
4.2	Housing Shortage in India	25
4.3	TCD in affordable housing	26
<b>5</b>	<b>Chapter 5: Transit Corridor Development and Affordable Housing in Delhi</b>	
5.1	Delhi in its developmental context	27
5.2	Need for affordable housing in Delhi	28
5.3	The MRTS network	29
5.4	TOD in Delhi – The policy framework	32
5.5	Influence Zones	33
5.6	Planning of the TOD Areas	34
5.6.1	<i>Provisions under DDA’s TOD policy</i>	34
5.6.2	<i>The components of a TOD under DDA policy</i>	35
5.7	Transit Corridors proposed in Delhi	36
5.8	Implementation of the TOD policy	36
5.9	Densification and provision of Affordable housing in TOD influence zones in Delhi	37
5.10	TOD at Karkardooma and Trilokpuri	40
5.10.1	<i>Karkardooma TOD</i>	40
5.10.2	<i>Sanjay Lake TOD</i>	42
5.11	TOD policy of Delhi – A critique	43
<b>6</b>	<b>Chapter 6: Assessment of Potential for Densification along Transit Corridors in Delhi</b>	
6.1	Case Study Area 1: Influence zone between Moti Bagh To Bhikaji Cama Place metro stations	47
6.2	Case study Area 2: Influence zone between Lajpat Nagar & Moolchand metro stations	57



6.3	Potential for Densification in the Case Study Stretches – A Comparative Analysis	59
<b>7</b>	<b>Chapter 7: Transit Corridor Development and inclusion of affordable housing: formulation of guiding principles and key strategies</b>	
7.1	Evaluation of potential for densification	64
7.2	Principles and strategies for densification along the transit corridor	66
7.3	Tool for provision of affordable housing in Transit Corridors.	73
	References	73



## List of figures and photos

Figure No.	Title	Page No.
1	Methodology	4
2	Example of TOD	6
3	Mass Transt System in Denver City, Colorado (USA)	13
4	Mass Transit System in Austin (Texas, USA)	13
5	Portland City (Oregon, USA)	14
6	Perth, Australia	16
7	Mass Transit System in Gold Cost	17
8	Influence Zone Delineation in Delhi	29
9	Concept View of Proposed Karkardooma TOD	40
10	Concept Section of Proposed Karkardooma TOD	38
11	Concept View of Proposed Sanjay Lake TOD	40
12	The ongoing construction of Motibagh Metro Station	45
13	The ongoing construction of Bhikaji Cama Place Metro Station	45
14	Influence Zone Delineation	46
15	Informal market along the access street of Jhuggis	47
16	Existing landuse of the Case Study Area-1	47
17	Existing building heights in Case Study Area-1	49
18	Existing building heights in Govt. Colonies near Mohammadpur Village	49
19	Exisitng building heights in Mohammadpur Village	49
20	Highrise commercial hub at Bhikaji Cama Place	52
21	Delineation of Influence Zone	58

## List of Tables

Table No.	Title	Page No.
1	Housing shortage in India	24
2	Affordable housing by MHUPA, 2008	25
3	Affordable housing by MHUPA, 2011	25
4	Extents of influence zone delineation	33
5	Permissible Fars and Densities	38
6	Density analysis of the Case Study Area- 1	51
7	Comparative analysis of Case Study areas	59
8	Assessment of densification potential using various density scenarios	61
9	Assessment of potential for EWS housing using various scenarios	62
10	Assessment of Potential for Housing Using Optimization Scenarios	63
11	Assessment of Potential for Housing per Hectare of Redevelopment	66



## List of Maps

Map No.	Title	Page No.
1	MRTS network in Delhi	26
2	Influence zones of metro stations along Metro corridors	33
3	Transit corridors in Delhi identified by DDA	36
4	Location of Proposed TOD near Karkardooma metro Station	37
4	Location of Proposed Sanjay Lake TOD Area	40
5	Landuse at Proposed Sanjay Lake TOD	40
6	Location of Case Study Area-1	44
7	The Transit Corridor Stretch selected for Case Study Area-1	46
8	Master Plan showing landuse of Case Study Area-1	47
9	Map showing existing Landuse of Case Study Area-1	48
10	Map showing existing building heights of Case Study Area-1	50
11	Map showing existing residential density of Case Study Area-1	53
12	Location of Case Study Area-2	54
13	The Transit Corridor Stretch selected for Case Study Area-2	55
14	Master Plan showing landuse of Case Study Area-2	55
15	Map showing existing building heights of Case Study Area-2	57
16	Map showing existing landuse of Case Study Area-2	58

## List of Boxes

Box	Title	Page No.
1	5 Ds of environment that influence travel	8
2	TOD in Portland	15
3	Benefits of TOD for Delhi	32



## Foreword

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The sustainable growth and development of our cities and towns will be a key driver of India's progress. Indian towns are fast growing and productive and cities are expected to contribute considerably to growth of income in the years to come. While the potential for economic growth led by cities is tremendous, our cities themselves face incredible challenges as well. The need for rejuvenation of our cities is an urgent and important task before us. One concept which is gaining international attention as an innovative urban solution of the concept of TCD or Transit Corridor Development. TCD is a new urban planning paradigm. It has achieved considerable acclaim internationally; however, it is still relatively new in India.

This study done by HUDCO's HSMI has focused on the proposal of **Transit Corridor Development (TCD)**, and its policy framework and guiding principles in Delhi. The study has been funded by international organization **CITYNET** under National Chapter India activities 2016.

HUDCO is a premier techno-financial institution in the country committed to the cause of sustainable habitat. Since its inception, HUDCO has been encouraging innovative and sustainable solutions in the field of housing and urban development. Human Settlement Management Institute (HSMI) is established in 1985 as the research and training wing of Housing and Urban Development Corporation Limited (HUDCO) to provide training support for professionals engaged with the issues of day-to-day practice of human settlement development. Through its capacity building, research and documentation activities, HSMI strives to fulfill the role of a facilitator for healthy debate on key issues in the habitat sector, act as a catalyst to stimulate innovative policy options & implementation strategies, and facilitate the participation of all in the dream of achieving sustainable habitat development.

As part of its efforts at research and capacity building in the urban development sector, HUDCO's HSMI is bringing out the publication of the report. The study attempts to document the international experiences of TOD, and develop suggestions for TOD and housing in Delhi. The guidelines and suggestions can serve as pilot for the similar other developments in the country.

I appreciate the efforts of HUDCO's HSMI in bringing out this publication. I hope that the study serves to disseminate the concept further among professionals, local bodies and various other stakeholders in the urban development process.

**Dr .M. Ravi Kanth IAS (Retd.)**  
**Chairman and Managing Director, HUDCO**



## Acknowledgement

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The completion of this project is a culmination of the dedicated efforts of many individuals and professionals. The HUDCO- HSMI team gratefully acknowledges the sincere efforts of all those who contributed towards making this report a reality.

First, I would like to acknowledge and appreciate the trust shown in us by HUDCO by giving us an opportunity to carry out this project. A particular debt of gratitude goes to Dr. M Ravi Kanth, Chairman and Managing Director, HUDCO for his vision, support and encouragement towards engagement of HUDCO's HSMI.

I am grateful to the funding source- CITYNET for support to Indian members of citynet through grant to conduct the study under this project.

I would also like to appreciate the efforts of the project team comprising of Sh. Surendra Kumar, Smt. Simrandeep Kaur, Ms. Tanya Rajwal and Sh. J. Rambabu, for their exemplary work as team members in this project. I also appreciate the efforts of two summer interns from Amity University, Ms Karman Kaur and Mr. Ajit Singh in contributing to survey and analysis for the project.

I hope that this research will be a beginning point for HUDCO - HSMI's long-term association with this area to follow and document such cases all over the country for development of compact cities and sustainable mobility practices.

Dr .D. Subrahmanyam  
Sr. Executive Director (Training), HSMI



## Executive Summary

HUDCO's HSMI has undertaken a study on **"Transit Corridor Development – Framework and guiding Principles – Case Study Delhi"**, approved by CityNet in 2016. The study involved preparation of a strategy and guiding principles for densification along selected transit corridors in Delhi.

The objectives of the study include:

- Identify influence zones along transit corridors having densification potential.
- Prepare a densification strategy along transit corridors, for housing and other uses.
- Reservation of land for housing the urban poor
- Evaluate the use of urban planning tools like Town Planning Schemes, compensatory FAR/FSI etc. as a part of densification strategy.

The project is based on secondary data assessment, as well as primary studies of two case study areas along metro transit corridors in Delhi. The first case study area selected is a part of the under construction Phase III metro network, called as Pink line, which will be the longest line in Delhi metro while second case study area is a residential and commercial neighborhood in the South Delhi district. Both the case studies are comparatively analyzed in terms of proposed landuse in master plan, existing building & landuse, existing building heights & density, etc., and potential increase in densities and population based on densification of the corridors. The study also looks at the possibility of including affordable housing in the Transit Corridor Development proposed in Delhi.

The study report under this project comprises of total seven chapters. The first chapter gives introduction of the project with its need, aim & objectives, methodology adopted during the study, scope and limitations.

The second chapter reviews the theoretical framework of Transit Corridor Development, through its parent concept of Transit Oriented development, and examines the available literature of both Transit Oriented Development (TOD) and Transit Corridor Development (TCD).

The next chapter analyzes the international experiences in Transit Oriented Development and Transit Corridor Development in the world and lessons learnt from those experiences in countries like USA, Australia, and Brazil.



The fourth chapter examines the Transit Corridor development (TCD) concept and its linkage with affordable housing at the national level. It also examines the national policies related to TOD and sub-regional plans of TCD in India.

The fifth chapter describes the Delhi context of Transit Corridor Development and link with affordable housing, taking the case example of Capital City, Delhi. It examines the DDA policy of TOD, and the existing MRTS system of Delhi. It also looks at the affordable housing requirement of Delhi, and examines TOD policy of DDA with respect to housing the urban poor in TCD areas. It also analyses the two case studies of proposed TOD development by DDA, namely TOD at Karkardooma and at Sanjay Lake at Trilokpuri in Delhi.

In order to assess the potential of Transit corridor development in Delhi, two case studies in existing low-rise residential areas of Delhi around the existing or proposed metro corridors are also studied in terms of identification of potential for densification in the sixth chapter.

The last chapter of the Project suggests the principles for densification and for housing the urban poor along transit corridor development. Along with this, the strategies such as inclusionary zoning, incentive based zoning, etc. are also suggested for affordable housing along the transit corridors for sustainable urban growth of Indian Cities.

The outcome is applicable for similar densification along transit corridors in other cities. The study report was submitted to CityNet in November 2016 and has been accepted.

The findings of the study were presented in a dissemination workshop held at HSMI wherein sectoral experts gave their comments. These comments have been incorporated in the final report of the project.



# Chapter 1 : Project Introduction

## 1.1 The context

Cities are growing at an unprecedented rate, particularly in the developing world; 1.4 million people are being added to urban areas each week, and by 2030, it is projected by the UN that around 60% of the global population will live in cities. India has also seen rapid urbanization in recent years from 17.3 per cent in 1950 to 31.6 percent in 2011 respectively. It is projected that by the year 2050, the Indian urban population is expected to reach to 50 per cent of the total population. (*World Urbanization Prospects, 2014*).

The growth of population and change of socio-economic characteristics (increasing household incomes) of the people are the great causes for expansion of city into outer edges of a city, rural area, and farmlands, which is referred as Urban Sprawl. The urban sprawl describes the expansion of human populations away from central urban areas into low-density population and residential housing, mono functional zone and amplified dependence on the private automobile for transportation. The urban sprawl has the strong relation to increase of number daily trips, travel distance, traffic congestion, energy use, pollution, etc.

Urbanization in India has been accompanied by an increase in the use of motorized vehicles. While transit-oriented development (TOD) have been adopted by some Indian cities to arrest motorized vehicular use, the direct impact of improved accessibility in increasing public transport ridership has received less attention. Transit-oriented development (TOD) is generally defined as high-density, mixed-use development within walking distance (a 1/2 mile) of a transit station. TOD provides a range of benefits including increased transit ridership, reduced regional congestion and pollution, and healthier, more walkable neighborhoods.

## 1.2 Transit Corridor Development

Transit Corridor development (TCD) is a concept, which had evolved from TOD. It is essentially development, which occurs along the Mass Transit Corridors, such as the MRTS, based on the principle that landuse and transport are intrinsically interlinked and that the transport corridors should guide landuse around them. The nature of landuse in Transit Corridor zones is different compared to the other areas of the city. The purpose behind TCD is to reduce private vehicle dependency and encourage use of public transport use through design, policy measures & enforcement. TCD also involves providing easy public transport access to the maximum number of people within walking distance –through densification and enhanced connectivity. (CTOD, 2006)

Transit-oriented development (TOD) is commonly defined as high-density, mixed-use development within walking distance (a 1/2 mile) of a transit station. TOD provides a range of benefits including increased transit ridership, reduced regional congestion and pollution, and healthier, more walkable neighborhoods. (MiTOD, 2006)



The purpose behind TCD cannot be addressed by mere addition of transport infrastructure. It is necessary to induce a paradigm shift, TODs offer attractive alternatives to the use of personal modes – pleasurable walking experiences, very easily accessible and comfortable mass transportation with easy, convenient and comfortable intermodal transfers for last mile connectivity and other low cost, comfortable, non-motorized transportation options.

In addition, TCD offers highest possible population densities (as per local context), enhanced street connectivity, multimodal networks around transit stations and compact mixed-use development providing housing, employment, entertainment and civic functions within walking distance of the transit system. It can also include:

- An enhanced level of accessibility by non-motorized modes,
- A reduced trip length to the average commuter, and
- Economic viability of the public transportation system through substantial non-fare box revenues.

This, overall, results in lower levels of energy consumption per person for the city for the transport sector, besides numerous city/ local level benefits, as explained below. The private investment and development decisions play a large role in the TOD process.

### 1.3 The Study

India, like most major emerging economies, has been witnessing accelerating urbanization. As per the census of India in 2001, about 72% of the population lived in rural areas and 28% in urban areas. By 2011, these figures had changed to 69% rural population and 31% urban population. As India edges toward becoming the most populous nation, it is clear that its growing urban areas will occupy more of the top positions among the world's largest urban areas in the years to come.

Housing is a basic need and like any basic human need will be constantly in demand. The urban housing shortage in India recorded in 2012 was 18.78 million and among them, 96% of housing shortage was for EWS/LIG (MoHUPA). In India in the context of poverty, there has been a focus on the issues related to urban poor and their housing. The National Housing Policy of India has also advocated for solutions to housing the urban poor in India. As India increasingly looks for solutions such as TCD to solve its urban ills, there is also simultaneously need to ensure equitable development, so that no one is left behind and the urban poor too get fair share of the accruing benefits.

In this context, the study attempts to look at TCD in the context of affordable housing and sustainable urban transport, and suggest the principle and framework for development of such housing projects in the TCD corridor. The project is focused on the TCD in Delhi as a pilot for similar projects in other places of India. The study seeks to evaluate the need of providing and developing options for affordable housing for the urban poor and identify its applications along the selected



metro corridors under the concept of Transit Orient Development (TOD).

The study also seeks to establish a relation between Transit Corridor Development (TCD) and affordable housing and its need for the metropolitan and mega cities of India. The study finally comes up with suggestions, which can be applied for similar re-densification along transit corridors, with effective utilization of urban planning tools for equitable development in the influence zones of the transit corridor.

## **1.4 Objectives**

The objective of the study is to prepare a strategy and guiding principles for densification along the selected transit corridors. The study seeks to provide an insight into probable methodology to be adopted and strategies to be prepared for similar densification projects along the transit corridors across the city and other cities.

The objectives of the study are:

- To identify influence zones along transit corridors having densification potential.
- To prepare a densification strategy along transit corridors, for housing and other uses.
- To suggest a strategy for reservation of land for housing the urban poor.
- To evaluate the use of urban planning tools like compensatory FAR/FSI etc. as a part of re-densification strategy.

## **1.5 Scope and Limitations**

The study is based upon primary and secondary sources of information. The secondary data is mostly based on existing research in developed countries and very little research or information on developing countries is available. The primary case study is limited to Delhi, and is based upon sample analysis of two transit corridor stretches between two influence zones from Delhi in view of limited scope of work of the study.

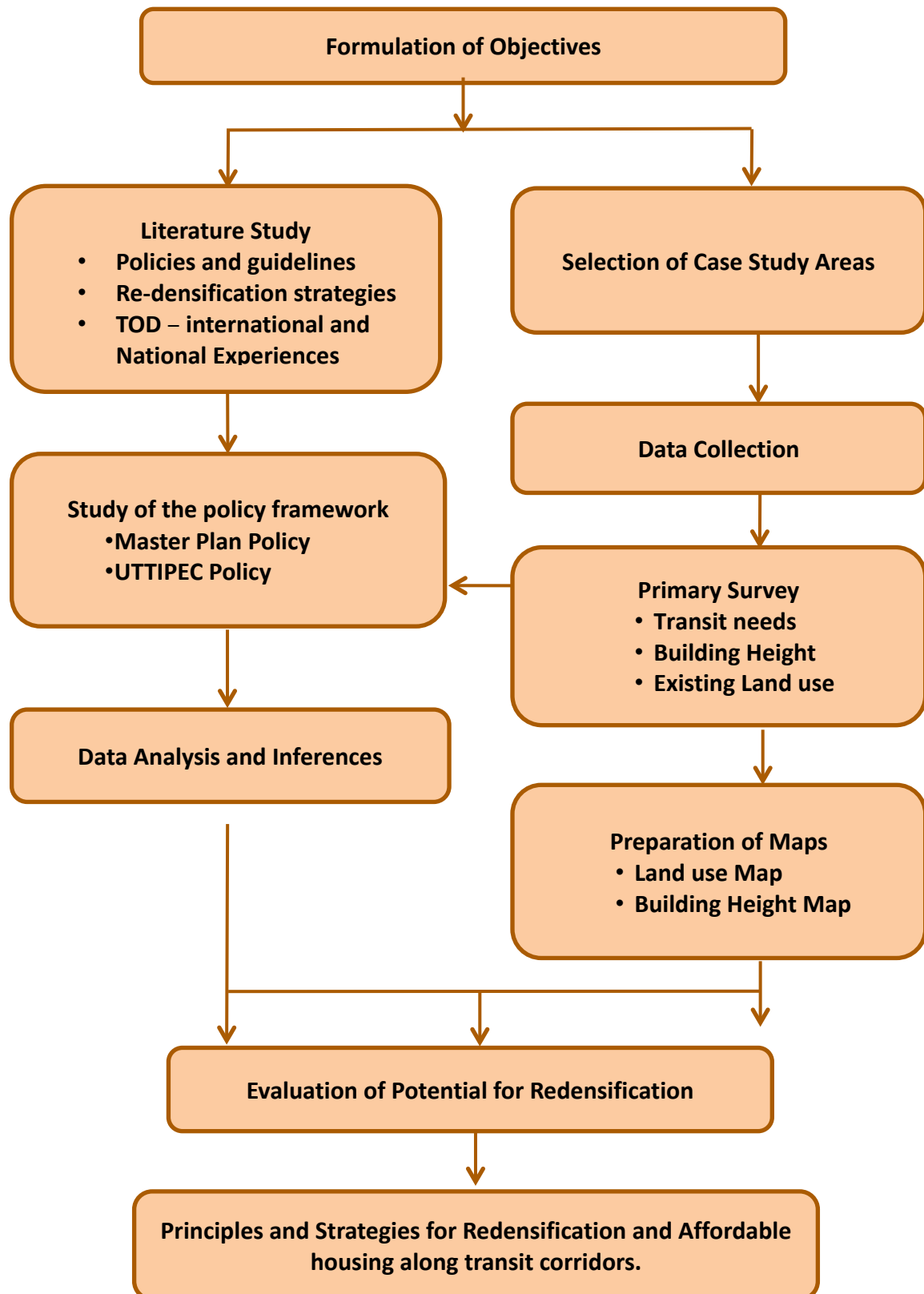
## **1.6 Methodology**

The study is divided into seven parts, starting with the formulation of objectives. Literature study was done based on the basic understanding of TOD, and TCD including the principles, components and benefits of TOD. Case studies of successful TOD models internationally were studied to understand densification strategies and how they are implemented in India and in other countries. The primary study has been done within Delhi to understand the current development along TCD corridor stretches in Delhi, and potential of densification, along with guiding principles for such development. Planning indicators were identified for primary studies. Two case studies have been taken along the ring transit corridor. Data was collected through primary and secondary sources. Tools used for the study involved mapping using google maps data spatial analysis through QGIS, and Autocad, and landuse analysis. The study draws inferences from the identified indicators and the secondary research and accordingly has given suggestions.



The methodology is depicted in the accompanying methodology diagram.

**Figure 1 – Methodology**





## Chapter 2 : Transit Oriented Development and Transit Corridor Development – A Theoretical framework

### 2.1 Evolution of the TOD concept

Historically, 'land use transport integration' has long been a basic tenet of the planning discipline. Cities since time immemorial have developed near or along major transport corridors, either along rail, roads or river that have shaped organic development and landuse. The relationship between transport and landuse has long been understood and explored in city planning practices.

Internationally, catering for car travel has dominated city planning from the early 1920s until the late 1980s. In the 1990s, the thinking in the developed countries started to move towards sustainable land use transport integration, this time framed around public transport access, affordable technological developments like metro etc. The new focus was on having a more compact city, both at the regional and at the neighborhood scale, and moving from a city planned for cars to the city which provides transport choice to pedestrians. Arguments were made for 'balanced transport', meaning provision for all modes of transport not just for private cars.

It was acknowledged in the developed countries that the close integration of land use activity and transport infrastructure (generally seen as public transport) could be one means of creating the means to achieve more sustainable travel outcomes. The concept of Transit Oriented development originated from these efforts. Transit oriented development (TOD) encourages public transit ridership by locating residences, jobs, and activities near transit stations.

The key individual in the definition, branding, and initial implementation of TOD was Peter Calthorpe. Calthorpe, an architect in the USA. Peter Calthorpe codified the concept of Transit-Oriented Development (TOD) in the late 1980's and, while others had promoted similar concepts and contributed to the design, TOD became a fixture of modern planning when Calthorpe published "The New American Metropolis" in 1993. TOD concept initially developed from the "pedestrian pockets" concept given by Peter Calthorpe.

During 1992 -93, a Charter of the New Urbanism was given by the Congress of New Urbanism held in the USA, including the TOD concept. It states *"We advocate the restructuring of public policy and development practices to support the following principles: neighborhoods should be diverse in use and population; communities should be designed for the pedestrian and transit as well as the car; cities and towns should be shaped by physically defined and universally accessible public spaces and community institutions; urban places should be framed by architecture and landscape design that celebrate local history, climate, ecology, and building practice."* (Carlton, 2007)



## 2.2 Transit Oriented Development

TOD generally defined as *“a mixed-use community that encourages people to live near transit services and to decrease their dependence on driving.”* ( Still, T., 2002) One of the first projects executed under the concept was in Sacramento, where the term TOD was first used.

Transit Oriented Development (TOD) is understood as high-density development around a transit node, which includes a mixed land use consisting of mixed residential, commercial and employment opportunities within the pedestrian access of influence area. It can be construction or redevelopment on micro/ macro scale to facilitate transit use. It aims at reducing dependency of people on private vehicles and increase public transport connectivity to maximum number of people.



**Figure 2 - Example of TOD**

**Source of image- Union Boulevard Transit Oriented Development, Colorado by RNL Design**

Various authors have given various definitions of Transit Oriented Development. As per the Centre for Transit Oriented Development, *“It is a mix of housing, retail and/or commercial development and amenities – typically referred to as mixed-use development – integrated into walkable neighborhoods within a half-mile of quality public transportation”*. (CTOD, 2013)

The UTTIPEC, Delhi has defined Transit oriented development (TOD) as *“Essentially any development, macro or micro that is focused around a transit node, and facilitates complete ease of access to the transit facility, thereby inducing people to prefer to walk and use public transportation to personal modes of transport”*.

A similar definition of TOD is given by reconnecting America, It defines TOD as *“It is a type of community development that includes a mixture of housing, office, retail and other amenities in a walk able neighborhood located around high-quality public transportation”*.

TOD is a concept that involves low carbon, high-density development, with compact, mixed landuse and minimum travel time for citizens. It seeks to promote public transport, reduce pollution and congestion, create diverse neighborhoods, have a work place and residence mix, provide adequate public spaces, and amenities, and ensure safety by eyes on the street concept.

Different cities have adopted different features for TOD. However, few key features are common. These include:

- High-quality public spaces which are sensitive to community needs;
- Variety of housing types and prices,
- Frequent reliable, fast and comfortable transit;



- Measures discouraging the use of private cars, including walkable and cycling-friendly environment,
- Parking management,
- Traffic calming measures promoted through street design and others.
- Well operating mass transit systems
- Importance to pedestrians and mixed uses- eyes on the street concept.

In TOD, the Local Government plays a key role in planning, coordination, stakeholder engagement and partnerships, public investment in urban infrastructure, and operation of mass transit among others. Many cities in the developing and developed countries have veered towards TOD due to its stated benefits. These include:

- Enhanced access to the transit network by households of all incomes.
- Reduced automobile trips and greenhouse gas emissions.
- Reduced transportation costs.
- Improved public health due to increased walking and cycling.
- Improved access to local and regional amenities.
- Improved workforce access to job opportunities.
- Increased transit ridership.
- Creation of a sense of community and place.
- Transit becomes the organizing principle for development.

*(source :Center for TOD)*

## **2.3 Transit Corridor development**

Transit Development at the corridor level is a more efficient way to achieve the benefits of TOD at all stations along the corridor. As per the Center for Transit Oriented Development , Corridor planning is a cost effective planning process, especially when multiple stations along a corridor face similar challenges and opportunities. The corridor is also the best scale at which to predict the long-range impacts of transit on the market for new development, on commuter travel behavior, and on where the potential for displacement of low-income residents may be greatest. (CTOD, 2013)

Transit Oriented development can be planned at many scales. Planning for TCD occurs at the scale of region, corridor, station area, and land parcel. A region may include many transit corridors, each corridor includes many stations, and each station includes many parcels of land. TCD planning can start at the smaller scale and move up the spectrum, or at the larger scale and move down.

Planning at the corridor level provides a more comprehensive view of opportunities in a neighborhood that are easily overlooked when focusing only on stations themselves or the “half mile around stations. ” Focusing on corridors helps to bring streetscape improvements to areas not typically covered by the “half-mile radius” but which are important to transit corridor neighborhoods, give a city focus on the projects for leveraging investments, and help to provide desirable uses and amenities that will serve as links to both neighborhoods and stations.



Some of the successful factors for TCD include:

- Zoning that is altered to ensure that developers can pursue the visions planned
- Street design guidance that prioritizes station access for people who bike and walk
- Creating typologies and metrics that help find the best places to pursue TOD and support efforts to change how people access transit
- Transit-specific bicycle and pedestrian master plans, or integration of access to transit in bicycle and pedestrian master plans

*(Reconnecting America.org, 2016)*

When Transit Systems are planned at the Corridor Level, there is greater potential for shared resources and amenities, (parks, major shopping, community facilities) and more opportunity for overall development of the city. This is because stations play different roles in different areas.

#### **Box 1: 5Ds of Built Environment that influence travel**

A recent UN Habitat study points out the five urban form related factors that strongly influence travel:

Density gauges how many people, workers or built structures occupy a specified land area, such as gross hectares or residentially zoned land.

Diversity reflects the mix of land uses and the degree to which they are spatially balanced (e.g. jobs–housing balance), as well as the variety of housing types and mobility options (e.g. bikeways and motorways).

Design captures elements such as street layout and network characteristics that influence the likelihood of walking or biking – e.g. pedestrian and bike-friendliness. Street networks vary from dense urban grids of highly interconnected, straight streets, to sparse suburban networks of curving streets forming loops and lollipops.

Destination accessibility measures ease of access to trip destinations, such as the number of jobs or other attractions that can be reached within 30 minutes travel time.

Distance to transit is usually measured as the shortest street routes from the residences or workplaces in an area to the nearest rail station or bus stop. These are not separate dimensions and indeed are often co-dependent. Having high-rise housing and office towers will yield few mobility benefits if the two activities are far from each other. A diversity of uses and improved accessibility to destinations from home or work are needed if denser development is to translate into more pedestrian and transit trips. City downtown areas are considered the densest part of most cities. They also tend to be the most diverse in terms of land use and the most walkable – e.g. small city blocks, complete sidewalk networks and fine-grain grid street patterns.

*Sources: Cervero and Kockelman, 1997; Ewing and Cervero, 2010, as quoted in UN Habitat Global report on sustainable Human Settlements 2013.*

The concept of Transit Oriented development has focused on the built form, and has a neighborhood approach, whereas the concept of Transit Corridor Development involves development along an entire corridor. The literature on TOD gives a variety of principles, which form the framework of TOD. Some principles for Transit Corridor Development (TCD) enunciated by the



Urban Land Institute, USA. These are equally applicable to transit Corridor development, and provide an insight into how TCD can be shaped by any city. These principles are restated below:

**NEED FOR A VISION :** As per the CTOD, there has to be vision for overall development of the city, and of the transit corridors in order to achieve successful TOD. A clear policy framework is very important in this context.

**DEVELOPING PARTNERSHIPS :** Transit Corridor Development involves developing partnerships. In addition to encouraging and supporting private development, transit agencies, local governments, or both may take a more active role, through partnerships with the development community. To be effective, however, these partnerships must be carefully crafted to benefit each of the partners—just as partnerships in the private sector would.

**LINKING OVERALL DEVELOPMENT WITH TOD :** Transit Corridor development can increase property values and create opportunities for community building, planning for areas around transit should be linked with economic and spatial development. Transit projects with thoughtfully planned routes and station locations can set the stage for significant private development: the careful coordination of transit and development is critical, so that each can optimally enhance the other.

**MIXING OF USES :** To provide a balanced mixed land use which includes residential, commercial and employment within close proximity so people do not feel dependent on motorized vehicle for travelling and prefer walking and cycling over it. This makes a street more active and safe. Another aspect of mix is mixing of different incomes and age groups and bringing diversity in the influence zone. Due to mixed land use in the influence zone with residential, commercial, employment all at the same place, overall need of trips will reduce, making the concept a step towards sustainability.

**PROVIDING CONNECTIVITY:** Connectivity is one of the major aspects of principles of TOD (Transit Oriented Development). It aims at making the influence zone more walkable and accessible by pedestrians and non-motorized vehicle users. It can be achieved by providing last mile connectivity and easy access to all.

**PROMOTING SHIFT TO PUBLIC TRANSPORT:** It is a shift from a city dependent on motorized vehicle for commuting to a multi-modal city with less number of personal vehicles dependent and is pedestrian friendly. In addition, a large majority of population depends on public transport for long distance travel. This shift will lead to a better environment with low carbon emission and provide better air for breathing.

**DESIGNING URBAN PLACES, NOT PROJECTS:** The concept of TCD promotes place making. This eventually leads to improved safety of pedestrians in the area. Transit Oriented Development should be more than an opportunity for “a project at the station.” It should be a design for a full-fledged transit-centered community, with all the attendant economic and cultural benefits. In this process, it is essential to involve highly skilled and experienced planners and architects, and to use design principles that support the creation of a genuine sense of place.



ACHIEVING A MIX OF INCOME GROUPS: It is important that the benefits of Transit development reach all income groups. Today, a diverse group of people including all income groups seeks out residential locations characterized by a mix of uses, and access to transit corridors. Young workers often choose to live in urban neighborhoods, even if their jobs are in the suburbs. Living near transit can satisfy a desire for community, independence, opportunity, and convenience. A diverse mix of incomes also makes the communities vibrant and help poorer sections get the benefits of development. *(Based on principles by Urban Land Institute , 2003)*

## 2.4 Transit Corridor Development , Affordable Housing and the concept of e-TOD

Affordability is typically understood as the cost of housing, but the interaction between housing and transportation costs has to be considered as an actual determinant of household affordability. Housing and transportation are the two biggest expenditure for any household, particularly low income ones. When families move to suburbs for better housing, their transportation costs tend to rise. A study by the Center for Housing Policy. US concluded that for every dollar a family saved on housing in 2005, it spent 77 cents more on transportation. Therefore, there is a great need to ensure that the benefits of TOD are passed to all sections of society, especially the poorer sections. Transit Corridor Development thus provides a great opportunity to interlink development and affordable housing.

TOD's are often promoted as a means to revitalize urban and suburban centers, and as an alternative to the economically and environmentally unsustainable model of predominant ex-urban North American land-use planning and development. They are positioned as an antidote to sprawl, which often leads to the loss of farmland, open space, and most importantly, local character. TODs can also be effective models for incorporating affordable housing. According to the Centre for Transit Oriented Development, *"Development of housing adjacent to transit presents opportunities to meaningfully address the nation's continued need for affordable housing"* (CTOD, 2007).

Peter Calthorpe, one of the founders of Transit Oriented Development, states, "Affordable housing must start with affordable neighborhoods." *(Peter Calthorpe , 1993)*

Paradoxically, world over, the trend is for gentrification in TOD corridors, as TOD development tends to push up real estate prices. International research shows that investments in communities and transit infrastructure can significantly enhance opportunity for low and moderate-income families. This has given rise to the concept of **e-TOD or equitable TOD**.

Equitable transit-oriented development (e-TOD) is one tool to ensure that high-opportunity neighborhoods are inclusive despite the property value increases that often result from such investments. e-TOD is compact, often mixed-use development with access to jobs, neighborhood-serving stores and other amenities that also serves the needs of low and moderate-income people.



A primary approach to e-TOD is the preservation and creation of dedicated affordable housing, which can ensure that high-opportunity neighborhoods are open to people from all lifestyles. To ensure e-TOD, international planners have used many tools. These include inclusionary zoning, where certain reservations have been made for lower income groups, incentives for affordable housing development, tax benefits, density bonuses etc.

In a developing country like India, the need for equitable TOD is even greater, especially considering the gentrification pressures of the TOD corridors and development. This concept is further explored in the coming sections.



## Chapter 3: Transit Corridor Development – International Experiences

TOD concept has been applied internationally, for infill development around station corridors. TOD received support both from environmentalists as well as from planners in order to reduce auto dependence. TOD has been mainly applied at the project level, creating high-density development around a transit node. TOD concept had its successes and failures as well. The study has covered few international practices of TOD to understand the practical applications of the policy.

Many cities throughout the world have a TOD policy. ***The cities in USA and Canada such as Portland, Denver, Montreal, San Francisco, and Vancouver are among those.*** These cities had the aim to reduce automobile dependency and increase the use of public transit. ***Perth and Melbourne in Australia also have implemented the TOD concept in their plans.*** One of the earliest and best-quoted examples is of ***Curitiba, Brazil.***

Implementing TOD has not been easy for the cities anywhere, as it involves changing zoning regulations, inserting a TOD overlay on existing development, formulating TOD policies, and involving funding and real estate in development.

Few examples of the cities that have implemented TOD from USA, Australia, Brazil and Hong Kong and their experiences are discussed briefly in the study.

### 3.1 The United States Experience

***The Transit-Oriented Development (TOD) started from the United States, and has seen widespread applicability in the country. It has increasingly moved from a planning theory to built projects. Over 100 TODs and an additional 100 joint development projects currently exist in the United States.***

As per a recent study, “At the federal level, several programs prioritize planning and funding for multi-modal transportation systems and development of services near transit stops. The U.S. Department of Transportation (DOT), the Department of Housing and Urban Development (HUD) and the Environmental Protection Agency (EPA) formed a Partnership for Sustainable Communities in 2009. The partnership has worked to coordinate investments and planning among the agencies to work toward their shared goals, which include increasing transportation choices, supporting existing communities, promoting equitable and affordable housing, and enhancing economic competitiveness. In addition, the partnership has helped to streamline federal grants” (Shinkle,D., 2012)

In addition, more than 22 states governments have also supported TOD in some manner in US. These range from states that simply define TOD to those that provide funding and incentives to encourage TOD to create more transit choices for its citizens, drive economic development, and mitigate congestion and environmental impacts.



### Denver City, Colorado (USA)

Denver, the capital city of Colorado, has a population of 660,000 persons, in an area of 400 sq. km. It is part of a larger metropolitan agglomeration.

Denver has emerged as a leading proponent of TOD development in the United States. Denver has a Transit-Oriented Development Strategic Plan that aims to make walkable neighborhoods anchored by transit stations. Denver's TOD Strategic Plan provides a foundation to guide public and private investment at rail stations by:

- Creating an implementation action plan through research and analysis of the existing state of transit-oriented development,
- Providing citywide, high-level policy recommendations and on the ground, station-level action items with the Intent to foster implementation of TOD at rail stations.
- Establishing a system to track and monitor Denver's success so the city can continue to refine and improve its strategic moves in the future.

In 2004, Denver approved \$4.7 billion Fast Tracks program, for development of light rail and related development. The plan was to add 121 miles of new commuter and light-rail tracks to the region, 18 miles of bus rapid transit lanes, 57 new rapid transit stations, and 21,000 park-and-ride spots. Transit linked development with real estate along the corridors.

***Fast Tracks investment has so far brought seven million square feet of new office space, 5.5 million square feet of new retail, and 27,000 new residential units, to the city. The Denver TOD policy also includes provisions for development of affordable housing in the TOD areas. (Denver local govt )***

### Austin, Texas (USA)

Austin is located in central Texas and is one of the largest towns in Texas, with a population of about 800,000 persons (2014 data), with an area of about 700 sq. kms. The City of Austin in Texas has prepared an "Imagine Austin" Plan, in which TOD is part of the strategy for development. In 2005, Austin adopted a draft TOD policy through an ordinance.

Austin's Transit Oriented Development (TOD) ordinance regulates development (new and



**Fig. 3 Mass Transit System in Denver City, Colorado (USA)**

Photo courtesy: Denver. gov



**Fig. 4 Mass Transit System in Austin**

Photo credits: Austin. metro



redevelopment/rehabilitation) that increases automobile trips by a threshold amount. The TOD development includes renewal of the city's Brownfield areas, which fall in the TOD zones.

The ordinance employs a two-phase implementation approach for introducing TOD. In the first phase, TOD district boundaries are established and TOD district zoning classification is identified. Gateway, Midway, and Transition Zones are designated and regulations that control density, height, and use are adopted for each zone, thus setting the stage for the second phase.

The second phase includes the implementation of Station Area Plans, which include specific design standards and development goals for each TOD district (located around transit stops on the city's rail line). The Plans in turn, have four to six sub-districts that regulate land use, density, building height, site and building design, and general standards. These districts are defined by density and use, and are further divided into residential and mixed-use categories: low density residential; medium density residential; high density residential; live/work flex; mixed-use; and corridor mixed-use.

***The TOD ordinance of Austin also reserves 25% of new housing units in each development for the poorer sections. The Plans developed for TOD also include strategies to achieve affordable housing around transit stations.***

Austin has seen limited success with its TOD policy until now, due to less expansion of its light rail system. (source: Austin local government)

### Portland, Oregon (USA)

**Portland**, the largest city in Oregon , is located in the northwest part of the state. It has a population of approximately 600,000 persons, and is spread in an area of 347 sq. km. (2014) The Portland region has a successful history at achieving transit-oriented development and compact growth. Portland was one of the first cities in the US to opt for Transit Oriented Development. Portland Metro has a growth management plan, the 2040 Growth Concept, which calls for focused growth around stations on the region's MAX Light Rail Transit (LRT) system, along Frequent Service bus corridors, and in mixed-use urban centers.



**Fig. 5: Public Transport in Portland City, Oregon (USA)**

Photo from: Portland.gov

The Metro Transit-Oriented Development and Centers Program (TOD Program) began in 1998 to support the regional Growth Concept by providing information and targeted public investments or incentives to private developers to build more intensely, and with greater attention to creating a walkable environment.



Portland Metro is relatively unique in that it offers grants directly to private developers to offset some of the higher costs of TOD development, subsidizing things like underground parking, tenant improvements that promote commercial activity, and green building innovations. (*Reconnecting America*, 2011)

In 2011, Portland Metro developed a TOD Strategic Plan for TOD in transit station areas. As per the plan, Metro's Transit-Oriented Development Program serves a unique and critical implementation-based role that is unmatched in other regions around the country.

The TOD Program is designed to provide incentives, primarily in the form of modest funding grants, to private developers to build higher-density, mixed-use projects located near transit. The program is structured to encourage projects that "push the envelope" in terms of density or building type, acknowledging that these projects are often more expensive to build or carry additional risk.

The Program's strategies for maximizing TOD potential include:

- Contributing to local identity through multi-year investments in catalyst projects and place-making elements.
- Creating higher-density mixed-use development near transit and in centers.
- Cultivating developers with expertise in higher-density and mixed-use development in suburban settings.
- Building community acceptance of urban style building types in suburban communities.

#### **Box 2: TOD in Portland**

Portland is one of the most successful examples of Transit Oriented Development in the US with:

- Over 23 projects (built or under construction)
- 2,500 Housing Units (80% affordable and workforce)
  - 500,000+ annual induced transit trips
  - \$350 m in private investment
  - 270,000 sq. ft. Retail/Office
  - 322 Acres protected (if developed conventionally)
  - Over 100 tons of reduced GHG's

(Source: Metro Planning department, Portland, Oregon)

These three examples from the US show that the TOD concept is being implemented in the US dynamically, and has seen considerable success. It also shows that affordable housing and easy access to transport is a key component in TOD development in the US.



### 3.3 TCD in Australia

Australia, with its urban sprawl and low densities. TOD concept has embraced the TOD concept. In the National Urban Policy of Australia the concept of TOD and TCD development has received support. The Planning Institute of Australia has also favoured the TOD form of development.

Cities that have incorporated TOD policies in their plans include Perth, Melbourne, Adelaide and Gold Coast. Two well-known case studies of Perth and Gold Coast are described below.



**Fig. 6 Perth City, Australia**

#### **Perth (Australia)**

Perth, the capital of western Australia has a population of 1.8 million, and an area of 5000 sq. km.(The Greater Perth Area). Perth is one of the most cited examples of transit-oriented development (TOD). State planning policy has required TOD for the past 20 years; the public transport network has progressively improved and built strong institutional arrangements. The policy seeks to include the TOD and integrate landuse and transport over the city. Given the low densities of Perth, and the fact that there is a disconnect between development and transit, there has been considerable public support for TOD in Perth. TOD is facilitated in Perth through the State's TOD Coordinating Committee (TODCC), a cross-agency partnership including the State's Department for Planning and Infrastructure (DPI), Public Transport Authority (TransPerth), Department of Housing and Works (DHW), Main Roads WA, LandCorp (the WA Land Commission), the East Perth and Midland Redevelopment Authorities (EPRA and MRA), and the WA Local Government Association. The state government of Western Australia to encourage infill development and TOD has specifically created the Midland and East Perth Redevelopment Authorities. The Western Australian Planning Commission (WAPC) in 2005 amended the development control regulations to reflect the Government's vision for a sustainable future as outlined in the Network city and the State Sustainability Strategy. *(Source: planning Department, Western Australia)*

This policy encourages mixed land uses within strategic regional centers, especially major office development, major retail facilities, high-density housing, sporting stadiums, and major entertainment venues. It also encourages increased residential densities and commercial and mixed uses within the TOD precinct of all major public transport infrastructure nodes. It specifies that medium- to high-density residential development should accommodate groups that are dependent on public transport, such as the elderly, the socioeconomic deprivations, and those with disabilities. The policy also encourages uses that allow for retail and office space and recreational, educational, and entertainment activities within TODs.



Perth has an urban commuter rail network of 173 kilometers, 189 railcars, 69 stations with total daily trips around 180,000 and an urban bus system of over 1,100 buses, 51 million route kilometers, with total daily trips of 240,000. (Source: Public Transport Authority, Perth). In 2008, it had TOD development at 9 nodes, and ongoing projects at 10 nodes, out of 68 total nodes.

Affordable housing development is a key component of TOD in Perth. Although the Perth model has its critics, with one study describing success as patchy, the Perth TOD is one of the most referred models for TOD in Australia.

### Gold Coast

Gold Coast City is located in the southeast corner of the State of Queensland in Australia. The Gold Coast is one of Australia's fastest growing cities. Its current population is over 500,000, but this number is expected to grow to 820,000 in the next 20-years. It is also the sixth largest city in Australia, with the top 5 largest cities in Australia all

being state capitals. (source; [Goldcoast.org.au](http://Goldcoast.org.au))



Fig. 7 Mass Transit System in Gold Cost

The original compact coastal settlement has sprawled in a low-density form to the west with high car dependency and relatively low public transport use. (Queensland Government). The Gold Coast has the highest level of multiple car ownership of any major Australian city (75.6% car mode share for the journey to work), however, for it to meet its objective to become a future global city it must reduce its car dependence.

The policy framework for TOD in Gold coast started with the "Gold Coast City Transport Plan (1998)", in which the light rail was formally proposed as a solution to increasing urban congestion. In 2004, a study was undertaken to confirm the feasibility of the project. The 2005 SEQ Regional Plan (Queensland Government 2005) also includes the TOD policy. (David, MN., 2013)

The proposed mass rapid system for the city is based upon the Light Rail (Gold Coast Rapid Transit) as the transport mode best suited for implementation on the Gold coast. TOD development is also proposed at Gold Coast rapid Transit (GCRT) stations.

The Gold coast model is considered one of successful urban innovations in Australia. The two cases studies taken here show the progress of TODs in Australia, and the fact that the concept of TOD and landuse Transport integration is well entrenched in urban policy in Australia.

## 3.4 Hong Kong Model

The TOD model for Hong Kong is internationally recognized for its focus on the joint development of urban rail systems and real estate. Real estate development is realized whenever a transit station is built, so that development gains are used to fund infrastructure costs. In this way, public transport is



provided in Hong Kong without the need for excess public expenditure. At the same time, this model creates highly accessible transport nodes with diverse uses and attractions, which encourages residents, employees and consumers to use public transport.

The Mass Transit Railway Corporation (MTRC), a joint venture in which the Hong Kong transportation department is the largest shareholder, administers the Hong Kong subway system. The MTRC also engages in real estate development around transit stations, including design, construction and (sometimes) property management.

The MTRC is a for-profit corporation listed on the Hong Kong stock exchange; as a result, it receives no government subsidies. Instead, it uses value capture to finance investment in subway systems. The Hong Kong government grants land to MTRC at low prices and gives them exclusive development rights. MTRC then sells these rights to private developers at much higher prices (considering that land prices will rise significantly once a subway stop is built). The company also negotiates a share in future profits arising from real estate development.

MTRC has developed twenty-five stations located in long under-ground housing, shopping and entertainment complexes that include 70,000 residential units and 15 million cubic meters of retail space. MTR also owns 12 shopping centers, 5 office buildings and co-owns the 88-story International Financial Center skyscraper.

Hong Kong is one of the most densely populated places in the world. The land population density as at mid-2014 stood at 6 690 persons per square kilometer. (*Source: Hong Kong Govt. – fact sheet on population, 2014*). Most inhabitants live near public transport: 75% of the population, or about 5 million people, live within a mile of a subway station, and 43% live even closer, within 500 m (or less) of a station. This density around transit stations ensures that the majority of Hong Kong residents regularly use public transport, representing 90% of all motorized travel. Taken together, proximity to transit stations and mixed land use encourage residents to walk and cycle, representing 38% of total trips.

The government plays a critical role in the Hong Kong TOD model. On the one hand, land holdings give the government direct control over how plans are developed. On the other hand, the city has a clear vision of how it wants to grow. The vision and planning strategy for Hong Kong up until 2030 includes strategy development around the subway system and a commitment to prioritize development in outlying areas, which are already urbanized. In addition, the city owns 78% of MTRC stock, giving it the right to not only direct transportation policy and urban development, but also directly participate in its implementation and construction. The Hong Kong government has enacted regulations that encourage high-density growth in areas surrounding subway stations. At the same time, it applies restrictive car ownership measures such as a high registration tax and annual ownership fee. This has led to a car ownership rate of 63 cars per 1,000 inhabitants; the result of a truly integrated mobility policy that prioritizes public transport. (*Hong Kong Transportation Department, 2013*)



### 3.5 Brazil and TCD

Brazil is an urban country, with around 80% of Brazilians living in cities in the beginning of 21st century. It is expected that by 2030, this number will rise to 90% of Brazil's population. In order to solve the issues related to traffic congestion, and to absorb the growing urban population, Brazilian cities have looked at TOD as an option. Cities such as Sao Paolo, Rio de Janeiro and Curitiba have experimented with Transit Oriented Development in various forms.

#### Curitiba

Curitiba is the capital city of the State of Parana in Southern Brazil. The city is located about 250 kilometers [150 miles] southwest of Sao Paulo. The city's population numbered approximately 1,879,355 people as of 2015. Its is the eighth largest city in Brazil

Curitiba is the pioneer of the Bus Rapid Transit System. It is well known for its approach to development. Curitiba, Brazil has been profoundly praised by transit enthusiasts for the city's focus on transit development. In 1974, the *Rede Integrada de Transporte* (Integrated Transportation Network) was implemented in Curitiba, establishing the first-ever Bus Rapid Transit (BRT) system in the world. BRT is similar to a fixed-rail transit system, but at a much cheaper cost. Typically, buses move above ground in their own designated lanes completely separate from automobiles, and are often faster than regular bus service. Over the past four decades, cities across the world have expanded their public transportation networks mirroring Curitiba's BRT method. Today, BRT is in use in more than 180 cities worldwide, successfully addressing challenges of urban mobility by providing an alternative mean of transport and reducing automobile dependence. Curitiba's BRT is used by an impressive 85% of the city's population.

Before significant investment into urban sustainability and transit, Curitiba was plagued with pollution, a lack of green space, traffic congestion, and overflowing landfills. Through aggressive sustainable urban development projects, Curitiba has experienced a dramatic turnaround, becoming a world leader by advising other cities around the globe to promote Transit Oriented Development (TOD).

Noted planner, Alain Bertaud in 2002, mentioned that *"In many ways, Curitiba's development is a precursor to TOD, and the master plan of Curitiba integrated Urban Landuse and Transport much before the term even existed."*



### 3.6 Learnings from International Experiences.

Internationally, a number of countries have embraced the concept of TOD. TOD at the policy and the plan level is now being integrated in many city plans. Projects based on TOD principles are common near Transit Corridors.

**Few common learning analyzed from internationally experiences are:**

- TOD has been acclaimed as the urban planning policy in keeping with the sustainable development agenda, which has become even more crucial post COP 21 and Habitat III. TOD and TCD can help the cities become more compact, energy efficient, as well as transport efficient. It can also solve the housing issues of the cities.
- Internationally, TOD is a well-implemented concept, with documented successes as well as issues. However, most of the work is in developed countries, especially in the US.
- TOD development does have a positive impact on Housing, Parking and travel for the residents. However, the western countries have also frequently faced opposition by community groups opposed to its high-density policy.
- Most TOD projects are development around Transit stations. While they contribute to urban place making, their impact at city level remains limited. The TOD concept and the corridor level is now being implemented in several places.
- TOD projects have also faced many barriers internationally. These include changing of zoning laws, funding issues, implementation issues etc.
- There is also a documented process of gentrification that accompanies this change.

In order to make TOD successful as well as equitable in the process of creating smart cities, TOD has to move from station approach to corridor approach and housing has to be a key component of TOD.



## Chapter 4: Transit Corridor Development and Affordable Housing in India

India is one of the major emerging economies in the world and has been witnessing accelerating urbanization. As per the census of India in 2001, about 72% of the population was living in rural areas and 28% in urban areas. By 2011, these figures had changed to 69% rural population and 31% urban population. As India leads toward becoming the most populous nation, it is clear that its growing urban areas will occupy more of the top positions among the world's largest urban areas in the upcoming years.

### 4.1 Transit Corridor Development in India

#### Regional and Sub-Regional Corridors

The Indian Government has also recognized and embarked upon a policy of regional and sub-regional development through corridors. India has been mulling regional corridors with neighboring countries. Several sub-regional corridors are being planned in India. These include the Delhi Mumbai Industrial Corridor, on which work is already happening, and the Bangalore Chennai Corridor development. These sub-regional corridors are proposed to be linked with high speed transits and are expected to spur economic growth in the entire sub-region.

Another important corridor developer is the RLDA, or the Railways Lands development Authority , which is developing the available railway lands along the railway corridors. However, these corridors are spatio – economic in nature, and are not TCD corridors, in true sense of the term.

The Transit Corridor Development, as used for the purpose of this research study, is driven by TOD , and is essentially a city scale approach to corridor development.

#### Policy approach to TOD and TCD in India

The Ministry of Housing and Urban Affairs has come out with a multi-pronged policy framework called Transit Oriented Development. The policy will enable people to live within walking or cycling distance from transit corridors like the Metros, Monorail and Bus Rapid Transit (BRT) corridors, currently being taken up on a large scale. It will also help people in connecting with different public transport.

The Ministry formulated the National Urban Transport policy in 2014, under which the TOD development has been promoted. Subsequently, the Ministry has also formulated a 'National Transit Oriented Development Policy' which seeks to enhance the depth of understanding of States and UTs on TOD as a viable solution to many of the challenges like haphazard urban growth and sprawl, mobility, rapidly rising private vehicles on roads, pollution, housing choices among others. (MOUD,GOI, 2016)



Under the national TOD policy , city densification will be promoted along mass transit corridors through vertical construction by substantially enhancing FARs (Floor Area Ratio) backed by promotion of Non-motorised Transport Infrastructure for walking and cycling to transport stations, development of street networks in the influence zone of transit corridors, multi-modal integration, effective first and last mile connectivity through feeder services to enable people access public transit in 5 to 10 minutes from home and work places. (*Indian express, 26<sup>th</sup> feb 2017*)

## Features of the National TOD policy

The national TOD policies lay down the objectives and principles of TOD development and also describes the approach to TOD development. The approach for TOD development includes the following, as per the policy:

### a. Delineation of the Influence Zone

It defines the influence zone around a transit station or corridor thus: *“Influence zone is either established at a transit stations or along the transit corridors. It is generally up to a radius of nearly 500 -800m of the transit station. Where the distance between the transit stations is less than 1 km and there is overlap in the influence area, it can be identified as a delineated zone (around 500m) on either side of the transit corridor within 10-12minutes walking distance. “* The influence zone needs to be carefully delineated so that there is no confusion later on.

### b. High Density Compact development

The policy clearly talks about densification. It mentions that *“TOD promotes densification in the influence area by providing higher Floor Area Ratio (FAR)/ Floor Space Index (FSI) and higher population & job density as compared to the area around and beyond the influence areas. To ensure sustainable development, the minimum FAR should be 300 - 500%, and can be higher, depending on the city size”*. However, the increased FAR need not be uniform over the city and can vary depending upon characteristics of the city.

### c. Mixed Use development

The policy states that mixed use should be allowed in the TOD /TCD zones. The mix can be achieved by horizontal or vertical mixing or both. The percentages of residential, commercial etc should be fixed.

### d. Mandatory and Inclusive Housing

In view of the importance of this aspect of the policy to the study, the details of this section from the policy are reproduced below:

- The cities should fix a minimum percentage (30% or higher) of allowed FAR for affordable housing (for example up to 60 sq.mt. area) in all development/redevelopment in the influence zones.
- Housing in the influence zone should have a mix of all economic groups/ sections. The development control regulation should stipulate housing for Economically Weaker Sections



(EWS) as well as LIG/MIG, or other types based on Census definition, in the influence area to give an opportunity to the people who depend on public transport for daily commuting to live in walkable neighborhoods.

- The upper limit to the area of individual dwelling unit should be fixed as a regulatory component in the influence zones to ensure housing for LIG/MIG.
- To ensure provision of EWS housing, a 10-15 percentage of built up area in the influence zone should be defined. This could be ensured by providing mandatory incentive of additional FAR for EWS housing. It should also be ascertained that only low income families/ individuals are provided ownership of these EWS units.

Essentially, the policy has made inclusion of affordable housing provisions in TOD mandatory.

#### **e. Multimodal Integration**

The policy says that the influence zone must have a seamless integration of multi modal transportation system, with last mile connectivity, park and ride facilities and bicycle lanes etc .

#### **f. Focus on pedestrians, cyclists and NMT users**

As per the policy, the streets should be designed for users of all age groups and for all types of commuters including pedestrians, bicyclists, motorists and transit riders. They should be safe and accessible by all.

#### **g. Street Oriented Buildings and Vibrant Public Spaces**

Retail and other 'active uses' should be supported on the ground floor along the main streets, key intersections, stations and parking garages to ensure high quality pedestrian environments.

#### **h. Managed Parking**

The parking should be managed within the entire influence zone, with controls on On-street and Off street parking.

#### **i. Value capture of TOD**

The policy advises value capture of TOD. Value Capture is based on the principle that private land and buildings benefit from public investments in infrastructure and policy decisions of the Government. Part of the increment in value of land and building should be captured to fund projects being set up for the public by the Central/ State government and the ULBs.

In TOD influence zones, land value capture can be done through enhanced or additional land value tax or one time betterment levy, development charges or impact fee<sup>5</sup>, transfer of development rights (TDRs), or other such mechanisms which have been adopted in various states across the country and abroad. The resources generated through various mechanisms should be credited into a TOD fund

The policy also lays down statutory and regulatory requirements of TOD. IT mentions that TOD should be integrated in the masterplan / Development plan of the town.



The policy also mentions clearly, that , in order to prevent TOD from becoming a mere high density development along transit corridors, which will result in grater congestion, the TOD policy needs to be implemented in its entirety.

In this context, the TOD policy is being seen in its relation to affordable housing.

## 4.2 Housing shortage in India

Housing is a basic need and will be constantly in demand. The urban housing shortage in India recorded in 2012 was 18.78 million and among them, 96% of housing shortage was for EWS/LIG (MoHUPA).

**Table 3: Housing Shortage in India**

	Congestion
Households living in non-serviceable kaccha DU	00.99
Households living in obsolescent houses	02.27
Households living in congested houses requiring new houses	14.99
Households in homeless condition	00.53
<b>Total</b>	<b>18.78</b>

Source: Report of the Technical Group on Urban Housing Shortage (TG-12), MHUPA, (2012-17)

The lack of available housing options, combined with limited income and minimal access to home finance for low-income borrowers, means that millions of Indian households currently live in cramped, poorly constructed houses/slum areas/shanties. They lack access to a clean and healthy environment, with even basic amenities such as sanitation, clean water, sewage, waste management and electricity often absent.

Thus, 'Affordable Housing' is the need of time. The concept of "Affordability" can be defined in different meanings for different people based on differences in income levels. Different countries have defined affordable housing to present the economic potential of an individual buying a house. In the United States and Canada, a commonly accepted guideline for affordable housing is that the cost of housing should not be more than 30% of a household's gross income. Housing costs here include taxes and insurance for owners, and utility costs.

If the monthly costs of a home exceed 30–35% of household income, the housing is considered as not affordable for that household. Defining affordable housing in India is a difficult task given that at every square kilometer of the country, the dynamics of the market are different. Various definitions of affordability and affordable housing have been attempted at different points of time.

According to the Task Force on Affordable Housing set up by the MoHUPA in 2008, affordable housing for various segments is defined by the size of the dwelling and housing affordability derived by the household income of the population.



**Table 4: Affordable Housing by MoHUPA, 2008**

	Size	Cost	EMI or Rent
EWS	300-600 sq.ft, carpet area	Not exceeding four times the household gross annual income level	Not exceeding 30% of gross monthly income of buyer
MIG	Not exceeding 1200 sq.ft. carpet area	Not exceeding five times the household gross annual income level	Not exceeding 40% of gross monthly income of buyer

Source: Task Force on Affordable Housing, MoHUPA, 2008

Affordable housing targets the two weakest income groups: the Economically Weaker Sections (EWS) and the Lower Income Group (LIG). The JNNURM Mission Directorate of MHUPA had defined affordable housing in its amended guidelines for Affordable Housing in partnership released in December 2011.

**Table 5: Affordable Housing definition by MoHUA, 2011**

	Size	EMI or Rent
EWS	Minimum of 300 sq.ft. super built-up area Minimum of 269 sq.ft. (25 sq m) carpet area	Not exceeding 30-40% of gross monthly income of buyer
LIG	Minimum of 500 sq.ft. super built-up area Maximum of 517 sq.ft. (48 sq m) carpet area	
MIG	600-1200 sq.ft. super built-up area Maximum of 861 sq.ft. (80 sq m) carpet area	

Source: Guidelines for Affordable Housing in Partnership (Amended), MHUPA, 2011

In PMAY (Pradhan Mantri Awas Yojana) guidelines for 'Housing For All' mission by MoHUA, EWS households are defined as households having an annual income up to Rs. 3,00,000 (Rupees Three Lakhs) and LIG households are defined as households having an annual income between Rs.3,00,001 (rupees three lakhs one) up to Rs.6,00,000 (rupees six lakhs).

The development of affordable housing is a complex and challenging task, which faces many barriers and challenges. These include:

- Lack of availability of urban land.
- Excessive control on development of land creates artificial shortage
- Lack of marketable land parcels
- Titling issues and lack of information
- Rising threshold cost of construction
- Lack of access to housing finance for LIG and EWS.

The Indian Government has taken various initiatives to bridge the housing gap between demand and supply of housing for urban poor. The Govt. programmes that have included affordable housing are:

- National Urban Housing and Habitat Policy (NUHHP), 2007



- Jawaharlal Nehru National Urban Renewal Mission (JNNURM)
- Affordable Housing in Partnership (AHIP)
- Interest Subsidy Scheme for Housing the Urban Poor (ISHUP)
- Rajiv Awas Yojana (RAY)
- External Commercial Borrowing for Affordable Housing
- Housing for All Mission

The recent initiative is **Prime Minister Awas Yojana (PMAY)**, which targets to provide houses to all population by 2021. Total housing shortage envisaged to be addressed through this mission is 20 million, to cover the housing shortage.

The Mission is being implemented during 2015-2022 and provides central assistance to Urban Local Bodies (ULBs) and other implementing agencies through States/UTs for:

- In-situ Rehabilitation of existing slum dwellers using land as a resource through private participation
- Credit Linked Subsidy Scheme
- Affordable Housing in Partnership
- Subsidy for beneficiary-led individual house construction/enhancement.

However, PMAY does not distinguish between TOD affordable and housing, and the rest of the city, as has been done in the TOD policy.

### 4.3 TCD and Affordable Housing

It is established that housing, or more precisely affordable housing, is an essential component of Transit Corridor Development, especially at the city level. The entire development area of affordable housing in TOD is based on a different definition of affordability, which takes into account not only housing, but transportation costs as well.

Preserving and building affordable housing near transit enables a household to save money on both transportation and housing expenditures (*Centre for Transit-Oriented Development, 2009*). Therefore, it is important to provide for inclusion of affordable housing in Transit Corridor Development, particularly in country like India, where there is a shortage of affordable housing. The National TOD policy needs to be implemented in spirit to achieve this objective.

The next section explores the implementation of TOD within the case study of Delhi.



## Chapter 5: Transit Corridor Development and Affordable housing in Delhi

### 5.1 Delhi in its developmental context

Delhi, the capital of India, is one of the largest and fastest growing urban agglomerations. Delhi is the capital city of India and second largest metropolis of the country situated in northern part of the country between the latitudes of 28°-24'-17" and 28°-53'-00" north and longitudes of 76°-50'-24" and 77°-20'-37" east. The city shares borders with the states of Uttar Pradesh and Haryana.

The National Capital Territory of Delhi has a total area of 1483 sq. km. of which 1110 sq km is urban, and the rest is rural. It has a total population of 16.75 million persons, of which 16.37 million is living in urban area. (*Statistical Abstract of Delhi, Govt of NCT of Delhi, 2014*)

Delhi has developed rapidly into an urban agglomeration encompassing the surrounding smaller urban centers as well. As per census of India, the population of Delhi has witnessed steep rise from 1.74 million in 1951 to 16.75 million in 2011. The average annual exponential growth rate of population of Delhi during 2001-2011 has been recorded as 1.92%. The overall population density of Delhi has increased from 9340 persons per sq.km. in 2001 to 11320 persons per sq.km in 2011, which is highest as compared to All India and other States/UTs. The urban density is even higher, at 14694 persons per sq. km. (source: Census of India, 2011). In terms of spatial development, the city has grown more horizontally than vertically due to controls on built form. Due to low density and expansion of the city into surrounding areas the travel distance, number of daily trips, traffic congestion, energy use, pollution, etc. are increased.

Apart from its population, bordering towns such as Gurgaon, Noida and Ghaziabad also share a symbiotic relationship with the main city. Delhi is a car centric urban agglomeration, with a 6.93 million registered vehicles in 2011. It has about 420 vehicles per 1000 persons, one of the highest car ownership patterns in the country.

Delhi has recently invested in a vast public transport system in the past decade, which includes an excellent metro system, but still it is unable to make people shift to public transportation. The public transport is the last preference of mode of travel for majority of people living in the city, the major reason behind this is lack of last mile connectivity and lack of safety for pedestrians, cyclists and women in the city.

The Government of India and Government of Delhi have taken initiatives for improving the urban situation in Delhi by introducing Metro Rail connectivity in Delhi to promote public transport and make easy transportation to inter and intra commuters of city. Still, the city witnessed for having high private vehicle usage and is among the most polluted cities in the world. Delhi master plan aims to have a 80:20 shift to public transport in the future, which seems like a dream at the moment. A study by RITES India has put the public transport to private vehicle ownership at 45:55 in 2008.



## 5.2 Need for Affordable housing in Delhi

In almost all the Indian Metro Cities including Delhi, slums and urban poverty are critical issues. As per the census of India 2011, 14% of Delhi's households are living in slums. Around 17.9 lakhs persons reside in slums in Delhi.

14.2% of Delhi's population, i.e 23.3 lakh persons are below the poverty line in Delhi. Out of which 22.9 lakh persons reside in the urban area of Delhi. (Delhi Govt. Estimates, 2010). These statistics show the severity of the problems related to population growth and urban poverty faced by Delhi. The impact is visible in the city's urban fabric as well. The city has rapidly sprawled into a huge urban agglomeration, where commuting is a nightmare. Delhi has a long history of forced eviction of 'illegal' squatter or slum communities, and an equally long history of immigration into the city. The low-income population was originally living in "illegal" squatter settlements, slums, or Jhuggis due to inadequate affordable housing supply for them in the Core City.

Displaced low-income population is most often shifted to the outskirts of the city. This puts tremendous pressure on the transport infrastructure of the city as well as on the economy of low-income group. Moreover, secondary sources of family income (women working locally, etc.) are often severed, thus making the family poorer. Children are disconnected from schools and new social and physical; infrastructure is not provided. Shared amenities originally available in the city centre are also out of reach after relocation. The above situation often forces the poor to move back into the city and live as squatters or slums in dilapidated conditions again, just to be close to jobs & amenities. (*Housing and Land Rights Network, Habitat International Coalition*)

For the poor, housing and transportation are two major costs in their budget. It is therefore very important that low-income communities be located near their sources of employment to reduce their transportation costs and are "mixed" with other income groups in order to reduce social segregation and stigma and build civic pride.

TOD aims at bringing up a mixed residential area in the community. It aims to ensure a minimum supply of affordable housing options for LIG and MIG within the influence zone, within walking/cycling distance from the station and in close proximity to the employment and recreation. In this context,

TOD development, which is now part of the Delhi Master Plan policy, is very important to Delhi in this context, and can be a great opportunity to provide affordable housing, as part of the densification process. But, it needs to be seen whether policy and planning instruments of the TOD policy are in line with this requirement.



### 5.3 The MRTS Network

Delhi Mass Rapid Transit System, popularly known, as the Delhi Metro has been instrumental in ushering in a new era in the sphere of mass urban transportation in India and it is serving the National Capital Region (NCR) of India. The Delhi Metro network is set to emerge as the seventh largest in the world after the completion of Phase III, with 241 stations by 2016-17.

DMRC has been certified by the United Nations (UN) as the first Metro Rail and Rail based system in the world to get carbon Credits for reducing Green House gas emissions as it has contributing significantly towards controlling pollution 6.3 lakhs tons every year and helped in removing about 3.9 lakhs vehicles from the streets of Delhi and it has been selected as one of the six Indian projects to feature in the prestigious “Infrastructure 100” (*World Markets Report*” compiled by KPMG). In addition, Delhi Metro was ranked 2nd among 18 international Metro systems in terms of overall customer satisfaction in an online customer survey conducted among the commuters of those Metro systems by ‘Global Metro Benchmarking Groups’, ‘NOVA and CoMET’ in May, 2014. (source : *Delhi metro*)

Currently, Delhi Metro, operates on six lines, making more than 2,000 trips a day, carrying over 2.7 million commuters every day. Presently the Delhi metro network consists of 213 kms with 154 operational stations along with 6 more stations of the airport express line (2016 Data). Delhi Metro was a major step in the modern urban transportation in the capital. The DMRC was first registered in 1995 and opened its first corridor between Tis Hazari and Shahdara in 2002. The network has now crossed the boundaries of the Delhi and have spread to Noida and Ghaziabad in Uttar Pradesh and Gurgaon and Faridabad in Haryana. Within 20 years of span Delhi metro rail has turned into a life line for the city and a key transport mode for the Delhi commuters.

Pink line is a part of Delhi Metro Phase III network, which is under construction. This line runs along the ring road. Hence, the Pink Line is also known as the Ring Road Line, as the entire line passes alongside the busy Ring Road in Delhi, that witnesses massive traffic jams every day. It consists of 38 metro stations from Majlis Park to Shiv Vihar, both the stations are in North Delhi. The Pink Line with a length of 58.59 kilometers will be the longest line in Delhi Metro, breaking the record set by the operational Blue Line. It will be mostly elevated and will be covering Delhi in an almost 'U' shaped pattern.

The present MRTS network pattern for Delhi is shown in the map on the next page:







## 5.4 : TOD in Delhi – The Policy Framework

Despite the success of the Delhi Metro, the transportation problems of Delhi keep mounting. The planners in Delhi recognized the need for a new thinking. In this regard, the Delhi master plan provides the statutory framework for the city of Delhi. In this context, the Delhi Development Authority has recently come up with a Transit Oriented Policy, which has been added as a separate chapter in the Master plan of Delhi (MPD 2021) (Chapter 19).

The concept of Transit Corridor Development is relatively new to India compare to countries in Europe, North and South America etc. In the past few decades, Transit-Oriented Development (TOD) has emerged as a popular and influential planning concept in the world. If successful, the Delhi TOD policy will become a precursor of all such policies in India. In this context, it is important to study and understand various aspects of this policy as applicable to TOD.

The Chapter 19 of Delhi Master plan stated, *“The city has a very long history of auto-centric planning which prioritized segregated land uses, low density sprawl and large non-walkable block sizes. The supply of extra wide roads with heavily encroached footpaths/ cycle tracks, discourage non- motorized travel modes and ensure that the citizen is auto-dependent. The result has been an exponential growth in private motor vehicle ownership, and a corresponding increase in pollution and congestion, with loss of man-hours and increase in urban poverty.... Major arterials of the city are currently down to 10 km/hr average speed in peak hours, which essentially means that we have hit gridlock.”*

The policy suggests a paradigm shift in the way Delhi is planned – a shift towards Transit Oriented Development. The policy defines TOD thus ***“Transit Oriented Development is essentially any development, macro or micro, that is focused around a transit node, and facilitates complete ease of access to the transit facility, thereby inducing people to prefer to walk and use public transportation over personal modes of transport”.***

**The Primary Goals of TOD are to:**

- Reduce/ discourage private vehicle dependency and induce public transport use – through design, policy measures & enforcement.
- Provide easy public transport access to the maximum number of people within walking distance –through densification and enhanced connectivity.

The policy has stated certain benefits accruing from the development for the city of Delhi, including housing for all ( given in box) . These principles are laudable, and are in line with the TOD policy of Delhi, but on ground implementation remains to be seen.



**BOX: BENEFITS OF TOD FOR DELHI (MPD, 2021)**

**Mobility Options for all** - Change the paradigm of mobility by enabling a shift from use of private vehicles towards the use of public transport and alternative modes helps in achieving Clean-Air Quality targets for Delhi and the targeted (public-private transport) modal share in favor of public transportation by 2021, as envisaged in the Transport Demand Forecast Study for 2021.

**Better Quality of Life for All** - Provide a variety of high-density, mixed-use, mixed-income housing, employment and recreation options within walking/cycling distance of each other and of MRTS stations – in order to induce a lifestyle change towards healthier living and better quality of life. Integrate communities rather than segregating them and reduce social stigma and dissent.

**Give Everyone a Home** - Increase the supply of housing stock and commercial space in the city, which would bring down prices and make living and working in Delhi more affordable. (Current Need is to provide approx. 3 lakh new dwelling units per year, with more than 50% of the new housing in the form of 1 and 2 room units with average plinth area of about 25 - 40 sq.m.)

**Market Participates in Better City** - Open up development opportunity to the private sector to bring in investment into the city's growth and revenue, and help cross-subsidize social amenities, affordable housing and public transport, using a variety of possible development models. Low-income groups can be provided space and shared amenities in integrated mixed-income communities, thereby reducing further proliferation of gentrified slums and unauthorized colonies.

**Self-Sufficiency** - Creating high densities would make decentralized infrastructure provision and management techniques more feasible, thus making it more economical to recycle water/sewage locally to meet community needs.

**Cheaper Public Transport** - Provide a significant source of non-fare box revenue for a public transport fund, which may help reduce ticket prices and increase provision of public transport facilities.

**Reduce Environmental Degradation** - Set a clear vision for the growth and redevelopment of the city in a compact manner, by minimizing sprawl (low density spread out development). Help save environmentally sensitive lands and virgin lands through high-density compact development.

**Save Public Money** - Provide savings in public money through reduction of investments in physical infrastructure like additional road expansion, piping/cabling costs, time-cost of traffic congestion and other large costs associated with low-density sprawl.

**Multi-disciplinary Multi-Departmental Approach** - Provide a shift to a more holistic paradigm of planning where all sectors work together – mobility, planning policy, urban design, infrastructure and economics – to deliver integrated development.

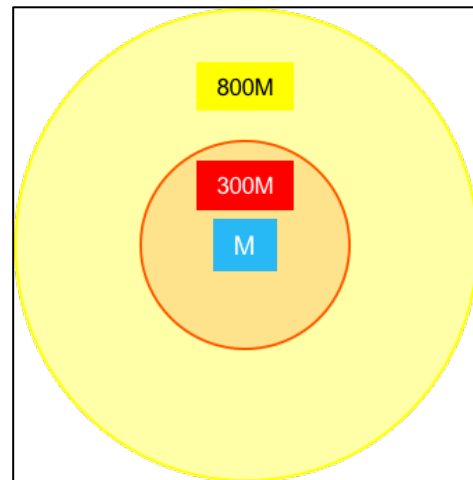


## 5.5 Influence zones

Under the MPD 2021 TOD policy , area around MRTS stations is termed as the influence zone. MPD 2021 had proposed the following influence zones.

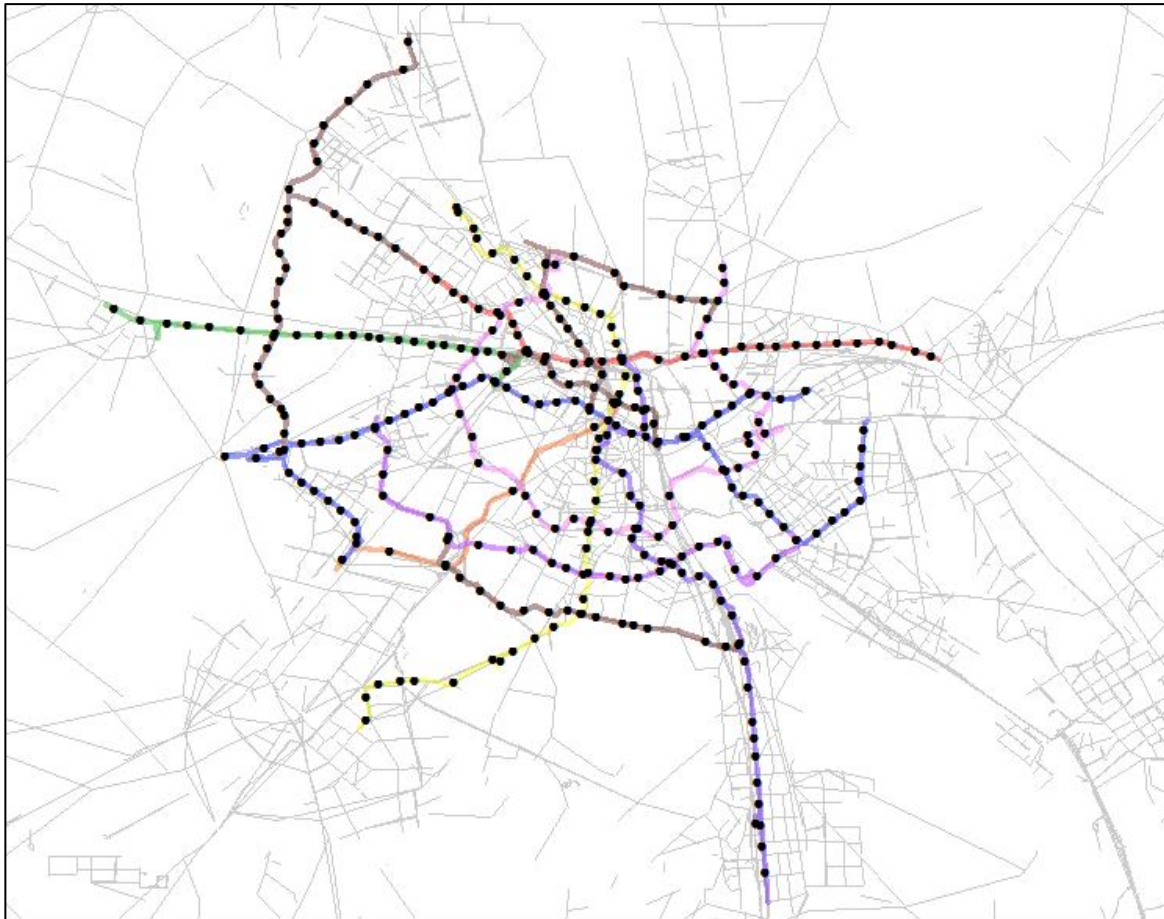
**Table 1: Extents of Influence Zone Delineation**

<b>ZONE 1: Intense TOD Zone</b>
300 M influence zone of all MRTS Stations
<b>ZONE 2: Standard TOD Zone</b>
800M influence zone of all MRTS Stations
<b>ZONE 3:TOD Transition Zone</b>
2000M influence zone of all MRTS Stations



The delineation of these influence zones along the metro corridors will affect the urban landscape, and densities along major transport corridors of almost the entire city of Delhi, as can be seen from the following map showing influence zone delineation along the metro corridors. :

**Map : Influence zones of Metro Stations along Metro Corridors.**





Recent Amendments to MPD 2021 have proposed ***a belt of about 500 m. wide belt on both sides of centre line of the existing and planned/approved MRTS Corridors as Influence Zone, which has been identified in the respective Zonal Development Plans, along with stations.***

It also proposes that the entire approved plan of a TOD integrated scheme will be included in the zone if more than 50% of the plan area falls inside the influence zone. Higher FAR and height can be availed through the preparation and approval of comprehensive TOD integrated scheme. Wherever height is restricted by any regulatory authorities like Airport Authority of India (AAI), National Monuments Authority (NMA) in order to enable the Developing Authority to utilize the permissible FAR, a relaxation in ground coverage and setbacks, without compromising the green public open space i.e. 20%, in such TOD integrated scheme shall be allowed subject to the clearance from Fire department as per Delhi Fire Services Act.

## 5.6. Planning of the TOD Areas

The planning guidelines given under the TOD policy are quite extensive . For the purpose of this research , specific guidelines related to planning are given below:

### 5.6.1 Provisions under DDA's TOD policy:

The provisions planning of TOD areas are in lien with the National TOD policy . The provision mentions that Development/ Redevelopment in TOD zone will be incentivized by providing significantly higher FAR of 400 on the entire amalgamated plot being developed/ redeveloped. However, these higher norms can be availed only for plots of area of 1 Ha or more for which a comprehensive integrated scheme has to be prepared. In contrast, the minimum scheme area for undertaking redevelopment outside TOD zone is 4 Ha.

- Within an approved scheme area in TOD Zone, development can be taken up in phases for minimum plot size of 3,000 m<sup>2</sup> at a time. Minimum scheme area for development by Mass Rapid Transit System (MRTS) agencies such as DMRC, Rapid Rail Transit System (RRTS) and Railways will be 3,000 m<sup>2</sup> Additional FAR through Transferable Development Rights (TDR), has also been given for schemes larger than 1 Ha.

The percentages for housing and other mixes have been fixed by the Delhi Development Authority. It is mandatory to use a minimum of 30% of overall FAR for residential use, a minimum of 10% of FAR for commercial use and a minimum of 10% of FAR for community facilities. Utilization of remaining 50% FAR shall be as per the land use category designated in the Zonal Plan. For example, in residential use zone, of the remaining 50% of overall FAR, at least 20% will be for residential use and other uses are permitted up to 30%. Similarly, in commercial use zone, of the remaining 50% of overall FAR, at least 40% will be for commercial use and other uses are permitted up to 10%.



There are, however, certain restrictions on the Delhi Development Authority (DDA) policy, keeping in view the heritage and sensitive nature of the development in Delhi. Certain sensitive, heritage and low-rise developments left out of the TOD norms. These areas include:

- Lutyens' Bungalow Zone, Chanakya Puri (as per layout plan of New Delhi Municipal Council, L&DO).
- Civil Lines Bungalow Area (as per layout plan of North Delhi Municipal Corporation, DDA).
- Monument Regulated Zone (As per Archaeological Survey of India (ASI) guidelines, development in Monument Regulated Zones shall be allowed under TOD Policy, subject to compliance of National Monument Authority's (NMA) restrictions, if any. If part of any scheme contains a Monument Regulated Zone, the benefit of the FAR can be taken within areas outside the regulatory boundaries within the scheme).
- Zone-O (as notified by DDA)
- Low Density Residential Area (as notified by DDA).

### 5.6.2 The Components of a TOD under DDA policy:

The TOD policy also lays down certain other components of the TOD Development, which need to be included for a holistic TOD Development. These include proposed planning measures and provisions for

#### **Pedestrian and Cycle/ Cycle Rickshaw friendly environment**

**Connectivity:** Create a dense network of paths and streets for all modes. The policy here involves inclusion of the following strategies for TOD:

**Multi-modal interchange:** Mass transportation options servicing the TOD should be well integrated with each other as well as the pedestrian and cycling networks, so that the time spent in modal transfers is reduced to the minimum.

#### **Accessibility Criteria for Social Infrastructure in terms of walking distance to nearest facility**

##### **Minimum Mixed-Use Criteria**

**Parking Policy in TOD for Travel Demand Management:** These norms include public on street and off street parking norms, On street private parking norms, norms for parking at metro stations , Parking space ratios for all new/ redevelopment projects and parking design regulations.

**Place making and safety:** create urban places for enjoyment, relaxation and equity. Under this policy, measures for creating a safe, vibrant, comfortable urban “place”, creating a climate-sensitive street and public spaces , creating “eyes on the street” are included

The policy also includes norms for street edge regulations, setbacks, Minimum frontage, Ground coverage, vending norms, street furniture norms and other urban design controls. The policy lays down a list of desirable and undesirable activities within intense TOD zones. Physical infrastructure and resource standards have also been given. Norms for reducing energy load within the site and at the building level have also been given.

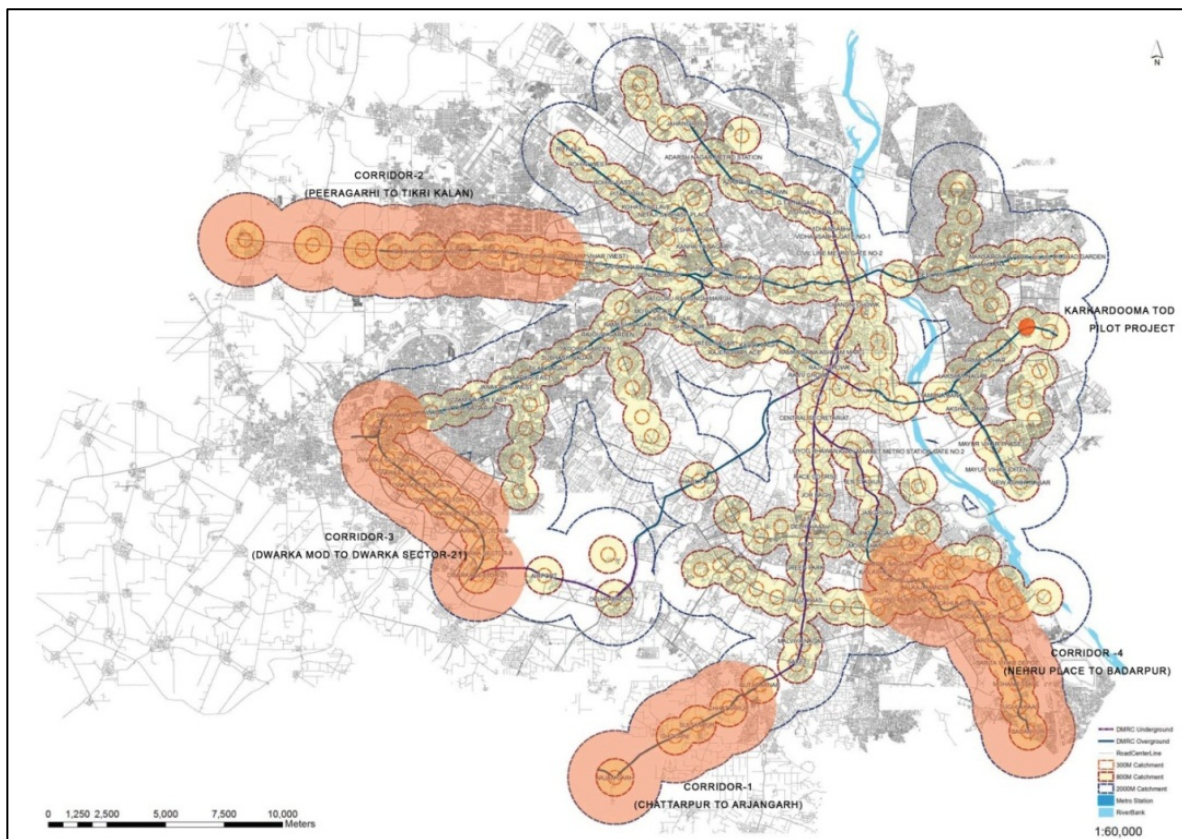


## 5.7 : Transit Corridors proposed in Delhi

While the policy is applicable to the entire stretches along the metro corridors, the policy indicates the priority corridors, which are being taken up for development in the first phase. These include four corridors. ( refer map below)

- a. Corridor 1: Chattarpur to Arjangarh**
- b. Corridor 2: Peeragarhi to TeekriKalan.**
- c. Corridor 3: DwarkaMor to Dwarka Sector 21.**
- d. Corridor 4: Nehru Place to Badarpur.**

**Map 2 : Transit Corridors In Delhi Identified By DDA**



Source: Delhi Development Authority (DDA)

A feasibility study is being carried out on the development on the transit corridors is ongoing. its provisions need to be fully understood from an equity and affordable housing point of view.

## 5.8 Implementation of the TOD policy.

The UTTIPEC (the Unified traffic and Transportation Infrastructure (Planning and Engineering) Centre under the Delhi Development Authority is the agency responsible for policy formulation and coordination for the TODs. They have brought out urban design guidelines for the purpose. The Delhi Development Authority has recently issued regulations for operationalizing the TOD policy.



Under MPD 2021, the TOD has been designated as a separate landuse zone. The local bodies, which will be the municipal corporations in this case, will further notify the processes of undertaking TOD, and shall also set up a *“ring-fenced TOD fund so that additional FAR and EDC charges levied during approval of TOD schemes may be escrowed and used exclusively for the infrastructure upgradation of the area, by transferring the adequate % of funds to service providing agencies, as per local needs”*.

The policy implementation has already started. Under the TOD policy, two TODs have already been approved, one at Karkardooma, and the other at Trilokpuri.

In Delhi however, there is concern on the densification of TOD corridors , and their likely benefits and impacts.

## **5.9 Densification , and provision for affordable housing in TOD Influence zone in Delhi**

A major objective of the TOD policy of Delhi is to promote a High density, mixed-income development to facilitate shorter commutes and travel times, and equity for all sections of society. This is likely to result in densification of the influence zones.

Towards this objective, the TOD policy of Delhi has given certain norms, with the rider that these norms have been made applicable only in Zone 1 – intense TOD, and Zone 2, standard TOD zones, and for new and retrofitted development only.

The highlights of this policy include:

- In order to facilitate most efficient use of land in TOD zones, maximize the population holding capacity of each TOD, to prevent low-density development (sprawl) elsewhere.
- Densification through redevelopment and infill within existing Urban Areas is to be prioritized over development in Urban Extension.
- New growth in urban extension should be in the form of dense growth along MRTS corridors, to create a compact city.
- Underutilization of FAR (below 3.0 and the corresponding minimum density) is not permissible for any new or redevelopment projects.
- Development of empty sites within 800m influence zone must begin within 5years of operationalization of MRTS Station.
- Higher FAR would not automatically result in densification as provision of large unit-sizes would defeat the very purpose of densification. Therefore, it is essential to couple the FAR threshold with a minimum density requirement.
- For effective TOD, high density is more important than increased FAR. Higher FAR would be an effective tool only for redevelopment of low density and/or dilapidated neighborhoods existing along transit stations. FAR should not become a mechanism for gentrification of lower and middle income neighborhoods, by replacing them with predominantly high-income high-priced car-dependent developments.



- Maximum permissible FAR and densities in various TODs shall be based on the capacity of public transport modes, circulation network and the physical infrastructure thresholds of the area.
- New FAR allowances above current caps can be taxed or otherwise monetized to fund infrastructure while increased future property taxes could fund operation and maintenance of public transport systems.
- A TOD Cess may be levied to fund public transport facilities and infrastructure management cost of the development. Revenue sharing as well as infrastructure maintenance models to be worked out based on Initial projects taken up.

The norms here propose that

- The minimum standard for gross density permissible for any TOD project is 250 du/ha.
- Higher FAR and density norms permitted as per the following table.

**Table 2: Permissible FAR and Density**

Gross FAR (site)	Minimum permissible density (with $\pm 10\%$ variation)	
	Residential dominated project (Residential FAR $\geq 50\%$ )	Predominantly non-residential (Residential FAR $\leq 30\%$ )
Below 1.0	Under-utilization of FAR (not permitted)	Under-utilization of FAR (not permitted)
1.1 - 2.0	200- 400 du/ha	100 - 200 du/ha
upto 3.0	400 - 600 du/ha	250 - 400 du/ha
3.1 - 4.0	600 - 800 du/ha	400 - 600 du/ha

\* Site level FAR shall be based on Approved TOD Influence Zone Plan (Source: UTTIPEC, DDA)

Recent amendments to the Master Plan of Delhi 2021 have changed the above provision. **Now, for any integrated scheme, a max. FAR of 400 and a maximum density of 2000 persons per hectare (PPH) i.e. approx. 450 du/ha is permissible. The entire amalgamated plot will be considered for calculating the FAR and density.**

FAR utilization shall not be less than 200. **Mandatory EWS FAR of 15% over and above the maximum permissible FAR shall be applicable.** Additional FAR may be availed through TDR only, for schemes larger than 1 Ha. shall be applicable.

The policy further specifies that “For ‘Redevelopment’ projects within the Intense or Standard TOD Influence zones, FAR-Density bonuses permitted only if:

- Existing density is  $\leq 250$  du/ha.
- If existing gross density is greater than 250 du/ha, FAR-density bonus may be availed only if the area is notified for redevelopment (e.g. slums, unauthorized colonies, special areas, etc.). Retrofitting for better access and physical infrastructure provision in these areas may also be required.”



Norms for provisions and development of open spaces are also laid down under this policy.

The TOD policy of Delhi has made provisions for distributing the benefits more equitably. The initial policy has included the provision that *“A mix of Housing types has also been proposed for a wide range of income brackets within communities with shared public spaces/ greens/ recreational facilities/ amenities, which will minimize gentrification and create more community-oriented developments.”*

The TOD policy had further proposed that the mandatory residential component covering 30% FAR shall wholly comprise of units of 65 m<sup>2</sup> area or less. Out of these half of the FAR, i.e. 15% of the total FAR, had to be used for units of size ranging between 32-40 m<sup>2</sup>. Over and above this, an additional mandatory FAR of 15%, i.e. FAR of 60 was proposed for Economically Weaker Sections (EWS). The size of EWS units will range between 32-40 sq.m.

Recent amendments have, however, diluted this provision . Now, it is proposed that:

- The minimum component of 30% residential shall comprise of units not more than 93 sq.m. (1000 sq.ft.).
- Within the 55% flexible use, in case Residential use is provided, Developer would have the option to provide homes of any/larger size, as per the demand.
- EWS FAR of 15% over and above the permissible FAR will be applicable.
- Minimum requirements for 30% Residential and 5% Commercial will not be binding on Transportation, Government and PSP land uses.
- The mandatory facilities and commercial component shall include the requirements of the residential population in that land parcel.
- In case of transportation and public and semi-public facility plots, the development control norms shall be as per lease conditions.

At another place , the policy states under **Minimum Housing Mix Criteria (by Unit Sizes)** that *“A minimum supply of affordable housing options for low and medium income population within walking/ cycling distance of Stations, and in close proximity to sources of employment and recreation must be ensured. “*

The strategies under this policy include:

- Minimum 15% of FAR for all TOD projects to be allocated to rental or for-sale housing with unit sizes no larger than 25sq.m.
- Through policy, architectural design and monitoring mechanisms, the affordable housing stock within TOD zones is to be preserved.

An analysis the two proposed TODs at Karkardooma and Trilokpuri is done below to understand how the policy is being interpreted at project level.



## 5.10 TOD at Karkardooma and Trilokpuri – Inclusion of Affordable Housing

The Delhi Development Authority has sanctioned the first two Transit Oriented Development Nodes in the city. These are both stand-alone developments. The available plans and details are discussed here briefly:

### 5.10.1 Karkardooma TOD

The Karkardooma project is proposed on a land parcel of 30 hectares located in East Delhi, adjacent to the Karkardooma Metro Station. The proposal was approved in 2014. It is Delhi's first TOD project. The plan has been prepared by the National Building Construction Corporation, in collaboration with DDA.

The highlights of the project are as follows:

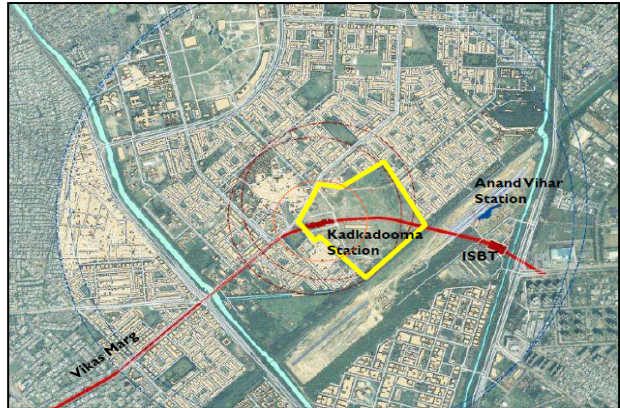
The developable site area is about 28.78 Ha, after excluding a bus terminal, a high school and primary school already located on the site.

This land has been proposed to be used as follows:

- 54% under Mixed use blocks
- 20% under green
- 22% under roads and circulation
- 4% under utilities

The gross FAR of the site achieved is 2.0. A 24 m zonal road is proposed to be extended upto the site under the project. The project claims to have strong urban design features reflective of TOD development such as:

- A circular skywalk connecting the project to metro,
- Mix of low rise and high rise- high density development including an iconic 60 storey



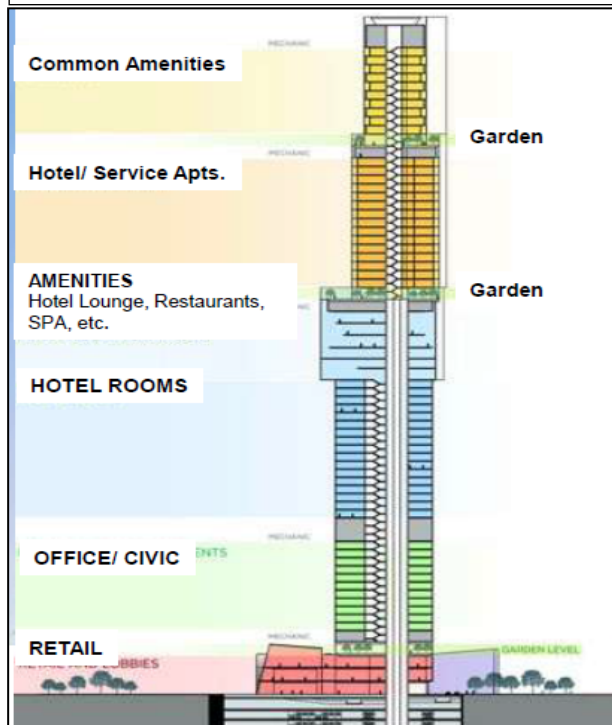
**Map 3- Location of Karkardooma Station.**

Source: UTTIPEC, DDA



**Figure 9- Concept View of Proposed Karkardooma TOD.**

Source: UTTIPEC, DDA



**Fig. 10 Concept Section of Karkardooma TOD- Vertical Mixing of uses**

Source: UTTIPEC, DDA



tower,

- Mixed use development, including vertical mixing
- Shared parks with windows of blocks facing the street based on the eyes of the street concept,
- No setbacks and boundary walls for commercial areas,
- Solar access for the blocks within the project,
- Improved accessibility within the site by network planning for reducing walking time to major facilities, and
- The high-rise blocks are proposed with retail at lower floors, commercial on middle floors and residential on the higher floors.
- The proposed town houses also have a live and work design.

The implementation of the project is proposed in partnership mode, between the Delhi Development Authority (DDA) and the National Building Construction Company Ltd. (NBCC). These two agencies, both under the Ministry of Urban Development, Govt. of India, have already been collaborated earlier for development projects in Delhi, as in case of the East Kidwai Nagar Development. The approved DDA project document states the model of development as follows:

- ***“NBCC will not invest anything and there will not be any share on sale realization. NBCC will do entire planning of the project DPR etc. for approval of Govt. This model is similar to the one adopted by NBCC for development of East Kidwai Nagar. The project cost shall be met from sale of the built-up spaces.***
- *NBCC may take up Project Management Consultant (PMC) on behalf of DDA for implementation of the project and would charge mutually agreed fee for rendering services towards PMC.*
- *NBCC in consultation with DDA, shall be responsible for formulating the sale methodology of the built-up space i.e. sale price of built-up space, saleable areas, terms & conditions of sale, phases of sale & timing of such phases preference to Govt. bodies/employees may be given in consultation with DDA. NBCC shall charge mutually agreed marketing fee on sale realization.”*

After the approval of the project, NBCC has been asked to prepare a detailed project report for the Karkardooma scheme, on the lines of the East Kidwai Nagar Housing scheme of MOUD, for consideration of the DDA.

Since 70% of the site falls within the TOD zone, the project has been planned as a TOD project. Under the project, as the use of the land is residential, the norms of minimum 50% residential, 10% commercial, 10% under facilities and rest under uses as per market demand applies. The land distribution shows that the distribution of residential has been broadly followed.

Regarding provision of affordable housing, the DDA-TOD policy specifies the following:

*“Minimum 15% of FAR for all TOD projects to be allocated to rental or for-sale housing with unit sizes no larger than 25 sq.m. of this, minimum 5% should be of one of the following types:*

- Units with only kitchen and no attached toilets. Toilets to be provided as a shared facility on every floor, segregated for male and female.*



- ii. *Units with shared kitchen and dining space as well as shared toilet facilities. Maximum 8 units to a shared kitchen and toilet/ bathing facility.*
- iii. *Dormitories with shared toilets and kitchens.*
- iv. *Hostels*
- v. *Daily rental homes, which may be rented in shifts.”*

The project documents state that the project has provided 5% of FAR for the housing typologies stated above and 10% for units of 25 sq.m. However, the proposed units seem to be mainly located in the transit village zone, close to existing EWS development outside the site, which does not promote harmonious integration of the affordable housing.

### 5.10.2 Sanjay Lake TOD at Trilokpuri

The Delhi Development Authority has approved a proposal regarding Lake View Complex at Patparganj/ Trilokpuri based on TOD development norms. The area of the total pocket of land for the proposal is 10.26 Hectares. Out of which provisions have been made for a fire station, petrol pump, police post and the Trilokpuri Metro Station. Remaining land of nearly 8.82 Hectares is proposed for development.

As per the approved proposal, the land is proposed to be used as follows:

- 45% of total land area of 10.0 Ha. under Mixed use blocks
- 20% under green
- 20% under roads and circulation

The proposal involves development near the existing Sanjay Lake in the capital. The implementation of the project is proposed on a model similar to the one being followed for Karkardooma.

The site is located in a socially vulnerable, crime prone area, where previous commercial development on the site has not been successful. DDA intends this development to have a transformative role in the area.



**Map-5 Landuse of Sanjay Lake TOD Area**

Source: UTTIPEC, DDA



**Figure 11- Concept View of Proposed Sanjay Lake TOD.**

Source: UTTIPEC Cell, DDA



The proposed site falls under Commercial use zone as per the master plan. More than 50% of the site falls within the influence zone of 300 m, so the norms of TOD have been applied in the project. The proposed development seems to have high-rise development, with mixed use proposals. DDA has planned it as an integrated project, including not only commercial uses but also residential uses. These include old age homes, service apartments, hostels etc. One of the state benefits of the project is to have eyes on the park as well, increasing the sense of security among visitors to the park. This development is proposed to make this underutilized & crime prone area into alive and safer area for the residents. The catchment area of the Sanjay Lake will not be affected by the project as per the authorities.

There is no specific mention, among all the grand plans that how the service population and the low-income groups will be benefitted from the project, and whether affordable housing has been accommodated.

### 5.11: TOD Policy of Delhi – A critique

Delhi is a large auto-centric city, which leads to many problems for the urban agglomeration. TOD policy brought out by Delhi is quite comprehensive; however, it is also restrictive and vague in actual operational details. It has also left out the New Delhi Municipal Corporation (NDMC) area, which is the heart of the city and has among the lowest densities in the city. The policy is also restrictive in not allowing individual private owners to take the benefits of densification.

The projects approved under the plan also show a piecemeal approach to TOD rather than a corridor specific approach. While the projects are quite innovative and visionary in many ways, the strong urban design oriented approach seems to have marginalized the concerns for affordable housing, which should have had a strong focus in the projects. The actual impacts in terms of equity and affordable housing can be analyzed only after development.

**While the policy has a complexity, making it difficult to understand and comprehend, the crux of the policy ensures that there will be densification along the Transit Corridors in Delhi. It will be difficult under the current policy framework for the individual private land owner to take the benefit of this densification, but it is a realistic possibility in the lands owned by public authorities or the Delhi Metro authority (DMRC) considering the land prices in Delhi. In fact, the process has already started. it will be an attractive proposition for both the developers and the land owning agencies to step into this densification process.**

**It is not clear how affordable housing will be made part of the TOD process. There is a need to ensure that the Govt policy of “Housing for All” is reflected in the TOD process, and it does not become a densification exercise which will end in congestion, and gentrification, resulting in ultimately losing the public benefits which were to accrue from the policy.**



## Chapter 6- Assessment Of Potential For Densification Along Transit Corridors In Delhi

In order to assess the potential of Transit corridor development in Delhi, two case studies in existing low-rise residential areas of Delhi around the existing or proposed metro corridors are identified. One case study is of an area with low density with mainly comprises of Govt. residential housing, and the other case study is of a typical low to medium density with mainly private housing. These areas are specifically selected to assess the possibilities of re-densification and redevelopment in the corridor areas.

The objectives of this project include preparation of a re-densification strategy and suggestion of strategy for reservation of land for housing the urban poor. Therefore, the case studies have been taken from areas, which are inner city, and well-connected neighborhoods, where housing for the urban poor is difficult in normal development scenario, in order to be able to suggest a re-densification strategy, which is inclusive of the urban poor.

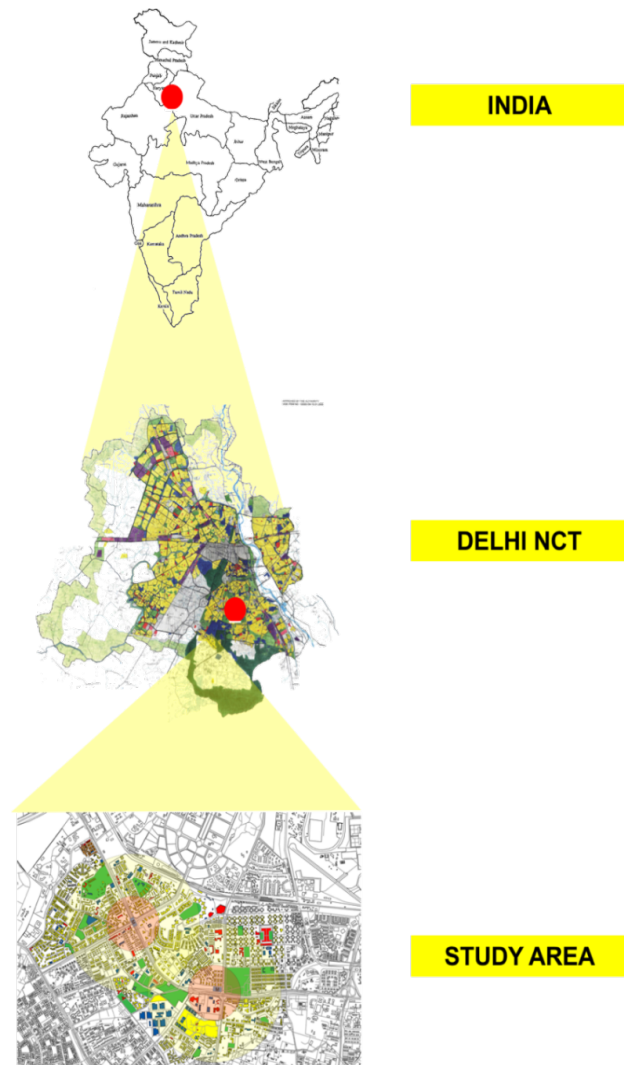
### 6.1 Case Study Area 1 - Influence Zone Along Transit Corridor Between Moti Bagh To Bhikaji Kama Metro Stations

#### Introduction to Area & Location

The area, falling in South Delhi has Govt. housing, offices, open spaces. The area has been selected as a case study area due to its connectivity, location in the core city of Delhi, and the availability of Govt. Housing.

The stretch considered is a part of the under construction Phase III metro network, called as **Pink line**, which will be the longest line in Delhi metro, with 58 kms and 38 stations. It runs along a major transportation artery of Delhi, the inner ring road.

Moti Bagh is a residential colony in the South district of Delhi. It was developed in 1970's and comprises of two parts south Moti Bagh and North Moti Bagh. Moti Bagh. Bhikaji Kama is a district centre, as per the Master



**Map 6: Location of Case Study Area-1**



plan of Delhi, and part of original eight District centers which were developed in Delhi. It has commercial use, with offices, hotels and retail use located in it. The area falling in between the two stations is characterized by low- rise, low-density development and is mostly residential in nature.

### Connectivity

The area is well connected by road and buses, with the inner ring road, which is the city's major transport artery going right through its centre. The study area consists of 13 bus stops throughout the ring road from Motibagh, Guru Nanakpura to Africa Avenue.

The phase III metro line, which is going to run along the ring road is already under construction, and expected to be operational by 2017. Motibagh to Bhikaji Cama are connected through Metro Pink Line. The layout is elevated at Motibagh and underground at Bhikaji Cama. Fig. 4 and 5 shows the ongoing construction of both the Metro Stations Motibagh (Fig.4) and Bhikaji Cama (Fig.5).



Figure 12- The ongoing construction of Motibagh Metro Station



Figure 13- The ongoing construction of Bhikaji Cama Place Metro Station



### Delineation of the Stretch of Corridor for Study

The corridor stretch to be studied has been identified, considering the conceptual influence zones indicated by the DDA TOD policy. The influence zones around both the metro stations have been delineated considering the 300 to 800 m area around both metro stations (Fig. 14). The outer influence zone (800 m) of the two stations overlap, creating a shadow zone.

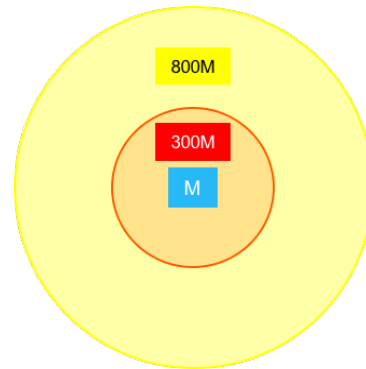
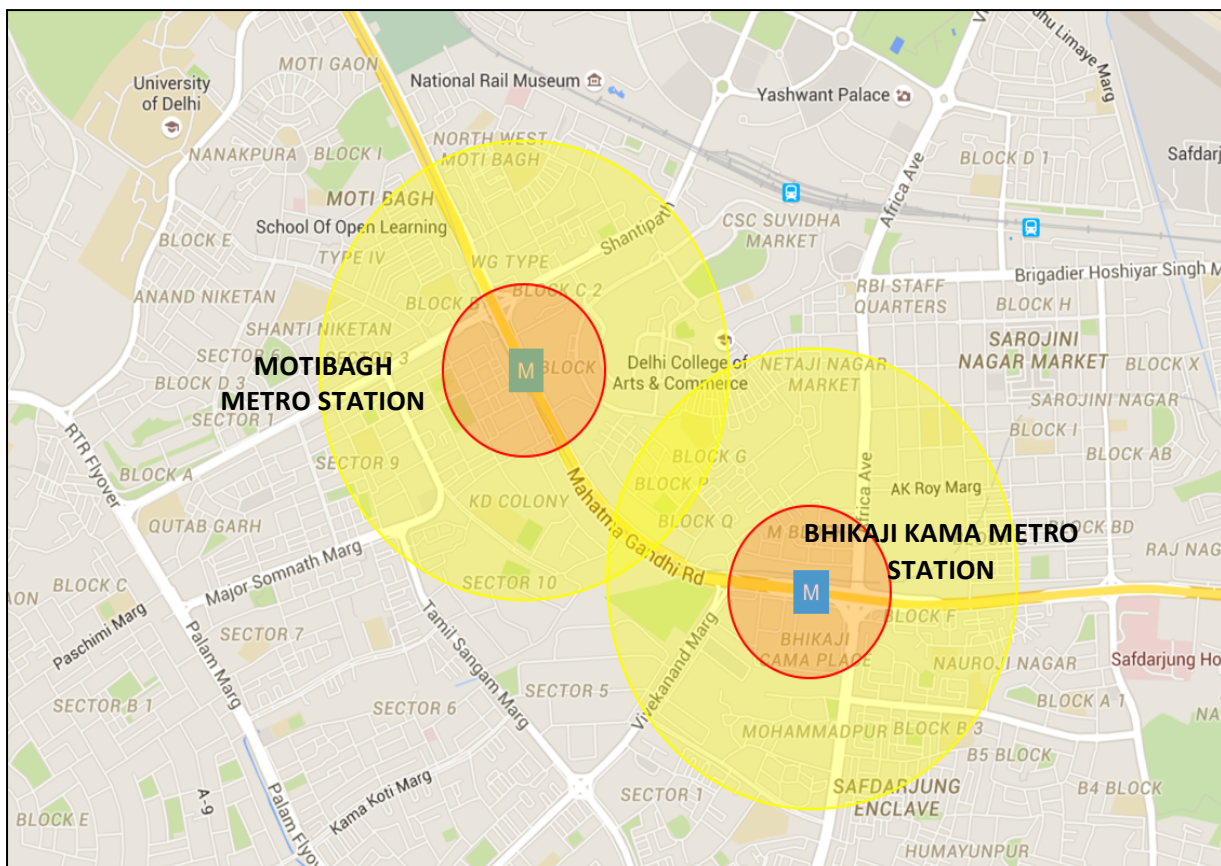


Figure 14: Delineation of Influence Zone

While presently the TOD policy of Delhi demarcates a 500 m influence zone on both sides of metro corridor, for the purpose of this study, a circular zone of 800 m wide radius from the metro station has been taken, considering a walkable zone (about 10 m in walking distance from the metro station)



Map 7: The Transit Corridor Stretch Selected for Study.



### Proposed Landuse from Master plan of Delhi 2021

As per the master plan landuse, the area falls in the residential zone, with holding capacity/ proposed density varying from 350 DUs per ha to 450 DUs per ha for the residential use.

As per the proposed Master Plan of Delhi 2021, there is also presence of commercial use - Community Centre in the area. Urban Village areas also fall in the delineated influence zone.

### Existing Character of the Area

The area has a mix landuse character. It is mapped in the study to understand its building use patterns. Presently, the area is predominantly residential, with considerable presence of commercial use.

The area also consists of a slum cluster. Fig. 15 shows the access street used to enter the jhuggi (slum) cluster. The Informal market is settled along this street, adjacent to the Gurudwara in Guru Nanak Pura.

### Existing Landuse

The study area consists of residential (including urban village) , commercial, public-semi-public uses and open spaces. Out of the total study area, 66% of area falls under residential, 8% area under commercial, 7% area under public-semi-public, 19% under open space (fig.16).

the predominant use is Residential with 66 % of land under it. Bhikaji Cama place is a commercial hub. This results into considerable traffic flow in the influence area. The area also consists of many Govt. residential colonies. These colonies are of low density and have the potential of redensification. The large open spaces are available which includes Bhimrao Ambedkar Park adjacent to the Bhikaji Cama Place and another near the Gurudwara in Guru Nanak Pura.



Map 8: Master plan Landuse of Case Study Area-1.



Fig. 15: Informal Market along the access street of Jhuggis

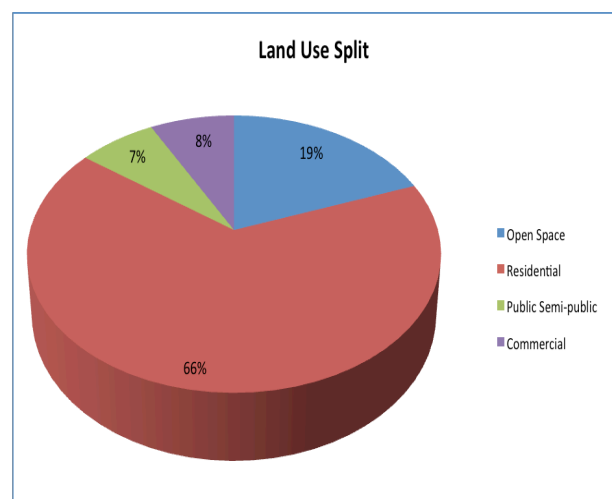
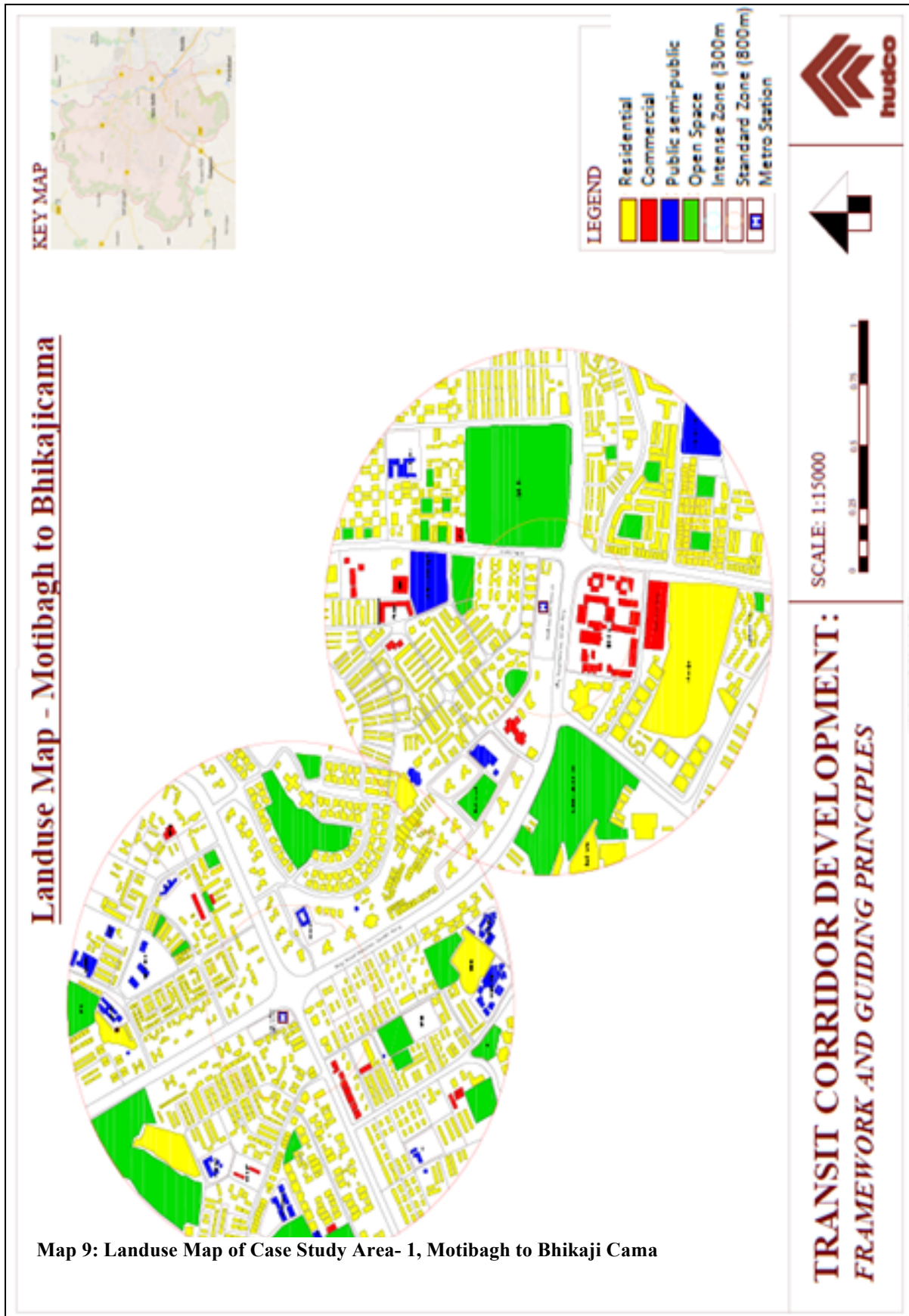


Figure 16: Existing Landuse of the Case study area -1 (Source: Site Survey by HSMI)







## Existing Building Heights

The analysis of building heights results that the area is mostly low-rise in character, with predominance of G+1 and G+3 housing. Fig. 17 shows the split of the building height of the study area. Building height varies from G to G+12. The areas like Bhikaji Cama Place and Sarojini Nagar consists of highrise buildings. New Motibagh and South Motibagh has relatively low rise. Mohammadpur village has the compact high rise with an average building height of G+3.

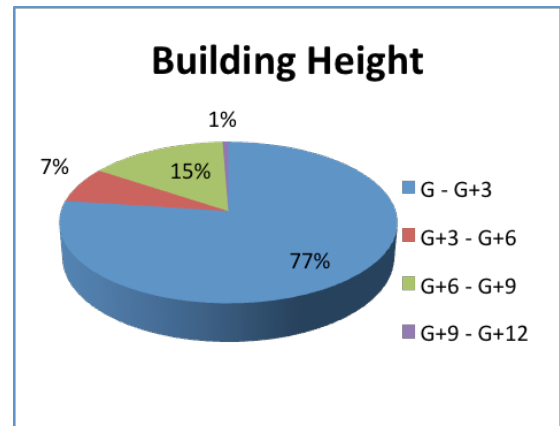


Figure 17: Existing Building heights in Case Study Area-1



Figure 18: Existing Building heights in Govt. Colonies near Mohammadpur Village



Figure 19: Existing Building heights in Mohammadpur Village

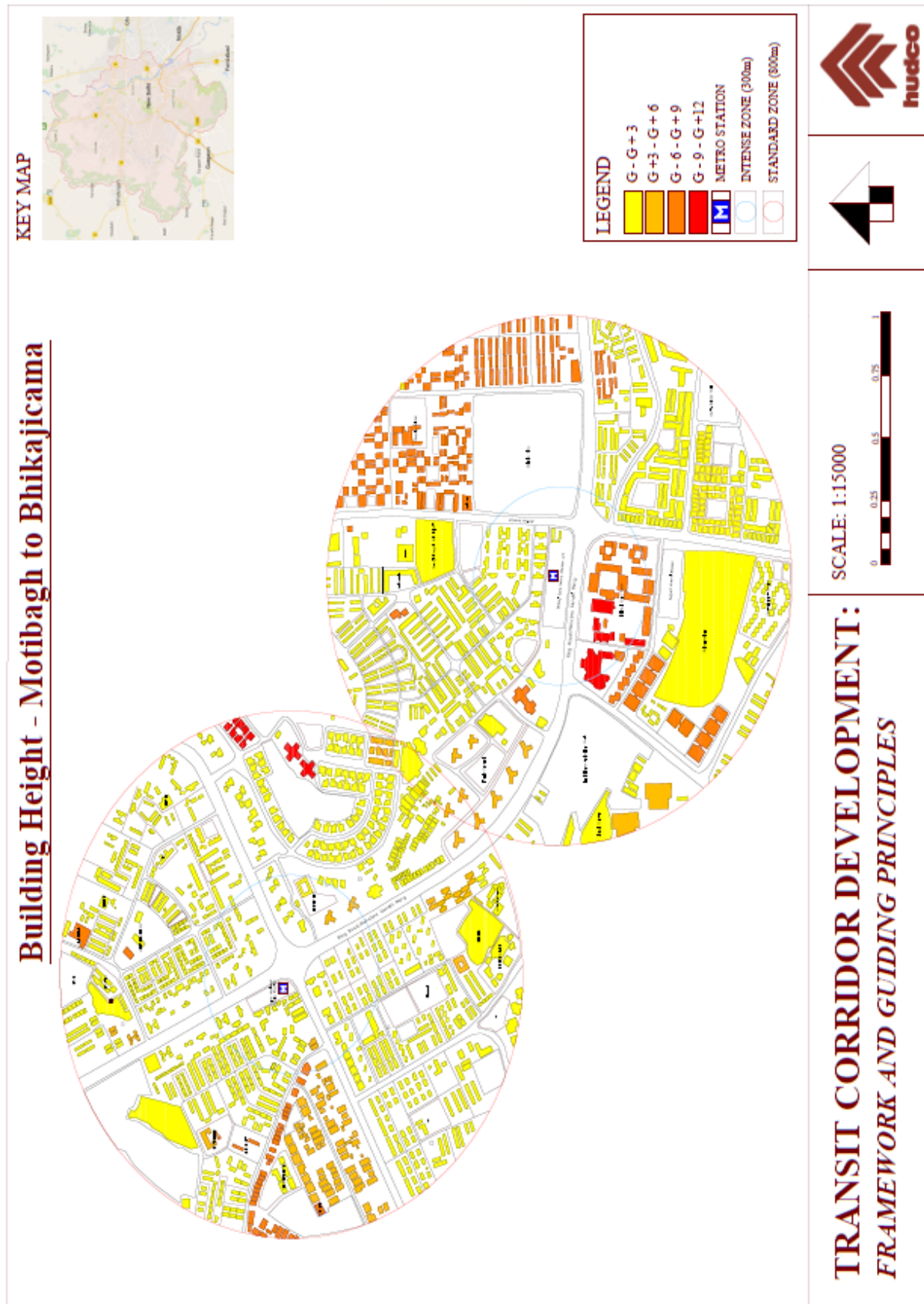
Fig. 18 shows the building height (G+1) with old building structure in government colony near Mohammadpur village. This area has the high potential of redevelopment within the influence zone. Densification can provide a good number of dwelling units in this area.

Fig.19 shows a compact high rise in the Mohammadpur village. Fig. 20 shows high-rise commercial hub at Bhikaji Cama place.



Figure 20: Highrise Commercial Hub at Bhikaji Cama





Map 10: Building Height Map of Case Study Area- 1, Motibagh to Bhikaji Cama Place



## Housing Typologies

Primary survey revealed that the area has a diverse housing typology such as plotted housing, group housing, government colonies, Jhuggis, urban villages etc. All the government colonies including Sarojini Nagar, New Motibagh, sector 13 have group housing whereas Naoroji Nagar and Safdarjung Development Area have plotted housing. Some of the areas have both group and plotted housing both.

Most of the govt. housing is quite old, and has potential to be redeveloped. In fact, The process has already started.

## Existing Densities

Most of the area have very low density including New Motibagh, Sector-9, Sector-12, Sector-13, Block- B, C , B2, A2. Shanti Niketan, Block E and F have the medium density. Overall density of Motibagh area and Bhikaji Cama Place area is 96 person per hectare and 65 person per hectare respectively.

**Table No-6 Density Analysis of the Case Study Area-1**

Location	Area	Estimated No of DUs	Population	Estimated Existing Density	
				DUs/Ha	Person/Ha
New MotiBagh	30	396	1782	13	59
Sector 13	25	427	1922	17	77
Sector 12	30	400	1800	13	60
Sector 9	15	128	576	9	38
MotiBagh South	23	936	4212	41	183
Shanti Niketan	18	647	2912	36	162
Block - A	4.3	172	774	40	182
Block - B	4.8	78	351	16	73
Block - C	6.9	72	324	10	47
Block - D	1.5	82	369	55	246
Block - D1	2	36	162	18	81
Block - E	6.5	144	648	22	100
Block - F	7.6	214	963	28	127
Block - B1	5.9	194	873	33	148
Block - A2	5.7	74	333	13	58
Block - B2	6.3	66	297	10	47
Block - C2	4.5	176	792	39	176
Block - D2	3.8	204	918	54	242
Block - F2	8	576	2592	72	324
Block - G2	4.2	122	549	29	131



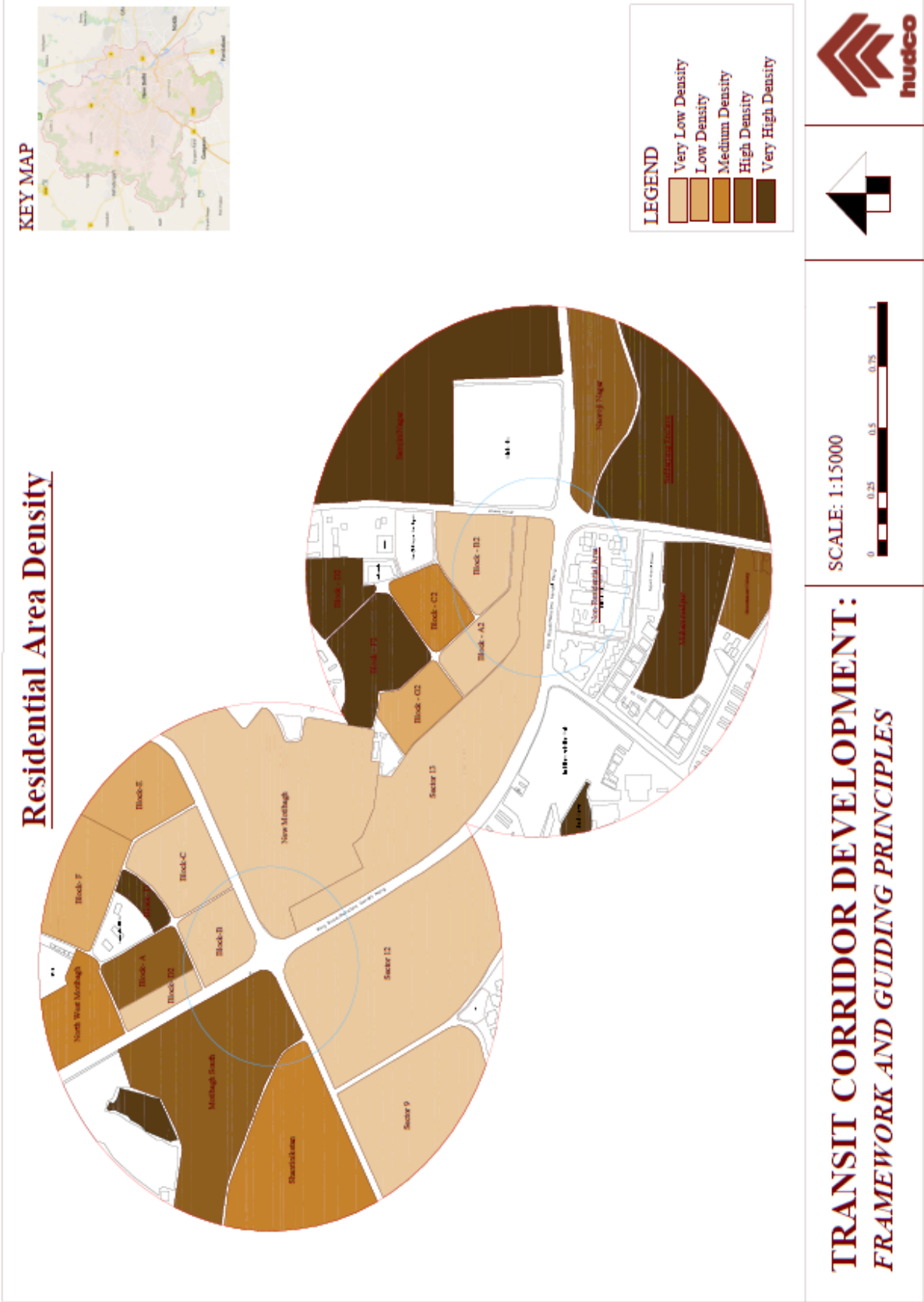
<b>Government Colony</b>	3.8	164	738	43	194
<b>Sarojini Nagar</b>	24	1432	6444	60	269
<b>Naoroji Nagar</b>	9.5	466	2097	49	221
<b>Safdarjung Enclave</b>	21	1076	4842	51	231
<b>Total/Average</b>	<b>271.25</b>	<b>8282</b>	<b>37269</b>	<b>32</b>	<b>145</b>

On comparison of the residential densities and the building heights, it can be analyzed that the majority of housing units varies from G to G+ two. Hence, there is an opportunity to increase the building height and accommodate more dwelling units in the area.

The pocket wise split of densities has been analyzed. It shows that existing residential densities are quite low, varying from 40 to 270 persons per Hectare. The average residential density in the area is only about 30 DUs per Hectare, which highlights the potential for densification. The spatial variation in densities based on a residential pocket wise analysis is shown in the Map-11.

A comparison with master plan densities shows that the areas is still underutilize in term of residential densities, and even the master plan proposed densities have not been fully achieved. A study of this case study area shows that this area has the characteristics required for transit corridor development, and densification, with presence of mix of uses, and presence of low density housing stretches which can be redeveloped. there is considerable potential for densification along the metro stretches, particular in the low density government colonies.





Map 11: Residential Density of Case Study Area- 1, Motibagh to Bhikaji Cama



## 6.2 Case Study Area 2 - Influence Zone Along Transit Corridor Between Lajpat Nagar and Moolchand Metro Stations

### Introduction to Area and Location

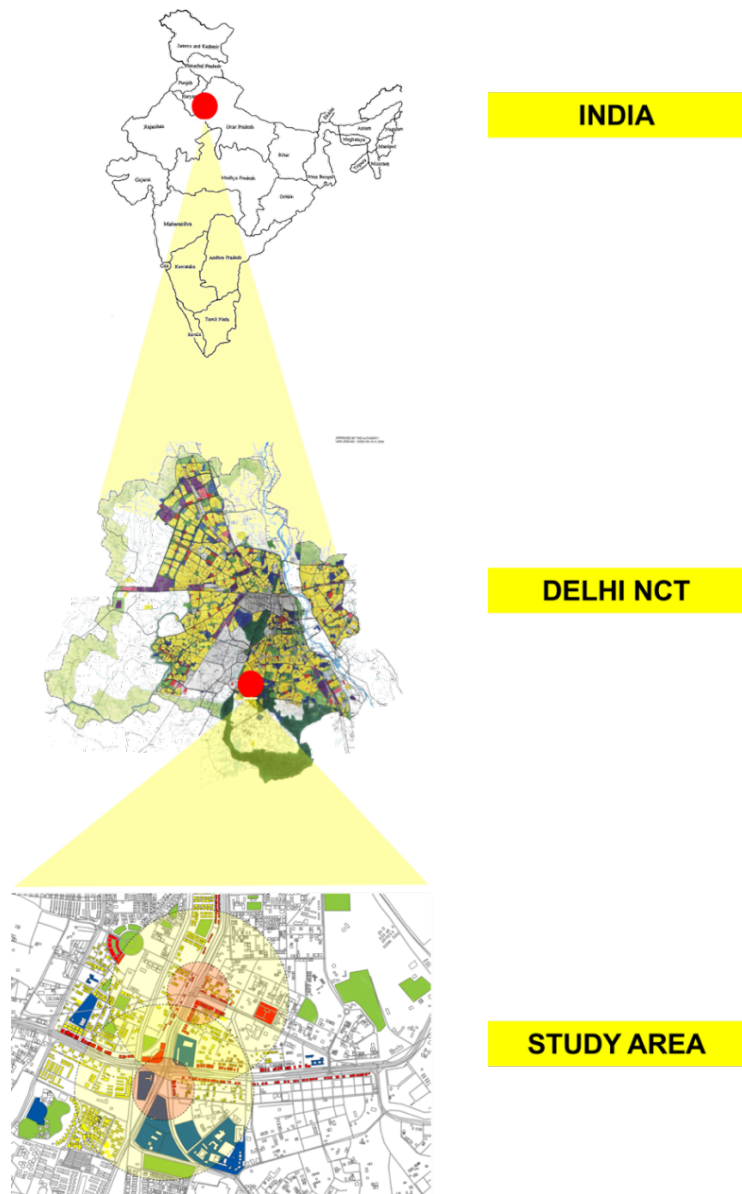
Lajpat Nagar is a residential and commercial neighborhood in the South Delhi district and zone D of Delhi. It was developed in 1950's after the partition of India in 1947. Moolchand Hospital is a prominent private hospital in Delhi. The area around the hospital is known as the Moolchand area.

### Connectivity

The area is well connected by bus and Delhi Metro. The Lajpat Nagar Station of the Delhi Metro is an elevated station on Violet Metro Line. Moolchand is the next Metro station on this line. The station was opened with the first section of the Line on 3<sup>rd</sup> October 2010 on the opening ceremony day of Commonwealth Games.

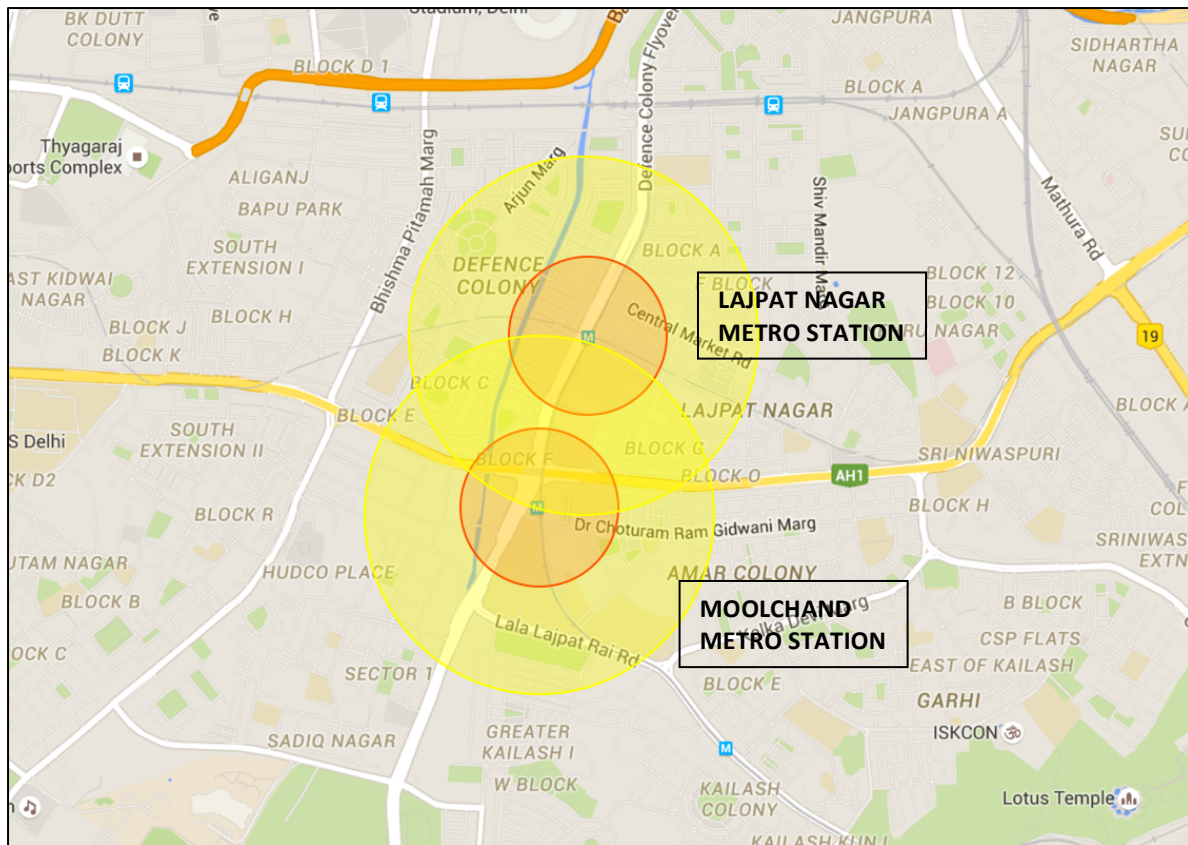
### Delineation of the Stretch of Corridor for Study

The corridor stretch to be studied has been identified, considering the conceptual influence zones indicated by the DDA TOD policy. The influence zones around both the metro stations have been delineated considering the 300 to 800 m area around both metro stations.



**Map 12: Location of Case Study Area-2**





Map 13: Transit Corridor Stretch - Case Study 2



Map 14: Master plan showing Landuse of Case Study Area-2



### **Proposed Landuse from Master plan of Delhi 2021**

As per the master plan landuse, the area falls in the residential zone, with holding capacity/proposed density around 300 DUs per ha for the residential use. As per the proposed Master Plan of Delhi 2021, there is also presence of institutional uses - Moolchand Hospital, Nursing institute, and a high school in the area. Urban Village areas also fall in the delineated influence zone.

### **Existing Building and Land Uses**

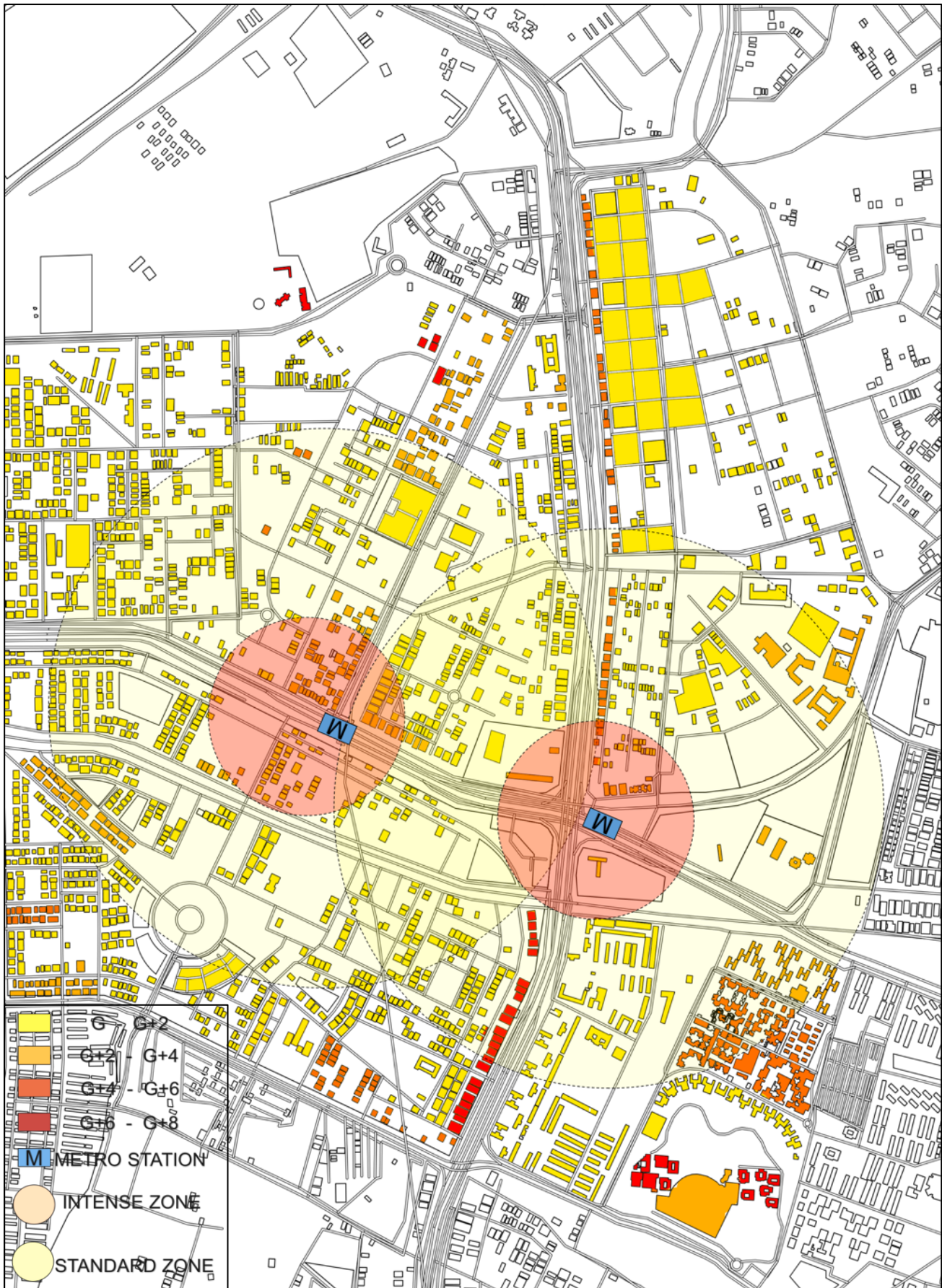
The Transport Corridor stretch has mixed use character in this case. The Lajpat Nagar station influence zone was composed of middle class plotted private housing, which has now converted into mixed-use character, with mix of plotted residential use, retail commercial and institutional uses. The Moolchand Institutional zone has more of planned character, with institutional uses. It has Govt. housing (Andrews Ganj area) developed recently on one side, and private housing (Lajpat Nagar) on the other side. The study area has a typical low-rise medium density character, with absence of vacant lots. There is also presence of considerable retail commercial use, especially in the Lajpat Nagar residential area. Map15 shows the existing building use in the study area.

### **Existing Building Heights and Densities**

The analysis of building heights shows that the area is mostly low-rise in character, with predominance of G+1, G+2 and G+3 housing. The private housing is mostly G+3 in height, whereas the Govt. housing varies from G+3 to G+7 floors. The Govt. housing is relatively less especially on the Andrews Ganj area, which shows that possibilities of densification, even of Govt. housing are less. The densities of the area are also low. The nature of development is low-rise medium density. Map 16 shows the existing building heights in the case study area.

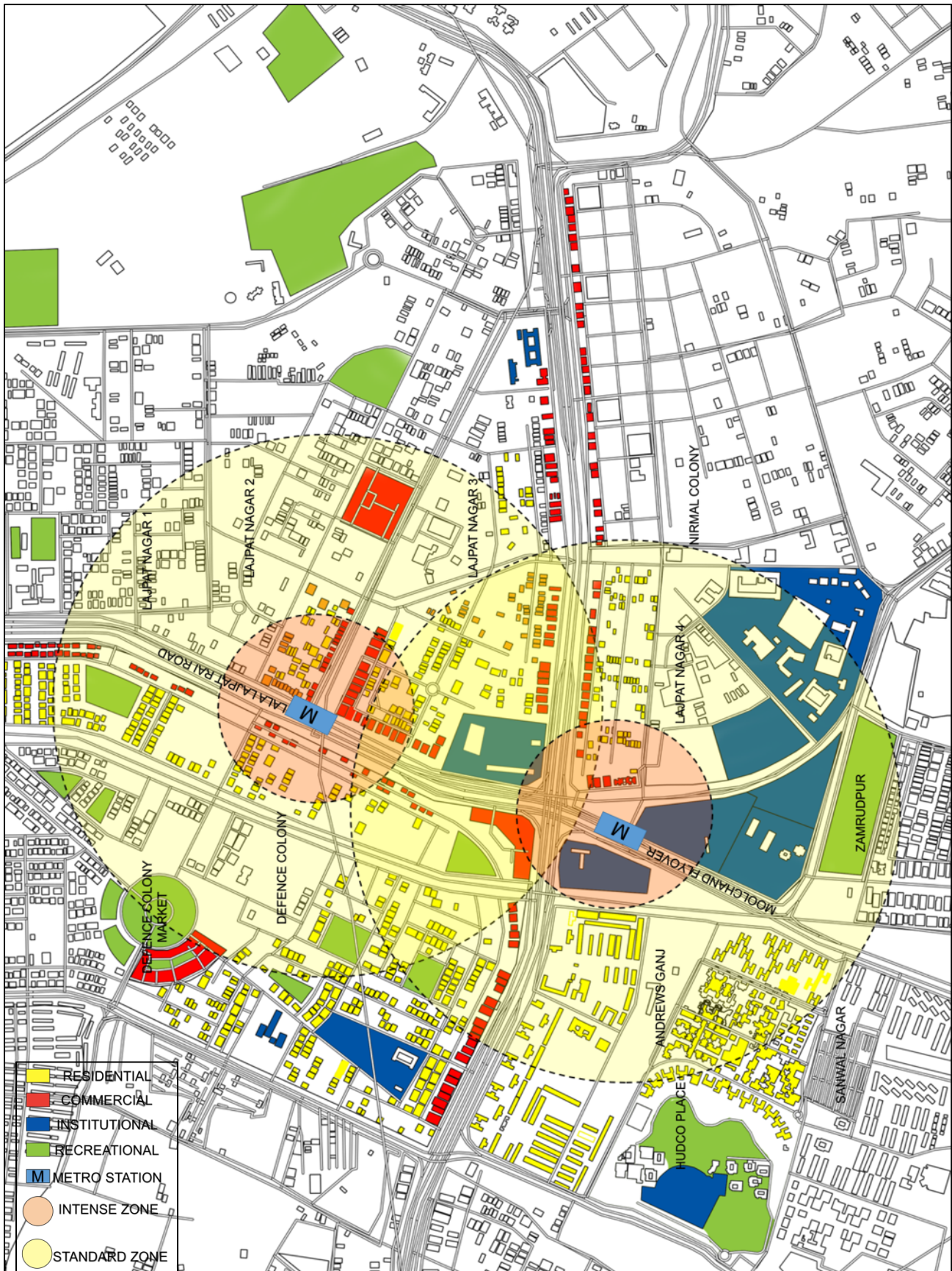
An assessment of potential for densification is made in section 6.3





Map 15: Existing Building heights - Case Study Area-2





Map 16: Existing Building Use - Case Study Area-2



### 6.3 Potential for Densification in case study stretches – A comparative analysis

A comparison has been made of the two case study stretches to understand the potential for Transit Oriented Development, and affordable housing in the two corridor stretches. The parameters considered include density, availability of vacant land, potential for redevelopment in terms of govt. ownership of Brownfield / low density existing development, potential for infill development in terms of presence of inefficient uses, or vacant land.

**Table 7: Comparative Analysis of Case Study Areas.**

Parameters for comparison	Case Study 1	Case Study 2
Connectivity	Good	Good
Presence of low density uses	Yes	Yes
Availability of Govt. housing/ Brownfield development with potential for	Yes	No
Possibility of Infill Development –Vacant land availability	Yes	No
Availability of work centers within or around the influence zones	Yes	Yes

Both the stretches are similar in many ways, considering connectivity and location. On comparing the two stretches for parameters that establish the potential for TOD redevelopment, it is found that, out of the two case studies, Case study 1 has greater potential for development of TOD in the area. It can be derived from the above analysis that there are low-density pockets in transit corridor areas, even in existing built up areas in Delhi, which can have considerable potential for redevelopment.

The Master plan does permit such redevelopment in TOD corridors with densification, however due to practical constraints, the potential for redevelopment in privately held housing areas, however, requires special strategic plans for implementation. The presence of vacant lots in the central city areas is also quite low, so the only real prospect of TOD development emerges through brown field development in old Govt. housing colonies, falling within the Transit Corridor Zones.

An analysis of potential for densification of case study area 1 shows that the average existing residential density is only about 30 DUs per hectare, which is much below the threshold of 250 DU per hectare required for densification under the master plan policy. However, each proposal has to be analyzed with respect to its built character and landuse details before proposing densification. A set of framework and principles, which can act as guidelines for Indian cities have been proposed in the next chapter for Transit Corridor Development in general, as well as for the development of affordable housing in TCD corridors. There are 3394 DUs in Government owned residential pockets, where the existing densities on average are 41 DUs/Ha. According to the MPD 2021, densification with density 450 DUs per Ha., and FAR of 4.0 is allowed. 15% of additional FAR is to be provided for EWS units.



HSMI has analyzed three growth scenarios, shown in table 8 to understand the potential for densification, and development of housing development in the area, each representing a low, medium or high growth scenario, considering the limitations allowed under the Master plan policy. In all three scenarios, densification of govt. residential pockets in case study 1 area is considered.

Scenario 1 has densification at a density of 250 DUs per Hectare (FAR of 2.0), which is at the lower end of the range allowed under the TOD policy. If the government owned residential pockets are densified with an FAR of 2.0, or average densities of 250 DUs/Ha, similar to other TOD projects in Delhi, there is potential to develop over 19000 additional dwelling units in the area. Considering 15% DUs of FAR for EWS, 4000EWS units can potentially be developed in the area. In Scenario 2, a medium growth scenario, a densification of 350 DUs per Ha, (FAR of upto 3.0), there is potential to develop 28000 residential units, additionally 6000 units can be for affordable housing. In scenario 3, a high growth scenario, calculations show that it is possible to develop 37000 units at a maximum 450 DUs per Hectare, while the additional 15% FAR for EWS can generate 9000 affordable housing units.

The study has calculated number of dwelling units which can be achieved in densification of Govt. owned low density pockets in case study 1 area, considering achievement of maximum densities (table 9), achievement of 15% additional FAR for EWS housing and optimization of FARs and densities for mixed use development (table 10). The calculations show that it is possible to accommodate 50 EWS DUs and 100 other DUs per hectare of development. The assessment of densification and affordable housing development potential shows that the current TOD policy can go a long way to solve the city's housing problems.

However, given the character of the existing cities, and the infrastructure and environmental implications, any densification proposal needs to be part of a redevelopment plan for the entire influence zone of the area. The process of densification has already started in stretches, with proposed development of low density Govt colonies by NBCC, but there is no information on how this process is going to be made more inclusive, or how the housing generated in the process will benefit the poorer sections of society.

There is a need to develop guidelines which can guide such densification efforts along Transit Corridor development, and make the process more inclusive . The next chapter suggests the principles and strategies required for Indian cities to ensure affordable housing in the transit corridor zones.



Table 8: Assessment of Densification Potential Using Various Density Scenarios

Scenario 1 : Densification at 250 DU per Ha, Site FAR of 2.0				
Sr. no.	Area of Govt. pockets(in Ha)	Existing DU/Ha	Proposed Densification Density under TOD	Additional No. of DUs
1	30	13	250	7110
2	23	41	250	4807
3	4	43	250	786.6
4	24	60	250	4560
5	10	49	250	1910
<b>Total</b>	<b>90</b>	<b>41</b>	<b>250</b>	<b>19173</b>
Scenario 2 : Densification at 350 DU per Ha, Site FAR upto 3.0				
Sr. no.	Area of Govt. pockets(in Ha)	Existing DU/Ha	Proposed Densification Density under TOD	Additional No. of DUs
1	30	13	350	10110
2	23	41	350	7107
3	4	43	350	1166.6
4	24	60	350	6960
5	10	49	350	2860
<b>Total</b>	<b>90</b>	<b>41</b>	<b>350</b>	<b>28203</b>
Scenario 3 : Densification at 450Dus per Ha, Site FAR upto 4.0				
Sr. no.	Area of Govt. pockets(in Ha)	Existing DU/Ha	Proposed Densification Density under TOD	Additional No. of DUs
1	30	13	450	13110
2	23	41	450	9407
3	4	43	450	1546.6
4	24	60	450	9360
5	10	49	450	3810
<b>Total</b>	<b>90</b>	<b>41</b>	<b>450</b>	<b>37233</b>



Table 9: Assessment of Potential for EWS Housing Using Various Scenarios

Scenario 1 : Densification at 250 DU per Ha, Site FAR upto 2.0				
Sr. no.	Land area of Govt. pockets	Floor Area	Floor Area for EWS (@15%)	EWS units*
1	300000	600000	90000	1500
2	230000	460000	69000	1150
3	38000	76000	11400	190
4	240000	480000	72000	1200
5	95000	190000	28500	475
<b>Total</b>	<b>903000</b>	<b>1806000</b>	<b>270900</b>	<b>4515</b>
Scenario 2 : Densification at 350 DU per Ha, Site FAR upto 300				
Sr. no.	Land area of Govt. pockets	Floor Area	Floor Area for EWS (@15%)	EWS units*
1	300000	900000	135000	2250
2	230000	690000	103500	1725
3	38000	114000	17100	285
4	240000	720000	108000	1800
5	95000	285000	42750	713
<b>Total</b>	<b>903000</b>	<b>2709000</b>	<b>406350</b>	<b>6773</b>
Scenario 3 : Densification at 600 DU per Ha, Site FAR upto 4.0				
Sr. no.	Land area of Govt. pockets	Floor Area	Floor Area for EWS (@15%)	EWS units*
1	300000	1200000	180000	3000
2	230000	920000	138000	2300
3	38000	152000	22800	380
4	240000	960000	144000	2400
5	95000	380000	57000	950
<b>Total</b>	<b>903000</b>	<b>1806000</b>	<b>270900</b>	<b>9030</b>
*-assuming 75% of FAR used for units of plinth area of 30 sqm				



Table 10: Assessment of Potential for Housing Using Optimization Scenarios

Scenario 1 : Density at 250 Dus per Ha, Site FAR of 2.0					
Sr. no.	Area of Govt. pockets(in Ha)	Total DUS achievable (full density and FAR)	EWS DU	Rest DUs achievable (Half of available site FAR)	Total units available
1	30	7500	1500	3000	4500
2	23	5750	1150	2300	3450
3	4	950	190	380	570
4	24	6000	1200	2400	3600
5	10	2375	475	950	1425
<b>Total</b>	<b>90</b>	<b>22575</b>	<b>4515</b>	<b>9030</b>	<b>13545</b>
Scenario 2 : Density at 350 Dus per Ha, Site FAR upto 3.0					
Sr. No.	Area of Govt. pockets(in Ha)	Total DUS achievable	EWS DU	Rest DUs achievable (Half of available site FAR)	Total units available
1	30	10500	2250	4500	6750
2	23	8050	1725	3450	5175
3	4	1330	285	570	855
4	24	8400	1800	3600	5400
5	10	3325	713	1425	2138
<b>Total</b>	<b>90</b>	<b>31605</b>	<b>6773</b>	<b>13545</b>	<b>20318</b>
Scenario 3 : Density at 450 Dus per Ha, Site FAR upto 4.0					
Sr. no.	Area of Govt. pockets(in Ha)	Proposed Redensification Density under TOD	EWS DU	Rest DUs achievable (Half of available site FAR)	Total units available
1	30	13500	3000	6000	9000
2	23	10350	2300	4600	6900
3	4	1710	380	760	1140
4	24	10800	2400	4800	7200
5	10	4275	950	1900	2850
<b>Total</b>	<b>90</b>	<b>40635</b>	<b>9030</b>	<b>18060</b>	<b>27090</b>

Table11: Assessment of Potential for Housing per Hectare of Redevelopment

	EWS DU/ Ha	Rest DU/ Ha	Total DU/ Ha
Scenario 1	50	100	150
Scenario 2	75	151	226
Scenario 3	100	201	301

**Note: Utilizing half of FAR for Residential use + 15% of additional total FAR for EWS Housing.**



## Chapter 7- Transit Corridor Development and inclusion of affordable housing: formulation of guiding principles and key strategies

### 7.1 Evaluation of potential for densification

Densification is a well accepted, although controversial strategy for building compactness of cities. The UN Habitat, in its working paper for Habitat III has also highlighted the need for compact development.<sup>1</sup> It seeks to *“Promote compact cities and control urban sprawl by developing progressive and integrated densification strategies and limit where appropriate the footprint of urban areas to mitigate climate change and enable the affordable provision of basic services (Planned City Infills)”*

The literature review in the present study has revealed that there are several successful examples of cities, which have practiced TCD. Tools such as inclusionary zoning and incentive based zoning are globally accepted as part of the strategies for densification in TCD. These include higher FAR, gross densities and reservation of a percentage of floor area/ units for the poorer sections. Globally, in the developed world, use of these tools, along with other strategies given in the earlier section is quite common.

It is observed from the study of the theoretical framework of TOD, and the international case studies, that affordable housing is an intrinsic part of the TOD concept. It is also observed that there is a very real threat of gentrification in transit corridors unless specific provisions for affordable housing are made, which needs to be guarded against. However, most of the available literature focuses on American Cities and developed cities, where problems are very different from Indian cities. Unlike western cities, Indian cities do not have issues of lower densities. However, there are possibilities of Brownfield redevelopment, and redevelopment along transit corridors, as established from the case study areas included in the present study.

The concept of TCD comes from a western context. The densities of Indian cities are much higher than those of the US and Australian cities, and have a number of sensitive uses and vulnerable areas which need protection and preservation. Therefore, any densification or increase in FAR has to be contextual and based on an assessment of carrying capacities and sustainable densities. It is also imperative to consider the infrastructure needs of the densification process. The infrastructure required to meet water and sanitation needs would be considerable in densification, and this needs

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<sup>1</sup> I As per the UN Habitat *“In developing countries an average of 6 out of 7 cities experienced a decline in density, while in higher income cities, a doubling of income per capita equated to a 40% decline in average density<sup>8</sup>. Cost of sprawl in the United States alone is estimated to cost USD400 billion per year mostly resulting from higher infrastructure, public services and transport costs. Urban compactness and Greenhouse Gas Emissions have an inverse correlation. For each one percent of growth that occurs in the city-core instead of in the suburbs, approximately 5 million Mt of CO<sub>2</sub> per capita are avoided.”* Source: Habitat III Issue Papers 8 – Urban and Spatial Planning and Design New York, 31 May 2015.



to provided in a planned manner. Similarly, there is concern about the increase in traffic, pollution and congestion related to densification. These needs should be addressed in the densification plan.

It is seen in the earlier section, that the proposed densification under the DDA policy can result in creation of a large housing stock, as was seen from the calculation of just one influence zone. This potential, when multiplied over entire TCD influence zone, can result in a boom of housing and other development. It is therefore importance that the development be planned, with consideration of infrastructure provisions and environmental sustainability, rather than a piecemeal approach of simply bolstering densities by redevelopment.

One lesson that repeatedly emerges from international case studies is the tendency of gentrification along the TCD stretches, in connection with increased land values. Since this is very likely in Indian metropolitan cities too, it is important that reservations be made for the poorer sections through use of planning tools detailed in the next section.

In Delhi, the Delhi Development Authority has also used these strategies as part of its TOD plan. FSI-linked land use control schemes have already been implemented in India, especially in the state of Maharashtra wherein the concept of Transfer of Development Rights (TDR) is used. However, these previous schemes are prone to geographically random urban development, whereas the corridor development focuses more on compact urban development along the transit corridor. Hence, it is important to have a separate influence zone plan, linked to the city masterplan.

The policy analysis of TOD policy of Delhi shows that re-densification is allowed for larger parcels of land under single/ Govt. ownership. At present, the amalgamation of plots for re-densification is allowed only where the minimum plot size is 3000 sq.m. In view of this consideration, the transit corridor stations where there is presence of low-density Govt. housing, particularly those with dilapidated housing that requires renewal, need to be picked up first for redevelopment. This is also validated by present analysis of the case study areas given in the earlier chapter, which shows that densification potential at project scale is not obvious in many stretches in Indian cities, due to complexity of uses, and already intense use of land. There is , however, considerable potential for re-densification in the govt. housing areas, where the existing densities are low, as compared to the private housing areas. The potential for densification appears highest in redevelopment of underutilized or vacant pockets under government use. The pockets of densification therefore have to be identified with care.

While the Delhi policy has reserved 15% of FAR for the economically weaker sections, supporting the National Urban Housing and Habitat Policy of India, and the remaining residential FAR is reserved for smaller housing units, how the policy will be actually implemented remains to be seen. In the first two pilot projects, i.e. Karkardooma and Sanjay Lake, how the housing has been made inclusionary is not clear. In this context, the current project aims to develop a set of guidelines for inclusion of affordable housing in the densification and redevelopment of Transit Corridor Zones, which can be useful for the Ministry of Housing and Urban Poverty alleviation as well as urban local



bodies, and can be incorporated in TOD policy frameworks at a country scale. Strategies provide paths to implementation. Strategies can identify courses of action, set priorities, link to resources, and assign responsibilities. Accordingly, strategies and tools are also suggested here for cities to implement re-densification along transit corridors in an All India context.

## 7.2 *Suggested Principles for densification along the Transit Corridor*

The transit-oriented development comes in-built with a few key concepts which have been explained earlier. Indian Cities need to adopt few key principles for development, which are suggested below. Within the framework of these Keystone principles, some strategies are also proposed for implementation of Transit Corridor Development:

**Principle 1: Densification should be based on an inclusive approach, based on a clear Identification of the influence zone, and study of characteristics and densities of influence zone**

An essential point that comes through the analysis done in the earlier chapters is that cities in India cannot look towards densification in isolation along transit corridors. Given our multiple urban problems and comparatively higher inner city densities, unlike cities of the developed world, feasibility for densification has to be seen in combination with the existing landuse and the present density analysis. A carrying capacity analysis and an environmental impact analysis should both form part of the densification strategy of the city. Environment is expected to improve as a result of implementation of TOD.

### **Strategies / actions required under this step include:**

- i. Identify the stretches of transit corridors for development based on stakeholder analysis and in consultation with existing transit development authorities
- ii. Study the existing master plan/ zonal plan to find out the landuse zoning and proposed densities in the area
- iii. Develop an existing landuse, and density map of the area to understand the possibilities of densification and redevelopment.
- iv. Identify the holding population of the areas, and possibilities of densification assessing land availability and sustainable density for the area.

**Principle 2: Densification should be in consonance with equity and sustainability principles.**

A vision for the development of entire corridor needs to be developed, clearly identifying project goals, which include not only densification but also concerns for the livability and equitable development for the residents.

### **The corridor plans should:**

- i. Identify the key goals for the entire project
- ii. Identify a clear vision for each station area in the corridor.



- iii. Identify spatially, the area to be taken up under the Transit Corridor Development as a zoning overlay.
- iv. Develop a process to identify infrastructure needs and environmental impacts, planning the needs within a plan period of twenty years.
- v. Identify local, state, and central funding sources for infrastructure projects.
- vi. Identify the options of development to be proposed in the corridor based on infrastructure and amenity deficiency analysis for the entire corridor
- vii. Identify the feasible developmental model for the stretch, based on city form and land value analysis.
- viii. Identify incremental approaches, without major changes in existing landuse, which can help develop the entire corridor, focusing on vacant lands, brownfield development, and possibilities of redevelopment.
- ix. Identify implementation mechanism that will implement the vision.
- x. Identify areas to be preserved and protected.
- xi. Identify feasibility of increasing FARs, density thresholds along the stretch, considering its spatial, environmental and infrastructure implications. Strategies that increase FAR include compensatory FAR, tools like TDR, strategies to increase density can include density zoning bonuses, mixed-use zoning codes, specific plans, reduced on-site parking standards, using parking lifts, etc.

**Principle 3: There should be a mix of affordable housing to be proposed for the corridor housing areas.**

Since affordable housing should be at the heart of TOD development, the goal here is provide sufficient affordable housing that fits the needs of an area's workforce and disabled, elderly, and low-income residents and that offers affordable transportation options.

**The key strategies here would include:**

- i. Develop a housing needs statement about the type of housing required in the transit zones- whether a higher mix of affordable housing is required.
- ii. Identify the need for rental vs ownership housing
- iii. Identify how many more units can be accommodated, and spatially, where and how they can be accommodated.
- iv. Identify special needs areas.
- v. Bring in inclusive zoning strategies for protecting the needs of the lower income groups considering the very high possibility of gentrification along the corridor. In case of India, the inclusive zoning also has to be in harmony with the National Housing and Habitat Policy and state housing policies.



**Principle 4: The development should include the creation of a range of employment opportunities along the transit corridor for the benefits of the residents, and for vitality and growth of the area.**

Cities need to develop a range of income opportunities for the residents along the transit corridor to encourage a close work – home relationship. This can help in reducing costs and encourage a wider labor pool.

**Specific strategies, which can help cities, create job opportunities:**

1. Creating a mix of uses along the corridors
2. Promoting development of activity centers along the corridor
3. Workshed cum house schemes for the poorer sections.
4. Allowing zoning codes to be more flexible about work from home offices.
5. Study of socio-economic data, and landuse data along the corridor to identify area specific strategies, or special skills which can be encouraged.

**Principle 5: The development should include the use/ reuse of vacant or previously developed land that has become vacant or underutilized/ dilapidated.**

The reuse of underutilized sites can complement corridors by delivering uses that may be in short supply, such as housing in job-rich corridors, and retail and services needed locally.

**Strategies that can be used by cities in this regard include:**

- i. Identify pockets of vacant/ underutilized/ dilapidated development lands, which can be reused.
- ii. Provision of financial feasibility and incentives for redevelopment of vacant/ Brownfield land.
- iii. Joint development with private partners in PPP mode based on financial viability
- iv. Value capture – value capture can occur by gaining the benefits of investment in nearby areas to develop other areas in the zone.
- v. Predevelopment assistance – easing up of approval processes can help in this regard.

**Principle 6: Develop healthy safe and walkable neighborhoods based on TOD principles using sensitive design and incentives.**

Cities need to identify alternative modes of transport to reduce car dependency. These could include walking, bicycling, transit use, and carpooling, E-rickshaws.

Key strategies in this regard could include:

- Bring out form-based development codes which specify the urban design guidelines for the process
- TOD design guidelines need to be developed by the cities.
- Zoning overlay need to be developed along transit corridors specifying areas where higher densities and FARs over and above the permitted densities and FARs have been allowed.
- Develop street oriented designs with lining of streets with building facades that have generous windows, frequent entrances, and attractive features, and generally avoid parking lots or blank walls along streets.



- Enhance connectivity with building entrances that face streets or are connected to the circulation network via pedestrian paths.
- Provision of bicycle facilities and availability, such as bike paths, secure bicycle parking, lockers for bike commuters, and low-cost bike rentals such as bike-share programs.
- Enhanced pedestrian environments, such as continuous sidewalks lined by street trees and street-oriented buildings
- Providing free transit passes for the poor, offering easy-to-use transit service and last mile connectivity.
- Carpool facilities and programs, such as preferential parking for carpools, and employer-funded carpool vehicles.

**Principle 7: The fund from TCD Development should contribute to the development of the entire city .**

Internationally, some cities have developed innovative strategies such as TOD development funds, as in the case of Denver, or TOD grants, which are supported by the US Govt. Indian cities will also have to look for funding opportunities based on project viability for funding TOD and TCD projects.

**Principle 8: The densification in TCD development should consider the needs of infrastructure as well in its planning , and should be implemented through effective interagency coordination**

Implementation of TOD would require efforts by many agencies, such as the development authority, the urban local body, the transit authority, etc. for which a joint mechanism would need to be devolved by the city government.

### ***7.3 Tools for Provision of Affordable Housing in Transit Corridors***

Affordable housing creation in TCD corridors is not simply a matter of densification. It also involves creation of safe neighborhoods, which encourage people to walk, creation of jobs nearby, mixed landuse, creation of housing units, which are affordable not just in name, but actually serve the needs of the urban poor. The Transit Corridor Development has to be undertaken within the ambit of the masterplan of the city, through necessary planning and legal provisions to ensure implementation. Urban Planning tools can provide the necessary tools for implementation of the report.

The following strategies can help increase affordable housing in the Transit Corridors.

#### **a. Inclusionary Zoning**

Inclusionary housing refers to a requirement by local government that ascertain percentage of new development be set aside for occupancy by families of very low, low and moderate income. This can be a very useful tool for involving the private sector in producing affordable housing near transit.



Inclusionary zoning asks developers of new housing to make a percentage of units affordable to lower-income households as a condition of project approval. There are 4 key components of an Inclusionary Zoning policy that play an important role in determining how effective the policy is in producing actual housing<sup>i</sup>:

These include

- i. Decision on the percentage required to be reserved(our case studies have shown a range from 10% to 25%);
- ii. Further breakup of the percentage into EWS and LIG units, or by area as seen in DDA's example.
- iii. Compulsory requirement for the builder to construct these units on site. In the US, builders are allowed to deposit in- lieu fees as well, however, this may not work well in India.<sup>2</sup>
- iv. The formula for setting the in-lieu fee, if allowed.

## **b. Incentive based Zoning**

Incentive based zoning normally offers the following incentives to the developer for construction of affordable housing:

- Density Bonuses
- Extra FARs or height allowances
- Parking space reduction<sup>3</sup>

These incentives work by enticing the private developers to invest in affordable housing through increasing his building envelope and saleable area, and reducing per unit cost. In the US, the amount of bonuses has been linked to the amount of affordable units, which will be developed by the private developer (*see footnote 4*).

The Delhi Development Authority, on the other hand has given a set amount of benefit subject to its approval. Cities can also apply reduced parking standards for affordable housing projects, in order to reduce the open area, and increase buildable area for the developer. These incentives have been given by cities in the US, such as Denver. However, in India, the cities must link the reduced parking requirement with increase amount of affordable housing, and consider the availability of off-site parking in the vicinity so as not to overload the neighboring streets.

<sup>2</sup>As per CTOD , In the US..." Most jurisdictions offer the option for the developer to pay an in-lieu fee instead of building affordable housing on-site. Depending on the jurisdiction, this option may be available to all developments or it may be limited to small projects or projects facing special hardships. In-lieu fees can often be positive, allowing for the more efficient development and thus, to a greater unit of units offered at deeper levels of subsidy. In addition, it may make some developments feasible, where a "must build" policy would be cost-prohibitive. However, when land is scarce or expensive, in-lieu fees may limit affordable housing construction to areas far away from the original development; this may led to less income diversity in the transit district and a reduction of access to transit for lower-income households".

<sup>3</sup>As per California Law.. "At least 5 percent of total units must be affordable to very low income households, or 10 percent for low-income households, to trigger a 20 percent bonus. With greater levels of affordability, the bonus also increases up to a maximum of 35 percent." Additionally, developers are also allowed development "concessions" depending on affordability level. [Goldfarb & Littman, Frequently Asked Questions Regarding SB 1818 (Hollingsworth) – Density Bonus Law, [www.goldfarbclipman.com/art\\_sb1818faq.html](http://www.goldfarbclipman.com/art_sb1818faq.html).]



### **c. Fast Track Permits and development agreements**

Fast track permits are also a tool given as an incentive to builders who are developing affordable housing in the transit corridors. Another strategy is to have a long-term development agreement between the builder and the city government to ensure that work can on unaffected, even if the zoning laws or byelaws change in the future.

### **d. Dedication of public land/ govt. vacant lands and Brownfield / underutilized housing redevelopment for affordable housing**

Development of zoning overlays in the transit zone, (within walking distance of metro stations or 300m to 500 m) earmarking vacant/ underutilized government land for affordable housing development will be required in order to increase the stock of new affordable housing. Developing mixed-use projects or employment generation projects close to affordable housing areas will serve to better attract both employers as well as residents to the area. Many of the Govt. housing in Delhi and other cities in India was low density housing built by the British and is now on its last legs, requiring considerable maintenance. These pockets can be taken up on priority basis for redevelopment by cities, with the existing renters being shifted to transit housing, and redevelopment of existing housing with higher FAR, either through govt. funding of in the PPP mode. Both inclusionary and incentive based tools can be used for such development.

### **e. Preservation and Anti-Displacement Strategies**

Along with the development comes a very real trend as well threat of gentrification, which has been observed in several parts of the world, and may fritter away the equity benefits of the Transit Corridor Development. While strategies such as inclusive zoning can to some extent, counter this phenomenon, there is also need to preserve the existing housing stock. Normally, the areas where displacement can occur are areas, which have high number of renters, small patches of affordable or low-income housing and rising land prices along the transit corridors.

In India cities, particularly the larger Indian cities, there is a discernible trend of land and property prices rising after metro development. This has been seen in Delhi also. Therefore, the fear of gentrification along the corridors is quite reasonable in Indian situation, and this can, in the long term, totally mitigate all benefits of development of affordable housing in the corridor. In order to prevent this, possible strategies which can be taken up by the cities include provision of secure tenure to residents, rental housing for the low income groups and provision of credit linked subsidies to lower income groups, such as already being provided under PMAY. The existing heritage sites, landmarks, recreational spaces and environmentally sensitive areas should also be preserved in the transit corridor plans.



#### **f. Bringing down housing construction costs**

While undertaking new housing development, cities also need to focus on bringing down the affordable housing costs. This can be done through adoption of faster and green construction technologies, such as the alternate technologies proposed under the PMAY. Some other tools available for the propose include:

- Waiver of registration fees of the poorer households
- Parking requirement reduction to increase buildable areas
- Fast track permitting
- Subsidies / tax incentives for affordable housing projects.

Use of these tools in case of India must be done with caution and sensitivity, and only as part of an overall TOD plan.

#### **g. Involving the community in affordable housing development**

Involving the community, particularly in redevelopment projects, at the site level, can help reduce resistance and make achievement faster. Community participation will also help bring more transparency in decision-making.

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