TRANSIT-ORIENTED DEVELOPMENT CASE STUDIES REPORT

An Assessment of Six Settlements and Interventions in East Africa and India

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Abstract	
In the following report, we assess six case studies using the TOD Standard, surveys, and a series of interviews, with the goal of documenting lessons learned for achieving the goals of inclusive TOD in the context of cities in low- and middle- income countries, specifically targeting cities in East Africa.	
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ACRONYMS

2MHP	Two Million Housing Program
AMC	Ahmedabad Municipal Corporation
AMTS	Ahmedabad Municipal Transport System
AUA	Ahmedabad Urban Agglomeration
AUDA	Ahmedabad Urban Development Authority
BEST	Brihanmumbai Electrical Supply & Transport
BDD	Bombay Development Department
BMC	Bombay Municipal Corporation
BRT	Bus Rapid Transit
BSUP	Basic Services for Urban Poor
BUDP	Bombay Urban Development Project
CBD	Central Business District
CDP	City Development Plan
CDS	Corridor Development Strategy
CMP	Comprehensive Mobility Plan
CNG	Compressed Natural Gas
DART	Dar es Salaam Rapid Transit
DCPR	Development Control and Promotion Regulation
DP	Development Plan
DPS	Detailed Planning Scheme
DUTP	Dar es Salaam Urban Transport Improvement Project
FAR	Floor Area Ratio
FCDO	Foreign, Commonwealth & Development Office
FSI	Floor Space Index
GDP	Gross Domestic Product
GIS	Geographic Information System
GMRC	Gujarat Metro Rail Corporation

GPS	General Planning Scheme
GSRTC	Gujarat State Road Transport Corporation
HIC	High-Income Country
HVT	High-Volume Transit
IMC	IMC Worldwide Ltd.
ITDP	Institute for Transportation and Development Policy
JnNURM	Jawaharlal Nehru Urban Renewal Mission
LDP	Local Development Plan
LGA	Local Government Authority
LIC	Low-Income Country
LISP	Land Infrastructure and Serving Programme
LRT	Light Rail Transit
M2W	Motorized Two-Wheelers
MHADA	Maharashtra Housing and Development Authority
MIC	Middle-Income Country
MoHUA	Ministry of Housing and Urban Affairs
MLHHSD	Ministry of Land, Housing, and Human Settlement Development
MRTS	Mass Rapid Transit System
NGO	Non-Governmental Organisation
NMT	Nonmotorised Transport
PCMC	Pimpri-Chinchwad Municipal Corporation
PMAY-U	Pradham Mantri Awas Yojana – Urban
PMC	Pune Municipal Corporation
PMPML	Pune Mahanagar Parivahan Mahamandal Limited
PMR	Pune Metropolitan Region
PT	Public Transportation
SNP	Slum Networking Project
STA	Sustainable Transport Award

TDR	Transfer of Developmental Rights
TOD	Transit-Oriented Development
TPS	Town Planning Schemes
WHO	World Health Organization
WUF	World Urban Forum

1. Introduction

In the following report, we assess six policy interventions in India, Ethiopia, and Tanzania that have fostered elements of inclusive transit-oriented development (TOD), which we define below. The goal of the report is to better understand the characteristics of how the case study sites have implemented elements of inclusive TOD, such as access, basic services and housing affordability. We also study the key impacts of the policy interventions, and how they were developed and implemented. Finally, we look at lessons that can be learned from the cases for creating inclusive TOD in low- and middle-income countries in the East Africa region, and particularly in Ethiopia and Tanzania.

This report is the second of three activities. In Activity 1, we assessed the background conditions of growth and the potential for TOD in two cities in Ethiopia and two in Tanzania. The findings for Activity 1 were based on a literature review of urban growth and TOD in Africa, quantitative data on urban growth, and qualitative data from policy documents and interviews, and these were delivered in a Baseline Report.

In Activity 2 (this report), we assess case studies of policy interventions in cities in East Africa and India, to understand what happened, what worked, and what can be learned. Generally, TOD-related policy interventions have been in place for longer in India, providing important lessons in a related context that could be relevant in East Africa. India is significantly wealthier than both Tanzania and Ethiopia, and the case studies in India were implemented 10 or more years ago, when wealth levels in India were closer to the current levels of wealth in Tanzania and Ethiopia.

In Activity 3, we will develop policy recommendations from the results of the first two activities and conduct capacity-building projects to spread those ideas to decision makers and practitioners in the target cities in East Africa.

In this report, we use data gathered from street audits to derive scores according to the TOD Standard (1) as well as a short household survey to measure the quantitative impact of policy interventions. This is one of the first times that the TOD Standard has been applied in these contexts, and we consider this research to be exploratory. We supplement the quantitative results with qualitative results from a series of interviews we conducted with local residents and key stakeholders involved with and impacted by the intervention, as well as with site observations from the six case studies.

1.1 TOD background

TOD is a framework for thinking about urban planning that ensures access and urban mobility without the reliance on personal motor vehicles that characterised the expansive suburban forms in the 20th century, typified by low-density, auto-centric growth in the United States. According to the TOD Standard, inclusive TOD is defined as follows (1):

TOD, or transit-oriented development, means integrated urban places designed to bring people, activities, buildings and public space together, with easy walking and cycling connection between them and near-excellent transit service to the rest of the city. It means inclusive access for all to local and citywide opportunities and resources by the most efficient and healthful combination of mobility modes, at the lowest financial and environmental cost, and with the highest resilience to disruptive events. Inclusive TOD is a necessary foundation for long-term sustainability, equity, shared prosperity and civil peace in cities (p. 8).

TOD aims to create built environments based on walking, cycling, efficient high-capacity public transport, public space and dense, mixed-use development.

Although the specific term 'TOD' only spread in American planning circles beginning in the early 1980s, TOD-like practises have existed since the advent of public transport. Early investments in services and infrastructures were often financed by property developers, as was the case with so-called 'streetcar suburbs' in cities around the world in the 19th century (2). Starting in the mid–20th century, a movement of dissatisfaction with car-oriented culture—and the hidden costs mentioned above, as well as the rise of social–spatial equity concerns and environmentalism—created the backdrop for a profound shift in urban planning and transport theory that included the current concept of TOD.

In 2010 ITDP sought to re-establish TOD as a framework for long-term urban sustainability, inclusiveness and shared prosperity in urban development, in line with the new Sustainable Development Goals then in development at the United Nations. This led to the creation of the TOD Standard, a tool that enables people to assess the quality of TODs against a set of standard metrics, agreed upon by global experts in the field.

1.2 TOD Standard

We designed our quantitative data collection using the TOD Standard as a basis. The TOD performance evaluations followed the assessment tool and metrics from the TOD Standard. TOD Standard is a comprehensive tool to evaluate TOD performance of single projects (for example, a specific urban development around a public transportation station) and station areas. We used the station area assessment method for two reasons. First, we were interested in evaluating the TOD performance in the entire 500 m walkshed, as some of these walksheds contained a variety of urban forms, including informal settlements. Next, not all of the six case studies had clearly and readily identifiable boundaries that related to a single policy intervention. We provide more detailed information on the sites below.

1.2.1 TOD principles and assessment metrics

To develop the TOD Standard, in 2012 and 2013 ITDP convened a panel of globally renowned experts in the integration of land use, urban design and sustainable access and mobility, with a focus on low- and middle-income cities. The panel developed a set of eight core principles of TOD —Walk, Cycle, Connect, Transit, Mix, Densify, Compact, Shift— each with concrete implementation objectives and relatively easy-to-use performance indicators and proxies. These elements of TOD definition and measurement were vetted through a large network of ITDP staff around the world and by local and international partners. They were then tested worldwide on a large range of urban and suburban development complexes, with a focus on Low-Income Countries (LICs) and Middle-Income Countries (MICs). They were refined iteratively through three major published versions to date and eventually endorsed by major international and philanthropic institutions. The TOD Standard identifies the following eight core principles of TOD (illustrated in Figure 1):

- Walk: Develop neighbourhoods that promote walking
- Cycle: Prioritise nonmotorised-transport networks
- Connect: Create dense networks of streets and paths
- Transit: Locate development near high-quality public transport
- Mix: Plan for mixed uses, income, and demographics
- Densify: Optimise density and match transit capacity
- Compact: Create regions with short transit commutes
- Shift: Increase mobility by regulating parking and road use

Figure 1: TOD Standard Core Principles

Source: ITDP

Each TOD Standard Principle is supported by performance objectives and measurable metrics. There are 25 metrics in total that cumulatively create an assessment framework to measure the TOD performance of station areas or development projects. Each metric has a measurement formula with a corresponding point system. For example, while there are 25 points available for the metric for mixed use and 15 points for density, for 'cycle' only 5 points are available. Additionally, the TOD Standard emphasises social equity by elevating metrics pertaining to socio-economic mix. The points were assigned to metrics by the technical committee of experts based on relevance to TOD. The 'scorecard' below (see Table 1), devised to help facilitate TOD assessment, provides an overall view of the points derived in the TOD Standard. We provide greater detail on the scoring of the six cases in the subsequent section in Table 5: Summary of TOD standard adaptations for the analysis.

Table 1: TOD Standard metrics, measurement method and point system breakdown

Principles and Metrics	Maximum Points
WALK	**15**
Walkways Measured as: Percentage of walkway network with all accessible segments	3
Crosswalks Measured as: Percentage of intersections with safe, all-accessible crosswalks in all directions	3
Visually Active Frontage Measured as: Percentage of walkway segments with visual connection to interior building activity	6
Physically Permeable Frontage Measured as: Average number of shops and pedestrian building entrances per 100 m of block frontage	2

Principles and Metrics	Maximum Points
Shade and Shelter Measured as: Percentage of walkway segments that incorporate adequate shade or shelter elements	1
CYCLE	**5**
Cycle Network Measured as: Maximum walk distance to cycle network	2
Cycle Parking at Stations Measured as: Secure multi-space cycle parking facilities provided at all high-capacity transit stations	1
Cycle Parking at Buildings Measured as: Percentage of buildings that provide secure cycle parking	1
Cycle Access in Buildings Measured as: Buildings allow interior access for cycles and cycle storage within tenant-controlled spaces	1
CONNECT	**15**
Small Blocks Measured as: Length of typical blocks (long side)	10
Prioritised Connectivity Measured as: Ratio of pedestrian and cycle intersections to motor vehicle intersections	5
TRANSIT	
Walk Distance to Transit Measured as: Walk distance to the nearest transit station	Required
MIX	**25**
Complementary Uses Measured as: Percentage of the predominant use (main land use either residential or non-residential including commercial and institutional uses) in the station catchment area.	8
Access to Basic Services Measured as: Percent of buildings within walking distance of a source of fresh food (500m). Percentage of buildings within walking distance of a healthcare service or pharmacy. Percentage of buildings within walking distance of an elementary school.	3
Access to Green or Open Space Measured as: Percentage of buildings within 500 m walking from a publicly accessible park	1
Affordable Housing Measured as: Percentage of dwelling units priced 30% below the metropolitan median	8
Housing Preservation Measured as: Percentage of households that have been maintained, relocated on site, or are within a 250 m. of walking from their previous address, or offered relocation compensation	3
Businesses and Services Preservation Measured as: Percentage of pre-existing local businesses maintained in situ or relocated within 500 m walking from their previous address	2
DENSIFY	**15**
Non-residential Density Measured as: Non-residential density in comparison with reference value expressed in jobs and visitors per hectare or non-residential floor area ratio (FAR) per hectare	7
Residential Density Measured as: Residential density in comparison with the reference value expressed in the number of units per hectare	8
COMPACT	**10**
Urban Site Measured as: Percentage (area) of developable plots that are built-up	8
Transit Options Measured as:	2

Principles and Metrics	Maximum Points
● Additional high-capacity transit lines ● Additional regular transit lines ● Bikeshare scheme	
SHIFT	**15**
Off-Street Parking Measured as: Total off-street area dedicated to parking as a percentage of total land area	8
Driveway Density Measured as: Average number of driveways per 100 m of block frontage	1
On-Street Parking Measured as: Total road area used for motor vehicle travel and on-street parking as percentage of total land area	6
TOTAL POINTS	**100**

Source: ITDP

*Predominant uses are described as the main land use.

The TOD Standard distinguishes scoring of single projects and assessment of entire station areas. Station areas are defined as immediate surroundings of the main transit station expressed as pedestrian walkshed, typically between 500 m and 1,000 m. A distance of 500 m represents about a 10-minute walk and 1,000 m about a 20-minute walk at an average urban speed of approximately 3 km/h, including wait time at intersections. Planners and researchers use a range of distances to define station catchment areas for pedestrians. These are often between 400 m and 800 m, with network distances generally considered more accurate than simple radii (3).

1.2.2 Examples of TOD assessments using the TOD Standard

The TOD Standard Assessment Framework has been used in multiple ways, most notably by public and private sector organisations to evaluate the effectiveness of urban development in terms of TOD.

At the 2014 World Urban Forum (WUF) in Medellín, Colombia, ITDP released Transit-Oriented Development (TOD) scores for 50 urban developments around the world highlighting best practises in global TOD. Using the metrics from the TOD Standard, ITDP evaluated development projects on six continents to see how they incorporated the eight principles of high-quality TOD and rated qualifying projects as gold, silver, or bronze. The scoring of developments and station areas elevates best practises of TOD from different contexts. This helps build awareness of TOD principles and highlights the successes in whatever context the Standard is applied.

Table 2 lists development projects assessed in 2014 alongside the launch of TOD Standard v.2.1. This spreadsheet shows the detailed scores for projects with the highest performance. Dark green indicates that the site received maximum points, red that the site receives no points. Light green, yellow, light orange and dark orange represent a spectrum of scores closer to maximum (green) or closer to no scores (red) respectively and the colour assigned to the value varies by metric. The data for scoring was gathered in 2014 on site or via desk research.

Table 2: Projects publicly scored with the TOD Standard

Site/Project Name	City, Country	Total Score	Walk Score	1.1 Walkways	1.2 Crosswalks	1.3 Visually Active Frontage	1.4 Physically Permeable Frontage	1.5 Shade and Shelter	Cycle Score	2.1 Cycle Network	2.2 Cycle Parking at Transit Stations	2.3 Cycle Parking at Buildings	2.4 Cycle Access in Building	Connect Score	3.1 Small Blocks	3.2 Prioritized Connectivity	Mix Score	5.1 Complementary Uses	5.2 Accessibility to Food	5.3 Affordable Housing	Densify Score	6.1 Land Use Density	Compact Score	7.1 Urban Site	7.2 Transit Options	Shift Score	8.1 Off-Street Parking	8.2 Driveway Density	8.3 Roadway Area
Central Saint Giles	London, UK	99	14	3	3	6	1	1	5	2	1	1	1	15	10	5	15	10	1	4	15	15	15	10	5	20	10	2	8
Hammarby Sjöstad	Stockholm, Sweden	94	15	3	3	6	2	1	4	2	1	1	0	15	10	5	10	6	1	3	15	15	15	10	5	20	10	2	8
Vauban	Freiburg, Germany	90	13	3	3	6	0	1	4	2	1	1	1	15	10	5	13	10	1	2	15	15	10	6	4	20	10	2	8
Quartier Massena, Paris Rive Gauche	Paris, France	90	14	3	3	6	1	1	4	2	0	1	1	13	10	3	15	10	1	4	15	15	15	10	5	14	4	2	8
Liuyun Xiaoqu	Guangzhou, China	90	14	3	3	6	2	0	3	1	1	1	0	15	10	5	11	10	1	0	15	15	15	10	5	17	10	2	5
Centro Internacional de Bogotá	Bogotá, Columbia	90	11	3	0	6	1	1	4	0	1	1	1	11	6	5	15	10	1	4	15	15	15	10	5	20	10	2	8
Bo01, Västra Hamnen	Malmö, Sweden	90	14	3	3	6	1	1	4	2	1	1	0	15	10	5	11	10	1	0	15	15	11	10	1	20	10	2	8
HafenCity	Hamburg, Germany	87	13	3	3	6	0	1	4	2	1	1	0	15	10	5	15	10	1	4	15	15	15	10	5	10	0	2	8
Olympic Village	Vancouver, Canada	86	12	3	0	6	2	1	3	2	1	0	0	15	10	5	9	4	1	4	15	15	15	10	5	17	10	2	5
Uptown, Cleveland	Cleveland, Ohio, USA	84	14	3	3	6	1	1	3	2	1	0	0	13	10	3	11	10	1	0	15	15	11	6	5	17	10	2	5
Jianwai SOHO	Beijing, China	83	12	3	0	6	2	1	5	2	1	1	1	13	10	3	11	10	1	0	15	15	15	10	5	12	10	2	0
GWL Terrein	Amsterdam, Netherlands	82	15	3	3	6	2	1	5	2	1	1	1	15	10	5	15	10	1	4	0	0	15	10	5	17	10	2	5
World Trade Center site	New York, New York USA	79	13	3	3	6	0	1	2	0	0	1	1	15	10	5	5	4	1	0	15	15	15	10	5	14	4	1	2
Ciudadela El Recreo	Bogotá, Colombia	79	5	0	0	6	4	1	4	2	1	0	1	11	10	1	15	10	1	4	15	15	9	6	3	20	10	2	8
Puerto Madero	Buenos Aires, Argentina	78	13	3	3	6	0	1	0	0	0	0	0	15	10	5	11	10	1	0	15	15	14	10	4	10	0	2	8
Pearl District	Portland, Oregon, USA	78	15	3	3	6	2	1	2	0	1	1	0	15	10	5	11	6	1	4	15	15	15	10	5	5	3	2	0
New Quay, Docklands	Melbourne, Australia	78	14	3	3	5	2	1	3	2	1	0	0	15	10	5	11	10	1	0	15	15	10	6	4	10	0	2	8
North Battery Park City	New York, New York, USA	77	10	3	0	6	0	1	2	0	1	0	1	9	6	3	15	10	1	4	15	15	15	10	5	11	4	2	5
Mission Bay	San Francisco, California, USA	76	11	3	0	6	1	1	2	0	1	0	1	11	6	5	11	6	1	4	15	15	15	10	5	11	1	2	8
Fruitvale Station Village	Oakland, California, USA	76	12	3	0	6	2	1	2	0	1	1	0	15	10	5	11	6	1	4	15	15	11	6	5	10	0	2	8
Corvin	Budapest, Hungary	76	14	3	3	6	1	1	4	2	0	1	1	15	10	5	11	10	1	0	7	7	15	10	5	10	0	2	8
Reforma 222	México City, México	75	13	3	3	4	2	1	1	0	1	0	0	15	10	5	11	10	1	0	15	15	15	10	5	5	0	0	5
Marina Bay Financial Centre (Towers 1,2,3 & residences)	Singapore	74	11	3	0	6	1	1	0	0	0	0	0	15	10	5	11	10	1	0	15	15	11	6	5	11	1	2	8
Bab Al Bahr	Rabat-Sale, Morocco	74	12	3	0	6	2	1	0	0	0	0	0	11	10	1	7	6	1	0	15	15	15	10	5	14	4	2	8
Wilshire Vermont Station	Los Angeles, California, USA	71	13	3	3	6	1	0	2	0	1	1	0	9	6	3	15	10	1	4	15	15	15	10	5	2	0	2	0
Bank of America Building	New York, New York, USA	70	12	3	0	6	2	1	2	0	0	1	1	9	6	3	5	0	1	4	15	15	15	10	5	12	10	2	0

Source: ITDP

Figure 2 shows an example of a 'gold' TOD project with the highest score (99/100)—Central St. Giles in London. While Central St. Giles is in a wealthy city, the design principles are transferable to other contexts: permeable and active frontages, small pedestrian blocks, pedestrian-priority intersections, minimal share of space for car use, mixed uses, and high share of affordable housing.

Figure 2: Central St. Giles in London has been recognised as a gold TOD

When applied to a station area, a TOD Standard assessment can help understand the strengths and weaknesses of the area. The South Holland Province in Holland and its municipalities have used TOD Standard metrics to gather data on station area characteristics along the commuter rail lines (see Figure 3). The data is helping to monitor changes to the built environment of the station areas. It also helped the province distinguish characteristics such as car-dependent areas and transit-adjacent development (4).

Figure 3: Performance summary for all 67 station areas in South Holland

The TOD Standard scoring framework can also inform the design phase of a project or neighbourhood development by highlighting important aspects of TOD that may have been overlooked. In addition, TOD assessment can be performed in areas that have not yet encountered TOD to establish a baseline scenario for future TOD development.

2. METHODOLOGY

In this assessment, we compiled case studies in several Indian and African cities. We selected sites in Ethiopia and Tanzania, as they are in the target countries, and we chose sites in India, as we believe they provide important lessons for the African region. Generally, policies related to TOD have been in place in India for significantly longer than in Tanzania and Ethiopia, so there are more long-term lessons. While India is significantly wealthier than both Tanzania and Ethiopia, the policies in India were put in place more than 10 years ago, when Indian wealth (as measured in GDP) was much closer to current wealth in Tanzania and Ethiopia. Thus, although the countries ae quite different in many ways, we believe the lessons from India may provide important lessons for the current context in Ethiopia and Tanzania.

We conducted a mixed-methods, embedded case study for each site (5). The study employs mixed methods (both quantitative and qualitative methodology) to gather information on the impacts of policy interventions in the six case studies, and we complement this data with the perspective of policy-makers and residents of these areas. The quantitative data included spatial data gathered from street audits via a smartphone app, and qualitative data collected through interviews and site observations. We describe the main data formats and data points in the Field Survey Data section. The goal for this approach is to evaluate the TOD performance of policy interventions designed to improve informal settlements and provide housing for low and middle-income residents through the TOD Standard assessment tools, as well as to provide context for these interventions.

2.1 Site selection

The TOD sites chosen for analysis are a convenience sample of cities in East Africa and India. These sites were not explicitly targeted to become TOD but include elements that are consistent with compact urban development that supports walking, cycling and public transport. We examine case studies in India because it is also a middle-income country with far fewer economic resources than high-income countries, but nonetheless has a relatively long history of interventions to improve informal settlements. Many of the interventions in India have been in place for decades, providing important lessons that may be applicable for the East African context. These cases were selected because they met the following criteria:

1. They had received a policy intervention to provide low- or mixed-income housing more than five years ago.
2. They are linked to transit.

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3. They are located within a built-up part of the city.

Our study evaluates the area around the public transport (PT) station closest to the intervention site. We selected six sites for TOD case studies, to represent a variety of different interventions in different contexts and to ensure that we were able to complete the detailed assessment within the project timeframe and budget constraints. We explored other possible sites for inclusion in this study in Kenya, Rwanda, and Ahmedabad. Before arriving at the final six case study sites in the sample, we excluded sites for various reasons, such as the policy interventions at the sites had not been in place for long enough, the sites were not well served by transit, and they lacked a component of inclusivity (seeking to provide housing for low and/or middle-income groups). Of the six sites we selected, three sites are in Eastern Africa: two sites in Addis Ababa (Ethiopia) and one in Dar es Salaam (Tanzania). We also selected three sites in India: in Mumbai, in Pune, and in Ahmedabad. The sites are described in greater detail in the Site Profiles Section.

The six case studies include:

- Addis Ababa, Ethiopia – Gotera Condominium
- Addis Ababa, Ethiopia – Jemo Condominium
- Dar es Salaam, Tanzania – Tandale Argentina BRT station
- Ahmedabad, India – Gupta Nagar
- Mumbai, India – Charkop sites and services area
- Pune, India – Yerwada
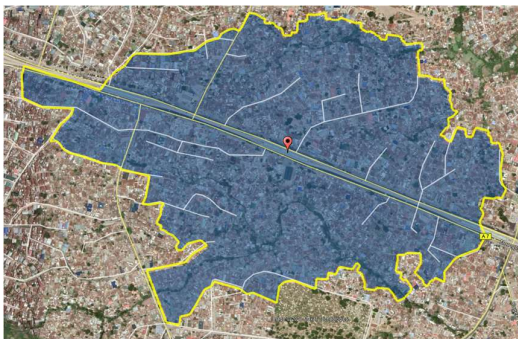
We selected the study areas using a 500 m walkshed as the basis to align with the TOD Standard, which considers a 500 m to 1,000 m walkshed as the optimal area of TOD influence–equivalent to a short walk to the main transit station that can be completed by an able-bodied person in about 10 to 15 minutes. While mobility patterns vary across cities and countries and no one size for a station walkshed applies universally, in cities in low- and middle-income countries, conditions for active modes are often more challenging (fewer safe, high-quality pedestrian and cycle facilities) than in wealthier cities, potentially reducing the catchment area for public transportation. For this reason, and considering time and resource constraints, we feel that using a 500 m network distance for the walksheds of our case studies was an acceptable distance.

We used geographic information system (GIS) software, including both ArcGIS and QGIS, to identify the walkshed, starting with a 500 m network distance from a public transportation station (bus, BRT or LRT stop). We then defined the borders of the study sites, manually selecting the borders when necessary. This manual selection was necessary to ensure that the case study area included only entire blocks (i.e., as opposed to ending the study site at a mid-block location. We did this first to simplify data-gathering in the field and also to include the streets and buildings on the outside border of the study area (this would not be possible if the study area ended mid-block). Please see Table 3 (below) for the final study areas. Our initial intention was for the intervention site boundaries to roughly coincide with the 500 m walkshed from the main transit station, or about 0.8 km^2. However, due to street network characteristics and the need to include entire blocks, the size of the sites varied considerably, from 0.99 km^2 (Jemo, in Addis Ababa) to 0.36 km^2 (Yerwada, in Pune). The small size of the site in Pune is because the southern border of the site contains a river.

Table 3: Site area maps

Site Name and Location	Area	Site Boundary Map

Site Name and Location	Area	Site Boundary Map
Addis Ababa, Ethiopia **Gotera Condominium**	0.85 km² 210 acres	
Addis Ababa, Ethiopia **Jemo Condominium**	0.99 km² 246 acres	
Dar Es Salaam, Tanzania **Argentina BRT station area**	0.75 km² 175 acres	
Ahmedabad, India **Guptanagar-Pravinnagar**	0.65 km² 160 acres	

Site Name and Location	Area	Site Boundary Map
Mumbai, India **Charkop**	0.47 km² 113 acres	
Pune, India **Yerwada**	0.36 km² 89.5 acres	

NOTE: The site boundaries are the same as 500 m walksheds (yellow). Policy interventions are shaded in blue. Red point shows the main transit station

Source: ITDP

Table 4 below provides a brief overview of the types of interventions and main actors involved in the interventions in the cases. These include four projects that upgraded existing informal settlements, one greenfield development (on what was previously farmland), and one 'sites and services' scheme. 'Sites and services' schemes provide residents with a housing plot that contains the most basic elements needed, such as drinking water and sewage lines, and can include one or more walls, and a roof. Residents then build the rest of the dwelling according to their needs and capabilities.

Table 4: Summary of site and intervention types

Site Name and Location	Year of Intervention	Intervention Type	Involved Actors
Gotera Condominium **Addis Ababa, Ethiopia**	2007	**Upgrading of informal settlement** urban renewal project under Ethiopia's Integrated Housing Development Program	Ethiopian Housing Development Agency GIZ (German International Cooperation Agency)
Jemo Condominium **Addis Ababa, Ethiopia**	2010	**Greenfield social housing development** under Ethiopia's Integrated Housing Development Program	Addis Ababa City Government Oromia Regional Government
Argentina BRT station area	1980s	**Upgrading of informal settlement**, focusing on	Ministry of Lands, Housing and Human Settlements

Site Name and Location	Year of Intervention	Intervention Type	Involved Actors
Dar Es Salaam, Tanzania	2015 – present	water and sewer provision, road construction, drainage, and electricity infrastructure	World Bank FCDO Nordic Development Fund
Guptanagar-Pravinnagar Ahmedabad, India	1990 – early 2000s	**Upgrading of informal settlement**, focusing on street grid, water and sanitation provision under the Slum Networking Project.	Ahmedabad Municipal Corporation Slum Networking Project SAATH Charitable Trust, a healthcare and education NGO Local landowners and residents
Charkop Mumbai, India	1983 – 1993	**Sites and services scheme** developed on greenfield in phases under the Land Infrastructure and Serving Programme (Part of Bombay Urban Development Project).	Mumbai Municipal Corporation Ministry of Housing and Urban Affairs (MHADA) The World Bank
Yerwada Pune, India	2008 – present	**Informal settlement upgrading** focusing on in-situ upgrading of housing and the street network	Pune Municipal Corporation, SPARC Mahila Milan, a decentralised network of collectives of poor women propagating credit and saving programs in their communities

2.2 TOD Standard assessment methodology

2.2.1 Adaptations of TOD Standard methodology

In several cases we made adaptations to the TOD Standard assessment methodology because of a lack of available data and site characteristics that did not match existing categories or measurement procedures. The full team discussed modifications and mutually decided to make adaptations to ensure that the results would still reflect the objective of each metric that was modified and not bias the score in any way. Please refer to Table 1, TOD Standard Metrics, Measurement Method, and Point System Breakdown to see the measurement method. In Table 5 below, we provide a summary of the changes made to the assessment method and data categorization. Additional information on data sources for these calculations is available in Appendix B. TOD Standard Scores (p. 122).

Table 5: Summary of TOD standard adaptations for the analysis

WALK:	We adapted qualifying conditions of walkways and crosswalks to account for the street design and traffic speeds in the case study areas. We decided to award points in the **Walkways** metric for footpaths/walkways along slow speed roadways that are not demarcated but are smooth and passable. We used a similar approach for the **Crosswalks** metric. Many crosswalks lack ramps and demarcation. However, if a crosswalk spans a slow-speed 'shared street', we decided that it fulfils the requirement of 'adequate crosswalks', as in the contexts we examined, people with physical disabilities typically use crutches rather than wheelchairs. In

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	the scoring, we noted the lack of ramps and/or level-crossings to document the conditions. We also decided to consider local streets that are very narrow and accommodate pedestrians, two-wheelers, and three-wheelers at slow speeds as shared streets. In these cases, we also considered the streets to satisfy the requirements for demarcated walkways as well as for crosswalks that cross the 'shared street'.
CONNECT:	The **Prioritized Connectivity** metric considers intersections that prioritize nonmotorized modes. In India and Africa, we found many narrow local streets that only accommodate pedestrians, two-wheelers, and three-wheelers at slow speeds, and we decided to consider them to be shared streets. Because these streets dramatically limit vehicle speeds and volumes, we decided to count the intersections of these streets as prioritising pedestrians.
CYCLE:	The **Cycle Parking at/in Buildings'** metric calls for secure parking within the building area or within 100 m of the building entrances. In many cases, we observed 'informal' bicycle parking areas within the distance range. We considered these parking areas that were secure, such as those behind locked gates, and thus as qualifying for points for this metric.
MIX:	In many informal areas, we observed that pedestrian paths and streets act as open spaces for activities such as children's play. For the **Access to Public Open Spaces** metric, which calls for parks and playgrounds larger than 300 m^2, we counted pedestrian-only public spaces (> 300 m^2) as qualifying for points.
DENSIFY:	The scoring method for metrics **Residential and Non-residential Density** calls for a comparison of the station area density to a 'baseline area' density. The measurement method also looks at whether the area in the immediate surroundings to the main transit station (0–500 m) is denser than the '1,000 m station catchment area' (0–1,000 m). According to the TOD Standard, the baseline area should be the densest district or station area in the metropolitan area with similar land uses that and a high liveability/desirability, as measured by real estate values that are above average.

We measured the 500m station area densities directly in the survey. For the baseline densities, we used different sources for the sites. For Indian cities, we used data from the Census of India 2011 data on employment and the density of Greater Mumbai. For Addis Ababa city, we used the Addis Ababa city master plan of 2017 and referred to the city's criterion for deciding the minimum density calculation for the provision of housing and deciding building height. For Dar es Salaam, we used a baseline of the Kariakoo area, an area with above-average real estate values and high density. Across most sites, we used data collected in the survey for the 1,000 m station catchment area. In Mumbai, however, for the 1,000 m catchment area, we used the residential density of the local ward and the non-residential density of Mumbai suburbs. |
| COMPACT: | For the **Access to Additional Transit Modes** metric, we included frequent transit modes such as three-wheelers and other microtransit vehicles that operate on regular routes and frequencies. |
| SHIFT: | Metric **Roadway Area Occupied by Motor Vehicles** measures total roadbed area used for motor vehicle travel and on street parking as a percentage of total development area. In the study areas, on-street parking is frequently unmarked or informal. To measure the on-street parking space we estimated the space occupied informally by vehicles, including two- and three-wheelers. In the case of shared streets, we excluded travel lane area in the calculation but counted areas of shared streets used for parking. |

Teams of field researchers gathered data in situ in February 2021, and we processed the data contained in this report in the same month.

2.2.2 Basemaps

We first created digital basemaps of each case study area prior to beginning fieldwork. We did so by stitching high-resolution satellite imagery tiles of the site from Google Earth that we compiled in Photoshop, matching the overlapping areas of the tiles (see example in Figure 4). We then georeferenced the resulting image using site boundary shapefiles for the site area, and traced the building footprints, plots, roadways, pedestrian-only

paths, and amenities layers digitally in GIS software (see example in Figure 5). This resulted in highly accurate digital basemaps of each case study location. Next, we assigned an ID number to the plots and buildings on the basemaps to help surveyors verify the plots and building locations on site and later match the location on the basemap with data input from the survey in the GIS application.

Figure 4: Example of satellite imagery 'stitching'

Source: ITDP

Figure 5: Example of traced buildings and streets layer in GIS
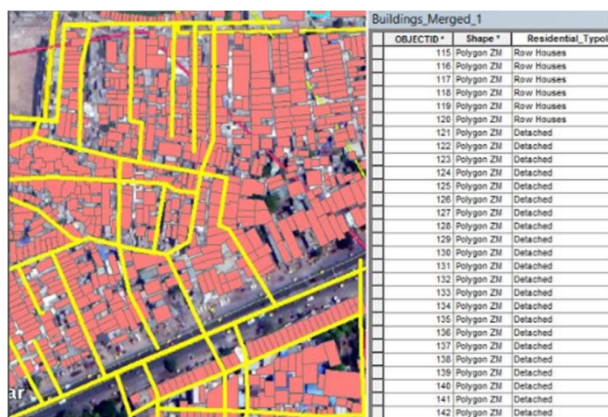
Source: ITDP

2.2.3 Field survey data

The goal of the survey was to collect data suitable for the TOD Standard assessment. We also collected additional data relevant to this study that is not specified by the TOD Standard but provides extra detail that is relevant to the lives of people living in low-income areas and informal settlements, such as demographics, crowding conditions, access to utilities such as sewer systems, electricity utilities, and clean water sources.

There are five categories of data:

- Buildings

  The 'buildings' category of the survey includes attributes related to built use and activity type, such as: number of floors in the building, land use of the structure and of each floor, retail type (if present), open space type, bicycle parking, car parking, and built-up area.

- Streets

  The 'streets' category includes data for all pedestrian and automobile street segments in the study area. This category includes information about road safety infrastructure for pedestrians and activity in the building frontage, as well as characteristics of the rights-of-way, including on-street parking.

- Household

We conducted a short household survey with closed-ended questions. On housing conditions and essential support infrastructure, vehicle ownership, years residing in unit, persons residing in unit, and income. We designed the questions to complement the metrics and categories used for TOD assessment by providing information about the socio-economic status and living conditions of the population. The household surveys also help provide data related to the TOD Standard metrics that address affordable housing and displacement.

- Amenities

  The 'amenities' category registered the type of local public amenity present on the block including parks, playgrounds, healthcare services, and sources of fresh food.

- Plot

  The 'plots' attributes included use and secondary plot use, which include residential, commercial, industrial, and park uses, among others. This information is useful in evaluation of mixed uses in the area and mapping of land use

2.2.4 Survey

A digital app for smartphones (Device Magic) was the basis for much of the on-site data collection. This software structured the survey of buildings, streets, amenities and plots. Device Magic geolocates data entries using the global positioning system (GPS) features of smartphones. It allows for convenient data input in the field and data output for GIS processing and TOD analysis. We programmed the app so it could give options for the answer input. To avoid potential problems related to using smartphones, such as dying batteries and software issues, researchers in Pune and Ahmedabad opted to use a paper format of the survey. Both the app and the paper-based survey contained the same categories and questions.

For the street network, we used maps available on Open Street Map (www.openstreetmap.org). Field researchers verified these networks in the field, and often added segments that were not on the original maps. Field researchers also discovered new pedestrian segments, such as alleyways between buildings. These new segments were noted in the field then added to the street networks in GIS.

The TOD Standard recommends collecting data by sampling across different urban development typologies in the station area. However, the study areas for the six cases contained a large variability in housing typologies, streets, and amenities, which would not be captured using a sampling technique. For this reason, field researchers canvassed all the blocks in the 500m study area for this study. This ensures full representation of the data on streets, buildings and amenities.

2.2.5 Images

The surveyors also took images during the TOD assessment survey of the area that they were able to geotagged via Google Maps (see Figure 6).

Figure 6: Geo-tagged site survey images
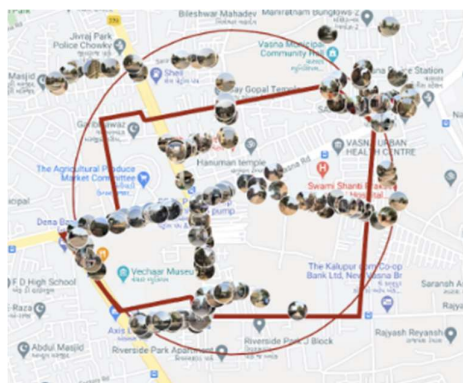
Source: ITDP

2.2.6 Household survey interviews

In addition to collecting data for TOD assessment, we also created a short household survey to collect data on basic services (including water, sanitation, and electricity), housing tenure, income, and vehicle ownership—information that can't be captured through observations and analysis of the built environment. Because of time and resource constraints, we were not able to collect this data for a statistically representative sample of households; therefore, we used a stratified sample. Stratified samples approximate representative samples by selecting observations based on key variables in the population (6). We applied approximately 100 surveys per study site and distributed the approximate location of the places to administer these surveys before commencing fieldwork. We distributed the short survey locations according to urban typologies, which we identified prior to fieldwork.

If the household member of the house/unit we identified prior to survey was not available or willing to participate, we picked an adjacent building. Researchers carried out the household survey after completing the TOD assessment survey and followed the COVID-19 safety protocols.

Prior to asking the survey questions, field researchers informed respondents of the intent of the survey, the approximate time it would take, and that data collected from this survey would be kept confidential and used only for the purposes of this project.

2.2.7 GIS data entry

We integrated the survey data, both from paper and digital format, into the GIS basemaps maps by linking the building and plot ID in the GIS attributes table. For the sites in Pune and Ahmedabad, we manually entered the data from the paper surveys into GIS. All layers are located as shapefiles with attributes adjusted to capture maximum detail.

2.2.8 Technical training and testing

Prior to conducting the field survey, the team organised multiple meetings and training sessions. These meetings were fundamental to aligning data-gathering across teams, ensuring that the audit reflected the data requirements for the TOD Standard as closely as possible. We also established the protocols for the site survey visits in these meetings.

Following these sessions, the teams went to the site areas to test the process of gathering the survey data and entering it in the Device Magic app on their smartphones. Teams reported on successes and failures at subsequent meetings, and we adjusted the survey and data-gathering process as needed.

We also held a technical training session on creating base maps and data processing in GIS. Finally, we also held meetings on the data to be used for the TOD assessment, fine-tuning the survey and harmonising approaches across teams.

2.3 Field survey protocols

Prior to conducting the survey, we circulated survey protocols to the supervisors and surveyors. They included general conduct protocol during the survey and a COVID-19 safety protocol.

2.3.1 General conduct protocol

The general conduct protocol informed the surveyor about how to interact with respondents during the household survey. The surveyors were required to inform the respondent about the objective of the survey and their affiliation, ensure that respondents are at least 18 years old, and obtain consent.

We also obtained endorsement letters from local NGOs to secure safe access to several of the sites. For example, in Dar es Salaam, we received letters from the Regional Administrative Secretary (RAS) and the Dar Rapid Transit (DART); in Addis Ababa, we received a letter from the Addis Ababa Transport Bureau; and in Ahmedabad we received a letter from the SAATH Charitable Trust. We also provided letters from ITDP, approved by the project management unit, describing the survey work, naming the surveyors, and providing local contact information of lead researchers. These letters proved to be essential for gaining access to most of the study areas.

2.3.2 COVID-19 protocols

We adapted World Health Organization (WHO) guidelines to create COVID-19 safety precaution protocols for the field researchers. The surveyors needed to maintain at least 1 m distance from others, wear masks at all times in the field and wash hands as frequently as possible. The surveyors were also required to stay at home if feeling unwell or if there was a possibility of having contracted COVID-19.

See Appendix A for the detailed protocols.

2.4 Interview methodology

This section describes the methods used to collect qualitative data in the six case study areas. The results of such data are summarised in sections 6 and 7. Researchers in the six sites conducted open-ended, in-depth interviews to collect data from two groups of study participants: residents in predefined 500 m walksheds of public transportation stations and policy-makers from government and civil sector organizations involved in policy interventions in those areas. For additional detail on the methodology used for collecting qualitative data, please see the Interview Protocol in Appendix A.

2.4.1 Survey

This study used a nonrepresentative sample, with participants selected via convenience and snowball methods. Although this was a nonrepresentative sample, researchers tried to diversify the sample to some degree, particularly for residents. Where possible, researchers sought to distribute the sample of resident study participants in terms of:

- Where participants live (in project area or outside project area)
- Gender (balance between male, female, and other)
- Income (focussing on low- and middle-income residents)
- Age (balance between age-groups)
- Vehicle ownership (participants who own vehicles and those that do not)

Income levels were defined for each country. In India, we based our income levels on the household income categories set by the Prime Minister Aawas Yojana (PMAY) urban housing mission for Indian cities. To reflect local conditions, we used slightly different levels in each city. In Ahmedabad, we defined high-income households as earning more than INR 100,000 per month, middle-income households earning between INR 50,000 and 100,000 per month, and low-income households earning less than INR 50,000 per month. In Mumbai, we defined high-income households as earning more than INR 50,000 per month, middle-income households earning between INR 20,000 and 50,000 per month, and low-income households earning less than INR 20,000 per month. In Pune, we defined high-income households as earning more than INR 50,000 per month, middle-income households earning between INR 25,000 and 50,000 per month, and low-income households earning less than INR 25,000 per month.

In Tanzania, government officials peg the low-income category to Tanzania's public service minimum wage, and the middle- and high-incomes are linked to levels relative to the minimum wage. In Ethiopia, the income levels are set by the Central Statistics Agency, with high-income households earning more than USD $208 per month, middle-income households earning between USD $104 and $208 per month, and low-income households earning less than USD $104 per month.

The majority of the policy-makers in this study were men (14 of 18), which may reflect the sample's population, given that many policy-makers and practitioners in these countries are male. Residents of the six case-study areas were quite well balanced in terms of gender, with 21 women among the 41 participants.

Researchers recruited study participants by telephone calls and/or email notifications (policy-makers and residents) and from contacts made at case study sites (for residents).

Field researchers initially used their professional networks to recruit interview subjects (convenience sample). For subjects recruited via snowball methods, researchers explained that the potential subject's contact information was obtained through a colleague or acquaintance who knows the subject.

The downside to using convenience and snowball methods of recruiting interview subjects is that this approach does not result in a representative sample of residents. We only obtained data from the people we spoke to, and since these people do not represent the population, the results do not fully represent the population—they likely exclude key voices and perspectives, and elevate the voices of the people we did interview, who likely represent people who are easier to reach and more eager to participate. While we did take steps to reach more vulnerable populations, such as people with disabilities, these efforts were not always successful.

2.4.2 Interview guide

The interviews were open-ended, meaning that the questions and answers were not as specific as in a survey, which only has a limited number of possible responses. Researchers used questions from an interview guide (included in the Interview Protocol in Appendix A), modifying the questions to the specific needs of the site as appropriate. For example, researchers translated the questions into local languages, including: Marati (Mumbai and Pune), Gujarati (Ahmedabad), Hindi (all three Indian sites), Amharic (Addis Ababa), and Swahili (Dar es Salaam).

2.4.3 Researcher training and information sharing

All team members involved in qualitative data-gathering participated in a comprehensive web-based training session on 25 June 2021, before beginning fieldwork for this portion of research. That training covered basics of qualitative research, data-gathering through open-ended interviews, participant recruitment, ethical concerns of this research, and risk minimization for study participants, as well as safety protocols for COVID-19. The training also covered the contents of the Interview Protocol (in Appendix A).

Lessons from the first interviews were shared across groups to facilitate data-gathering across the six sites. For example, researchers in Pune were the first to carry out interviews, and their reflections on the interview process were shared with the other five research groups.

2.4.4 Interviews & transcription

Researchers spoke to a total of 41 residents and 18 policy-makers across the six sites. Each interview was approximately 40 minutes long.

Researchers carried out in-depth interviews with subjects via telephone or web-based video conference (such as Zoom or Google Meet) or via face-to-face interviews. Face-to-face interviews followed strict protocols to minimize the risk of transmission of COVID-19.

Researchers created transcripts of interviews from handwritten notes or electronic recordings of the interviews. Several local researchers indicated that participants were more likely to respond freely and honestly if their responses were not being recorded electronically; therefore, researchers could make the decision about the best way to record the conversation (by hand or with the aid of an electronic recording device). Thirty of the resident interviews were recorded and 11 were documented with handwritten notes only. Four of the policy-maker interviews were recorded via Zoom, and 14 were documented with written notes only. Public servants in Tanzania were under severe time constraints because of the COVID-19 pandemic, and at their request, two policy-makers emailed their interview responses.

3. SITE PROFILES

In the following section, we provide background information on the sites where we assessed the policy interventions.

- Gotera Condominium – Addis Ababa, Ethiopia
- Jemo Condominium – Addis Ababa, Ethiopia
- Tandale Argentina BRT Station – Dar es Salaam, Tanzania
- Gupta Nagar – Ahmedabad, India
- Charkop Sites and Services Area – Mumbai, India
- Yerwada – Pune, India

We first provide an overview of the cities, with some basic detail about the context in which the policies were implemented. The overview of cities will be expanded in the final version of the Case Studies Report. In addition, more detail on the policy context will be provided in the qualitative interviews and policy analysis portion of the future phase of this activity and is not included in this report.

3.1 Overview of sites

In the following section, we provide information on the sites included in the study. To provide a general sense of the demographics and planning context in the metropolitan areas that we examined in the case studies, we have provided the data (see Table 6).

Table 6: Statistics for metropolitan areas studied

	Addis Ababa, Ethiopia	Dar es Salaam, Tanzania	Ahmedabad, India	Mumbai, India	Pune, India
Mean Block Density* Source: Pedestrians First, 2020	78	40	29	33	34
National % Urban Population Living in Slums (2018) Source: World Bank	64.3%	40.1%	35.2%	35.2%	35.2%
Metropolitan Population (2015) Source: GHSL	3,830,790	5,345,515	6,678,960	21,755,900	6,656,510
Average Annual Metropolitan Population Growth Rate (2000–2015) Source: Calculated from GHSL	2.5%	9.5%	1.9%	1.2%	2.9%
Projected Annual Population Growth Rate (2020–2035) Source: United Nations World Urbanization Prospects 2018	4.2%	4.7%	2.3%	2.4%	2.0%
Weighted Population Density (people/km²) Source: Pedestrians First, 2020	24,453	24,012	42,865	55,679	32,665

***NOTE**: Mean Block Density is the number of city blocks (development surrounded by public right-of-way) per square kilometre.

Based on the data above, all six case study sites are located in large metropolitan areas with populations exceeding 3 million. One site is in a mega city (Mumbai) with a metropolitan population exceeding 20 million. All five urban areas have grown significantly between 2000 and 2015, but Dar es Salaam has grown at an exceptional pace—triple the rate of growth of the next fastest-growing urban area. The projected growth rates for the Indian urban areas in the next 15 years are roughly half those of the two African cities. The above table shows that the population in Addis Ababa is expected to increase while the growth rate in Dar es Salaam will decrease considerably. Despite this projected decrease, the growth rate in Dar es Salaam is still projected to be higher than in any other urban area in this study.

In all countries, the percentage of the urban population living in slums, or informal settlements is above 35%, reaching nearly 60% in Tanzania. It should be noted that this data is not specific to the cities within this study, but it provides useful context as to conditions within the country.

The case study sites are all located within dense urban areas, with weighted population densities above 20,000 people/km² and exceeding 55,000 in Mumbai. We measured weighted density by calculating the densities (population/ km²) of each tract or grid segment of an urbanised area and weighting each one by the

population in it. This resulting weighted density represents the experienced density of the average person living in that area. It should be noted that the densities do not distinguish crowding conditions.

The following subsections provide more detail on the urban context in each of the five cities and six case study sites.

3.2 Addis Ababa, Ethiopia

Addis Ababa is the capital city of Ethiopia and is located in the middle of the country. It was established in 1887 on a 2,400 m high plateau at the foot of Mount Entoto. Nearly a quarter of the city is located on relatively steep slopes. The municipality area is about 540 km^2 and is divided into 10 subcities and 116 *woredas* for administrative purposes.

As of 2017, the city was home to 3.2 million inhabitants, and it is projected to reach 4.7 million by 2030. The city contributes approximately 8% of the national gross domestic product (GDP) of Ethiopia, with an annual GDP growth rate of around 15% (7). The city has expanded horizontally, mostly towards the southern, eastern and southwest directions from the city main centre. This expansion mainly follows the topography and road network expansion rather than being part of a coordinated land use and transport plan.

3.2.1 Urban planning context

In 2004 Ethiopia launched the Integrated Housing Development Program (IHDP), intended to alleviate poverty and bring sustainable development. The IHDP is aligned with Ethiopia's millennium development goal to bring improvements to the lives of millions of slum dwellers by 2020. The program provides government financing for housing for low- and middle-income residents. IHDP projects aim to upgrade slum areas, particularly in the city centre by clearing them and rehousing residents in multi-storey condominium houses. Within the condominium developments, communal and surface parking areas are jointly owned and managed (8).

IHDP is administered by the Ethiopian Housing Development Agency. The housing units are built by the government and transferred to residents. Residents are awarded housing using a lottery system, and people are expected to deposit at least 20% of the total housing cost. The program is intended to serve people who are registered by the national bank as low- and middle-income. In particular, it aims to meet the demand for housing for people relocated from the city centres for urban regeneration programs. According to the 2017 Addis Ababa city master plan, there is a 1.2-million-unit backlog for housing.

The Addis Ababa City Development Plan 2017-2032 was approved in 2015 and includes a structure plan (see Figure 7), an action-oriented strategic development framework, and a management reform component. The structure plan provides an overall framework for the spatial development of the city. Before the preparation of the Addis Ababa city master plan, the condominium housing built by the IHDP in Addis Ababa was constructed at different scales and mostly located on the outskirts of the city. In order to manage these housing developments, the master plan proposed new land uses surrounding the condominium sites as well as new transport options, such as bus rapid transit (BRT)[1], to connect the sites to the city centre.

The action-oriented strategic development plan prioritises various key urban policies to be implemented in five years (e.g., housing; urban road network and transport; manufacturing industries and large storage facilities; environment; and inner-city renewal and upgrading). It also proposes implementation mechanisms and financial investment requirements. In addition, the plan identifies a network of around 15 BRT lines in the city.

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[1] BRT is a public rapid bus transit system running on dedicated carriageway with stops along the route, mimicking the speed and efficiency of a metro system. The idea was popularised initially in Curitiba, Brazil and Bogota, Colombia.

Figure 7: Addis Ababa city land use planning 2017–2032
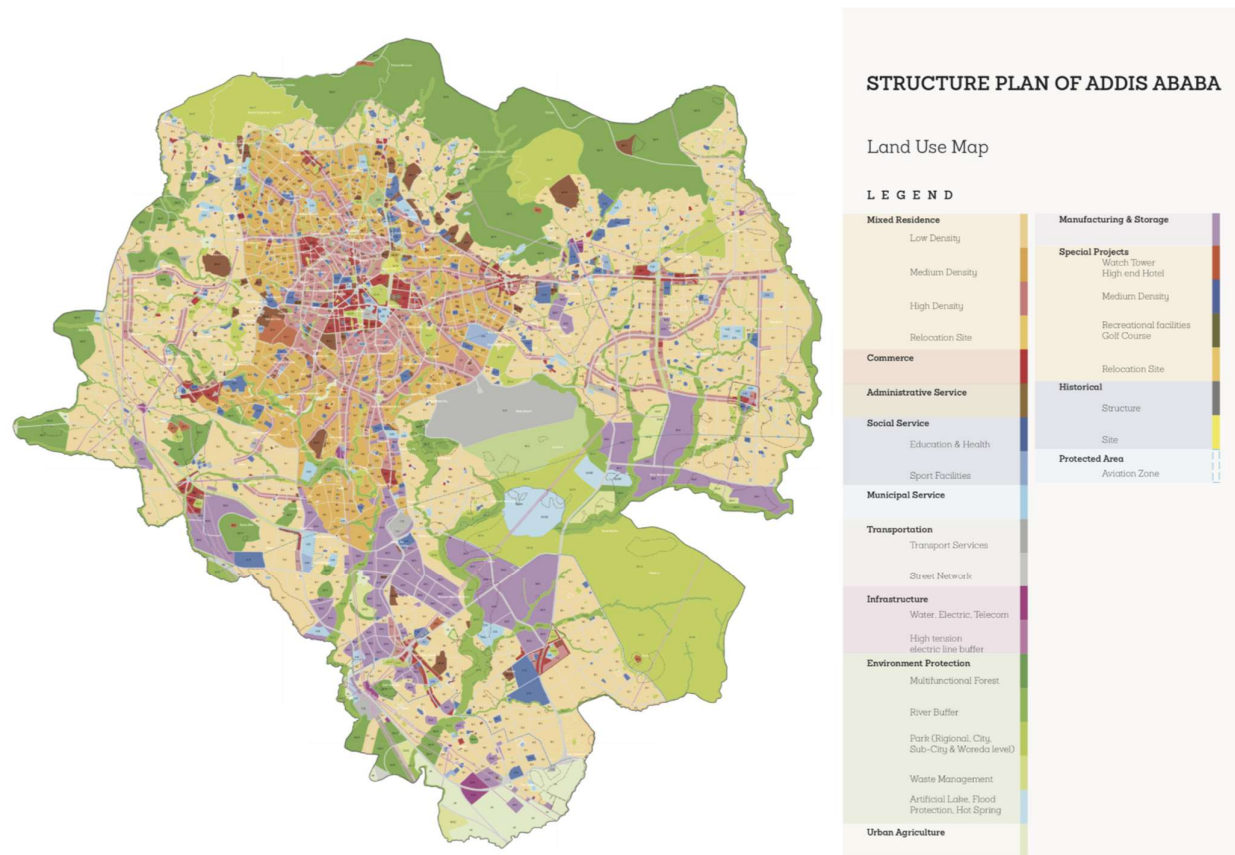
During the preparation of the new master plan, lessons were learned about the previous plan's implementation challenges. Those challenges resulted from either lack of foresight in the plan or constraints associated with its implementation. Major shortcomings of the previous plan include a failure to sufficiently describe implementation mechanisms (including institutional structure and funding sources) to encourage and guide proposed strategic investments. For example, some of the interventions proposed in the Local Development Plans (LDPs) lacked critical understanding and interpretation of land use and transportation integration. Hence, the new City Development Plan gives these issues more consideration and proposes transit-oriented development along key corridors.

3.2.2 SITE: Gotera Condominium

The Gotera Condominium site is in the centre of Addis Ababa city, in Kirkos sub-city (see Figure 8). The Gotera LRT station is at the centre of the study area. Surrounding the condominium developments are small *kebele* houses (government built public housing) provided by the municipality and constructed mainly for low-income residents.

Figure 8: Location of Gotera site

Source: ITDP

The Gotera Condominium development contains over 80 condominium buildings and 2,400 housing units of four different typologies: studios, one-bedroom, two-bedroom, and three-bedroom units. The condominium site is bounded by two major arterial streets. The existing public transport modes in Gotera are LRT, regular buses, minibus taxis, and smaller taxis. The LRT corridor operates from the north to the southern part of Addis Ababa, along the east side of the site. On the west side of the site is a major 30m street which the city master plan identifies as the location of the city's second BRT line (B2). The BRT B6 corridor is currently in the planning stage, with a planned length of 11.5 km, spanning from Bole International Airport to Sarbet via Gotera and other central city parts (see Figure 9).

Figure 9: The BRT B6 projects (Red Line)
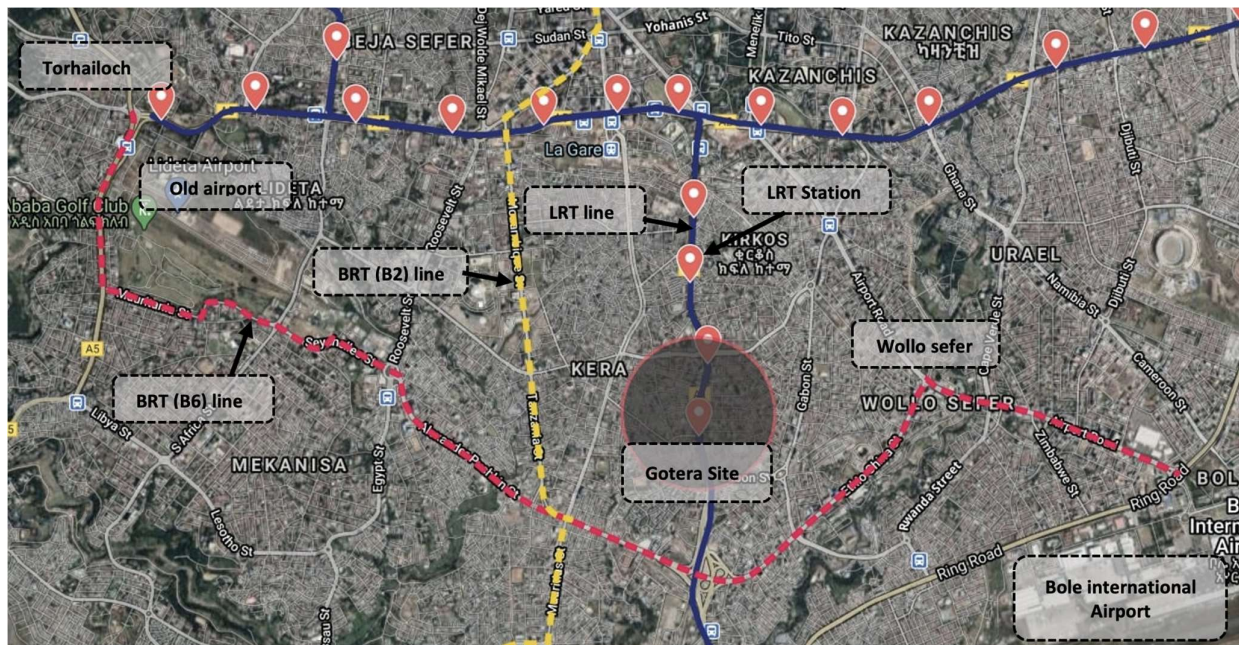
The Gotera site covers 0.85 km², with residential uses accounting for 44%, followed by commercial land use (12%), mixed land use (11%; that includes the intervention condominium site), and education facilities (4%). Health centres, green areas, recreation, and open spaces all account for less than 1% of land, while the street network covers the remaining 21.6% (see Figure 10).

Figure 10: Existing land use at the Gotera site
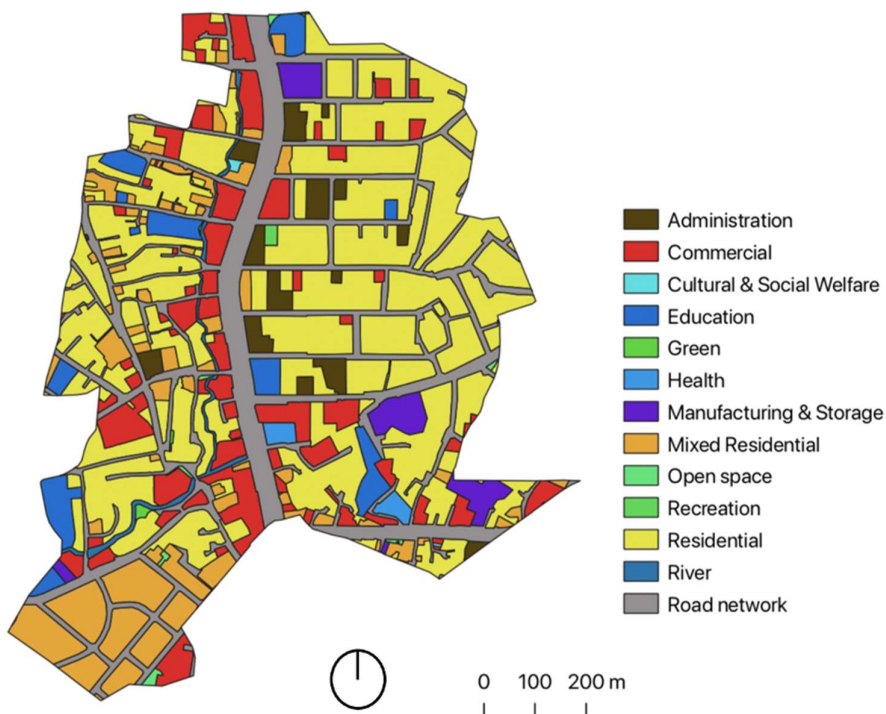
Source: ITDP

3.2.2.1 Site history and interventions

The Gotera Condominium construction was started in 2004 and finished in 2007. The urban renewal condominium project is part of the Ethiopian Integrated Housing Development Program (IHDP) in Addis Ababa. The major goals of the program were to provide low-cost housing units for Addis Ababa residents, to relocate residents from the inner slum areas like Lideta, and to renovate the existing slum settlement and military camp area. Before the condominium site development, the area was a slum settlement with small housing units, poor sanitation, and overcrowding. Part of the site has been used as a military camp for the soldiers. The areas surrounding the condominium, such as Lancia and Cherkos exhibit characteristics similar to those previously seen at the Gotera site (see Figure 11).

The policy changed the site by providing significantly higher-quality, five-storey residential buildings containing 1- to 3-bedroom units serving 2,433 households. The redevelopment also added proper sanitation and new streets. The people living in the area are residents of other city centre areas who were relocated for urban renewal projects.

Figure 11: Places surrounding (left) and inside (middle and right) Gotera Condominium
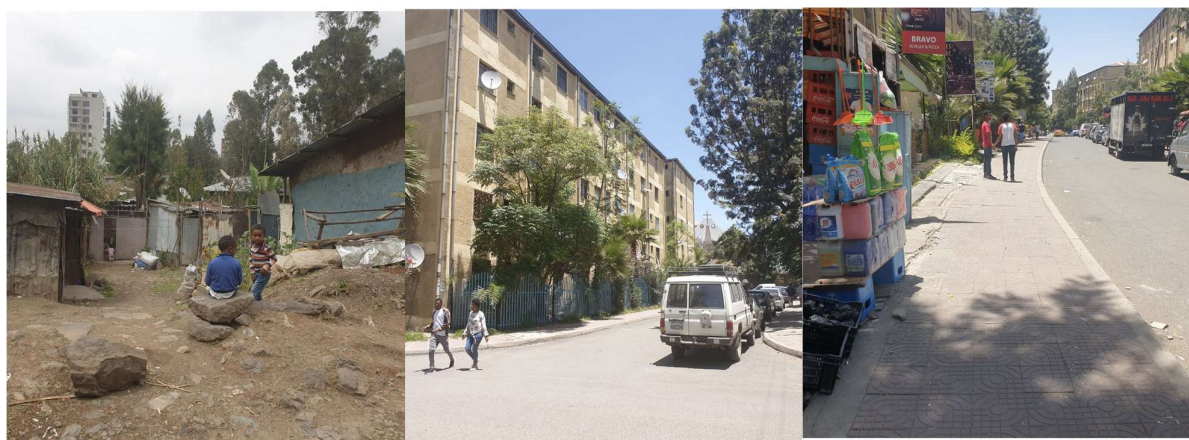
Source: ITDP

3.2.3 SITE: Jemo Condominium

Jemo condominium is a large social housing complex completed in 2010 in Addis Ababa, Ethiopia. The 500 m walkshed for this study is centred around a BRT station that is currently under construction. The site is located in an outer area of the southwestern section of the city under the Nifas Silk-Lafto subcity administration (see Figure 12). The site contains more than 10,000 housing units, and it houses more than 50,000 people. The area is currently being administered mutually by Addis Ababa city administration under Nifas Silk-Lafto subcity and by the Oromia region under Subeta city administration, due to administration boundary issues between the Oromia region and Addis Ababa city administration.

Figure 12: Location of Jemo site
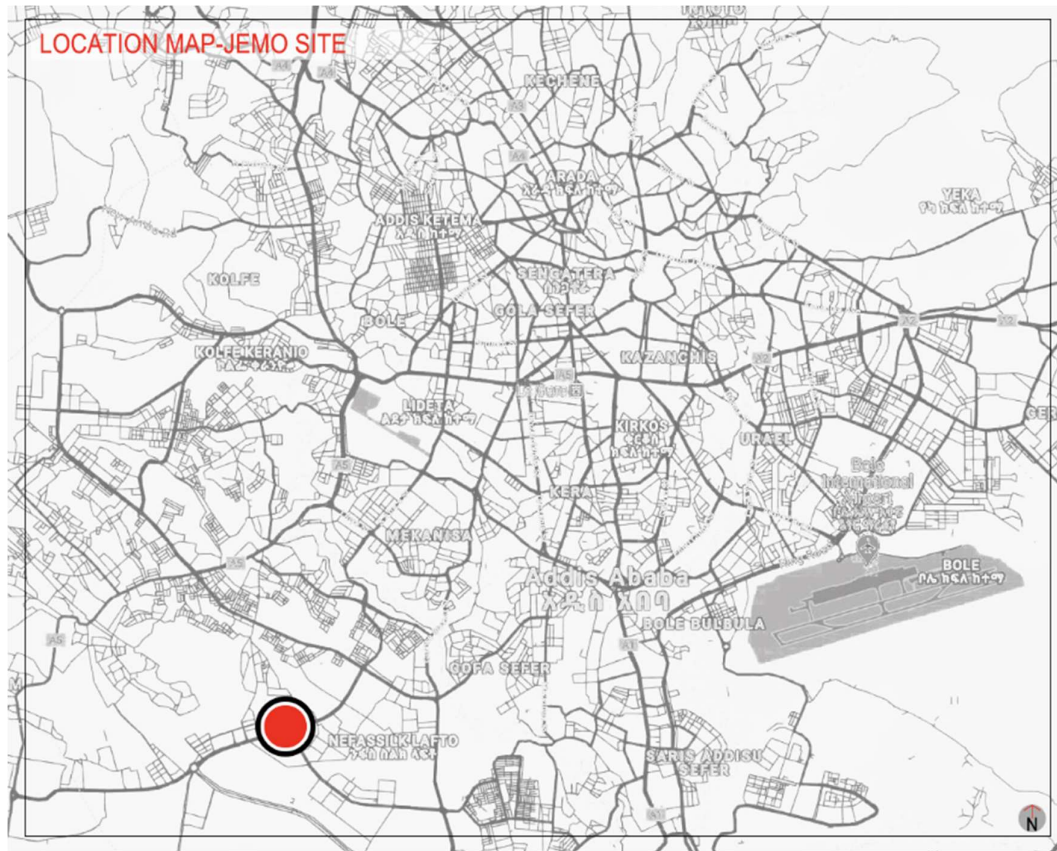
Source: ITDP

The Jemo project site covers 0.96 km², and the major land use on the site is a glass manufacturing and storage area that covers 21.4%. Mixed-use development including the condominium intervention site accounts for 20% of the site, and residential uses make up for 16.6%. Unlike the Gotera site, the Jemo site has a large portion of open spaces and water, which occupy 23% of the site. Streets cover the remaining 18% (see Figure 13).

Figure 13: Existing land use at Jemo site
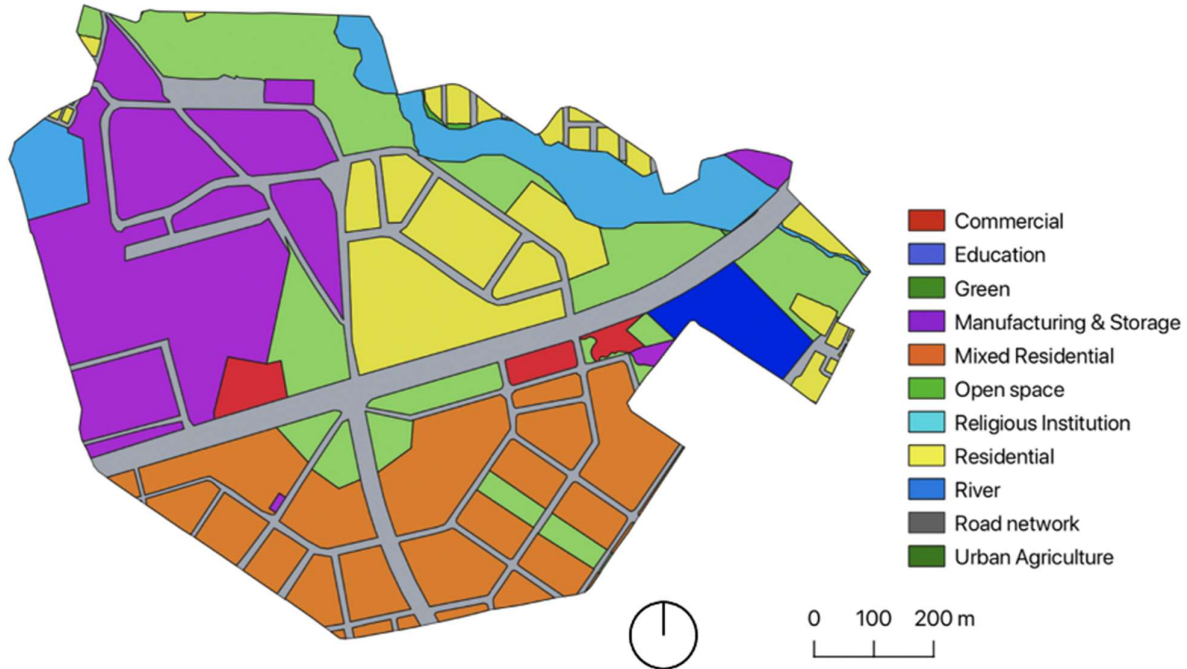
Source: ITDP

The existing transport system for the area is primarily composed of regular city buses, minibus taxis, privately owned city buses, and three-wheelers, known locally as *bajajs*. The 17.4 km (with possible 1.8 km extension) B2 BRT line is currently under construction, crossing Addis Ababa from Wingate roundabout in the north to Jemo Terminal in the south (see Figure 14). The line is expected to initially serve 5,400 passengers per hour in each direction. Direct services will extend beyond the dedicated corridor to provide convenient services to nearby areas.

Figure 14: B2 BRT corridor (red) with planned direct services
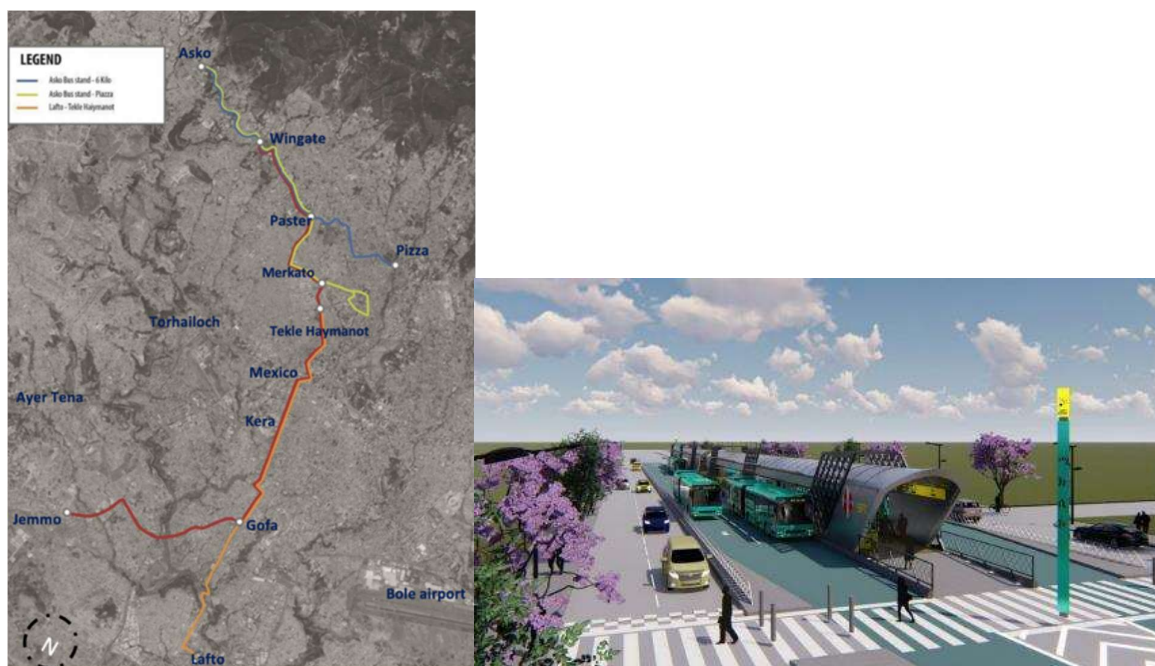
The new 2.8km pilot bike lane corridor was constructed in 2020 (see Figure 15), connecting the Jemo area to the eastern part of the city, including the Lebu area. Along the corridor, street edges are lined with mixed-use buildings that house stores, cafes, and other conveniences on the ground floors. A three-lane street in either direction was redesigned to accommodate a curb-side bi-directional cycle facility on one side, limiting parking to the other side of the street.

Figure 15: Jemo Lebu pilot bicycle lane

Source: ITDP

3.2.3.1 Site History and Interventions

The Jemo condominium project is part of Ethiopia's IHDP. Before the housing project the site used to be urban agriculture land, which was owned by the farmers who are now living in the surrounding Oromia regions, specifically Sebeta city, which is around 10 km from Jemo. Few farmers still use the land around the condominium areas for agriculture purposes. The policy intervention was a greenfield housing development. The government developed new housing on formerly urban agricultural land creating an urban neighbourhood of higher-quality five-storey residential buildings with 1- to 3-bedroom units, including proper sanitation and new streets. The people living in the area are former residents of other city centre areas, who were relocated for urban renewal projects.

Due to the high number of residents at Jemo site and huge transport demand to the city centre, the 10th Addis Ababa city master plan (2017–2032) has identified Jemo area as a secondary centre and proposed different land use around the site. The planned land use aims to create all of the facilities and services that are typically found in the main city centre but at a smaller scale and to reduce the travel demand to the city centre. The principle of the masterplan was to develop a polycentric structure at different levels.

Jemo and the surrounding area are identified as a secondary city centre (see Figure 16), and the plan proposed several land uses on the area. In addition to the existing housing sites, the plan identifies market areas, public spaces, regional and city bus terminals, city level stadiums and sub-city administration offices and other municipal and social services.

Figure 16: Addis Ababa city master plan city centre
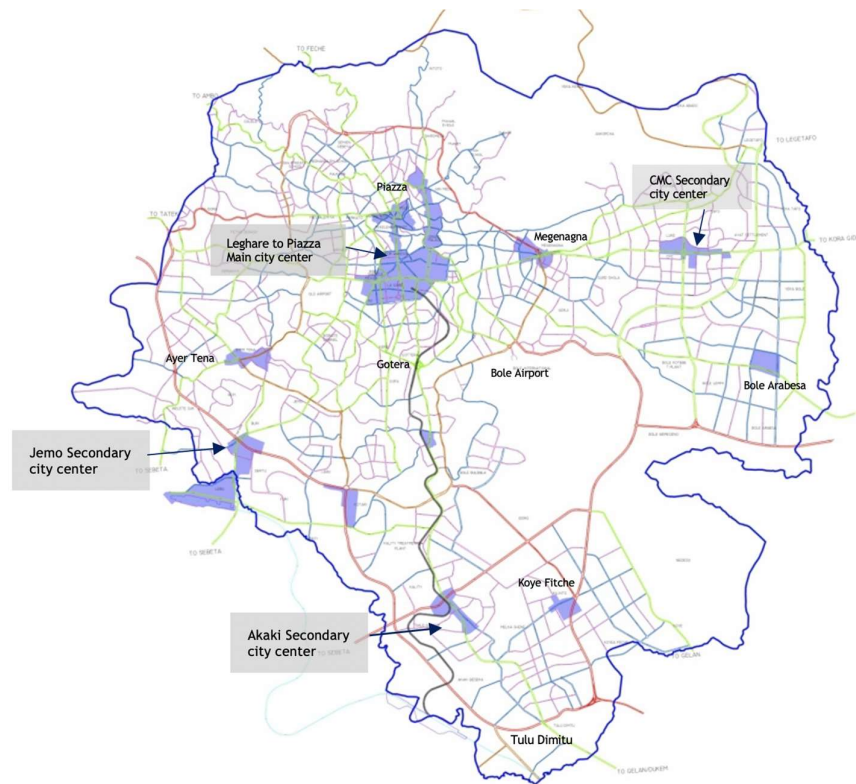
Source: Addis Ababa City Plan and Development Commission

3.3 Dar es Salaam, Tanzania

Dar es Salaam is the primary commercial city, the largest city, and former capital of Tanzania with an estimated population of over 7 million people. Dar es Salaam accounts for around 40% of the urban population in Tanzania. The city is located on the shores of the Indian Ocean with an area of 1,590 km^2.

It has five administrative districts/local government authorities (LGAs). The central government is represented by the regional commissioner (political) and regional administrative secretary (executive) who are responsible for the whole of Dar es Salaam. Under the same arrangement, the city is subdivided into five administrative areas governed by district commissioners (political) and district administrative secretaries (executive). The LGA administration boundaries follow the same boundary pattern except that they are headed by mayors (political) and municipal directors (executives). The LGA in Dar es Salaam include Ilala (recently elevated and renamed the Dar es Salaam City), Kinondoni, Temeke, Ubungo, and Kigamboni. Urban development and housing follow the five major roads leading to the central business district (CBD) where commercial, businesses and offices are located (see Figure 17).

Figure 17: Dar es Salaam central business district

Dar es Salaam city has a duality of character comprising contemporary multi-storey buildings in planned areas as well as unplanned settlements both of which are undergoing rapid transformation, with each exerting influence over the other. While the formal urban areas are assuming considerable informality, the informal settlements are adopting a formal structure due to uncontrolled construction of high-rise buildings. This duality of the city and its unique role as a regional hub in the East African Community and beyond, in part underlie the vision of the city.

3.3.1 Urban planning context

Each of Dar es Salaam's five administrative districts have elected mayors and appointed municipal directors as chief executives. Each district has a planning authority for the land under its jurisdiction. The land use planning and subsequent urban development is guided by policies and legislations issued by the Ministry of Lands and Human Settlements.

In 2016, the Ministry of Lands and Human Settlements in collaboration with the governing bodies in Dar es salaam prepared the Dar es Salaam City master plan that will guide all urban developments within the city. The master plan identifies various urban development plans to be implemented in phases depending on the availability of resources.

The President's Office Regional Administration and Local Government in collaboration with the Dar es Salaam City Council developed a Transport Corridor Development Strategy under the Dar es Salaam Metropolitan Development project. The project aims to intensify and diversify land uses in the one-kilometre corridor on both sides of the Dar Rapid Transit (DART) phase 1. The TOD plan could supplement the Master Plan proposals concerning the development of urban sub-centres.

In 2018, the Dar es Salaam city prepared the transport master plan to deal with transport challenges and traffic congestion in the city. The goals and direction outlined in the Dar es Salaam Transport Master Plan are aimed at making everyday life simpler in a large, competitive city. The Transport Master Plan will be implemented in action and investment plans and will be the starting point for present and future plans and programmes for different modes of transport in Dar es Salaam.

The Dar es Salaam transport master plan (see Figure 18) recognises the need for guided land development along the five urban corridors and recommends working with the private sector to construct urban infrastructure. The plan promotes modal shift by improving the capacity and service standard of public transportation to decrease traffic congestion and reduce the number of cars in use. The plan envisions railway

and BRT as the main transport modes, supporting TOD. The TOD approach is intended to improve revenue for transport operating agencies by increasing the number of users and reducing loss from road congestion.

Figure 18: Dar es Salaam Transport Master Plan
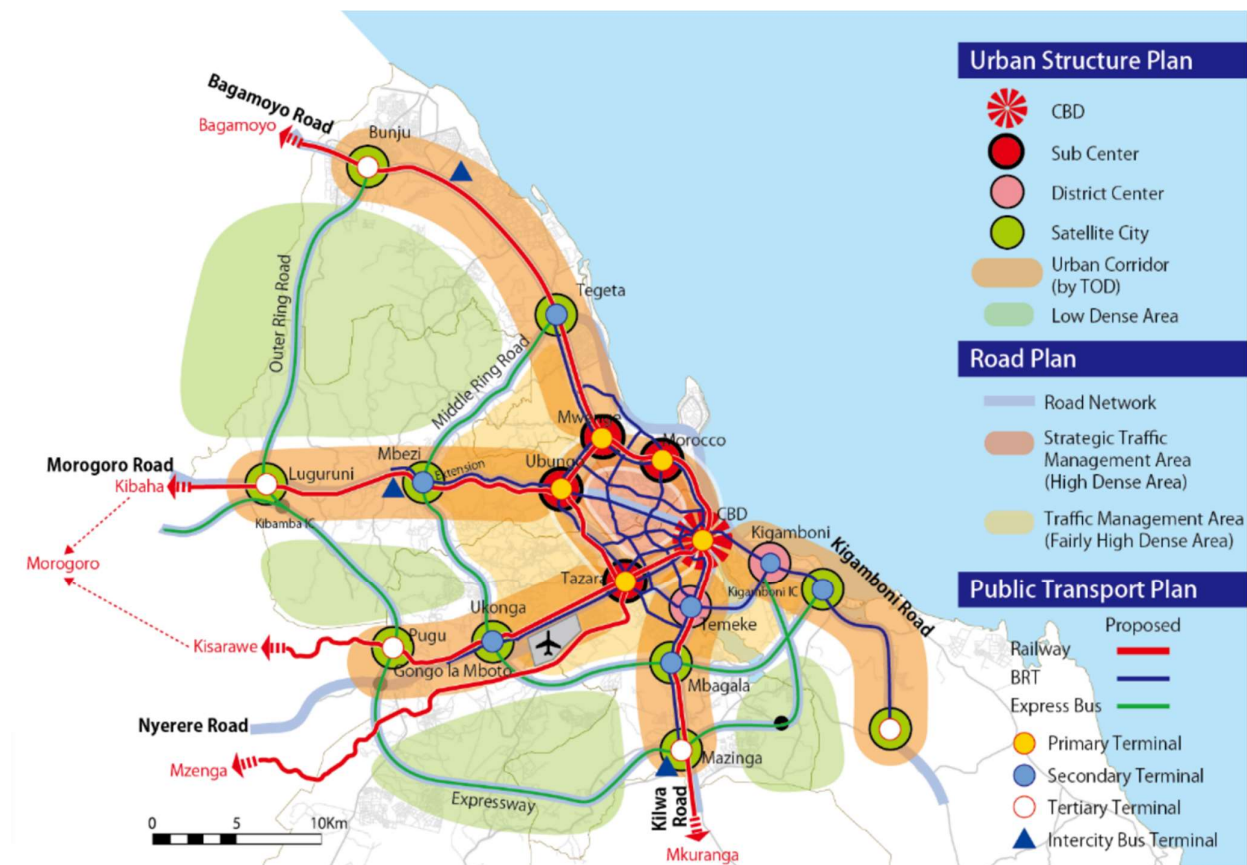
Source: Dar es Salaam City Master Plan 2016–2036

Studies done during the revision of the Dar es Salaam Transport master plan indicate that 58% of trips are made on public transport, which includes BRT, urban rail, and *daladalas*—privately owned medium-sized buses that can typically carry 30 to 40 passengers. Another 32% of trips are made by walking and cycling and 10% are made by private car. The aim of the Transport Master Plan is to provide Dar es Salaam residents, the business community and other stakeholders with the opportunity to make their own long-term decisions on where to live and invest.

In 2018, Dar es Salaam won the Sustainable Transport Award (STA)[2] for launching the first phase of its long-planned BRT system, Dar Rapid Transit (DART). DART, the first BRT in the region, is one of the most ambitious urban transport projects in East Africa. Located on one of the main roads leading into the city, the first phase of the BRT reduced travel time for some commuters from two hours to 45 minutes in one direction. Dar es Salaam BRT is designed to be developed in six phases, with dedicated bus lanes stretching over 160km. With 21 km completed, DART is already providing a massively improved public transport experience to approximately 180,000 passengers a day. The DART corridors also include high-quality walkways, crossings for residents, and cycle tracks.

The government of Tanzania, in recognition of urban planning and transport challenges in Dar es Salaam, has also been implementing various programs to reduce traffic congestion and informal housing. The Dar es salaam Metropolitan program focussed on improved road network, upgrading of informal areas and sanitation (lining of waterways, etc.). Another program underway is the Dar es Salaam Urban Transport

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[2] The STA is an annual award given by ITDP and a committee of judges that recognises the most innovative sustainable transportation projects that were implemented in the previous year.

Improvement Project (DUTP) aiming to finance designs and construction of a mass transit system in three corridors in the city of Dar es Salaam. The Transport Master Plan has been developed in parallel with the Corridor Development Strategy (CDS) under BRT phase 1 as they are all aiming at introducing TOD to the city of Dar es Salaam.

3.3.2 SITE: Tandale Argentina BRT station

The site in Dar es Salaam is centred around the Argentina BRT station. The site lies within two administrative authorities of Kinondoni MC and Ubungo MC. The BRT forms the boundary line between the two, with Kinondoni on the north and Ubungo on the south. The Wards of Tandale and Ndugumbi wards are north of the BRT, part of Kinondoni MC. Mburahati and Manzese wards are south of the BRT, part of Ubungo MC. The area consists largely of informal or semiformal development. Before the 1980s, the area was used as farming plots for local dwellers. The farmers were succeeded by individual informal housing developers.

The study area is categorised in high density with high concentration of buildings and residents as it is within 8km from the city centre. Land agglomeration is taking place where landowners are buying and adjoining two or more plots to be able to build bigger and high-rise buildings. The land use pattern is slowly changing from residential to more commercial. The majority of the residents are tenants and are low-income earners.

The existing road network is narrow, with many not accessible by vehicles. Apart from the BRT service, the area is also served by daladalas running parallel with the BRT. Once the BRT is fully operational it is expected that the minibuses will be rerouted to other areas not served by BRT. To supplement the public transport system, three-wheeler taxis (*bajajis*) and 2-wheeler taxis (*bodabodas*) move people along and around the BRT corridor. Limited cycling and pedestrian ways were observed along the major roads (especially along the BRT) and within the residential areas. Safe pedestrian crossings and ramps exist along the BRT corridor.

In terms of service provision, the source of water supply in this area is from the Dar es Salaam Water and Sewerage Corporation (DAWASCO).

Figure 19: Location of Argentina BRT station
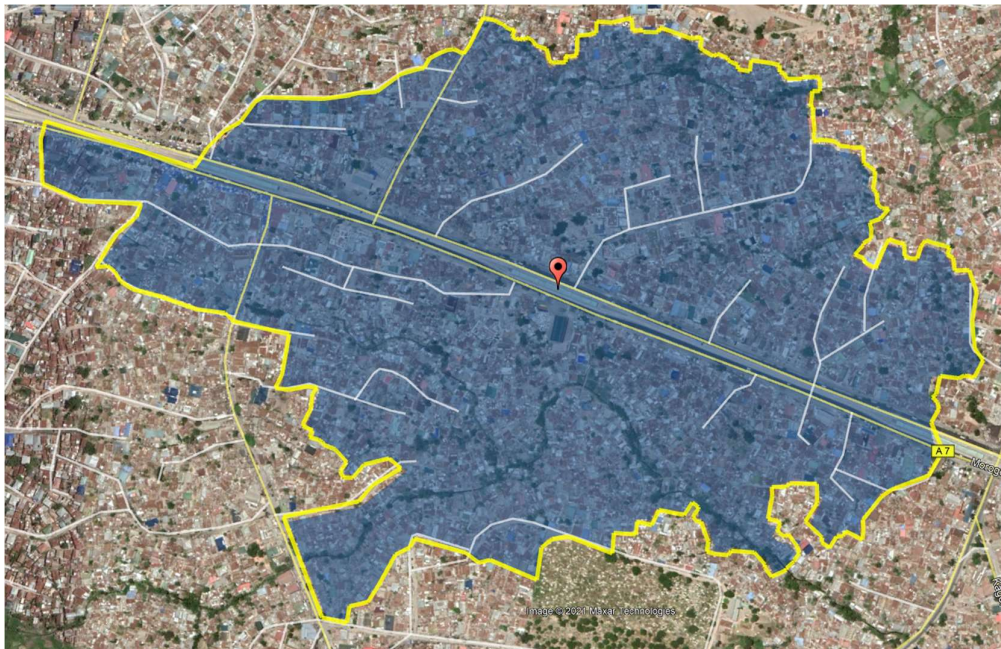
Source: ITDP

3.3.2.1 Site History and Interventions

In the late '70s and early '80s, Tanzania abolished the Local Government Authorities (LGAs) which were responsible for land use planning in urban areas. During the same period, the government established/constructed many industries in the urban areas to increase local productivity and create employment. In Dar es salaam, some of these developments were made in peri-urban areas such as Ubungo where land was abundant. This created employment and attracted people to settle in nearby areas such as

Manzese and Tandale. With few institutions to guide urban development, many unplanned communities grew in the nearby areas. In the 1980s the World Bank, through the Site and Services and Squatter Upgrading Schemes, supported the government to improve the informal settlements in Dar es Salaam. Major upgrading, including the construction of gravel roads, drains, and electricity infrastructure was done in Manzese (a part of the study area) as a part of the scheme.

The Ministry of Lands, Housing and Human Settlements is now responsible for land development in Tanzania and has been issuing policies and legislation to guide urban land redevelopment in informal and new areas. In order to improve access and living conditions in Tandale and neighbouring areas, the Dar es Salaam City Council, through the Dar es Salaam Metropolitan Development Project (DMDP), began implementing/constructing roads and making sanitation improvements in this area in 2015. This ongoing initiative; financed by multiple entities including the government of Tanzania, World Bank, FCDO, and the Nordic Development Fund; aims to ensure this unplanned area is developed following urban development guidelines issued by the Ministry of Lands, Housing and Human Settlements, to become safe and liveable to all categories of people.

3.4 India policy intervention overview

Modern urban housing policy interventions in India started with the first five-year plan (1951–1956), which focused on constructing houses for government employees and for the refugees pouring due to the India-Pakistan partitions. Later, plans aimed to develop townships for public sector industries and planned state capitals like Bhubaneswar and Gandhinagar. Public housing boards and 'slum clearance' boards were established to build public housing in the rapidly industrialising cities. The fourth five-year plan focused on decongesting large cities via remunerative housing and urban development. In the fifth five-year plan, the Urban Land (Ceiling and Regulation) Act was enacted to prevent the concentration of land holding in urban areas and to make urban land available for construction of houses for the low-income groups. This was also the same time when a number of 'Site and Services' schemes were introduced in the large cities like Mumbai, Chennai (called Madras then), and Kolkata. In the sixth, seventh, and eighth five-year plans, the government retained some emphasis on providing housing for poor sections of society, but the major responsibility for housing development was shifted to private developers. From 1997 to 2002, the Two Million Housing Program (2MHP) was launched, with 35% of the dwelling units constructed in urban areas. Between 2002 and 2007, under the 10th five-year plan, the Urban Land Ceiling and Regulation Act & the Rent Control Act were revoked. In 2005, National Urban Housing and Habitat Policy was adopted under which various housing schemes and programs were launched (9). The Basic Services for Urban Poor (BSUP) program was created under the Jawaharlal Nehru Urban Renewal Mission (JnNURM), a city renewal and upgrade program funded and promoted by the Government of India that ran from 2005 to 2011. JnNURM focused on improving and modernising Indian cities through the provision of infrastructure. The main thrust of BSUP was on integrated development of slums through projects for providing shelter, basic services and other related civic amenities with a view to provide utilities to the urban poor (MoUD, 2005). The projects under the program received grants from the central government and state government, local government and community. The Affordable Housing in Partnership was launched in 2015 under Pradhan Mantri Awas Yojana – Urban (PMAY-U), a flagship Mission of Government of India, implemented by the Ministry of Housing and Urban Affairs (MoHUA). The PMAY-U mission addresses the urban housing shortage among the Economically Weaker Sections/Lower-Income Group and Middle-Income Group categories including the slum dwellers by ensuring a formal/permanent structure (pukka house) to all eligible urban households by the year 2022 (MoHUA).

As per the census of 2001, a slum is defined as 'a compact area of at least 300 people in poorly built congested tenements surrounded by an unhygienic environment, usually with inadequate infrastructure and a lack of proper drinking water and sanitary facilities.

3.5 Ahmedabad, India

Ahmedabad is the largest city in the state of Gujarat and India's seventh largest metropolis/city. Ahmedabad has a population of around 5.8 million people within its municipal administrative boundaries and around 466 km^2 of land (10). The Ahmedabad Urban Agglomeration (AUA) stretches to 1,866 km^2 and includes four towns

and 13 villages beyond the municipal area. Ahmedabad has expanded significantly since it was founded in 1411. A thriving textile industry drove growth in the early 20th century, with the majority of growth occurring since 1949.

Ahmedabad city has two distinct halves; the east and the west, separated by the Sabarmati River. The eastern part of the city includes the Walled City of Ahmedabad, and beyond that is home to the industrial side of the city. The western part of the city is home to a significant economically upward population and also premier institutions of higher education and research.

Ahmedabad has a variety of housing typologies and markets. The eastern side of the city is predominantly low-rise high-density housing, mostly consisting of chawls and *pols*. Chawls are low-end industrial housing complexes developed to house labourers working in textile industries. They resemble a dormitory typology with common amenities. *Pols* are a community housing cluster with shared courtyards, typically housing people of the same religious or social groups. The western side consists mostly of low-density housing, including detached houses and low- and medium-rise apartments. Alongside formal housing, there are informal housing areas, consisting of slums and chawls, which provides housing to people with lower incomes (see Figure 20), in addition to the affordable housing schemes proposed by the state. The current statistics indicate that 23% of the population reside in slums and informal settlements. These slums are located both on private and public lands (10).

Figure 20: Location of slums in Ahmedabad
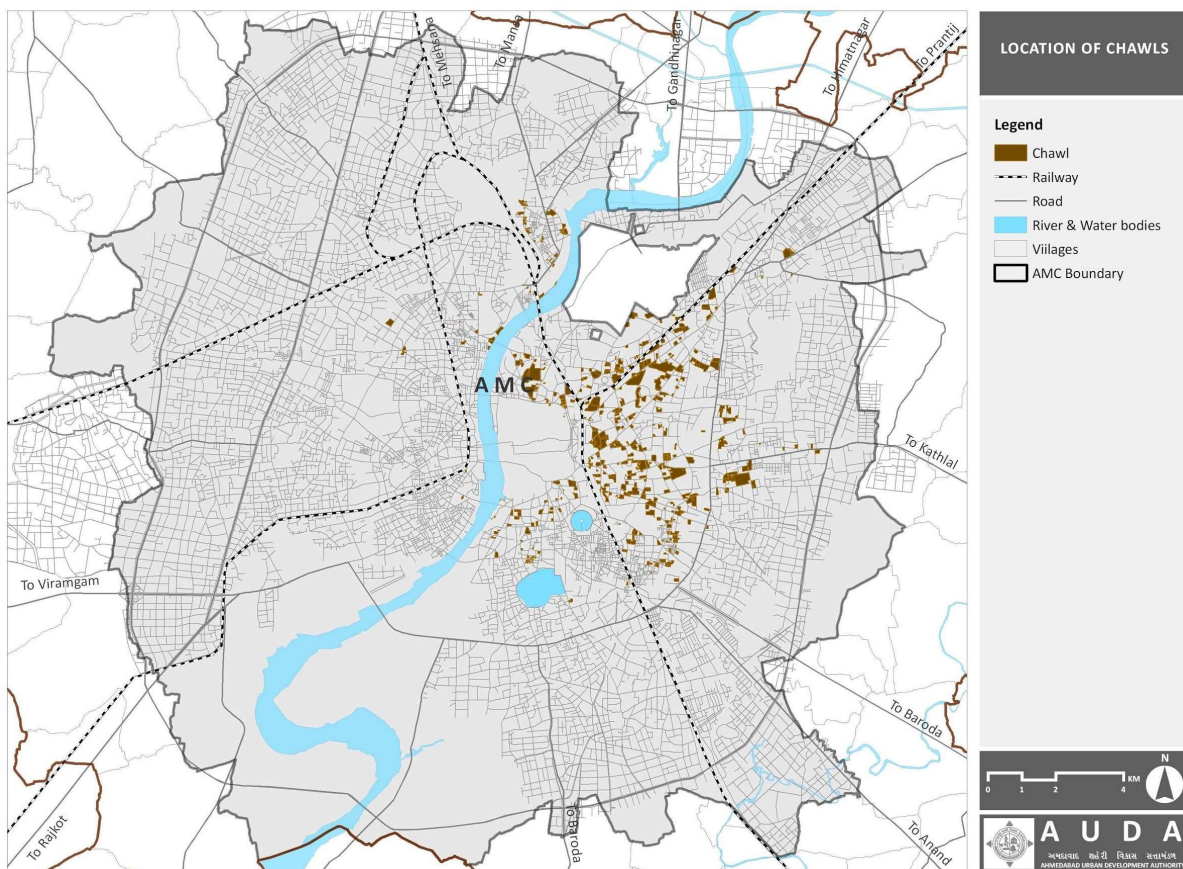
Source: AUDA 2012

For transport, Ahmedabad has a 2,400 km ring-radial road network and an intra-state road transport system managed by the state government Gujarat State Road Transport Corporation (GSRTC). The city also has the Ahmedabad Municipal Transport System (AMTS) public bus system managed by the AMC. The AMTS has been operational since the 1950s and has about 174 routes, covering a distance of around 780.4 km, and carrying roughly 0.65 million passengers per day—10% of all trips made in the city (11). The AMTS service has seen a steady decline because of the increasing numbers of two-wheelers and paratransit/private operators that operate in the city.

The city has a BRT system managed by Ahmedabad Janmarg Limited. The system, called 'Janmarg' or 'people's way', has a network of 13 routes and covers 88km. The BRT includes dedicated bus lanes and carries close to 158,000 passengers per day (see Figure 21). The BRT service faces similar challenges as the AMTS, and the high fares and limited last-mile connectivity make it a limited choice for many lower-income households. The upcoming (68 km-long) metro system will be managed by Gujarat Metro Rail Corporation (GMRC) (12).

Figure 21: Ahmedabad BRTS

Source: Ahmedabad Janmarg Ltd.

Semiformal auto-rickshaws, usually with three or six seats, area another option that operates along the same routes as the bus system almost everywhere in Ahmedabad. The auto-rickshaws are popular for a large number of people in the city as they offer competitive fares, easy access, and better last-mile connectivity. Statistics indicate that auto-rickshaws have around 7% to 8% of the total mode share in Ahmedabad. The city is experiencing rising motorisation with an increase in private automobiles and motorised two-wheelers (M2W).

Ahmedabad's modal share split reveals close to 50% for walking and cycling (32% walk, 15% cycling) and high percentages for motorised two-wheelers (26% to 30%) (13). Despite the high levels of walking and cycling, Ahmedabad lacks sufficient footpaths, safe crosswalks, and segregated cycle tracks. Only 15% of roads have adequate pedestrian facilities, and only 19 km of roads have bicycle lanes.

3.5.1 Urban planning context

Ahmedabad municipal area is managed by the Ahmedabad Municipal Corporation (AMC), which is responsible for urban planning, provision of basic services and amenities and management of the city. The Development Plan, a 10-year master plan (see Figure 22) for the city and its urban agglomeration, is prepared by the Ahmedabad Urban Development Authority (AUDA), while the Town Planning Schemes (TPS) —a planning framework for smaller areas in the city— is prepared by AMC (see Figure 23). The TPS mechanism manages land through land pooling and the reconstitution of plots. It is also pivotal for carving out land for affordable housing, public spaces, and streets.

Figure 22: City level planning
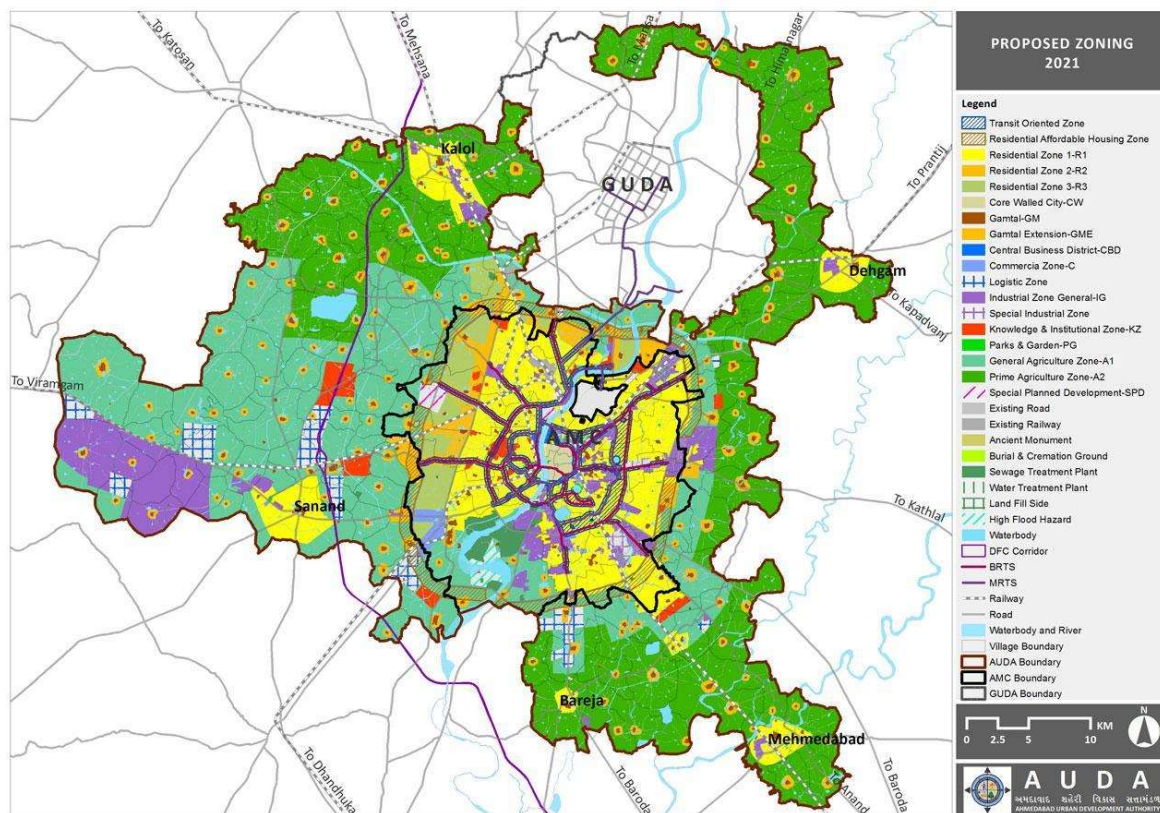
Source: AUDA 2012

Figure 23: Area level planning (before & after) at Hansol, Ahmedabad
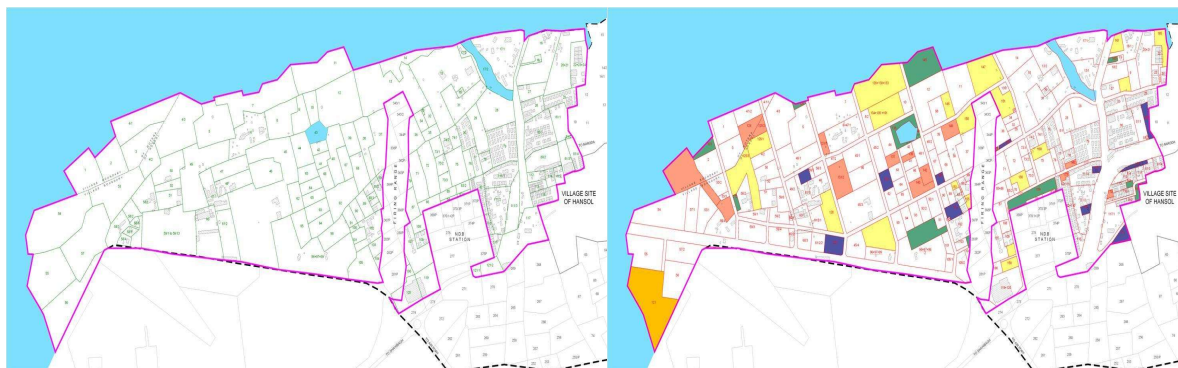
Source: AUDA and HCP

For housing, larger policy frameworks are set by the central governments, as described above, but whether or not to adopt and implement them is left to the state's discretion. In Ahmedabad, many such housing programs have been in action, like BSUP (under JnNURM), as well as the Affordable Housing in Partnership, launched in 2015 under PMAY-U. In situ slum rehabilitation programs and policies have also been prepared by individual state governments and carried out in their cities by their urban local bodies. On the micro level, projects such as the Slum Networking Project (SNP) and the in situ slum rehabilitation schemes are examples of where housing and sanitation in slums were improved through a variety of interventions and stakeholders.

The SNP was an important intervention that provided basic services to improve living conditions in the slum settlements and connected them to the city infrastructure network. The SNP project was a participatory effort by the Municipal Corporation, NGOs, slum residents, and private players who came together to connect the settlements to existing city infrastructure and improve their living conditions (see Figure 24). Each party

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played a different role in negotiations, design, and financing to make the project a reality. The SNP led to the installation of water and sewer lines with connections to individual households and the paving of internal streets. In addition, slums under the SNP program were given a no-eviction guarantee for 10 years. SNP is a relevant example of incremental development of housing and a vivid example of a participatory process. The SNP covered around 60 slums in Ahmedabad that housed close to 13,000 residents and ran from 1996 to 2009.

Figure 24: Slum Networking Project, Ahmedabad

Before   After

Source: PAS, CEPT

3.5.2 SITE: Gupta Nagar

Gupta Nagar settlement lies in the Vasna ward, in the western zone of the Ahmedabad Municipal Corporation (AMC) limits. The site surrounds the future APMC station of the MRTS metro line, which is currently under construction. The settlement abuts the 40 m ring road on one side and the Vasna-Ashram Road on the other. Prominent landmarks include the Agricultural Produce Market Committee (APMC), Primary Healthcare Centre Vasna, the upcoming MRTS metro line, and the Vasna transport hub for the AMTS buses. The settlement is in a very central location in Ahmedabad with relatively good connections to major spots around the city (see Figure 25). The Gupta Nagar transit stop is at the heart of the case study area. The stop includes various lines of the AMTS bus system and is a destination for pedestrians, motorised two- and three-wheelers, cars, trucks and minivans, and cyclists. There are also multiple businesses in the immediate area of the transit stop.
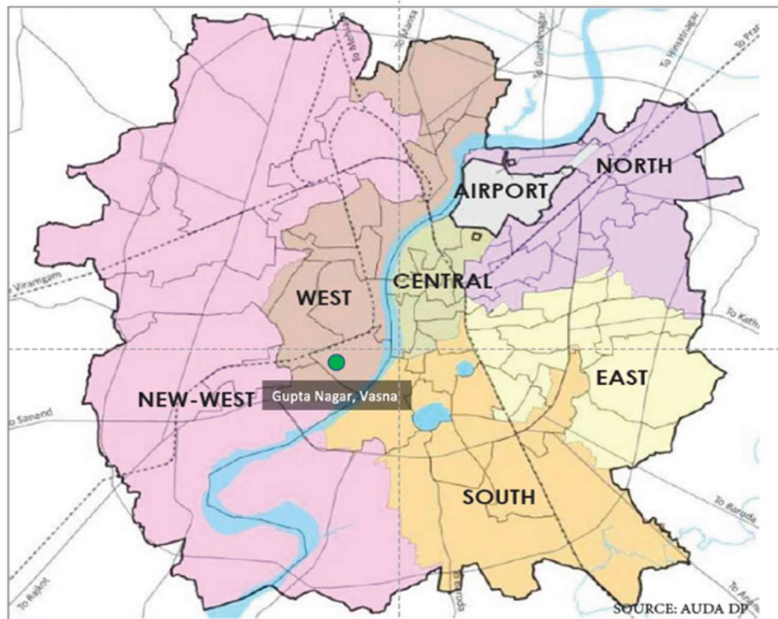
Basemap source: AUDA DP

Gupta Nagar and its surrounding areas have almost 1,200-1,300 households and a population of 6,000 to 7,000 people. The settlement area is approximately 0.6 km^2 to 0.8 km^2 (see Figure 26). The residents of these settlements are engaged in occupations such as daily-wage in construction labour, vegetable vending, and operating local shops such as grocery stores. Most people live close to their workplace and usually walk, cycle, or use auto-rickshaws to commute to work.

Figure 26: Gupta Nagar site map

Source: ITDP

The majority of the houses in Gupta Nagar and the surrounding areas are built incrementally. While they may not resemble formal housing typologies, the houses share a wall or two and are arranged like rowhouses, with doors opening to the streets (see Figure 27).

Figure 27: Internal lanes and houses in Gupta Nagar
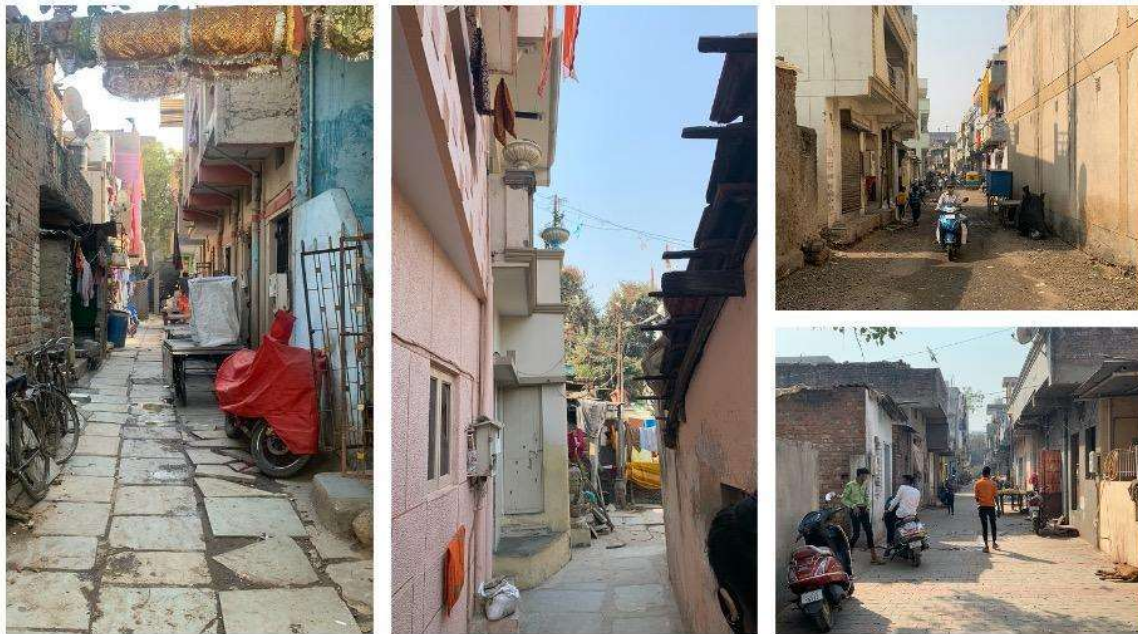
Source: Jacob Baby & Mallika Sehgal

Gupta Nagar is close to several bus stops served by municipal transport buses that connect to major spots in the city. The area is also served by shared modes of transportation such as shared autos, which provide more direct connection to homes and often have cheaper fares than buses. During the site surveys, we observed many motorised two-wheelers (M2W) in the settlement. The M2Ws are affordable, can easily navigate narrow streets, and may provide faster mobility than a bus or an auto.

3.5.2.1 Site History and Interventions

In the early 1970s, the Gupta Nagar settlement was empty grazing land on the periphery of Ahmedabad. Adjacent to Gupta Nagar, the Sankalit Nagar-Juhapura Area was used to relocate households who were affected by the Sabarmati River floods in the 1970s (14). While the Sankalit Nagar resettlement residents were given housing and tenure security by the local government, the residents of Gupta Nagar settled on the land without permission and built houses incrementally. Since the late '70s, the new residents have built kutcha or temporary structures to serve their shelter needs. These structures were upgraded over time to permanent structures. While these houses were quasi-legal, basic services such as water, drainage, and electricity did not exist, creating poor, unsanitary living conditions.

This informal development led to numerous land tenure entanglements between landowners and the new residents. In the 1970s to 1980s Development Plan, this area was marked as a green belt, thereby stalling any further development or changes for a certain period. The lifting of the green belt opened up the area for new construction.

The SNP intervention in Gupta Nagar was an informal settlement upgrading program. The intervention widened and paved streets and laid other infrastructure. SAATH, a healthcare and education NGO based in Ahmedabad was crucial in building trust with the residents of Gupta Nagar to make them an important participant in the project. SAATH had begun interventions in Gupta Nagar in the areas long before the SNP. Since the lack of proper infrastructure was one of the key reasons for poor healthcare scenarios, SAATH was able to convince a majority of the residents of the benefits that SNP would bring to the settlement (14).

A key hurdle the SNP program encountered was the question of tenure. Infrastructure provision can only be done in areas where there are clear land titles, so residents in Gupta Nagar were granted a 10-year no eviction guarantee from the local government. The SNP process had devised many flexible arrangements to ensure the community was at the core of this program. The beneficiary contributions were worked out to make sure there was no financial burden on the households, and small microfinance loans were extended in

case there was a shortfall. By the end of the project, almost 1,227 households had access to water and sanitation facilities. Over the years, given the robustness of these infrastructure provisions, many residents of Gupta Nagar were able to secure legal electricity connections and incrementally improve their houses.

3.6 Mumbai, India

Mumbai (known as Bombay until 1996) is a megacity on the western coast of India in the state of Maharashtra. It is India's largest city and one of the world's most populous cities. It is the largest natural port in India and has been home to a diverse population for more than a century. Mumbai city along with cities of Navi Mumbai, Thane, Kalyan, Dombivali, Mira-Bhayander, Ambernath, Ulhasnagar and Badlapur forms the world's fourth largest urban agglomeration (13). About 90% of the population is literate, which makes it the third most literate city in India after Nagpur and Chennai (11).

Mumbai has a diverse typology of housing developments owing to its colonial history and socioeconomic heterogeneity. The housing typologies in Mumbai include pavement dwellings, *chawls*, mass housing by state, private apartments, public-sector employee housing, slums, slum improvements and resettlements, slum rehabilitation projects, housing on urban fringes, and apartments in old agrarian lands and old villages, among many others (15).

Despite the recent economic growth, there is still poverty, unemployment, and poor housing conditions for a large section of the population. With available space at a premium, working-class Mumbai residents often reside in cramped and poor quality, yet relatively expensive housing that is usually far from workplaces. Over 7 million people, i.e. over 42% of the population of Mumbai, live in informal housing or slums, yet they cover only 6% to 8% of the city's land area (16). A significant section of the population lives in *chawls* and on footpaths. *Chawls* in Mumbai are multistorey low-quality tenements, typically a bit higher quality than slums (Figure 28); 80% of chawls have only one room. Pavement dwellings refer to Mumbai dwellings built on the footpaths/pavements of city streets (17). With rising incomes, many residents of slums and chawls now have modern amenities such as mobile phones, access to electricity (often illegally), and television.

Figure 28: *Chawls* **and high rises in Mumbai**

Source: The Wire (18)

For transportation, the majority of Mumbai's population relies on the bus and public rail services. The expansion of bus and rail transportation in Mumbai has not matched the growth of population. There are other new modes of transportation like metro rail, monorail and electric buses, which are also being introduced in the city and have low carbon footprints and provide better services—less noisy, air conditioned, less commuting time (19).

Mumbai suburban railway is the lifeline of the city and the busiest commuter train system in the world, with approximately 2.64 billion passengers annually (see Figure 29) (20). Its length is approximately 430km, with four corridors stretching across the city.

Source: DNA India

Mumbai is also served by the BEST (Brihanmumbai Electric Supply & Transport) bus service, with 3800 buses on routes within Mumbai and surrounding suburbs such as Navi Mumbai, Thane and Mira-Bhayandar (21). The service includes single and double decker buses, as well as air-conditioned Tata Marcopolo CNG minibuses. With nominal fares, BEST buses are popular among Mumbai residents. E- buses have now been introduced which are specially designed for the comfort and convenience of Mumbaikars including a "lift mechanism" for people with disabilities (22).

Mumbai is constructing a metro system designed to supplement the overcrowded Mumbai Suburban Railway network. It is being built in three phases over a 15-year period, with overall completion expected in 2025. The system will consist of eight high-capacity metro railway lines, spanning 235 km (24% underground) and 200 stations. Currently, only the Versova-Andheri-Ghatkopar line (11.4km) is operational (23). The city has also invested in a monorail system that can negotiate sharp turns and climb up and down steep gradients (19). The system started commercial operation in 2014 and now runs between Chembur and Wadala, with an under-construction route extending to Jacob Circle (24)**.** Approximately 135 km of line is planned to be completed by 2031.

Finally, auto-rickshaws and taxis can be hired for short and long distances. Most of these rickshaws and taxis run on CNG (Compressed Natural Gas). An electrical metre determines the fare, based on the distance travelled plus a base fare of Rs 21 for auto-rickshaws and Rs 25 for taxis (as of 2021). These vehicles can also be hired through private aggregators like Ola and Uber.

3.6.1 Urban planning context

The Bombay Town Planning Act enacted in 1915 was one of the earliest planning measures in Mumbai, created by the BMC (Bombay Municipal Corporation). Based on the act, the Bombay Development Department (BDD), established in 1920, undertook housing schemes, now known as BDD Chawls (25).

As the city became congested, its limits were extended to the near suburbs in 1950 and extended again in 1957. The Mumbai Town Planning Act of 1954 replaced the earlier Act of 1915. The new act required local authorities to prepare Development Plans for areas under their jurisdiction, in addition to Town Planning Schemes. In 1966, the Maharashtra Regional & Town Planning Act again restructured planning to enable regional/ metropolitan scale planning (25).

The first and second development plans were prepared in 1964 and 1991, respectively, and aimed to 'decongest' Mumbai by keeping floor space index (FSI) levels low. The third development plan (DP 2034) came into effect in 2018 and includes existing land uses (see Figure 30), proposed land use zones, permitted building uses, and land reservations. A Development Control and Promotion Regulation (DCPR) was also released to define building regulations (26).

The DCPR 2034 aims to achieve a bulk of one million housing units under the PMAY-U (Pradhan Mantri Awas Yojana- Urban) mission by opening up 3,330 hectares previously protected from development, including No Development Zones (63%), Recreation and Tourism Development Areas (33%), and the city's salt marshes (4%) that are currently classified as ecologically sensitive areas (18). With a slight dip in Mumbai's population recorded in the 2011 census, the new DP aims to 'repopulate' Mumbai by increasing the permissible FSI. While the FSI for the island city has been increased from 2 to 3, the FSI for the suburbs has been kept at 2.5 (27). This permissible FSI is now linked to the road width so that taller buildings can only be constructed only if the road is a certain width, with the goal of reducing congestion.

The increase in FSI has been facilitated through an increase in Transfer of Development Rights (TDR) limits. TDR allows property owners of land designated for public streets and other reserves to either transfer building rights to another property or sell the right to develop property to the owners of another property, increasing the size of building the buyers can then build (28). The TDR limit has been increased to 2.5 times the area of land surrendered in the island city and two times the area of land surrendered in the suburbs to ensure that there would be incentives for the stakeholders to expedite the process of slum rehabilitation, road widening and surrendering of reserved plots.

Figure 30: Existing land use for Greater Mumbai

Existing Land Use Categories (2012)	Greater Mumbai			
	Area (ha)	% of Total Area	Per Capita Area (sqm)	% of Developed Area
Residential –(Total)	**10,327.09**	**24.88**	**8.30**	**38.08**
Residential (Non-Slum)	6,930.93	16.70	5.51	25.56
Residential (Slum)	3396.16	8.18	2.73	12.52
Commercial	911.46	2.20	0.73	β.36
Offices	360.96	0.87	0.29	1.33
Industrial	2,242.88	5.40	1.80	8.27
Open Spaces	1,537.78	3.70	1.24	5.67
Education Amenities	853.81	2.06	0.69	3.15
Medical Amenities	318.44	0.77	0.26	1.17
Social Amenities	355.81	0.86	0.29	1.31
Public Utilities and Facilities	693.43	1.67	0.56	2.56
Transport and Communication Facilities	5,306.92	12.79	4.27	19.57
Urban Villages	318.42	0.77	0.26	1.17
Primary Activity (P1, P3, P4, P5 P6, P7)	939.22	2.26	0.75	3.46
Unclassified	1,829.77	4.41	1.47	6.75
Vacant Land (only under Construction)	1,121.97	2.70	0.90	4.14
DEVELOPED AREA	**27,117.95**	**65.34**	**21.79**	**100.00**
Natural Areas	11,303.82	27.23	9.08	
Vacant Land (excluding under construction)	2,282.82	5.50	1.83	
Primary Activity (P2, P8)	801.11	1.93	0.64	
UNDEVELOPED AREA	**14,387.75**	**34.66**	**11.56**	
TOTAL PLANNING AREA	**41,505.71**	**100.00**	**33.36**	
Area under Special Planning Authority	4,322.79	9.43		
TOTAL AREA GREATER MUMBAI	**45,828.49**			
Per Capita Land available in Greater Mumbai	36.0 sqm			
Per capita available developed land in Greater Mumbai	21.0 sqm			

Source: DCPR 2034

Another planning intervention was the Site and Services scheme, which was a part of the housing projects implemented by the World Bank. In Mumbai, this scheme was developed under the Bombay Urban Development Project's Land Infrastructure and Services Programme component (LISP) in 1979. BUDP identified land, infrastructure, and shelter development as being the most critically neglected problems in the Bombay Metropolitan Region (BMR, now known as Mumbai Metropolitan Region or MMR). It was financed by funding from the Government of India (GOI) and the International Development Association (IDA). The project did not have any specific macro-economic policies, but in terms of sectoral policies, it intended to bring about reforms in rent control, property tax, urban land ceiling, development control, and building regulations.

Among the cities in India, USD $200 million (1983 prices) was invested in Mumbai and Chennai for developing 28 sites over a period of 17 years (from 1977 to 1994)(29). Of this total investment, USD $158.7 million (1983 prices) was allotted to the LISP component. In this component, a total of about 110 contract packages were for onsite infrastructure and core houses and 80 contract packages were for land preparation and off-site infrastructure. Other costs also included costs for the plant, equipment, and vehicles, home expansion, and investment loans, and lastly technical assistance, training, and office equipment (30).

The 'sites and services' approach emerged as a response to the rapid slum expansion and failure of past government affordable housing programs (31–33). The objective was to deliver incremental housing through the provision of small, serviced plots. Governments assembled land, prepared layouts, and provided basic services. These either included a basic house (i.e., four walls and a roof) or just a toilet. The plot owners received formal land titles and were responsible for building houses, often incrementally, using a combination of their own labour, trained local contractors, and mutual self-help (34).

'Sites and services' marked a holistic shift in India's national housing policy, emphasising on housing construction and provision of fully serviced plots, over slum demolition and housing construction. It offered a way to reduce costs and increase housing investment, while also recapturing some ability to enforce regulation and standards that were lost with widespread informal development (31,32). It provided better health and living conditions for low-income households, while offering a stake in society and financial security. Initial attempts confined to small pilot projects were meant to demonstrate the feasibility of the approach (35). All sites implemented in India under the program were greenfield developments, predominantly on reclaimed land at the periphery of metropolitan areas.

3.6.2 SITE: Charkop sites and services scheme

The Charkop site is located in Kandivali (West) in the R- South ward in North Mumbai. The case study site is centred around the Charkop Market bus stop, which serves a number of bus lines and provides connections to nearby neighbourhoods, the Mumbai commuter rail, the Charkop bus depot, and the proposed metro station nearby. In 2011, the population of R/S Ward was 691,229 with 159,639 households. Around 40% of the population resides in informal settlements (31). Charkop is connected to New Link Road, a north–south corridor that connects the western suburbs. It adjoins Manori Creek, which separates it from the Gorai wetlands. The Borivali Creek Jetty, 2.7km from the site, provides access to ferry service across the Manori Creek, connecting to the Gorai wetlands on the other side. Significant landmarks include the Apna Bazaar shopping centre, Charkop bus depot, and the proposed Mahavir Nagar metro station. The Charkop site was selected because of its proximity to other residential and commercial clusters where trunk infrastructure was available (e.g., major roads, water supply lines, and public transportation) (29).

The study area includes approximately 6,220 households and covers an area of 0.39 km^2. It is a mix of one-, two-, and three-storey row-houses. The sub-arterial and collector roads are flanked by mid-rise residential buildings. The entire project is laid out in clusters of 35 housing plots with internal 4 m wide courtyards (with an area ranging between 25 m^2 and 40 m^2). Each of these clusters has a dedicated society office, usually above the main entrance gate (Figure 31).

Figure 31: Inner courtyard and entrance of a housing cluster

Source: Sagarika Nambiar & Sonal Shah

Three types of core houses are provided with the plot with a basic connection to sewerage and water supply (34):

- Open site with a utility wall that had connections for drainage, water, and electricity.
- A latrine/toilet
- The two shared walls and a roof.

3.6.2.1 Site History and Interventions

The intervention on the Charkop site was a sites and services intervention, where infrastructure and land were provided to residents and other businesses on a greenfield site. The new residents then built housing and other structures. The site is on the western periphery of Mumbai and was reclaimed from the Manori Creek wetland before the implementation of coastal regulation zones (CRZ) rules. This eliminated the need for land acquisition, but the neighbourhood is susceptible to flooding and the site construction resulted in the destruction of a wetland area (36). Because of its location, concerns grew over providing basic services to Charkop. However, growth materialised in regions around the site, and it slowly integrated into the city with ready access to schools, shops and public transport connections. The site is close to primary roads and is well absorbed into the metropolitan footprint (36).

The scheme covered 180 hectares with 15,420 plots. The project development took place in four phases, the first and largest one being of about 80 hectares. Construction began in 1983 and was completed by 1993, and as of 2016, 99% of the site had been built out (see Figure 32) (36). The project construction required about a 1 m deep reclamation to bring the land above the tideline (37). The project was conceived to ensure that 45% to 55% of the plots would be occupied by very-low-income families (Rs. 250–625/month in 1983) and 10% to 20% by low-income families (Rs. 625–875/month in 1983) (38). The target beneficiaries were identified through lotteries and advertisements. The scheme incentivised households to provide their income details in return for a better plot. They were eligible for a loan to complete the construction of the house (37).

Figure 32: Charkop Site and Services location
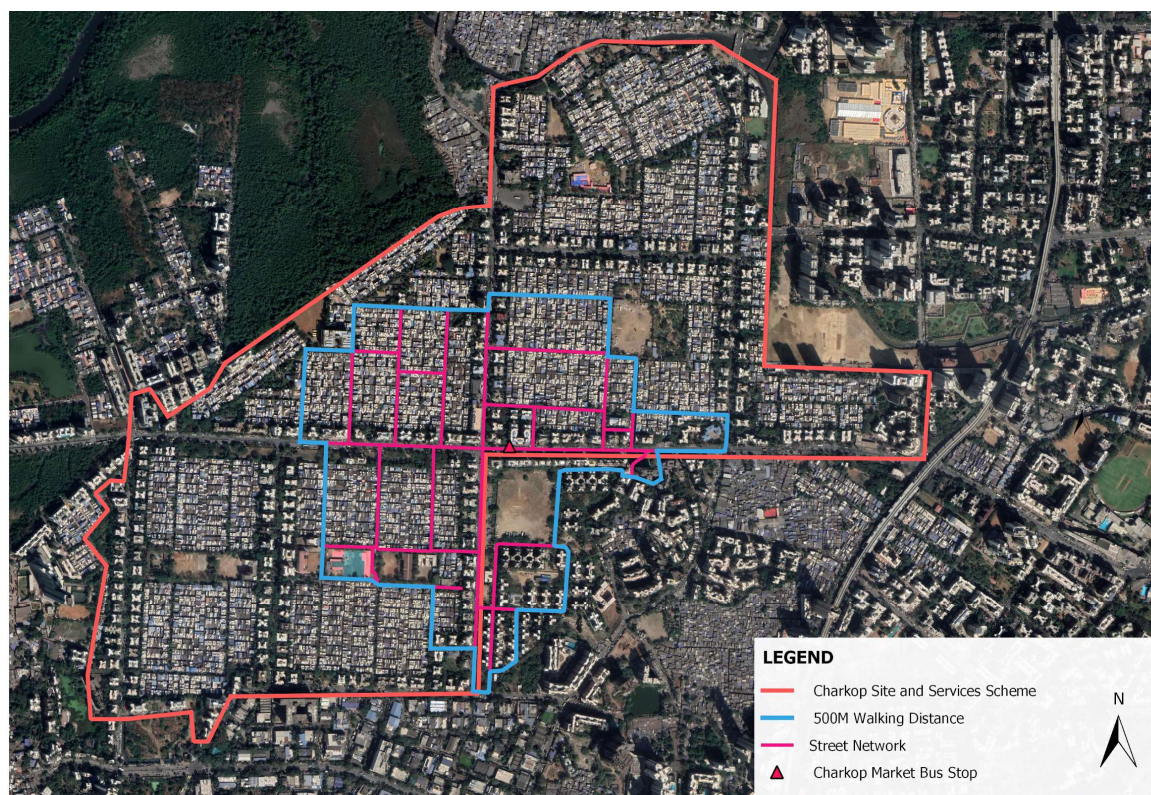
Source: ITDP

Planners made a number of decisions designed to improve affordability. Plot sizes were kept small so they would be affordable for low-income families, allowing them to enter the real estate market and build equity. The size of the smallest individual plots was 21 m^2, far smaller than the minimum plot sizes of 175 m^2 to 200 m^2 that are typical of other housing developments in the city. The site also included a range of plot sizes that attracted different income groups and created a mixed-income community. The plot pricing and payment plans were tailored to suit different income groups. The low prices charged for small plots designated for lower-income households (Rs 250–875 per month in 1983) reflected the lower costs of servicing these plots,

the lower market value of their location in the overall site plan, and their limited potential for housing construction. Larger residential plots, including plots for apartments, which were more expensive to provide services to, in better locations, and had a larger potential for housing construction, were marketed to middle- and higher-income households (above Rs 1,250 monthly in 1983) at prices that exceeded average development costs/net m2 of saleable area and approximate market values. Plots for service industries were priced at market value, while those for commercial activities were auctioned (39). Prices of construction varied based on the type of house being constructed. For the single-storey 'core house', the MHADA construction (CSH3) cost around Rs. 15,000 and went up to Rs. 22,000 at the time of allotment depending on the size of the unit.

In order to further enhance affordability, planners rejected existing planning and infrastructure standards, replacing them with standards that were seen as more affordable and appropriate for the local context. For example, to lower the cost of land, project planners designed for a higher population density (estimated at 1,100 people per hectare) than was typical at the time. To do this, planners designed the site to maximise sellable land, especially for residential uses. To further reduce the costs of site development and infrastructure, planners also optimised the site layout. In Charkop, almost all of the plots along the main road were 750 m^2 or larger and sold as multistorey apartment buildings. The smaller 25 m^2 plots were clustered around roads 3 m to 4.5 m wide or opened onto common courtyards 10 m wide.

The clusters were accessed by 9m wide roads, but the individual plots did not have direct vehicular access and there were no parking allowances. Based on the income group and the plot allotted, the percentage of monthly income to be paid as instalments and other maintenance charges too were calculated to determine the cost recovery of the project. The on-site costs of land, site preparation infrastructure, and shelter expansion loans were recovered from beneficiaries at an interest rate of 12%. Off-site infrastructure costs for roads and drains were recovered by BMC from general revenues, including the property tax, and by BMC and Government of Maharashtra (GOM) public utilities from user charges for water, sewerage, and electricity. Separate flat-rate monthly water and sewerage charges were levied on each household on an individual plot and ranged from Rs 5 monthly for the lowest-income household on the smallest plot to Rs 10 for the highest-income household on the largest plot. A metered charge was levied on households in apartments. (39).

Parks and open spaces had a hierarchy similar to that of the streets, matching the plot sizes (36). Figure 33 highlights this hierarchy, with open spaces highlighted in yellow. This enhanced the neighbourhood fabric by providing a range of green spaces, playground and community buildings to very small courtyards shared by several households. Figure 34 depicts what these spaces look like today.

Figure 33: Site plan at Charkop showing the grid pattern of roads

Source: Owens et al., 2018

Figure 34: Pedestrian path, internal courtyard and community ground in Charkop

Source: Sonal Shah & Sagarika Nambiar

Finally, planners explicitly designed for a mix of land uses, with site layouts that integrated commercial areas and amenities like schools, health clinics and even plots for small industries. In Charkop, with the residential, commercial and industrial space incorporated along arterial and secondary roads, the internal courtyards remain exclusively residential (36).

Formerly a low-lying wetland, Charkop was initially cut off from the existing transport network. To better connect the site, the Charkop bus depot was built with nine bus stops that serve multiple bus routes that connect the residents to other modes of transit and parts of the city. The closest high-capacity transit station is the Kandivali railway station, and rail connectivity will further improve with the upcoming Mahavir Nagar metro station that is 1 km from the Charkop Market bus stop. The site is serviced by sub-arterial roads, collector roads and local shared streets (Figure 35), which are predominantly used by motorised two- and four-wheelers. A small proportion of these roads are occupied by motorised vehicle parking.

Figure 35: Collector road and local shared streets at the site

Source: Sagarika Nambiar & Sonal Shah

The site was connected to the water supply and sewerage systems of BMC as part of the IDA (International Development Association) assisted Bombay Water Supply and Sewerage Project II. Off-site main roads, stormwater drains, and high-tension power lines are also located in and around the area. Electricity is supplied by BEST and the Bombay Suburban Electric Supply Company (39).

3.7 Pune, India

Pune, in the state of Maharashtra, is known as the educational and cultural hub of India. As per census 2011, Pune has a population of around 3.11 million within its municipal administrative boundaries and a population density of 12,777 persons/km^2 (approx. 128 persons/hectare) (40). The city and Pimpri Chinchwad Municipal

Corporation, cantonment areas, and surrounding villages, form the Pune Metropolitan Region (PMR) (see Figure 36). Cantonment areas are used for military purposes and were originally developed by the British.

The developed area in the city is around 70%, with only 30% left for ecological resources—20% is under green cover and forest. From 1987 to 2001, the residential land use has increased from 37% to 50%, along with an increase in jurisdiction by merging surrounding villages.

Figure 36: Pune Metropolitan Region and Pune Municipal Corporation
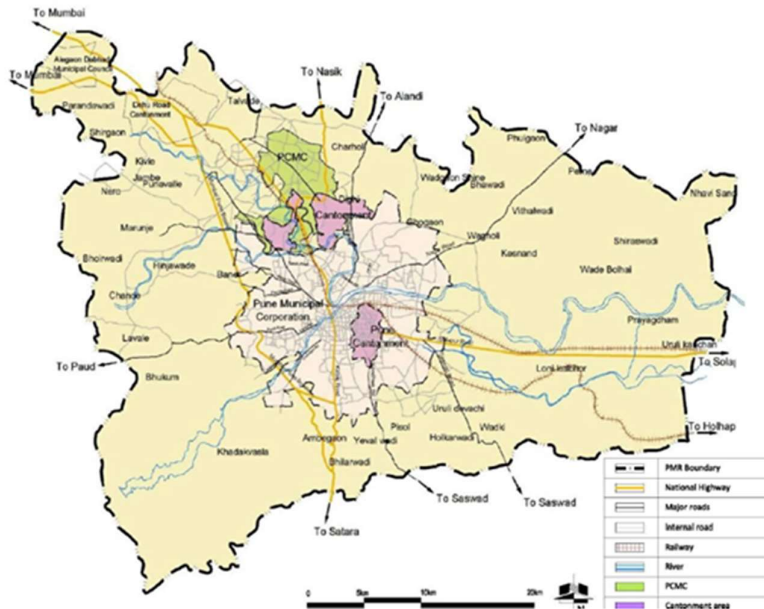
Source: PMC

As indicated in Figure 37, Pune Municipal Corporation (PMC) houses about 3.11 million residents and is projected to grow to around 8 million by 2041 (40). As per CMP 2019, the population density over the years has increased from 3,907 persons per km^2 in 1951 to 12,777 persons per km^2 in 2011. The growth per decade for Pune city (PMC) slowed from a 50.08% increase from 1991 to 2001 to a 22.73% increase from 2001 to 2011 (see Figure 37). This may be due to development in the metropolitan region, specifically the Pimpri-Chinchwad Municipal Corporation (PCMC).

Figure 37: Population projection
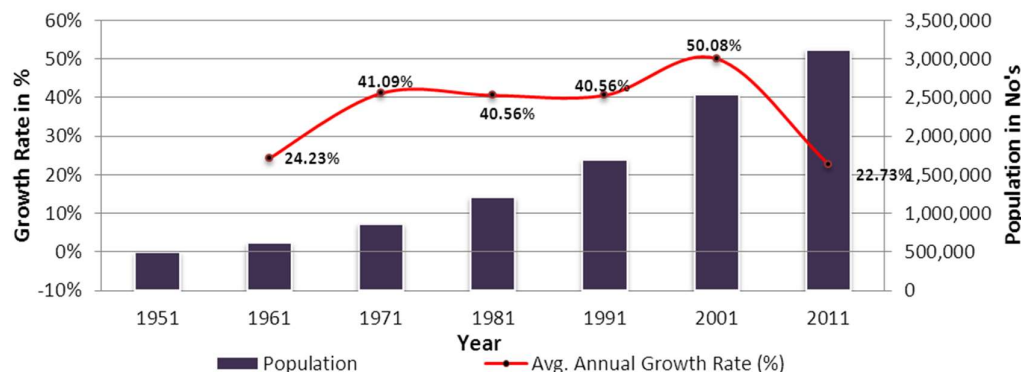
Source: CDP, 2012

Prior to the launch of the BSUP program, the population of the city was approximately 2.5 million (Census of India 2001), with an estimated 30% to 35% residing in slums (41). The housing typologies in Pune can be categorised as traditional housing (wada and chawls), formal/planned housing (group housing, public housing, and rental housing), and informal/unplanned housing (slums, squatter settlements, and other unauthorised housing) (41).

47

The city of Pune, earlier known as a bicycle city, is now facing challenges because of the massive growth in private vehicles, especially motorized two wheelers. The Pune Mahanagar Parivahan Mahamandal Limited (PMPML) operates the Rainbow BRT system (see Figure 38) and regular buses in the Pune region, the mode share of which is only 11%. The city currently has approximately 50 km of the BRT network (PMPML, n.d.) and 33.1 km of metro rail network under construction (42). The city has suburban rails, but its share is as low as 0.3%. According to the 2019 comprehensive mobility plan of Pune, the mode share of private vehicles is 47.5% and walk and cycle account for 29.5% of trips.

Figure 38: Nagar Road BRT

Source: ITDP India

The Pune Metropolitan Region (PMR comprises Pune, Pimpri Chinchwad and surrounding villages) has about 65 km of operational BRT. Around 66% of residents in PMC have access to public transport within a 500m walking distance, but only 23% of the total population lives within 500 m of BRT corridors. In terms of access to public transport for the poorer population, in the PMC jurisdiction, 77% of low-income groups living in designated slums have access to frequent transit (43).

3.7.1 Urban planning context

The Pune Municipal Corporation is responsible for the civic administration of the city and carrying out functions related to urban planning and management. The first town planning scheme was prepared for Shivaji Nagar in 1918, and a master plan for the city was prepared in 1952. Under the Maharashtra Town and Country Planning Act 1966, the first 10-year Development Plan (DP) was prepared in 1966. The DP was revised in 1982 and sanctioned by the Government of Maharashtra in 1987, with a 20-year horizon (valid till 2007). In 2001 the PMC jurisdiction was extended by merging 23 neighbouring villages (in parts), and a DP was prepared for this fringe area with a horizon of 20 years (valid till 2021). The combined percentage distribution for various land use categories is presented in Figure 39 (40).

Figure 39: PMC land use plan

Land Use - PMC (1997)

▢	Residential
▢	Commercial
▢	Industry
▢	Education
▢	Public utilities
▢	Transport and comm.
▢	Recreational
▢	Reserved Forest/Agri.
▢	Water bodies
▢	Hill/ Hill slope
▢	Cantonment
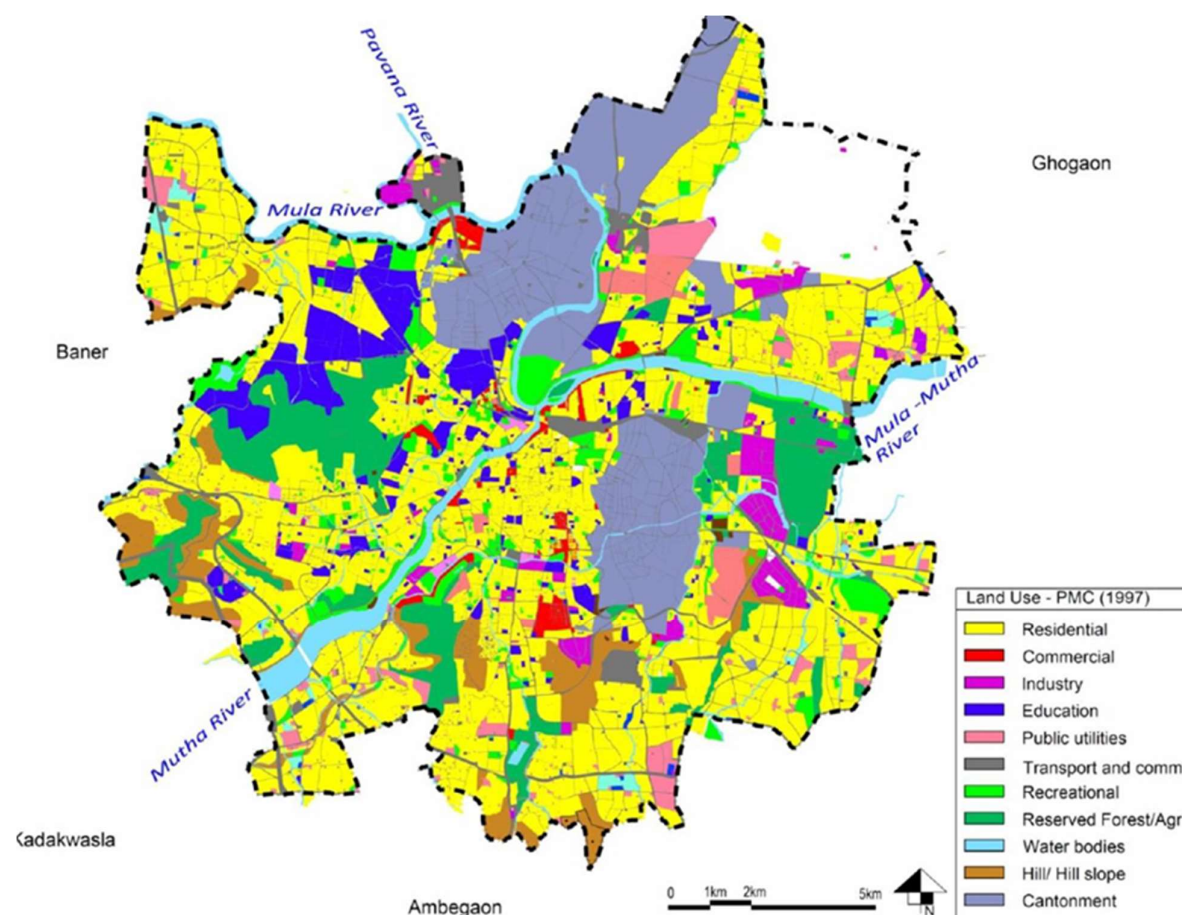
Source: CDP, 2012

PMC created Transit Oriented Development Control and Planning Regulations (DCPR) norms in 2019, establishing TOD zones along the metro rail currently under construction. The zones extend to areas within 500 m of the metro rail corridor. Within the zones, the maximum FSI is 4, but only for larger plots abutting roads with the right-of-way more than 30 m wide. The DCPR establishes new rules for street designs that promote sustainable modes of transport, but it does not change rules for the provision of private parking in buildings (44). Currently, PMC is carrying out an impact assessment of the TOD zones.

Under the Maharashtra slum improvement and clearance act 1971, a slum is loosely defined as a congested, unhygienic area or buildings that are public hazardous. The act declares the PMC as the administrative authority to implement projects under the Act, mainly the provision of basic services in slums (45). Some of the 564 slums are on government land, but around 77% are on private land (46).

As reported in the Shelter Survey conducted by PMC in 2000, most households did not have proper access to basic services or needed to share community facilities (47). The projects developed under the BSUP were categorised in three ways: in situ upgrading, in situ redevelopment, and relocation. The PMC participated in the BSUP initiative to upgrade the declared Slums on Central, State Government and PMC Land (interview with Ar Desai).

In terms of transport, the city is trying to improve the walking and cycling mode shares by constructing footpaths and cycle tracks under the Pune streets program and bicycle plan, which was approved in 2018 and aims to create more than 400 km of cycle-friendly streets (see Figure 40). As per the CMP, the goal of PMC is to achieve 50% of mode share by walk and cycle by 2031 and 40% by public transport (BRT, metro, regular buses and suburban rails) while reducing the private vehicle mode share to 10%. As of 2016, the mode share of cycling was only 3%, according to household surveys conducted as part of the bicycle plan of Pune. Older studies, like the detailed project report for metro rail indicate that the bicycle mode share may have been as

high as 9% in 2012. Overall, the mode share of cycles is a declining trend, dropping from 21% in 1981 to 3% in 2016 (48). Cycle ownership in the city is around 33% (48).

Figure 40: Proposed cycle-friendly streets
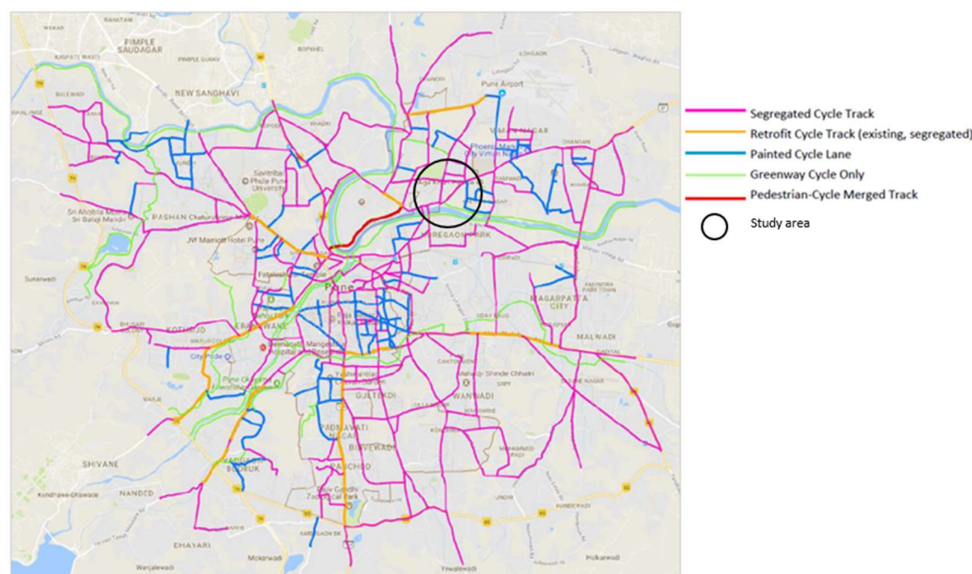
Source: PMC, 2017

The PMC is constructing a Metro rail corridor that is aimed to improve public transport mode share while reducing dependency on private vehicles. The PMC also has public parking policy, but it is yet to be implemented.

3.7.2 SITE: Yerwada

The slum settlements in the Yerwada neighbourhood are located in north-eastern Pune (see Figure 42). The site abuts the Mula-Mutha river and shares borders with Viman Nagar, Koregaon Park and Vishrantwadi (see Figure 43). Three BRT stations—Yerwada, Gunjan Chowk, and Wadia Bungalow—and the upcoming metro station are accessible to the settlement. The settlement is situated at the beginning of Pune-Ahmednagar highway. The study area includes six slums in Yerwada and the surrounding area. Landmarks in and around the settlement are: Gunjan Cinema, Yerwada Central Jail, Kasturba Gandhi Smiriti Mandir, Aga Khan Palace, and Yerwada Mental Hospital. The site is well connected by arterial roads to the city centre and airport.

Yerwada's site abuts Nagar Road BRT corridor. The site is centred around the Gunjan Chowk BRT stop and also includes the Yerwada BRT station, which is one of the busiest BRT stations in the Nagar Road BRT corridor (see Figure 44), with more than 60 buses per hour at the junction (PMPML official interview). PMPML and state transport buses also run along the Airport Road connecting the neighbourhood to towns on the outskirts such as Alandi.

The PMC is also constructing a metro rail corridor on Nagar Road. The site had connectivity by regular bus routes, before the construction of the BRT. The PMC developed the Yerwada site around 2007. The corridor has a high mode share of private vehicles, as shown in Figure 41. The PMC official indicated that the PMC distributed free cycles for school children living in this area under its 'Free Cycle Distribution Scheme for Economically Weaker Section'.

Figure 41: 24-hour vehicle screen line count at nearest location from the site
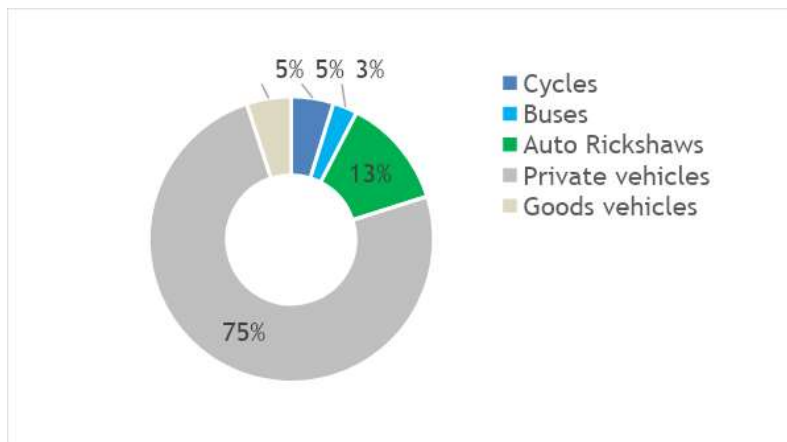
Source: PMC, 2007

The study area falls into the TOD zone as per the development plan for Pune. The Development Control & Promotions Regulations of PMC include special bylaws for the TOD zone that provide certain guidelines on the development of housing for economically weaker sections or the lower-income group and allow for a higher FAR. Since the study area falls within 500 m from the metro station, the redevelopment under the TOD norms will allow using a floor area ratio (FAR) of 2.5 with certain conditions, the most important being that out of the total tenements, at least 40% of tenements shall be of the area and not more than 30 m^2.

The slum settlement and surrounding area has approximately 2,948 households and a population of 9,139. The study area is 0.36 km^2, with mixed built characteristics, socioeconomic groups, and demographics.

Figure 42: Location of slums in Pune
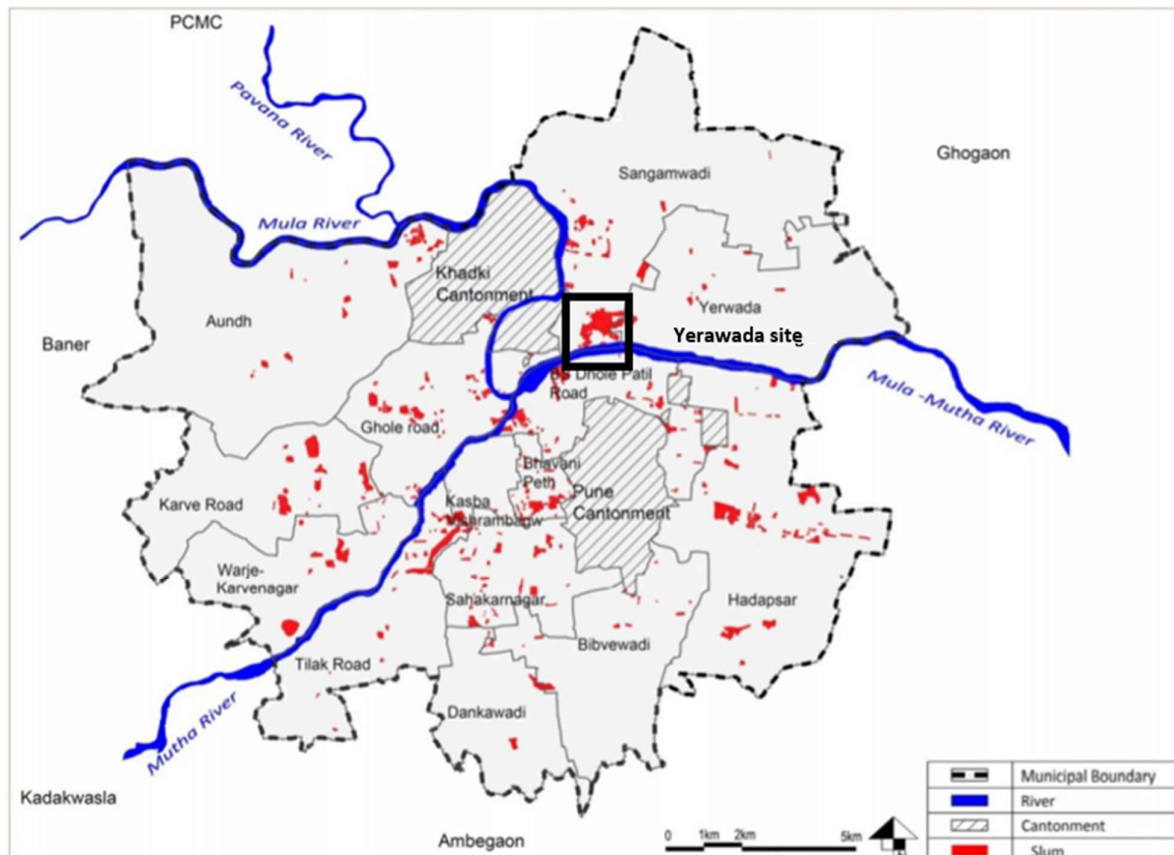
Source: PMC Slums Atlas, Mashal, 2009 & selected case study

Figure 43: Yerwada site and study area
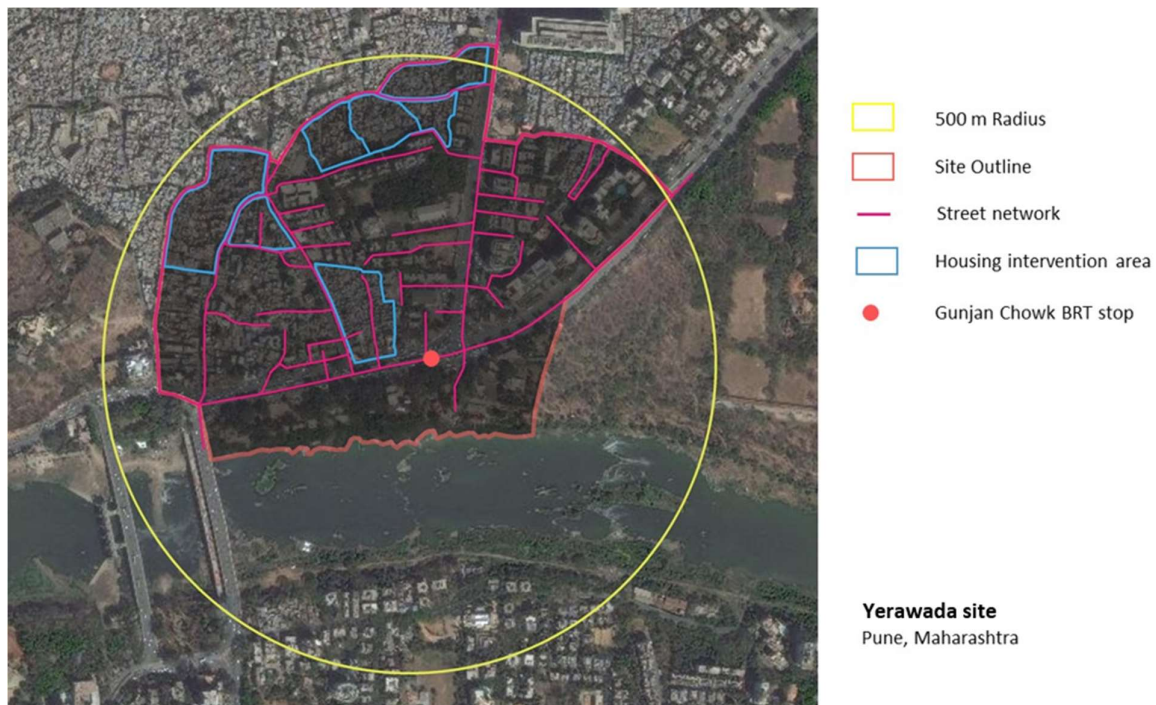
Source: ITDP

Figure 44: Area within 500 m of frequent transit and notified slums
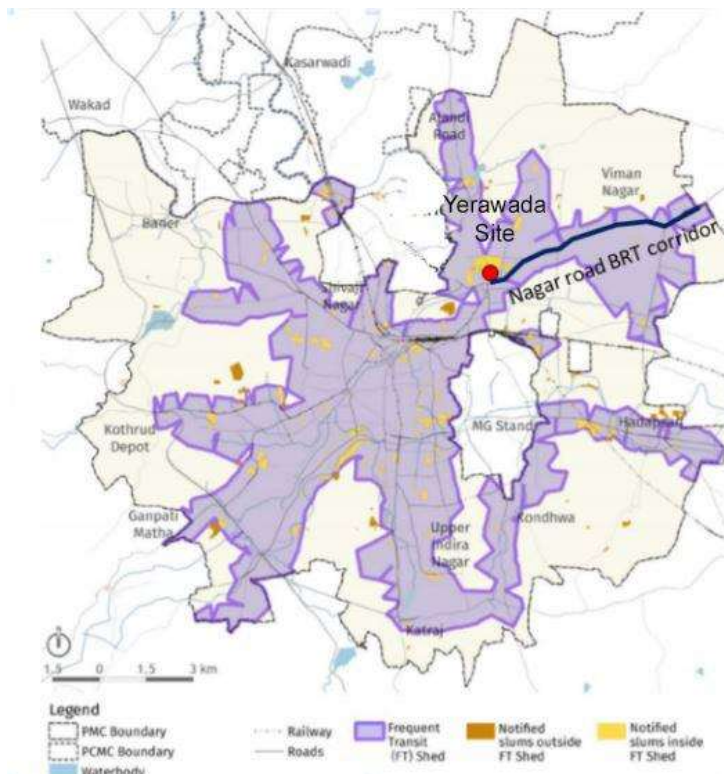
Source: ITDP, 2019

The street network within the dense slum settlements is mostly limited to walking and cycling paths. These pathways are narrow, which restricts vehicular access and allows them to be used for other social activities throughout the day. Commercial and retail uses are found along the edge of local and collector roads, including sidewalk vendors (see Figure 45).

Figure 45: Pedestrian pathways, retail, and street vendors in the study area

Source: Praniali Deshpande, Pranjal Kulkarni & Shreesha Arondekar

3.7.3 Site history and interventions

Yerwada is a former town along the Mula-Mutha river that was merged with Pune City. It emerged as a squatter settlement on state-owned land in the 1960s when growing industries attracted many workers (49). It is now one of the largest pockets of informal settlements, with more than 15,000 informal structures on a mix of private and public land (50). It has been the focus of some of the most substantial upgrading programs, using a participative process of upgrading incrementally in situ (51,52).

Under the BSUP project, 4,000 houses were identified for in situ slum upgrading. The project was led by Mahila Milan, a decentralised network of collectives of poor women propagating credit and saving programs in their communities (49). As part of the project, each dwelling unit was customised to meet the requirements of the user and was approved by the user. All units have been developed to the mandated size of 25 m^2. There are two types of buildings in the project: Type A is a single-family structure with kitchen and toilet on the ground floor and bath and bedroom on the upper floor; type B is a multi-unit building used to consolidate multiple plots that were too small to meet the minimum requirements (53). Most of the structures were redeveloped keeping neighbouring structures intact (interview with Ar Prasanna Desai). Based on the stakeholder consultations, attached toilets, underground water tanks, and balconies were included in the designs. The designs also consider potential incremental growth through flat terraces (47).

The internal streets of the project are narrow and semi-paved (53). The architect designed the housing to retain existing street patterns and existing footprints with the theme of 'neighbours remain neighbours, locals remain locals'. The design followed easy accessibility to houses with better light and ventilation. The architect's initial idea was to reduce the footprint of the existing house and 'return' the same to the owner by designing better streets and alleys, meeting at chowks (intersections) that can act as open public spaces (54).

Figure 46: Street patterns prior to the redevelopment

Source: Gupta, 2010

Figure 47: Proposed plan maintaining the permanent structures

Source: Desai, 2010

The architect wanted to improve the street network for uniform widths by acquiring approximately 0.2 - 0.3 m^2 per plot and better walkability but the owners did not agree to sacrifice their land for streets and hence the entire network could not be redesigned (55). As a result, some streets remained narrow, and the project did not create well-designed public open spaces.

The project aimed to provide adequate water, electricity, sewerage system, and disposal services (53). The earlier provisions of community toilets mostly do not serve the purpose as a result of poor maintenance and water scarcity. The toilets used to be filthy, causing people to defecate in the open and contaminate the surrounding environment (Governance Knowledge Center, 2012). The design of new houses provides toilets and bathrooms inside the dwelling unit. The architect mentioned during the interview that each house also

has a separate water tank for storing water for daily purposes. The location of the underground water tank was used to create a verandah (semi-private interactive space). Having sanitation facilities inside the house was a big relief for women, who often suffered indignity and risk for safety by having to wait till dark to defecate (Governance Knowledge Center, 2012). According to the girls, the best aspect of the redevelopment is the piped water connection and toilets at home. Now they do not have to stand in a queue at public toilets or community standpipes for water (56).

The central government, state government, and urban local body funded 90% of the project. The beneficiaries invested INR 3,00,000/- for the redevelopment of the dwelling units in 2007 (57). The ownership papers were provided to the beneficiaries by the local authority after completion of the construction. The authorities did not explore other options such as rental or shared housing (58). The local NGOs also emphasized training the beneficiaries to check the quality of construction and involving women in construction job opportunities. It provided them with an additional source of income to use towards their financial share. The NGOs gave an option of participation by replacement in construction activities for monetary contribution and also for reducing the construction cost. The NGOs and architects made additional efforts in terms of structural designs to make the redevelopment affordable. The Urban Nouveau was involved in preparing the community plan and concept design to make the pilot project people-centric (58). For the pilot project, Urban Nouveau experts helped with technical and design support to design a four-column technique for structural sharing to reduce costs. For those who couldn't afford to contribute their share of the construction cost, the NGOs gave an alternative: They could either work on the construction of the dwelling unit or bring materials, like tiles. Mahila Milan also gave an option of microfinance to those who couldn't contribute money or by a family member working (58).

The earlier structure of the fund-flow ran into several issues, such as the 10% tax burden on the NGOs. Hence the municipal commissioner changed the pattern by transferring the subsidy amount to the beneficiary, and then the beneficiary paid the relevant amount to the NGO, thus obviating the need for NGOs to pay taxes (45).

The project centres around the theme of a community-driven project. The project team held a meeting every fortnight, to explain the design typologies and architectural models and to incorporate the design changes suggested by the beneficiaries. Several such meetings were held between the designers, local corporators, beneficiaries, NGOs and PMC. Due to the high level of participation by the beneficiaries, the designer followed the 'custom-made design' approach to meet a variety of requirements. The designs allowed incremental development, and as a result, today many internal adaptations are visible typically to sublet. The designs followed an open-door policy where neighbours were welcome to walk in anytime and the community helped each other in times of need. The infill housing approach helped strengthen social cohesion, with trusted neighbours and not strangers living next door (56).

The project showed a high level of participation by women in the process because of the involvement of the Mahila Milan NGO. The authorities involved NGOs, local community organisations, and community members (45). The project improved PMC's understanding of the role of women in the process. The Municipal Commissioner was proactive in supporting a community-driven process. This led to design a tender for the NGOs that sought to find agreements from community members and their local elected representatives. The participatory approach resulted in the government working closely with communities, better documentation of existing slums and settlement profiles, selection of eligible households and the procurement of agreements (59).

Source: Srivatsa, n.d.

Research highlights that at the visioning stage, no attempt was made to include children in planning and design processes to understand their concerns and needs from the local area and the city. This exclusion and resistance from dwellers to sacrifice a portion of their land have led to a lack of adequate play, recreation and socialisation spaces (56).

The raised plinth (ground floor or slab) of new development protects these houses from floods. The research by Chatterjee highlights that a boy interviewed mentioned: 'It feels nice to sleep peacefully at night without fear of our homes flooding' (56).

Eventually, out of 26,606 approved units, 5,280 units were developed under the 'in situ upgradation' approach. Unusually for Indian municipalities, the PMC contracted NGOs to do a variety of tasks for the BSUP, including baseline surveys, collection of biometric information, community mobilisation, and the construction of houses. The second phase of BSUP funding for in situ informal settlement focused on upgrading an additional 4,000 households, bringing the total to over 9,000 (44). The NGOs involved in the projects were- Global Communities International, Shelter Associates, and Mahila Milan (and its Indian Alliance partners) (40).

4. TOD STANDARD ASSESSMENT

The following section contains the scores for the TOD Standard assessments by location and by metric. This report contains the full station area assessment, which includes the areas affected by the policy intervention and in some cases, areas *not* affected by the policy intervention. This section provides a summary of the TOD scores for the six sites as well as by the eight metrics. Appendix B contains the full scorecards and detailed assessments for each site; please refer to that appendix for further information on the TOD scores.

4.1 Key results by location

Table 7 below provides a summary comparison of scores generated for each site by applying the TOD Standard scorecard tool.

Table 7: Summary of TOD Standard scores

TOD Element	MAX	TOD Scores					
		Ethiopia		Tanzania	India		
		Addis Ababa		Dar es Salaam	Ahmedabad	Mumbai	Pune
		Gotera Condominium	Jemo Condominium	Tandale Argentina BRT Station	Gupta Nagar	Charkop Site and Services Area	Yerwada
WALK	15	3	2	6	7	6	9
CYCLE	5	0	1	1	3	3	1

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CONNECT	15	0	4	4	11	1	13
TRANSIT	-	All sites contain a qualifying transit station					
MIX	25	3	12	12	18	17	14
DENSIFY	15	15	15	13	11	13	13
COMPACT	10	10	8	10	6	10	10
SHIFT	15	12	15	15	15	15	15
TOTAL	**100**	**43**	**57**	**61**	**71**	**65**	**75**

Source: ITDP

Reflections on Applying TOD Standard to Low- and Middle- Income Country Context makes further points about applying the TOD Standard assessment tool in low and middle-income country contexts.

4.1.1 Addis Ababa: Gotera Condominium (43/100)

The Gotera condominium site stands out for its dense, compact nature, with good access to basic service, high-frequency transit services and a low amount of space dedicated to moving and storing cars. However, the site scored the lowest of all the sites assessed, 14 points lower than the fifth highest site and 34 points lower than the highest-scoring site.

The site scored low on the provision of walking infrastructure, with poor-quality sidewalks and few crosswalks. While some areas provide active frontages to monitor the street, many do not, and very few areas have physically permeable frontages. Safe space for cycling is virtually non-existent, and very few people cycling were observed. The Gotera Condominium site has relatively better walkway infrastructure, with high-quality pavement materials, compared to the rest of the project area, but the walkways do not provide wheelchair access and are poorly linked with the buildings because of existing fences inside the project area.

In addition, access to green and open spaces is negligible, as there are few such spaces. The housing on the site is not affordable, with average rents in the household survey greater than half of the monthly income. Housing and business are not being reserved for previous residents. The block sizes are relatively large, exceeding 100 m, and that creates longer walking distances. There is little mixing of uses, with residential units clustered at specific high-density locations apart from other land uses.

While it is not clear at this point what decisions led to a lower score than other sites received, it is worth noting that the site was one of two where the government initiated a large-scale development project.

4.1.2 Addis Ababa: Jemo Condominium (57/100)

The Jemo Condominium site is similar to the Gotera site, in that it is also a site of large-scale government building construction. It also stands out for its dense compact nature, and it has good access to basic services, high-frequency transit services, and a low amount of space dedicated to moving and storing cars. In addition, it has a strong mix of uses relative to its surroundings, providing more opportunities locally. The street network is relatively connected, leading to shorter walking distances.

The site, however, scored the second lowest among the sites assessed, but 14 points higher than the lowest scoring site and only 4 points lower than the fourth highest-scoring site. The site scored the lowest of the six on the provision of walking infrastructure, with poor-quality sidewalks and few crosswalks, and the least visually active frontages to monitor the street. Few areas in the site have physically permeable frontages, and there was very limited shade and shelter from sun and rain. The site has some safe spaces for cycling on major arterials, but these are very new. The city administration had provided a 2.8 km cycle lane in the area, but due to design and operational issues, the number of riders is lower than expected.

Access to green and open spaces is negligible; with green fields surrounding the site but not within it. Based on the household survey, we found that the housing units are not affordable, with the average rent costing more than half of the monthly income. As with the Gotera site, Jemo was the second large-scale government development, and it scored second lowest of all the sites. It is still unclear, however, what decisions and circumstances led to the score.

4.1.3 Dar es Salaam: Tandale Argentina BRT station (61/100)

The Tandale Argentina BRT station site stands out for its density, compact form, good access to basic services, high-frequency transit services, and very low amount of space dedicated to moving and storing cars. In addition, it has a relatively strong mix of uses, relatively active frontages, and a more physically permeable walking environment than other sites. The block lengths are short in many places, reducing walking distances. The mix of shops and businesses throughout the informal site creates good access to essential services, but the site is mostly residential and could benefit from additional uses.

The site is the fourth highest score of the sites examined, 10 points less than the second highest-scoring site and 14 points less than the highest-scoring site. The site could improve the quality of the walking and cycling environment, both of which received very low scores on the TOD Standard. A better-connected street grid would further improve access. Poor sanitation and an informal parking system both contributed to a lower-quality walking environment. The cycle infrastructure is limited to one major road.

4.1.4 Ahmedabad: Gupta Nagar (71/100)

Gupta Nagar provides an example of a somewhat compact, fairly dense, and fairly well-connected site. It provides a network of streets and pathways that is conducive to and even prioritises walking and cycling, scoring the maximum points for this metric under Connect. The higher number of doors on the street and active frontages create an informal 'eyes on the street'. However, more is needed to achieve a high level of safety and comfort for walking and cycling. On the site, 92% of streets are shared spaces providing some safe space for cycling. The site also provides very little space dedicated to car circulation and parking, serving to discourage those modes. The high non-residential density scores indicate more jobs and services are located in the area. The site scored second highest of all sites, 4 points below the highest-scoring site.

The site could be improved over time by ensuring that walkways provide easy access to all buildings, are unobstructed by things like parked cars, are well-lit and shaded, and are inclusive to all people, including those with limited mobility. We observed many motorized two-wheelers and paratransit operators, such as auto-rickshaws, during the site visits. While these modes ensure faster mobility for their users, they also take away space from people walking and cycling, and the higher speeds create additional danger.

4.1.5 Mumbai: Charkop sites and services scheme (65/100)

With a strong mix of uses, the Charkop area provides good access to services and amenities. Essential services like shops, medical stores, doctors, and schools are interspersed throughout the site, improving access and providing local employment opportunities. The site has a network of open spaces that improves the quality of life in the neighbourhood. The multiple transport modes around the site ensures that it is well connected to the rest of the city. Overall, the site scored third highest of the sites assessed, 6 points lower than the second highest-score and 10 points lower than the highest-scoring site.

To improve, crosswalks are needed to enable safer street crossings. The site would also benefit from ramps to enable street crossing in wheelchairs. Pedestrian movement is currently hindered by vehicle encroachment on walking spaces. Even though most of the streets are cycle-friendly, the cycle network and cycle parking at stations could be improved. The long blocks mean people have to walk longer distances to reach public facilities like bus stops that are located on the main roads. Parking could be regulated to improve the on-street walkability and to encourage people to use transit modes of travel instead.

4.1.6 Pune: Yerwada (75/100)

This compact site is located within 5 km of the central part of Pune, adjacent to high-frequency BRT services and under-construction metro rail. Like most other sites we examined, Yerwada scores well on the pedestrian environment surrounding the walkways (visually active frontages, physically permeable frontages, and shade and shelter) but poorly on the provision of walkways and crosswalks themselves. The site is a successful example of compact in situ development, scoring highly on key parameters of TOD such as densification and affordability. The site has a very fine grid of walkways that do not have separate space for walking and cycling but do have low vehicular speeds. The site planners prioritised habitable rooms over private parking, and the site scores well on affordability and a lack of space dedicated to car movement and storage. These combine to give this site the highest score of all the sites we assessed.

There is scope for improving good pedestrian and cycling infrastructure on the arterial streets, such as Nagar Road. Despite the presence of grocery shops, schools, and healthcare centres, the site could provide a better mix of land uses to complement the surrounding uses and offer better access to basic services. The site also suffers from a high number of two-wheelers and haphazard street parking on the shared streets in the area.

4.2 Key Results by Metric

Below, we describe an assessment of the TOD assessment of the case study sites using the TOD Standard by each metric to provide a comparison across sites. The sites generally score consistently well across several categories (DENSIFY, COMPACT, and SHIFT) and subcategories (visually active frontages, access to basic services). We also found categories with consistently lower scores across the sites (WALK, CYCLE, CONNECT), suggesting that these may require more intervention to achieve better results. In general, the Indian sites performed better than the African sites, although it's not clear if this is a result of the types of sites we chose, the very small size of our sample, particularities of the policies, or other factors. A more detailed discussion of each of the eight TOD Standard categories is found below.

4.2.1 WALK

Walking was one of the worst-performing metrics in these case studies, especially in the new developments in Ethiopia. In general, we found that sidewalks and crosswalks were often absent or in poor condition relative to the TOD Standard. However, in the locations where the case studies focused on in situ upgrading, the presence of narrow shared streets provides generally comfortable places to walk and cycle, as their width limits vehicle speed. The design of these spaces varied, and they often were occupied by parked vehicles, solid waste, and vending.

Many of the sites contained areas with visually active frontages and physically permeable frontages, apparently without specific policy intervention to create them or design and zoning standards that allowed flexible use of ground floors and de facto economic activities. The small buildings found in informal settlements appear to support ground floor retail and seemed conducive to creating physically permeable and visually active frontages. Visually active frontages are an important way to provide security by facilitating more 'eyes on the street' from nearby neighbours whose homes look out onto the streets. Physically permeable streets generate activity by having frequent connections from building and lot interiors to the street. On some sites, the narrow streets provide good shade and shelter from sun and rain from the buildings themselves, seemingly without any specific policy intervention, but almost all the sites lack good shade and shelter outside of that.

Table 8: TOD Standard walk element scores

TOD Element			TOD Scores					
			Ethiopia		Tanzania	India		
			Addis Ababa		Dar es Salaam	Ahmedabad	Mumbai	Pune
		MAX	Gotera Condominium	Jemo Condominium	Tandale Argentina BRT Station	Gupta Nagar	Charkop Site and Services Area	Yerwada
WALK		**15**	**3**	**2**	**6**	**7**	**6**	**9**
1A1	Walkways	3	0	0	0	1	0	1
1A2	Crosswalks	3	0	0	0	0	0	0
1B1	Visually Active Frontage	6	3	2	4	4	4	5
1B2	Physically Permeable Frontage	2	0	0	2	2	2	2
1C1	Shade and Shelter	1	0	0	0	0	0	1

Source: ITDP

4.2.2 CYCLE

Cycling was also one of the worst-performing metrics in the case studies. We found very few facilities designed for cycling; those that we did observe were very new and on large arterial streets. As noted above, we did observe shared streets that functioned to provide safe spaces for cycling in multiple sites. We did not observe secure bicycle parking, but we did see people adapt their environment (e.g., gated housing structures) to create secure bicycle parking.

Table 9: TOD Standard cycle element scores

TOD Element		MAX	TOD Scores					
			Ethiopia		Tanzania	India		
			Addis Ababa		Dar es Salaam	Ahmedabad	Mumbai	Pune
			Gotera Condominium	Jemo Condominium	Tandale Argentina BRT Station	Gupta Nagar	Charkop Site and Services Area	Yerwada
	CYCLE	5	0	1	1	3	3	1
2A1	Cycle Network	2	0	1	1	2	1	0
2B1	Cycle Parking at Transit Stations	1	0	0	0	0	0	0
2B2	Cycle Parking at Buildings	1	0	0	0	1	1	1
2B3	Cycle Access in Building	1	0	0	0	0	1	0

Source: ITDP

4.2.3 CONNECT

We observed that large block sizes were a problem in many of the sites, often because of disconnected pedestrian networks and gated housing complexes that lead to longer walking distances. For the slum upgrading projects in India, the internal streets typically provide short blocks and pedestrian prioritized intersections. However, we observed that many of the case study boundaries also included blocks that were not part of the informal settlements and were large and created barriers to direct access across the area.

Table 10: TOD Standard connect element scores

TOD Element		MAX	TOD Scores					
			Ethiopia		Tanzania	India		
			Addis Ababa		Dar es Salaam	Ahmedabad	Mumbai	Pune
			Gotera Condominium	Jemo Condominium	Tandale Argentina BRT Station	Gupta Nagar	Charkop Site and Services Area	Yerwada
	CONNECT	15	0	4	4	11	1	13
3A1	Small Blocks	10	0	4	4	6	0	10
3B1	Prioritized Connectivity	5	0	0	0	5	1	3

Source: ITDP

4.2.4 TRANSIT

We specifically selected sites that were well served by transit, so all sites satisfied this scoring requirement.

4.2.5 MIX

Mix was one of the strongest performing metrics, especially for the in situ upgrade case studies. All sites except one, though, performed very negatively on the metric for green and open spaces. Residential uses dominated all sites, and while half of the sites scored points for complementary uses, they all scored 4 out of

8 points, not near the maximum points. The other half scored 0 points. Most sites provide good access to basic services, and all provide at least some access. Often this was provided through informal vendors selling fresh food.

For housing affordability, the three sites in India all scored well, and all sites except one scored well on housing and business preservation. The site that scored poorly on preservation (Gotera) involved the demolition of an existing neighbourhood to develop new housing.

Table 11: TOD Standard mix element scores

TOD Element		MAX	TOD Scores					
			Ethiopia		Tanzania	India		
			Addis Ababa		Dar es Salaam	Ahmedabad	Mumbai	Pune
			Gotera Condominium	Jemo Condominium	Tandale Argentina BRT Station	Gupta Nagar	Charkop Site and Services Area	Yerwada
MIX		**25**	**3**	**12**	**12**	**18**	**17**	**14**
5A1	Complementary Uses	8	0	4	4	4	0	0
5A2	Access to basic services	3	3	3	3	1	3	1
5A3	Access to Green or Open Space	1	0	0	0	0	1	0
5B1	Affordable Housing	8	0	0	0	8	8	8
5B2	Housing Preservation	3	0	3	3	3	3	3
5B3	Business and Services Preservation	2	0	2	2	2	2	2

Source: ITDP

4.2.6 DENSIFY

As one of the best-performing metrics from the assessment, nearly all sites scored near the maximum scores on both residential and non-residential densities, suggesting that achieving higher densities near transit stations may arise organically in informal settlements or may be achieved through planned new development and possibly by in situ upgrading of informal settlements.

Table 12: TOD Standard densify element sources

TOD Element		MAX	TOD Scores					
			Ethiopia		Tanzania	India		
			Addis Ababa		Dar es Salaam	Ahmedabad	Mumbai	Pune
			Gotera Condominium	Jemo Condominium	Tandale Argentina BRT Station	Gupta Nagar	Charkop Site and Services Area	Yerwada
DENSIFY		**15**	**15**	**15**	**13**	**11**	**13**	**13**
6A1	Non-residential Density	7	7	7	5	7	5	7
6A2	Residential Density	8	8	8	8	4	8	6

Source: ITDP

4.2.7 COMPACT

All six sites also performed well on the Compact metrics, as almost all the case study sites are within the existing built-up urban area and well served by public transport options. While some informal settlements began initially on greenfield sites, the subsequent transport system upgrades and urban development in the surrounding areas now earns them high scores for being compact.

Table 13: TOD Standard compact element scores

TOD Element		MAX	TOD Scores					
			Ethiopia		Tanzania	India		
			Addis Ababa		Dar es Salaam	Ahmedabad	Mumbai	Pune
			Gotera Condominium	Jemo Condominium	Tandale Argentina BRT Station	Gupta Nagar	Charkop Site and Services Area	Yerwada
COMPACT		**10**	**10**	**8**	**10**	**6**	**10**	**10**
7A1	Urban Site	8	8	6	8	4	8	8
7B1	Transit Options	2	2	2	2	2	2	2

Source: ITDP

4.2.8 SHIFT

The case study sites performed strongest on shift metrics, indicating that they were not designed for cars and did not allocate specific public space for them. We observed that on nearly all of the sites, parking was not prioritised and accounted for a low percentage of land. The same was true for paved street space and driveways. This was often due to the presence of narrow shared streets with limited space for parking, which was often informal, but did impede walking. The on-street parking on larger roadways tended to spill over to pedestrian footpaths posing barriers to pedestrian access. Some on-street parking use depended on the time of day, suggesting the need for some parking for the purposes of economic activity and employment. One reason for the low amount of space dedicated to parking and private vehicles could be the generally high cost of cars relative to incomes in the three countries and the subsequent low rate of car ownership, particularly among people with lower incomes.

Table 14: TOD Standard shift element scores

TOD Element		MAX	TOD Scores					
			Ethiopia		Tanzania	India		
			Addis Ababa		Dar es Salaam	Ahmedabad	Mumbai	Pune
			Gotera Condominium	Jemo Condominium	Tandale Argentina BRT Station	Gupta Nagar	Charkop Site and Services Area	Yerwada
SHIFT		**15**	**12**	**15**	**15**	**15**	**15**	**15**
8A1	Off-Street Parking	8	8	8	8	8	8	8
8A2	Driveway Density	1	1	1	1	1	1	1
8A3	On-Street Parking and Traffic Area	6	3	6	6	6	6	6

Source: ITDP

5. OTHER QUANTITATIVE ASSESSMENTS

Surveyors conducted household surveys in the case study areas to determine more detail about the locations. They asked residents questions regarding the number of people residing in the unit, the number of rooms, the number of years residing in the area, the number of years residing in the housing unit, and tenure. They also asked residents about access to water, access to sewers, water supply service, vehicle ownership, the type of vehicles owned, and socioeconomic questions related to income and rent prices. Researchers also conducted a street audit, where they measured street paving status, street and sidewalk materials, and clear walkway widths. We distributed approximate locations of the household surveys and street survey audits across the sites according to housing typology. As we explain in section 4.2.3.3, this was a stratified sample, meaning we did not design it to be statistically representative. This is consistent with the exploratory nature of this research project.

We aimed to carry out 100 surveys per case. In some locales, obtaining surveys was relatively easy, due to very cooperative and easily accessible residents who were eager to participate; in other sites, finding willing survey respondents was more challenging. The total number of surveys carried out per site ranged from 68 to 140 surveys.

5.1 Addis Ababa: Gotera Condominium

Household surveys were conducted in the Jemo site on five days in February 2021. A total of 68 surveys were conducted on the site, and the survey team used the Device Magic app to record information on the number of households, years of residing, tenure type, sanitary facility, vehicle ownership and other socio-economic questions.

5.1.1 Mobility and access

In the households surveyed, more than 40% of the respondents own private vehicles. Of those who own a vehicle, 3.1% own three-wheelers, 9.4 % own motorcycles, and 87.5 % own four-wheeled private cars. The street survey results show that most of the local roads inside the Gotera site have less than 2 m of clear walkway width.

5.1.2 Basic services

The survey showed that all households had full sanitary facilities (indoor water and sewer connections) and 81% of households surveyed have both toilet and bath, connected to respective sewer lines. All of the surveyed households reported that a piped water connection to their home tap is the main source of water, although the water supply is intermittent. Some 63% of the households have access to water supply for about 48 hours per week, and the remaining 37% have water supply access for about 72 hours.

5.2 Addis Ababa: Jemo Condominium

Researchers gathered survey responses from 70 households in Jemo during five days in April 2021 and used Device Magic to compile data.

5.2.1 Mobility and access

In Jemo Condominium, more than 36% of the survey respondents own private, four-wheeled vehicles, indicating that walking and public transport are the dominant modes of transport. The street survey results show that most of the local roads inside the Gotera site have less than 2 m of clear walkway width.

5.2.2 Basic services

More than 83% of the surveyed households obtain water from a home tap with a piped connection and 15% get water jugs delivered. The remaining 2% use communal tap water. The water supply in the area is not regular, and among those with a piped connection, 38% reported that they have access to water supply for about 72 hours per week, and 23% said that they have access to water supply less than 24 hours per week. People living on higher building floors reported receiving lower quantities of water.

A total of 92% of the households surveyed have both a toilet and a bathroom, 5% have a toilet but not a bath, and 3% reported that they have no sanitary facilities at all.

5.3 Dar es Salaam: Tandale Argentina BRT station

Researchers carried out the street audit as well as the household survey for Tandale Argentina Station site for 100 households over four days in February 2021. All the selected units were reached and surveyed with the assistance from local leaders. Researchers used Device Magic to gather survey responses.

5.3.1 Mobility and access

Of the 100 surveyed households, only 2% own vehicles. The survey results indicate that the majority of the residents in the area use public transport to travel to the CBD and/or to reach other services.

5.3.2 Basic services

Of the households surveyed, 27% are connected to piped water from DAWASCO, 51% receive water through delivery from neighbours and kiosks in 20-litre containers, and the remaining 22% receive water from other means. For sanitation, 73% of the households have both toilet and bath, 21% are served by pit latrines, and the remaining (5%) have no sanitary/toilet facilities.

5.4 Ahmedabad: Gupta Nagar

A total of 100 households were surveyed in Gupta Nagar over seven days in July 2021. Researchers marked survey responses electronically, using either Device Magic or Google Forms and geo-pins. For the street audit, the team decided to create basemaps using GIS software, which were then printed on paper for data collection purposes. The data from the paper maps was later entered manually into an electronic geospatial database.

5.4.1 Mobility and access

Of the surveyed households, 61% of households owned a vehicle (a two-wheeler) which they used for their daily commutes to work and for other trips. None of the households owned a car. Among the households that owned a vehicle, there were also many members who relied on other modes of transport such as walking, cycling, intermediate public transport options such as auto-rickshaws, and buses to move around. Among the households that did not own a vehicle, respondents indicated that they either walked, cycled, or relied on autorickshaws or buses to reach their destinations.

5.4.2 Basic services

The household survey indicates that the SNP project was able to meet the goal of providing access to basic services. Of the surveyed households, 100% have a piped water connection at the household level, with taps that connect to the municipal water supply. Survey respondents mentioned that the municipal water supply is quite regular, and the quality and quantity of water is fairly good. Similarly, all the households surveyed have individual toilets and baths that were installed as part of the SNP.

5.5 Mumbai: Charkop sites and services scheme

A total of 140 housing units were surveyed by ITDP over eight days in July 2021. Because of the site layout of the study area, these surveys were proportionately distributed among the three predominantly residential quadrants created by the intersection of the sub-arterial and collector roads and farther among the two predominant household types, i.e., 110 purely residential and 30 mixed-use (residential and commercial) units. These 140 surveys included 125 privately owned units and 15 units that are rented out. Such a distribution aimed to gather a set of varied responses that would approximate an accurate representation of the characteristics of the neighbourhood (although, as stated previously, we do not claim that our sample is statistically representative). The street audit of the site was collected predominantly via Device Magic, but with some paper data collection as well.

5.5.1 Mobility and access

Of the households surveyed, 62% owned a private vehicle, and the remaining 38% did not. Among all households surveyed, 51% owned a motorised two-wheeler, 7% owned a four-wheeler, 3% owned a cycle, and 1% owned a three-wheeler; 6% of households owned both a motorised two-wheeler and a four-wheeler.

5.5.2 Basic services

The household surveys conducted by ITDP confirmed access to basic services. Of the surveyed households, 100% receive water supply daily, but residents mentioned that water is only available for about one or two hours between 11 a.m. and 2 p.m. daily. Those surveyed said their main source of water is individual tap connections in their homes. Each household has at least one combined bath area and toilet inside their home, a connection for which was provided along with the provisions of the scheme at the time of allotment. Houses that have additional floors, i.e., G+1/G+2/G+2.5, also have an additional toilet because of the increase in the household size. About 70% of the households surveyed now have two bathrooms. The additional bathroom

was constructed by the residents to meet the needs of growing families. Research and on-site observations show that the site is serviced by a well-connected sewer system.

Residents of Charkop have good access to electricity, with 100% of the surveyed households receiving a continuous supply of electricity throughout the day and not facing power cuts.

5.6 Pune: Yerwada

Household surveys were conducted in June 2021. A total of 102 households were surveyed over a period of a week and their responses were marked electronically. The researchers covered the six blocks in the study area. Overall, we observed the respondents to be keen to answer and participate in the surveys. The street audit was going to be collected via Device Magic, but the team determined that it was easier to conduct the audit on paper and then translate to maps.

5.6.1 Mobility access

The survey showed that almost 70% of the surveyed households own at least one private motorised vehicle, and 75% of trips taken by residents surveyed are by private vehicles. Of those surveyed, 12% use the nearby BRT daily and 25% use it occasionally. The main reason for not using the bus is the long waiting times, the inability to find a seat, and the crowding on buses. Most of the daily BRT commuters walk to the nearest BRT station—either Yerwada or Gunjan Chowk, which are both within the study area. We found that women are more dependent on auto-rickshaw and private vehicles, with around 88% of those surveyed using auto-rickshaws or private vehicles.

Vehicle ownership in the study area is higher than the city-level ownership, and the use of cycles is less, with 12% of respondents using cycles daily for work trips. We observed that in most households, children (mostly boys) own the bicycle and use it for recreation rather than as a mode of transport.

5.6.2 Basic services

Of the households surveyed, 100% get adequate water every day. They highlighted that the potable water supply by the PMC is for one or two hours every morning; however, they use an underground water tank or additional tanks and vessels for storing the water.

6. QUALITATIVE ASSESSMENTS FROM RESIDENT INTERVIEWS

The following section describes the results of a series of 41 interviews with people residing in the six case study areas where the policy interventions occurred. Twenty-one of the interview subjects were women, two had a disability, 13 were low-income, and eight were over the age of 65. Each interview was approximately 40 minutes long. One of the limitations of the study was that the research team was working in a variety of contexts during a pandemic—and in the case of two of the case studies, during a civil war. Due to these circumstances and the practical considerations of working in a variety of locations, the research team used different research methods, such as transcriptions and note taking, leading to some variability in the data. In the instances where we were able to transcribe interviews, we include direct quotes, whereas in other locations we include more synthesised responses.

It is also important to note that the researchers used convenience and snowball methods of recruiting interview subjects, so the results are not a representative sample of residents. While the research team did take steps to include the voices of women and people with disabilities, these achieved different levels of success in different locations. While these research findings provide useful insight into conditions in the following case study locations, they do not represent the full range of perspectives in those locations.

6.1 Addis Ababa: Gotera Condominium

Researchers conducted a series of five resident interviews in August 2021. All interviews were conducted in Amharic and were documented via handwritten notes taken at the time of the interview. Of those interviewed, four were male and one was female, all were between the ages of 30 and 45, one had a disability, and two had incomes that were low for the area. Because we were not able to interview any older residents, that perspective is missing from the analysis of this site. The residents for the interview were

recruited by the local area administration, the Gotera Condominium association, which has its own management team who identified the three local resident representatives. In addition, the team interviewed two residents who were approached on the street in the area.

Table 15: Interview synopsis

Gender	Monthly Household Income	Age	Disability	Household Vehicle Ownership
Female	Low	30–45	No	Yes
Male	Middle	30–45	Yes	No
Male	Low	30–45	No	No
Male	Middle	30–45	No	Yes
Male	Middle	30–45	No	No

Source: ITDP

6.1.1 Access

In the resident interviews in the Gotera Condominium, some respondents said that it takes five to 10 minutes to reach the nearest public transport station. Several participants found it hard to travel from their houses to destinations, as the station is a bit far from their houses and poor pavements mean that people with disabilities can't use a wheelchair. It is also hard for them to find taxis and LRT service easily, and there are long queues for public transport. People who use their own vehicles, digital taxis (ride-hailing services), or office shuttles find it easier to make trips. To provide some level of improved access, people with disabilities were given the ground floors during the housing provision.

6.1.2 Inclusivity

Access on the site was not inclusive. One interview subject with a disability said that people with disabilities and older people do not have proper pavements to use a wheelchair and that walkways are filled with construction material from different building projects on the site. One woman we interviewed said it was difficult to move at night because of a lack of security, as the streets have no proper lighting. Interview subjects said that the ground floors of most buildings serve as bars and restaurants, creating a lot of noise in the area. They said fights often occur between drunk bar patrons, making it difficult for people to move around the area.

6.1.3 Basic services (water supply, sanitation, solid waste management)

In the Gotera site, all the basic services are provided by the city administration. The residents mentioned that the services are not constantly supplied to the site. The water service can reach most of the site, but the residents on the top floors could not easily access the water. The water and sewerage corporation announced a water supply shortage in most parts of the city, and sometimes in Gotera the water does not arrive for a day or two and people have to store it in big jars for use when there is no running water.

Electricity is constantly supplied to the site, but occasionally heavy rain or any other technical issues will result in a temporary loss of power. Two different major electric lines came to the site: Lancha and Kera lines. The

electricity from the Kera area is disrupted frequently, whereas the Lancha electricity is more consistent. The solid waste management is handled by the *woreda* administration and there is a frequent waste collection system. The telecommunication service works well in the area, but internet access is an issue on some blocks because of their location. Phone service for regular calls is good, but a few blocks at the northern part of the site experience issues with call quality and internet services.

6.1.4 Housing affordability

All the residents we spoke to who rent a house on the site find it very expensive and unaffordable to live in. They assume new refugees are coming to the site with the financial support from international aid organisations who can afford to rent the housing units in the project site. In addition, the local housing brokers contribute to increasing rent prices in the area. Currently rent ranges from 8,000 Ethiopia Birr for a studio with a smaller living room, kitchen, and toilet to 14,000 ETB for two bedrooms, living room, kitchen, and toilet, and 17,000 for a three-bedroom house. Due to the increasing rents, middle- and low-income house owners rent their houses and move to the outskirts so they can get cheaper houses to rent for themselves.

6.2 Addis Ababa: Jemo Condominium

In the Jemo Condominium, researchers conducted a series of five resident interviews in August 2021. All interviews were conducted in Amharic and were documented via handwritten notes taken at the time of the interview. Of the five people we interviewed, three were male, all five were between the ages of 30 and 45, none had a disability, and one had a low income for the area. Because we were not able to interview any older residents or people with disabilities, those perspectives are missing from the analysis of this site. The interviewees were selected by the contacts from the local area administration. Like other condominiums, the Jemo Condominium association has its own management team who identified two local resident representatives. In addition, the team interviewed three residents who were approached on the street in the area.

Table 16: Interview synopsis

Gender	Monthly Household Income	Age	Disability	Household Vehicle Ownership
Female	Middle	30–45	No	Yes
Male	Middle	30–45	No	No
Male	Middle	30–45	No	Yes
Male	Middle	30–45	No	No
Male	Low	30–45	No	No

Source: ITDP

6.2.1 Access

According to the interviews, people who live in the Jemo site usually use public transport, such as buses, minibus taxis, and three wheelers. Parents send their children to nearby schools to avoid long-distance transportation. Residents described long wait times and queues for using the bus and somewhat expensive

minibus taxi and digital taxi services. Residents described street theft as a very serious problem in the area, with particular issues in a few locations near the taxi station.

6.2.2 Inclusivity

Study participants said that streets in the site were of good quality, and that smaller shared streets and walkways are well constructed in most parts of the site. However, they said that street vending, on-street parking on smaller streets, shops placing goods on the street, construction materials left on the street, and limited maintenance on the infrastructure have limited the ability of people in vulnerable groups to move around freely. Residents also said that children find it hard to play and to move through the neighbourhood because of the faster vehicular traffic moving through the area.

6.2.3 Basic services (water supply, sanitation, solid waste management)

The residents of Jemo Condominium site get water service only two or three times per week. The residents said they buy water in large jars and that there are people who deliver and sell water in jars to people in the area. There are smaller clusters of eight to 10 buildings, each of which has an administrative office in charge of the solid waste management system, security issues, and other socioeconomic activities for the cluster. Electricity service is available every day, but occasionally residents lose electricity for two or three days. There have been some changes in the electricity service recently, and the area now receives constant uninterrupted electricity. Residents said the telecommunication and internet services work in most parts of the area and that the network for phone calls is relatively good.

6.2.4 Housing affordability

Study participants report that monthly rent was very high: 7,000 Ethiopia Birr (ETB) for a studio with a smaller living room, kitchen, and toilet; 7,500 ETB for two bedrooms, living room, kitchen, and toile; and 12,000 ETB for a three-bedroom house. Residents wanted the government to do research and intervene to limit the increase in rent prices.

6.3 Dar es Salaam: Tandale Argentina BRT station

In the Tandale Argentina BRT station site, five residents were interviewed in August 2021 regarding transportation and housing affordability in the study area. All of the interviewed subjects reside in the intervention area and moved to the area before the intervention was implemented.

All interviews were conducted in Swahili and were recorded electronically and documented via handwritten notes taken at the time of the interview. Of those interviewed, three were male; four were aged 65 or older; while one was between 45 and 64. None of the interview subjects had a disability, and four had a low income for the area. Since we were not able to interview any people with disabilities, that perspective is missing from the analysis of this site.

The female interviewees moved to the area following their husbands who moved to the area to establish homes for their families. The table below describes the sample in terms of gender, income level, age-group, disability, and vehicle ownership.

Table 17: Interview synopsis

Gender	Monthly Household Income	Age	Disability	Household Vehicle Ownership
Male	Low	66+	No	No
Female	Low	66+	No	No

Female	Low	46–65	No	No
Male	Middle	66+	No	No
Male	Low	66+	No	No

Source: ITDP

6.3.1 Access

Residents reported that walking around the area is difficult, particularly during the rainy season, because of poor sanitation and a lack of culverts to allow streams to cross streets.

'It is easy to walk around in this area where the terrain is flat and sanitation is good, no ponding on streets. But since there are natural streams frequently with water during rainy season, it is not easy to cross these streams at that particular time.'

Residents complained that walking to the nearby BRT station and other places is cumbersome due to the absence of planned streets and paths.

'Paths and streets are narrow and discontinuous making it difficult for elderly and people with special needs to move around.'

Some houses cannot be accessed by vehicles, making it difficult to use the services of ambulances and firefighting services.

The advent of the BRT system has simplified life for many residents, who have opted to use the BRT because it is cleaner, comfortable, and reduces travel time to destinations. Multiple residents interviewed use public transit as a main mode of transport, and they described it as reliable and safe. Some participants prefer Argentina BRT station, while others like using other BRT stations, such as Kagera, which is closer to where they live. Residents said they also used the Magomeni BRT station regularly due to its centrality and connections to destinations outside the CBD. Most residents said they access the Argentina BRT station by walking.

Residents also complained about the safety and reliability of other modes, particularly cycling.

'It is not that safe to cycle around the city, since the daladala *drivers are reckless.'*

6.3.2 Inclusivity

Residents described the study area as not particularly inclusive for older people and women. The area was not developed with access roads, and many roads are narrow and in poor condition, making it more challenging for older people and women to access basic services like health facilities and markets. Since cars and motorcycles cannot access the majority of houses, it is hard to get older people to health facilities. Residents also said the area is also not inclusive for people with disabilities, who have difficulty moving within the neighbourhood due to poor road conditions in many areas.

'My husband was given a wheelchair, but we don't use it when we take him to hospital, as the paths are in poor condition.'

The site contains many low-lying areas that are prone to flooding, which creates particular challenges for women, older people, children, and people with disabilities during rainy seasons.

6.3.3 Basic services (water supply, sanitation, solid waste management)

According to those interviewed, the majority of people in the study area have access to basic services. Dar es Salaam Water Supply and Sewerage Corporation (DAWASCO) is responsible for water supply and sanitation, while TANESCO (Tanzania Electric Supply Company) is responsible for electricity supply in the study area.

Not all houses are connected to piped water from DAWASCO due to high connection fees. Nevertheless, the houses that are not connected with water pipes often pay for water from neighbours, but they find it expensive. Water service is not reliable, and residents said they have access to water three or four days per week.

'It costs TZS 100 to TZS 200 to get 20 litres of water. This is still too high, especially for the lower-income people.'

Residents said solid waste management in the area is poor and lacks waste collection points, leading residents to dump their waste in open spaces, nearby streams and valleys, or along the BRT corridor.

'[The] *collection of liquid waste is not possible due to narrow streets. [I] normally use on site sanitation and pit latrines.'*

Residents said the dumping of waste in streams and construction activities are the main causes of flooding in the area, as waste often blocks drainage channels. Residents believe it is necessary to construct and provide proper drains to alleviate flooding.

6.3.4 Housing affordability

Availability and affordability of housing varies and depends on one's income. Many of the residents interviewed live in their own houses and rent some of their rooms to others. The rent levels vary depending on the quality of the rooms and available services. Multiple residents who rent their homes find housing affordable since there are many choices of rooms or houses for different income levels.

'People do come and leave depending on their preferences ... [I] do not think it is because it is becoming expensive.'

Renting single rooms costs between Tsh 20,000 and 30,000, which seems to be affordable to lower-income participants. Some rental homes require a lump sum payment of three to six months of rent, which residents described as making the area unaffordable. Poor housing, sanitation, and accessibility were mentioned as contributing to residents' leaving the area.

Regarding the changes in housing for lower-income people, most of the residents have mentioned that the government has no affordable housing scheme in the area. Others mentioned that housing loans are no longer provided to people, so it makes it hard for lower-income people to improve their housing. Affordable housing schemes from institutions like National Housing Corporation (NHC) were mentioned by a few residents as a way to make it easier for lower-income people to live.

6.4 Ahmedabad: Gupta Nagar

The research team conducted 10 interviews with residents of the Gupta Nagar area in Ahmedabad in July 2021. Seven of these interviews were conducted at the respondents' residences in Gupta Nagar. All the respondents agreed verbally to the interviews being recorded and notes being. Before the interviews began, a brief summary about the project and the interview's intentions was to all respondents. All the respondents recruited were referred by the local community member, who is also a resident of Gupta Nagar and had participated in the Slum Networking Project (SNP) in this area. All the respondents were first-generation residents who had settled in the area almost 50 years ago and were part of households involved in the SNP in the 1998–2000 period.

The interview guide prepared by ITDP was used with minor modifications (e.g., in terms of household members, income, and expenses) to help better understand the context. All interviews were recorded in Hindi/Gujarati and transcribed in English. The residents' name and address have been anonymized to protect their identities.

Table 18: Interview synopsis

Gender	Monthly Household Income	Age	Disability	Household Vehicle Ownership
Female	Middle	46–65	No	Yes
Female	Middle	46–65	No	Yes
Female	Middle	30–45	No	No
Male	Middle	66+	No	Yes
Female	Low	46–65	No	No
Female	Low	30–45	No	Yes
Male	Middle	46–65	Yes	No
Male	Middle	30–45	No	Yes
Male	Low	46–65	No	Yes
Male	Middle	18–30	No	No

Source: ITDP

6.4.1 Access

All the respondents spoke about how the paved roads had made parts of their daily commutes to work, shops, and leisure activities easier. The provision of lighting, doors opening to the streets, and strong social ties meant moving around in the neighbourhood was safe and comfortable. Some people, however, mentioned that there is still much left to be done in terms of improving access to better open, green spaces. Since such spaces are limited, respondents described the streets in the neighbourhood being used for multiple purposes. For children, the streets serve as a playground; for vendors and buyers, the street is the marketplace; for pedestrians and motorists, the street is a conduit for movement; and for vehicle owners, the street is a place to park vehicles.

For a majority of respondents, walking within the area has become much easier since the SNP put down paved or pukka roads. For short trips such as buying vegetables, medicine, or healthcare services or meeting relatives, walking is the preferred mode, and it has become easier after the intervention. Residents recounted that before the SNP, the roads were *kaccha* or not paved, and it was difficult for them to walk during the monsoon season as the roads would be flooded with water and waste. The addition of streetlights and similar

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initiatives as part of the SNP made walking safer and more comfortable at night. Respondents also said it was easy to walk to the public transit stop or the rickshaw stand.

One of the respondents who had a disability mentioned that after the SNP, it has become easier for them to navigate these streets with their special cycles and that they seldom had to rely on external help. However, not many residents cycled in this area. Some respondents who cycle, did so when they were younger and have now shifted to using motorised two-wheelers. Children and teenagers currently cycle for recreation. Some of the women who were interviewed mentioned that they were afraid to cycle or had not learned to cycle.

Respondents also described the dominant modes for work trips among residents as personal vehicles, such as two-wheelers, or a combination of shuttle rickshaws and the AMTS bus service. Respondents with their own vehicles cited the convenience, while public transport users cited its affordability as reasons for their preferred mode.

'I rely on our Activa (two-wheeler) for all our travels. It made my life easier. There is always traffic in Ahmedabad, and the bus will get stuck in it. On Activa, things will get done faster.'

Respondents who commute using a combination of public transport service, shuttle rickshaws, and walking described the affordability of AMTS bus service and its connection to major parts of the city as their primary reason for choosing the bus. However, they also described the bus service as infrequent, often arriving late to stops, and taking much longer to reach destinations than expected. In comparison, the shuttle rickshaws (shared auto-rickshaws) were always available in the vicinity and faster but more expensive than the bus service.

'From *here to Panjrapole, it would cost around eight to 10 rupees on the bus, while the same ride on a shuttle would cost you around 25 to 35 rupees. However, you cannot rely on a bus, but rickshaws are always available and will reach fast...'*

Some interview subjects described combining bus trips with shuttle rickshaws to complete the final segment of their journey. One respondent mentioned that the last mile of their trip was completed by walking to their destination.

Multiple participants mentioned that all trips other than work trips were shorter in nature and completed by walking. Since Gupta Nagar has easy access to fresh food thanks to the presence of vendors on the streets and multiple commercial establishments, trips for shopping could easily be conducted by walking. Since the neighbourhood had paved roads, interview subjects said that walking was comfortable and safe.

'I *go to Vasna or Jivraj to buy things. Sometimes, I walk to these places or sometimes I use the Activa. I feel safe while walking. It's easy and enjoyable. I like walking, a lot of things get done, and I am pretty much on my own*.'

6.4.2 Inclusivity

For some of the women respondents, owning and operating their own two-wheelers provided a sense of individual freedom and convenience. They could go to work, reach home on time, and come back without having to wait for a bus or an auto or rely on a family member to take them around. Some of them also expressed concerns over buses and shuttle auto-rickshaws as being unsafe, crowded, and spaces of harassment. The trips made on their personal vehicles were under 10 km to 15 km, but having a personal vehicle meant their range and accessibility to the city was much wider. Women who walked as part of their daily trips mentioned that they felt safe and comfortable while walking in the neighbourhood. They said that improved street conditions such as paved roads and lighting made them feel safe.

Several respondents mentioned how these improvements have also helped residents who have disabilities to move within the neighbourhood. The residents with disabilities affirmed this observation by explaining that they could move independently using special fitted/designed cycles or vehicles. A respondent suggested that giving people with disabilities such vehicles would help them to move around easily in this settlement.

'My husband is disabled and used to have a cycle to move around. Earlier, when the roads were kaccha*, if he had to move around, somebody would have to push him from behind… only then he could move. Now he's got*

an Activa from the government's scheme, and the roads have improved, he can move around without anyone's help.'

'For disabled people, they had to rely a lot on other people to move around to do their work. Now they can go around doing things on their own.'

However, a respondent remarked:

'There is a person nearby who uses a wheelchair to move around. Sometimes it becomes difficult for them to move around if people park haphazardly or there are too many vehicles or people on the street. In places where the road surface is not even, it will be difficult for them.'

A few older residents who were interviewed felt that the neighbourhood was safe for them to walk as part of their recreational activities. The gradual but significant improvements in the street network and its surroundings have allowed these older residents to walk safely and comfortably. A concern these residents raised was about the increasing motorised traffic, especially two-wheelers, which sometimes travel at high speeds and are parked on the street, occupying walking space.

6.4.3 Basic services (water supply, sanitation, solid waste management)

According to many residents, the SNP has significantly improved their neighbourhood through the provision of infrastructure. Multiple respondents said that after the intervention, the new infrastructure facilities such as water connections and sewer lines have been of much help to their families. For example,

'We had no facilities to get water, we had to go outside Guptanagar to get water. There was a water stand on the main road—all families used to go there and stand in line for water to come. A few rich houses would have taps, and if we had to collect water from there, we had to pay 25 rupees a month to use that.'

In the 1970s, municipal water connections and sewer lines had not been extended to the settlement. Multiple first-generation residents recounted their experiences of collecting water from sources outside the settlement or waiting for the municipal water to come at the water pipes/handpumps at the junctions (*nakas*) outside the settlement. Often, they had to pay to obtain water from an external provider. Respondents described such experiences as difficult and time-consuming for their households.

'Earlier, we used to take buckets and go outside to collect water. When the children were small, we had to go fetch it early in the morning, because we had to come back and prepare tiffin [a light meal] *for work. We had to spend a long time standing in line, waiting for our turn to come. It is good that the SNP happened because it helped us get taps and water connections in the house. This saved us time, and so we had time for other activities.'*

Interview subjects described similar experiences with solid waste management. Since municipal services were unavailable, they said households formerly dumped their wastes in the available open grounds and a huge dump ground was formed as a result. Since there were no individual toilets in most households, respondents said open defecation was prevalent across the neighbourhood. Women respondents recounted how they went to relieve themselves early in the morning or late to avoid being seen by others. Some of the residents had reared cattle and similar livestock in the past, so animal excrement was also part of the waste. During the monsoons, the waste and water would flood the roads, making it difficult for people to move. The respondents recounted how all of these unsanitary/unhealthy environments caused many health problems.

Residents described how the addition of household-level individual toilets and baths has most certainly led to a reduction in open defecation within Gupta Nagar. Survey respondents mentioned that the paved streets allow water or any kind of spillage to drain off and be collected by the catch-pits connected to the drains.

Multiple respondents described how the SNP was a timely intervention and beneficial to their lives and the community as a whole. They said it led to a cleaner, safer environment and reduced several of their hardships, especially in terms of health, significantly and largely built in an ownership of the neighbourhood.

'A lot of things have changed. A lot. Earlier we didn't have water, we had to go out and fetch for the water and that too at odd times...Now after SNP, things have become much easier. The biggest advantage is water, toilets, and electricity came home.'

6.4.4 Housing affordability

All the residents interviewed had their own houses which they had improved over time. They said that when they settled in Gupta Nagar in the 1970s, they lived in *kaccha* or temporary housing structures. Gupta Nagar then was on the peripheries of Ahmedabad and largely vacant land. Respondents said it had informally developed when the first-generation residents settled there illegally and constructed their shelters. Several respondents mentioned that even though the area lacked basic infrastructure, the houses were affordable for them to buy, and the central location allowed them easy access to the rest of the city. Most of them initially rented their houses and bought them over a period of time.

'*It was a* kaccha *house when we came here; we rented it. Then later we bought it, around 19 or 20 years ago. We paid around 300 rupees per month as rent.*'

SNP was a key determinant in most of the respondents' upgrading or improving their houses in incremental fashion. They remarked that gradually they added a sturdy roof or a floor to accommodate their growing households. Over time, the houses transitioned from *kaccha* or temporary houses to formal or permanent houses.

'*Yes, it was a* kaccha *house, and as we earned money, we improved this house. It was during the SNP we improved this house.*'

The respondents were familiar with the housing/property market in Gupta Nagar. Most of them remarked that housing has become expensive in the neighbourhood, given that all the houses are of a formal structure and connected to the city's infrastructure. They were cognizant of the fact that like them, newer residents looking to buy an affordable house in this area would find it difficult because of the high housing prices and its tenure situation—since the land title of the area is contested, multiple residents said it was difficult to sell or mortgage their house in the formal housing market.

'*It [housing] is expensive. It depends on the area and price changes, and this area has become expensive. If somebody wants to buy a house it is difficult, because no one will sell and leave this area. Plus, this area does not have dastavej [legal land titles].*'

The respondents echoed similar sentiments about the rental market in the area which were around 4,000 to 6,000 rupees per month and increased depending on the size of the house. The respondents mentioned how it would be difficult for those engaged in daily-wage labour or similar professions to afford a house here.

'*The rents are high here—a room smaller than this would cost around 3,500 rupees, with 500 rupees extra for the light bill. So that's 4,000 rupees, but the bathroom/toilet is shared. Three people will have to share that house to live there… With that kind of rent and low incomes, how will they run their house?*'

'*For low-income folks, the place will be expensive. If one earns only 4,000 to 5,000 rupees a month, how will he afford a house? The rents start here at 5,000.*'

When asked what could be done to make Guptanagar affordable to low-income residents, several responded that little could be done about rents in the area, which were bound to be high given the location and the facilities available.

'*It is a long, difficult process to bring down the rents here. Some communities reign here and decide on the rent. I can't give it on low rent even if I want to. It will require a big meeting to make them understand, and it's a difficult process.*'

'*It all depends on the house owner to decide the rents. They will charge whatever rents and say it has facilities like electricity, water, sewer line etc and charge more.*'

'*I think they can make the rents less... What we could do is if someone says they can't afford 4,000 rupees, we can reduce some 500 to 1,000 rupees. But then again, doing that is not really easy for everyone.*'

Several respondents suggested that options such as housing loans or financing could be made available to low-income residents. Others remarked that with a regular job and steady income, people can afford to rent houses, but that is still difficult to purchase a house.

'*If they can get some loans or some work, then a lot of things will change. Earlier, only one person was working and wouldn't allow women to go to work. So, if two people are working, things could be better.*'

Multiple respondents said they did not desire to leave the area given their social/community ties and the improvements brought in by the SNP. They explained that it would be difficult elsewhere in the city to find such neighbourhoods with easy access or proximity to other parts of the city. Several mentioned their friends who left the area because they were able to sell their house at a good price and purchased another house far from Gupta Nagar.

6.5 Mumbai: Charkop sites and services scheme

As a part of the study, eight residents were interviewed in July and August 2021 to learn about transportation access and housing affordability in the Charkop area. Many residents were reluctant to be a part of the interview, so, residents who were open to interaction during the household surveys were approached for a further interview. However, while approaching the potential interviewees, researchers aimed to speak to people belonging to different age-groups, occupations, genders, and income groups. The interviewees included senior citizens, female business owners, a working middle-aged man, a female caregiver, a housing society secretary, and a housewife. The interviewees were given a brief on the project and the intentions behind the interviews being conducted. Details pertaining to monthly income range and vehicle ownership of each household were also collected from the interviewees as illustrated in Table 12.

Table 19: Interview synopsis

Gender	Monthly Household Income	Age	Disability	Household Vehicle Ownership
Male	Middle	30–45	No	No
Male	Middle	46–65	No	Yes
Female	High	46–65	No	Yes
Female	Middle	18–30	No	Yes
Male	Middle	46–65	No	Yes
Female	Middle	30–45	No	No
Female	Middle	30–45	No	Yes
Female	Middle	46–65	No	Yes

Source: ITDP

The interview guide prepared by ITDP was used with minor modifications (in terms of household members, income, and expenses) to help better understand the context. All the interviews were recorded in English/Hindi and transcribed in English. The residents' name and address have been anonymized to protect their identities.

6.5.1 Access

The resident interviews give an insight into the nature of the trips that the residents take daily. One interview subject complained about the lack of secure parking spaces.

'We had to sell our vehicle because of issues like lack of parking space and security.'

Multiple residents said they park their four-wheelers along the local shared streets and two-wheelers in the internal courtyards. The mode of transport used varies according to the purpose of travel. Multiple interviewees walk or take an auto-rickshaw for their trips to nearby schools and clinics and to make household purchases, and several take the train from Kandivali railway station (3.5km from Charkop Market bus stop) to their workplace in other suburbs in Mumbai. The availability of different amenities within close proximity is one of the main reasons why the existing residents are satisfied living in Charkop.

'...People say that Charkop has now become a very well-developed area with all the facilities and amenities within reach.'

Since the railway station is located far from the site, the residents said they have to depend on a secondary mode of transport to reach there. While rickshaws are easily available for trips to the railway station, they said buses are less frequent during nonpeak hours. Also, residents said during peak hours, the return journey is not as convenient and easy because of the distance, overcrowding on the buses and traffic congestion.

Of the interviewed residents, multiple people said they walk to the Charkop Market bus stop, and several preferred taking a bus from the Charkop bus depot as it is a starting point for the buses, and they could get a seat and travel long distances comfortably.

One respondent said that typically in Indian cities, cycles and motorised two-wheelers are driven by men or the youth, while women mostly depend on public transport (auto-rickshaws or buses), private vehicles driven by a family member, and walking for shorter distances. Among the five women interviewed, those who worked travelled to Kandivali station by auto-rickshaw or bus and then used the train. All of the women interviewed walked to nearby stores or vendors for household purchases. For healthcare, they described taking an auto-rickshaw or walking to a nearby clinic. Multiple residents expressed that cycling is safe and risk-free. Residents informed the researchers that people who own provisional stores own bicycles and use them for deliveries.

The residents believe that the upcoming Mahavir Nagar metro station will improve access to the site. Multiple residents said that the neighbourhood could perform better in terms of walkability, particularly by tackling the problems of on-street and off-street parking that narrows carriageways and increases traffic, as well as footpaths encroached by vendors.

6.5.2 Inclusivity

Residents interviewed said that initially, the majority of the residents who moved to Charkop were Maharashtrians, who trace their ancestry to Maharashtra in western India. However, they said that Gujaratis, who trace their ancestry to Gujarat in north-western India, now make up a major proportion of the resident population. Interviews with women who own small businesses like a beauty parlour and a general store, or who work from home, suggest that the neighbourhood is safe and secure for women at all times of the day.

'My previous job required me to travel late at night. However, I never felt threatened or at any kind of risk here.'

'There are no unsafe areas. Most of the areas in the neighbourhood are already developed, making them quite safe.'

Female caregivers we spoke to felt that the neighbourhood is safe for their growing children as well, and none could think of any unsafe spaces in the area. Various options of day care facilities and preschools are also available for them to leave their children so they can manage their work or household chores during the day. A few women also babysit their neighbour's children in their homes. However, the caregivers described the need for bigger and better play areas for their children.

Older residents said they find walking in the neighbourhood slightly inconvenient because of the encroachment of footpaths by shop displays, poles, household items, street vendors, and cars parked along

the roads. They said two-wheelers often exceed the safe speed limit along the narrow local shared streets, making them feel unsafe while walking or crossing.

'Parking is a major problem [for older people], because of which the space available to walk freely is quite less. Two-wheelers exceed safe speed limits while driving through the local shared streets, making it unsafe and inconvenient for us to walk or cross.'

'The best area in Charkop is Sector 8. The traffic congestion there is less, noise caused is less too. Hence, it is better suited for people to walk freely, youngsters to play, and socialize.'

The residents claim to have built a strong social connection with their neighbours over their period of stay. Despite belonging to different backgrounds, they continue to live harmoniously and solve any problems or disputes within themselves.

'We are a society of families that belong to different castes and religions. However, I do not discriminate against any of them. We celebrate many festivals and rituals, like Ganesh Chaturthi, Eid, Diwali, etc., in our courtyard. Each member contributes to the organisation and such events. The residents readily help any person in need. We live together harmoniously.'

'The people here are nice. The neighbours are helpful too.'

6.5.3 Basic services (water supply, sanitation, solid waste management)

Based on the residents interviewed in the study area, 35 years after the site's inception, we found that the project has achieved a level of success concerning the provision of good-quality basic infrastructure to its residents. The sample interviews indicate that all dwelling units receive water supply every day. Although available for only two hours daily, interview respondents claim that the water, which is collected in individual storage tanks, is enough to last for two to three days. However, in some housing clusters, a resident mentioned that a few dwelling units have connected their storage tanks directly to the main supply line, instead of the individual taps in their homes. Because of this, the other housing units face problems like inadequate water pressure, resulting in unequal distribution of water. The housing society secretaries need to keep the activity in check, to ensure the judicious use and equal distribution of water.

'Society secretaries need to be proactive and provide solutions to the resident's issues. A rule that I imposed as the society secretary is that houses located close to the gate and away from it are allowed to collect water only for an hour each. This is to ensure that each and every house gets a sufficient amount of water. Houses do face a small water shortage during the summer months of April and May.'

One resident we interviewed noted that the sewer lines are regularly cleaned by the BMC. However, according to two respondents, rainwater enters homes with low plinths (ground floors/slabs) during heavy monsoons, causing damage to personal property.

'The sewage line, although cleaned regularly by BMC, continues to remain clogged.'

Residents said they do not face issues with the power supply. They said outdoor spaces such as streets are also well lit at all times during the day because there are adequate streetlights. They reported that rainwater enters housing units with lower plinths during the monsoons.

Multiple residents said that apart from minor issues regarding water supply, people are happy with the standards of infrastructure available to them. While several suggested that increasing the duration of water supply would solve the problem of water shortages, others said that being vigilant about how the water is being collected by each household could also help.

Interview subjects anticipate that the development of the Mahavir Nagar metro station may lead to more apartment building construction. Residents expressed that if apartment buildings were to be constructed in the area, the new households would create a need for upgrades in basic services such as drainage and open spaces, which would increase maintenance costs.

6.5.4 Housing affordability

Multiple residents we interviewed have been living in the Charkop Site and Services Scheme for about 30 years. Affordability of the plot, and the space available for the price paid, were the two most common reasons they cited for moving from their previous residences (formal settlements in other suburbs of Mumbai) to

Charkop. The residents who moved recently into the neighbourhood (three to 10 years back) said they moved into a home owned by a family member. These residents said they moved out of their previous residences as their family size was growing and it was difficult to adjust to the space constraints. According to the interviewees, Charkop has changed significantly since they first moved here, with increased access to multiple modes of transport; improved roads; new amenities such as schools, clinics, and markets within walking distance; increased property rates; and increased sizes of homes (built incrementally over time).

All of the residents interviewed said that Charkop is no longer an affordable neighbourhood for low-income people who wish to move there. They also believe that the property rates will increase with the development of the Mahavir Nagar metro station in the neighbourhood.

According to the residents, a 23 m² home that cost them Rs. 20,000 to construct 30 years ago now costs about Rs. 6,500,000. A 37 m² row house (plots along the streets) costs up to Rs. 10,000,000. According to a resident, rental prices have also increased over the years and depend on the size of the housing unit. For a 23 m² house, the rent is approximately Rs. 9,000; for a 28 m² home, it ranges between Rs. 15,000 to Rs. 18,000; and for a 37 m² home, it can be over Rs. 20,000. In some cases, pavements along these streets have also been rented out for about Rs. 4,000 a month or claimed by the residents who own home businesses and used to display their products. One resident said these prices are similar to the prices in other suburbs of Mumbai. Maintenance costs, however, are quite low—Rs. 300 to Rs. 400 per month, when compared to Rs. 2,000-Rs. 4,000 per month in an apartment building, owing to the higher standard of infrastructure (lifts, corridors, etc.).

'A household having at least two earning members will find this neighbourhood slightly more affordable and easier to settle in. Property is also unaffordable without a loan.'

We also gathered information on the reasons behind people moving out of Charkop. Current residents said that a few people left the neighbourhood because it was no longer affordable, but most people left after selling their homes at a good price in order to move to other suburbs of Mumbai, farther away from the city centre, such as Vasai, Virar, and Bhayandar. Interview subjects said that the families that left purchased a smaller apartment in these suburbs for a lesser price and saved up on the rest of the money that they received. Respondents said that other families left their homes because their economic status improved over time, and they could afford to move into bigger apartments. The respondents said that they think a majority of the residents are happy building over their existing homes whenever needed and wish to continue living in Charkop.

'People have left this area, but not because of affordability. A lot of people have sold their homes for a good price and have moved out. A few people have also sold their homes and moved into apartments, in and around Charkop. The area is convenient—other areas in Mumbai are well within reach and are well connected. People prefer renovating their houses and continuing to live in this area instead of moving out.'

Residents also said that amenities in the neighbourhood have also become expensive. They said the neighbourhood has a combination of schools that are affordable (New King George School, Shree Dnyaneshwar Vidyamandir, and Shree Ekveera Vidyalaya) and expensive (Oxford Public School and SVP School). While there are many small healthcare clinics in Charkop, residents said there is no big multi-specialty hospital. Residents find medical care very expensive and feel the need for a hospital that offers good-quality services at affordable prices in the neighbourhood.

6.6 Pune: Yerwada

As a part of this study, eight residents were interviewed in July 2021 to learn about access and housing affordability. The samples are well distributed in terms of residents living in and around the project area, with a balance of gender, income, age-group and vehicle ownership (see Table 13). We were not able to interview any residents with disabilities, so that perspective is missing from this analysis.

Table 20: Interview synopsis

Gender	Monthly Household	Age	Disability	Vehicle

	Income			Ownership
Male	Low	30–45	No	No
Female	Middle	46–65	No	Yes
Female	Low	66+	No	Yes
Female	Middle	30–45	No	Yes
Female	Low	66+	No	No
Female	Middle	18–30	No	Yes
Female	Middle	66+	No	Yes
Male	Middle	18–30	No	Yes

Source: ITDP

The project area is divided into six sites: Mother Teresa Nagar, Sheela Salve Nagar, Wadarwasti, Bhatt Nagar, Netaji Nagar, and Yashwant Nagar. Residents were selected from each site. It was observed that their experience of living in the neighbourhood varied depending on their location.

All the interviewed residents have been living in this neighbourhood for more than 40 years, i.e., prior to policy interventions. Multiple residents said they moved to Yerwada because of work opportunities and affordable housing options, with multiple facilities within walking distance.

6.6.1 Access

The residents we interviewed described different trips for work depending on the nature of their jobs. Residents said that most trips were within 10 km of the site. While multiple residents we interviewed preferred to walk for trips within the site, they could not walk for daily work or educational trips because of long trip distances. Residents reported that the walkability of the area is satisfactory but includes challenges of narrow lanes and traffic throughout the day.

Those we interviewed who owned their own vehicle said they preferred it over public transport. Younger residents (age-group 18 to 30) who did not have their own vehicle said they choose to travel by public transport. Older people and women preferred to travel by IPT (auto-rickshaws). Multiple people did not prefer public transport because of longer waiting periods, no seating because of crowding, or multiple modes or transfers involved to reach their destination. The state ease of reaching their destination varied across different actors based on age and gender.

'After walking to the BRT station, there is a long waiting period. The BRT is crowded, and seating is not available. The overall trip takes much longer, and we have to rely on the BRT. Using my own vehicle gives me the flexibility to go wherever I need to at any time.'

Walking on and crossing streets with heavy traffic was difficult for women, older people, and children. Safety from crime was not a concern for the residents within their own areas, irrespective of gender and age.

'We have to walk to the BRT stop. Walking in the neighbourhood is easier now because of improved streets but it is still difficult owing to the traffic.'

Very few of the residents we interviewed used the cycle as a mode for their trips as they either owned vehicles or perceived it as unsafe. Those who did cycle expressed that this mode was quicker and easier than walking or using a vehicle.

Multiple interviewed residents mentioned that accessibility has improved since the intervention as open drains were replaced by closed drains and the lanes were paved properly. An aftereffect of redeveloping informal structures into permanent houses was the reduction of public open spaces. As residents increased the area of their houses, the street width and common spaces shrunk. It is difficult to access certain lanes using vehicles, especially in case of emergencies. It also took away space for the children to play, resulting in them using wider streets with vehicular traffic.

6.6.2 Inclusivity

When it comes to vulnerable groups, the residents suggested improvement of access from houses to the streets, particularly for people with disabilities. They also said that having community activities in the public realm that allowed women to claim the space would improve the quality of living. Since the policy intervention, residents said all households have access to basic services, but there are specified days when there is no water supply and residents are informed beforehand so they can store water.

'The roads have been improved but my daughter who is visually impaired cannot step out on her own for medical visits. There are too many hurdles on the street. It is good that the toilet and bathing area is now within the house. Someone always had to accompany her otherwise.'

According to residents we interviewed, an advantage of the intervention for lower-income residents was that it gave them an opportunity to improve their housing conditions and a sense of security, as they had their own house now. They said that having access to basic services has benefitted the vulnerable groups immensely, as women no longer have to make trips in search of water, and indoor toilet and bathing facilities improved comfort and safety. In the case of people with disabilities, interview subjects said the new facilities allowed them to access the toilet without relying on anyone else.

The residents unanimously agree that the policy intervention has improved their quality of life. Yet some gaps have been pointed out through all these interviews, suggesting that there is still room for improvement.

6.6.3 Basic services (water supply, sanitation, solid waste management)

The interviews indicate that the provision of water access has been helpful to residents.

'Having a water tap, a toilet, and bathing area within the house has made a huge difference for all of us and particularly the vulnerable groups. Previously there were issues of water supply and toilets. Now it has been resolved.'

'We no longer have to walk to the river or go around the area searching for a water source, stand in queues, deal with arguments, and finally fill the water. Having a water connection at home has made a big difference for us!'

The interviewees mentioned that earlier, the houses lacked individual toilets and the residents were using community toilets. The amount of open defecation was high. With the toilets and bath area inside the houses after redevelopment, it has helped to maintain clean and hygienic surroundings. One interview subject said that the community toilets have been retained for the houses that were not part of the program.

'There is a provision for toilets outside the house and within the house. Earlier there were open drains and all that water would come inside the house. Now that the drains are closed, it is saving the women a lot of effort.'

Multiple interview subjects noted that the biggest change in the area was the policy intervention that led to improved roads, proper houses, attached toilets, water supply, and closed drains. They believed this improved the overall hygiene in the area.

'The biggest change is the cleanliness in the area. We used to live in huts. There were open drains and no proper streets laid out. Garbage would be dumped on the streets. These things have changed now.'

Women said they were happy because the toilets are now inside their houses, and their kids get more space to study. One interview subject highlighted that although it is difficult to quantify, it can be seen that the better houses have improved the educational levels in the family, leading to better livelihood opportunities.

6.6.4 Housing affordability

All the residents interviewed have been living in this neighbourhood for more than 40 years, beginning prior to the policy interventions. Multiple people moved to Yerwada because of work opportunities and affordable housing options, with multiple facilities within walking distance.

Affordability in the neighbourhood varied across the residents we interviewed. Some mentioned that buying a house in the site was not affordable after the intervention and with the coming of the metro. Though no lower-income residents have left the area, it is difficult for them to buy or rent a house here now. Some respondents suggested that to make it easier for low-income people to live in the area, the government and institutions should help create jobs and income generation opportunities for women.

'After all these upgrades, the housing rates have increased in the area. It has become expensive to purchase a house now. Earlier, when we came here a hut would cost Rs. 5,000 to Rs. 6,000. We are a joint family living here. My son wants to buy a new house in the neighbourhood. But today the cost ranges from Rs. 14 to 60 lakhs. We cannot afford it.'

7. QUALITATIVE ASSESSMENT FROM POLICY-MAKERS

The following section describes the results of a series of interviews with people involved with the development and implementation of the policy interventions in each case study area. As with the resident interviews, a limitation of the study was that the research team was working in a variety of contexts during a pandemic and an ongoing civil war in Ethiopia. These circumstances occupied much of the attention of government officials, making scheduling interviews more challenging. Due to these circumstances and the practical considerations of working in a variety of locations, the research team used different research methods, such as transcriptions and note taking, leading to some variability in the data. In the instances where we were able to transcribe interviews, we include direct quotes, whereas in other locations we include more synthesised responses.

7.1 Addis Ababa: Gotera Condominium

To gain a better understanding of the intervention, in mid-August 2021 researchers interviewed two senior municipal officials involved with the Gotera Condominium project. To protect their identity, the interview subjects requested not to be named. The interviews were documented with written notes taken during the interview.

7.1.1 Intervention background: goals, actors, process, and challenges

According to the stakeholders interviewed, the Addis Ababa city administration began the IHDP at the direction of Mayor Dr. Arkebe Oqubay who served between 2003 and 2005. The city sent a proposal to the German Technical Corporation (now known as GIZ), which then set up an office in Addis Ababa. Next the city began designing the pilot condominium housing project in the neighbourhood of Bole Gerji. The actors in the projects include the mayor, the project manager, a team from the different land management offices, small-scale construction companies, local contractors, and city planning departments.

According to the stakeholders interviewed, major challenges on the housing project included managing the local contractors who constructed the housing units, poor finishing work on the blocks, and a lack of capacity for the planning and design of the units.

7.1.2 Intervention impact: access, inclusion, affordability

According to the stakeholders we interviewed, the Addis Ababa city administration used a lottery system for delivering the housing units to people who were relocated from the inner city because of renewal projects. The major impact of the intervention was that it created an opportunity for the low-income residents in the city to own a house. However, according to stakeholder interviews, most of the low-income residents lived in the area only a few years, and after the land increased in value, they either sold or rented their property and

moved to other peripheral locations. In addition, there are several cases at the Gotera site with poor quality housing units.

Policymakers said a major goal of the project was to improve the informal settlement and military camp, which had experienced elevated levels of crime, causing many people to be afraid. Interview subjects said that the intervention led to a reduced crime rate in the area.

Major improvements to local infrastructure and utilities were also part of the intervention. According to the stakeholders interviewed, the quality of the services varies from block to block. Road infrastructure was the largest intervention at the site, with Addis Ababa City Road Authority in charge of the geometric design and construction. The experts we interviewed believe that high-quality roads were built on the site. According to the interview subjects, all the housing blocks inside the project site have access to the local roads paved with asphalt. People with disabilities were given preference for ground floor units so they could have easy access to their homes via the new roads.

The program was planned to be inclusive, particularly for people with low incomes, but the policy-makers we interviewed said that it was not clear to most people in the city how the housing unit owners were selected. In the interviews, respondents said that they and most people think the housing units were provided to people based on their political affiliation with the previous administration.

The interview subjects said that the installation of electricity and other utility services was not finished in most houses that were transferred to residents. In addition, the communal spaces were constructed to have local services like washing clothes and a slaughter room for sheep and cattle, but currently they were being used as an office for the local administration and rented as retail space.

7.1.3 Intervention assessment and lessons learned

According to the stakeholders interviewed, officials involved with the program learned from the issue of low construction quality, and the quality of the construction materials was improved on the condominium sites that were contracted after Gotera.

In general, it is not clear to the research team that the intervention has helped the low-income people gain access to improved housing, but it does appear that most of those who received housing likely benefitted financially from either renting or selling their units to wealthier people. The area also appears to have been transformed from an informal settlement and military camp to a vibrant mixed-use area. After the intervention, there appear to be more people on the site, which has led to more activity and congestion in the area. The development of the roadway interchange near the site, the new hotel, and other commercial services in the area appears to be as a result of the condominium site.

The new interchange may signal a shift towards a more car-centric form of development that caters to wealthier residents who can afford cars. For those not able to use cars for transportation, this likely creates a reduction in access and safety, as large interchanges present significant obstacles to mobility on foot.

7.2 Addis Ababa: Jemo Condominium

To gain a better understanding of the Jemo Condominium intervention, in August and September 2021 researchers interviewed two stakeholders who were engaged with the intervention. Researchers interviewed the Director of Plan Preparation at AA Planning commission and the Branch Manager for the traffic management agency (TMA) south region. To protect their identity, the interview subjects requested that they be referred to by these titles. The interviews were documented with written notes taken during the interview.

7.2.1 Intervention background: goals, actors, process, and challenges

According to the interview subjects, the goal of the Jemo housing project was to create 10,000 housing units in three different sites: Jemo I, Jemo II, and Jemo III. The process was initiated by the previous Addis Ababa city mayor, Arkebe Oqubaye. He had initiated the integrated housing development project, which includes different departments from the land preparation, compensation system, local banks, local contractors, micro-scale enterprises (MSEs), and others. The area was urban agriculture open-field land with few housing units. The land was cleared and transferred to the city administration, with compensation given to the local farmers and property owners. The construction was done by the Addis Ababa housing agency, local MSE, and the

IHDP. The transfer of the housing units to the residents was made by the lottery system, and priority was given to the residents living in the city centre urban renewal sites. The major challenges cited in the interviews were the limited capacity of the local MSE on the construction of the housing units, which led to the poor quality of housing units. The research team was not able to interview higher-level officials who were more involved with the financial aspects of the intervention.

7.2.2 Intervention impact: access, inclusion, affordability

From the observation of the local administration, the condominium on the western side has a higher number of pedestrians and cyclists. The experts we interviewed believe that the walkways on the major road and local streets are narrow compared to the number of pedestrians, and some sections lack walkways entirely. They recommend that these be improved in the future.

Most residents work in the city centre, and there is heavy traffic congestion, especially in peak hours between 7 a.m. and 10 a.m. and around 4 p.m. Commuters are often forced to wait for the bus for more than two hours. According to the stakeholders we spoke to, the government is trying to improve public transportation service by increasing the number of buses. The construction of a dedicated bus lane between the Mexico and German roundabouts has improved the reliability of buses. According to the experts, there are few local roads and alternative routes, which may contribute to traffic congestion.

According to the interview subject in charge of traffic management in the area, the new cycle lane provision on the site has coincided with several bike rental options that allow residents to ride a bike. However, the policy-maker noted that the cycling facilities are provided on the major streets surrounding the project site, but they are not used much as they are encroached upon by vendors and three-wheelers who use them as a waiting area. The streetlights on the main road are not working well, which contributes to theft and other crime. The monthly car-free day is celebrated in most parts of Addis Ababa, and the major Lebu to Jemo corridor is the one of the most vibrant, attracting a lot of residents and children to walk and ride a bike.

According to policy-makers, the condominium houses are now very expensive for the area. A studio costs 6000 birr and a one-bedroom house costs 8,500 birr, which is not affordable for low- and middle-income residents. After the condominium was constructed, efforts were made by the Addis Ababa Traffic Management Agency to create intersection improvements on a ring road around China camp (Koshe landfill site), which has reduced traffic in the area. Interview respondents said that there are several options for public transport. The most expensive ones are the three-wheelers, but they are popular in the community because they can operate on smaller feeder roads. The new BRT project is under construction, and it is expected to be finished in two years. After completion, it will improve public transport in the area.

Most people shop for basic needs like vegetables and fruits at the market in the Haile Garment area, which is about 4 km from the site and is less expensive than shops in the Jemo area.

7.2.3 Intervention assessment and lessons learned

According to policy-makers, the project appears to have met its goal of constructing housing, but the housing is not affordable. The experts we interviewed recommend that the government own and rent some of the housing units at lower prices to make them more affordable. They also recommend that the planning process accommodate commercial uses in addition to the housing units. Relatedly, the housing programs also need to provide facilities for clinics and hospitals that are closer to the residential units to improve access to these services.

According to the TMA director, a glass factory located in front of the Jemo Condominium and is creating respiratory problems for the community with its emissions. The director suggested that local and alternative roads should be constructed in the area to give the properties easier access. The Lebu–Jemo bicycle corridor needs to be permanently replaced with a segregated cycle lane with bollards that will not allow three-wheelers to encroach. In order to create awareness on bicycle uses, the bicycle needs to be affordable for the community.

Experts believe that the government should build the capacity of small-scale enterprises that sell consumable goods in the area and increase their number to make the existing market competitive. This will help to reduce some of the cost associated with vegetables and to reduce the travel distance to markets.

7.3 Dar es Salaam: Tandale Argentina BRT station

To better understand the interventions that were and continue to be implemented in and around the Tandale BRT station, the researchers asked questions to stakeholders involved with the interventions. One of the three stakeholders was interviewed through a Zoom call. Due to severe time constraints on public servants in Tanzania because of the COVID-19 pandemic and at the request of these participants, the other two policy-makers sent their responses to interview questions via email. The interview was conducted, and the email responses were completed in September 2021. Documentation of the responses from the interviewees was directly recorded on the questionnaire sheets. Respondents provided their responses relating to recent development interventions under the Dar es Salaam Metropolitan Development Project (DMDP) that they witnessed or helped to implement.

The respondents included one female and two males to ensure gender balance. Respondents included a senior staff from DART, the institution responsible for development and operation of the BRT in the city of Dar es Salaam, as well as a senior town planner and an engineer from the President's Office, Regional Administration and Local Government (PORALG) that oversees the local authorities in Tanzania. The interventions in Tandale are taking place under the auspices of the PORALG, which implemented the DMDP aiming to upgrade slums in the city and make them more liveable by provision of infrastructure and sanitation services.

7.3.1 Intervention background: goals, actors, process, and challenges

According to the government officials interviewed, the government began implementing the DMDP in 2015 to eliminate flooding, improve road infrastructure, and enhance connectivity to the main roads and sanitation in low-income areas. In Tandale, the project aimed to construct streets with walking and cycling facilities and lighting, line stormwater drains, reconstruct the Tandale market, and provide public toilets. The government took a loan from the World Bank to finance the interventions. The PORALG, in collaboration with the Dar es Salaam local authorities, then consulted with the communities to select the roads and other interventions needed in specific localities. Other stakeholders, like the utility companies, were involved to create awareness of the program and the intended objectives.

The main challenge faced by the project, according to interview subjects, is the availability of sustainable institutional and financing arrangements under the Ubungo Municipal Council, which is responsible for maintenance and preservation of the new infrastructure.

7.3.2 Intervention impact: access, inclusion, affordability

The interview subjects reported that government intervention has had positive impacts on the lives of people in the area of intervention. Sanitation has drastically improved due to provision of storm-water drainage. Construction of roads has made the area more accessible and attractive to land developers. Land and house values are gradually increasing, which may also push up the rents and ultimately render the area not affordable to low-income renters. However, the house owners who are also in the same category may benefit from the development and increased rent levels, which will enable them to refurbish their homes and make the area more liveable.

Unfortunately, interview subjects noted that after provision of these interventions, no plan was put in place to preserve them. Some of the services have run down, and others, like the roads, have been encroached upon by settlements. The government has had to pay compensation to remove and resettle the residents who encroached on the road right-of-way.

Interview subjects noted that the provision of NMT facilities and street lighting along the recently reconstructed Argentina Road is making the area safer to the general public, especially to the vulnerable groups who avoided the area because of a lack of security on the streets. Walking and cycling are now possible on the roads thanks to the newer facilities and accessibility to public transport is easier. However, small traders are using walking facilities to display and sell their goods. In addition, interview subjects reported that residents are disposing of sanitary waste in the side drains that were part of the Tandale road improvements.

Finally, interview subjects noted that the initial interventions under the Site and Services are no longer visible, with the exception of the power lines and health facilities. In the decades since the interventions, many people have moved to other parts of the city.

7.3.3 Intervention assessment and lessons learned

Government officials we contacted viewed the DMDP as the right path for improving accessibility and creating compact and mixed land use to reduce unnecessary trips and congestion on the major roads. Improvements of roads/streets and roadside stormwater drains have eliminated flooding in homes making the area more liveable.

Living standards, however, have not changed much. One respondent reported that prices of food and other commodities have not changed as a result of the intervention. Land and houses are becoming more attractive and expensive as the area becomes more accessible to potential land developers. Residents with plots, however, expect that they may benefit as their houses become more valuable and attract high mortgaging from financing institutions.

Under the Site and Services with little follow-up action, the interventions quickly became rundown, going against the long-term goal. Improvement of infrastructure in the communities should be taken holistically. It is of utmost importance that governments set up sustainable institutional arrangements and stable financial flows to ensure that the interventions are well preserved and not encroached upon to head off future high compensation costs.

7.4 Ahmedabad: Gupta Nagar

To understand the interventions in the Gupta Nagar area of Ahmedabad, India, researchers talked to four people who were involved in the project, including two Senior City Engineers with AMC, a Director of SAATH (the healthcare and education NGO involved in the slum upgrading project), and a Program Chair of Urban Housing at CEPT University. All interviews were conducted in a mixture of English and Gujarati in July 2021 and were documented via notes taken during the interviews. The respondents included one female and three males.

7.4.1 Intervention background: goals, actors, process, and challenges

According to the stakeholder we interviewed, SAATH, an NGO, helped build consensus within the Gupta Nagar community. Before the SNP took off in the late 1990s, SAATH was involved in various health, livelihood, and education programs in Gupta Nagar. Policy-makers observed that these efforts helped establish SAATH as a trustworthy mediator between the community and the AMC. Some of the residents of Gupta Nagar are active members or employees of SAATH, and this helped in establishing rapport and consensus among other residents and households of Gupta Nagar.

'*The collaboration and rapport shared between the residents, AMC, and SAATH was crucial for the success of SNP in Gupta Nagar. Involving residents of Gupta Nagar as active participants rather than passive onlookers helped immensely in the success of this program.*'

Across the board, all the key actors agree that the SNP has achieved its intended objectives, but the tenure situation of the settlements is still a challenge. While SNP could be carried out on slums located on public lands the tenure situation for slums located on private land makes it difficult for AMC or the NGOs to intervene and replicate the SNP process. On recalling the program 20 years later, an AMC official remarked,

'*The AMC gave no-eviction guarantees to the residents of Gupta Nagar as a form of tenure security protection. This was done because urban land in Ahmedabad is most often entangled in tenure disputes which would take a long time to resolve. To address this issue, we will have to think about speedy tribunals for urban land locked in similar tenure disputes.*'

Another key challenge was achieving a broad consensus among all the stakeholders on the project and its intended outcomes. A resident of Gupta Nagar who was also a member of SAATH's team mentioned how it took time for the community to trust the AMC and SAATH when it proposed the SNP. They viewed the AMC's role sceptically, since they could be evicted by them under the premise of illegally occupying the land. However, repeated confirmations and guarantees on no-eviction brought the community on-board.

'When the SNP happened, we had a contract with AMC that gave us a NOC for 5 years - a no-eviction guarantee. The renewal has happened without fail for 5 years, but they could evict us given how Ahmedabad is becoming a megacity now…'

Similar challenges arose when deciding financial contributions for the project, post-project follow-up and clarity on the tenure situation. Such challenges, mentioned the interviewed policy-makers, require very creative negotiations and consensus processes to reach a middle ground. This is a time-consuming process with a potential to impede the progress of the project.

According to the interview subjects, the SNP in Ahmedabad, which began in the late 1990s and finished in 2001, brought individual water connections, household toilets, and sewer lines, reaching almost all the households by 2001. The subjects stated that most households previously sourced water from external sources and dumped their household level wastes in open or vacant lands.

7.4.2 Intervention impact: access, inclusion, affordability

The SNP, policy makers recall, allowed the community to access basic services such as drinking water, sanitation and improve their housing incrementally and in doing so, improving the neighbourhood. They mention how paved roads, closed drains and street lighting on all streets has made it easier for residents to move around comfortably and safely. Earlier, during monsoons, the streets used to flood with rainwater and surface garbage, thereby making it difficult for anyone to move across the neighbourhood. The street improvements have significantly improved walking conditions within the neighbourhood. According to interview subjects, these improvements also mean mobile vendors, cyclists and motorized two-wheelers are now able to access internal streets much more easily.

The installation of water taps and toilets in individual households has significantly improved life for the residents of Gupta Nagar, according to the policy-makers. Earlier, the residents had to fetch water from far away sources or wait in long lines in front of community hand pumps. The installation of toilets at the household has brought down incidents of open defecation and helped keep the surrounding environment clean and hygienic. With door-to-door collection of waste and the disposal of household waste through bins, open dumping has declined. Corresponding incidents of contagious diseases and other public health issues have also declined. Several of the policy makers remarked that the residents of Gupta Nagar showed a willingness to pay for these services and cooperated when they were made aware of the benefits of living in a cleaner and more hygienic environment. A SAATH official remarked that earlier, incidents of tuberculosis, malaria, etc. were widespread in Gupta Nagar. Their efforts to run medical camps and nutrition camps before the SNP helped facilitate implementing the SNP, because the community then understood the benefits of sanitation and proper solid waste management.

The policy-makers unanimously agreed that the biggest impact the SNP has had was on the housing situation in the area. SNP was not merely a service installation or upgradation, but a housing and services program that went hand-in-hand to improve quality of life in Gupta Nagar. SAATH officials mentioned how previously, housing in the area was made of poor materials and susceptible to harsh weather during the monsoon season. Leaky roofs, weak walls and rainwater formerly flooded the houses from the streets, contributing to the poor health conditions among the residents. SAATH had set up Urban Resource Centres (URCs) to help foster livelihoods and develop microfinance programs in the community. Such initiatives helped in several residents taking housing improvement loans or similar loans to improve or buy a house in Gupta Nagar. In hindsight, remarked SAATH officials, such an integrated approach of housing and services was found to be much more impactful as it involved an exercise of community participation and flexibility for residents to improve their housing at their own pace once the requisite infrastructure was in place.

'Health was a serious concern here, because half of whatever we earned went to treating diseases. When SAATH came in 1992, it focused on health and education centres. They created awareness about these diseases and showed what practises caused these diseases. The SNP brought in facilities, such as water, electricity, and lights. With their help, we brought our own house and improved it over time.'

The policymakers feel that better streets have increased access to many areas within settlement, and given the locational advantage of Gupta Nagar, it is well connected to most parts of the city. Most households now own a two-wheeler to make their work trips, while others rely on the AMTS or the shuttle rickshaws. With the improvements in housing, infrastructure, and streets, the policy-makers are aware that the housing prices in

Gupta Nagar have increased, and it is no longer affordable for low-income households to buy a house. Another issue policymakers brought up was the tenure status. Residents were given five-year no-eviction guarantee, but no title to the land, locking these properties out of the formal housing market as the land remains in legal disputes.

7.4.3 Intervention assessment and lessons learned

The city government officials (or AMC officials) viewed the SNP as a successful venture, as it realised the goals of providing basic services and infrastructure to slum settlements that lacked them. Some of the city government officials also viewed the SNP as an important case study to build better public–private partnerships to deliver solutions to such difficult problems in the urban environment.

According to policy-makers, the housing policy in India and particularly in Gujarat has seen many changes after the SNP. From Site and Services, the policy landscape has shifted to provision of housing in partnership with the private sector and the governments facilitating these processes. This shift in policy means that housing is viewed as an 'asset' rather than an integrated approach for poverty alleviation—i.e., through better living environments, incremental housing, livelihood creation, etc. The SNP falls into the latter category, as it addresses most of these features by upgrading infrastructure and involving the community in the entire process. Officials from SAATH recounted these policy shifts as one of the roadblocks in replicating and scaling SNP. They also mentioned that city governments are more interested in providing new houses to slum residents on the site than implementing to broader efforts to upgrade many aspects of an existing settlement.

Officials from SAATH believe the success of SNP was not just in ensuring that households in Gupta Nagar had access to drinking water and toilets but also instilling optimism about incrementally improving their houses and neighbourhood. Such an integrated focus is currently missing from the affordable-housing programs in the city. The newer affordable housing programs (e.g., PMAY or In-Situ Slum Redevelopment Policy (2013) of Gujarat Government) in slum settlements are focused towards constructing compact replicable houses in an apartment fashion in situ with private sector participation and the consent of 80% of the community. The private sector is attracted to such programs so it can leverage land remaining after construction of these houses for free-sale or to obtain Transfer of Development Rights (TDR).

All the interviewed stakeholders that mentioned consensus building, participation, and negotiations are the most challenging and difficult parts of the SNP process. These are time-consuming and often hamper and delay the program even before it takes off. While the tenure situation can be mitigated by guaranteeing assurances from the city government, bringing all stakeholders to the same page and to have clear demarcation of roles and responsibilities, as well as post-project maintenance and follow-up, require multiple discussions amongst all stakeholders. Such challenges and delays to creating housing are not visible in the current in situ affordable-housing programs and one of the reasons city governments prefer it over slum upgradation programs, according to AMC officials. Since tenure in private land is uncontested, city governments are reluctant to roll out slum upgradation programs for slums located on private land.

SAATH officials view the SNP as a housing and service program aimed not just at physical or built environment improvements but also at community development. The SNP, they believe, created a housing asset in the process, but with an overall development of the community. Another key reason they prefer the SNP is the participatory nature of this exercise. The residents of the community were the facilitators and negotiators in the entire process, remarked SAATH officials.

7.5 Mumbai: Charkop sites and services scheme

As a part of the study, we interviewed four policy-makers in July 2021 to understand the broad objectives, implementation process, and impacts on the Charkop Site and Services scheme on its residents. Two of the policy-makers interviewed were part of the planning and design organisations at the time of implementation, and they discussed the background, context, challenges, and shortcomings of the interventions. The other two interviewees were urbanists and housing policy experts, who shared their perspectives on the performance of the organisations, strategies, and processes involved in the Charkop Site and Services scheme in relation to their relevance and applicability to TOD projects. All the interviews were conducted in English. Three of the interviews were recorded, and one was documented with notes taken during the interview.

7.5.1 Intervention background: goals, actors, process, and challenges

According to a former senior MHADA (Maharashtra Housing and Development Authority) official, under the Site and Services scheme in Charkop, about 100,000 households were to be allotted homes. MHADA was responsible for providing the infrastructure for about 60,000 households. The project was based on the following basic principles:

1. Affordability
2. Full recovery of the cost of construction
3. Replicability
4. Pedestrian-friendly
5. High-density

The main objective was to provide people with the facilities and infrastructure that they do not have direct access to, including land and related infrastructure like drainage, water, and electricity. The housing could be developed by the residents themselves. MCGM (Municipal Corporation of Greater Mumbai) was responsible for providing the major infrastructure, which included the widening of DP roads, water supply, and sewerage, as well as off-site infrastructure, such as sewage pumping stations. All on-site infrastructure costs, which included the smaller roads (less than 9m wide), pathways, and core house construction, were handled by MHADA. The planning principles mandated that 80% of the plots be sold to households whose income was below a predetermined level and the rest were made available to the beneficiaries at near market price.

The former senior MHADA official also report that when planning for services, toilet connections were provided on the front side of the house, to prevent the need for a service road or duct in between the houses. This also ensured that the residents would maintain the toilets. Maintenance costs were reduced by increasing the proportion of 'private spaces'—these include the individual housing units and the semi-private courtyards within the clusters that are now maintained by the residents themselves. During the planning process, the proposal for courtyards was met with strong objections. After the completion of the project, however, the courtyards were considered to be assets by the residents. The hierarchy in plot and road division resulted in differences in the commercial values of each plot based on the level of access.

According to policy-makers, the target 7,000 to 8,000 beneficiaries were identified through a lottery system, which was advertised. The beneficiaries had to form groups of 30 or 35. These groups were registered as housing societies and were then allotted a single cluster of houses. If the beneficiaries couldn't form groups, MHADA itself formed groups, selected a promoter, and assigned a cluster name. The allotment was done on the following day, and in about two to three months, all the clusters were allotted. This allotment process was also handled by MHADA. According to the MHADA official, since the process of identifying beneficiaries, forming housing societies, and allocating homes was all dealt with directly by them, the residents found the process to be hassle-free and quick.

An interview subject stated that the land was distributed on receiving a down payment that was equal to twice the monthly income of the target beneficiary. Once the land was allotted and the loan was taken out, 15% of the monthly household income was to be paid by the residents as a monthly instalment for the house. The beneficiaries from the formal sector had to provide salary statements. According to the official, those from the informal sector had to indicate details through bank statements. Women who worked as domestic helpers could provide affidavits as proof of employment/income.

According to a policy-maker, land reserved for educational amenities was handed over to the respective school authorities. A few plots were handed over to BMC (Brihanmumbai Municipal Corporation) and BEST (Bombay Electric Supply & Transport Limited). Other lands were allotted based on advertisements. Some open spaces were maintained by schools but were open to the general public. A few open spaces were maintained by the residents' welfare associations in the area. Additionally, a few plots located along the sub-arterial and collector roads were allotted with International Development Association's (IDA) agreement on a one-time basis outside the normal auction process to public sector agencies (for example, Air India) at average cost price.

As gathered from one of the interviews, there were four types of land allocations (reservations) set aside for people belonging to Scheduled Castes and Scheduled Tribes (lower castes). There were no reservations for female-headed households. While the target income groups were fixed before the planning process, research does not indicate the active inclusion and participation of these target groups in the process itself. While the target beneficiaries belonged to the low-income groups, another eligibility criteria used for the selection of households was that they required a minimum period of residency in the city. This left out a large category of poor households who were recent migrants to the city and in search of a more stable residence (60).

7.5.2 Intervention impact: access, inclusion, affordability

The Charkop Market bus stop is located 3.5km from the Kandivali railway station. Since this is not a walkable distance, decisionmaker participants observed that the residents depend on secondary modes of private or public transport like auto- rickshaws and buses to get there. While rickshaws are readily available, the overall state of BEST bus service in Mumbai has declined over the years, putting a strain on the connectivity of the neighbourhood, as stated in our interview with an urbanist. The BEST buses ply across the site along the main sub-arterial and collector roads. These roads, however, are located within a long walking distance from the homes in the clusters located further away from the intersection.

'Geographically, the city of Mumbai widens in plan upwards from K Ward, increasing the commute time between the centrally located railway stations and areas like Charkop… the frequency of… buses is low, which again puts a strain on the connectivity… currently, Charkop is one of the lesser-serviced regions of the city.'

'Try taking a rickshaw from Kandivali railway station to Charkop—it's crazy! Also, a single rickshaw ride from Kandivali station to Charkop costs around Rs. 50 [2021 prices], which amounts to about Rs. 1,500 [2021 prices] per month, which is unaffordable to low-income families.'

The two urbanists who were interviewed also stated that the upcoming high-capacity Mahavir Nagar metro station will improve access to the Charkop neighbourhood by offering an alternate mode of public transportation. While the metro station is located within a kilometre of the Charkop Market bus stop, people who live in the inner end of Charkop will have to depend on an auto-rickshaw or bus to get there.

Since basic necessities like water supply, sanitation, electricity, and drainage were made available for the residents at the time of allotment, this scheme has had a major impact on the living conditions of the residents and has aided in the creation of a hygienic and liveable neighbourhood. In Mumbai, while the slum population's access to safe and hygienic sanitation facilities is compromised, the residents of Charkop were provided individual toilets with each plot, thereby improving their health standards. Garbage collection and disposal carried out on a daily basis by the BMC continues to ensure that the neighbourhood is clean.

The hierarchy in the subdivision of land enhanced the development of a sense of community living and close-knit social setting. The process of identifying the target beneficiaries (as explained in section 5.5.1), ensured that the residents who came together to live in a cluster were not complete strangers, allowing them to easily settle in, explained by one of the urbanists. The internal courtyard within the cluster became a space for the residents to socialize and a safe space for their children to play.

At the end of the implementation process, project evaluators concluded that about 60% to 70% of the beneficiaries were indeed low-income families (29). In tandem with the results of the resident interviews, policy-makers also affirmed that low-income families find it expensive to move into the neighbourhood now.

'A few years after the allotment, developers took over, older societies were replaced with fictitious societies that were formed, houses were built and were sold at a rate much higher than the actual rate, because of which developers started making huge profits. The houses were sold for approximately Rs. 3 lakh.'

'Over the years, the aspect of aspirational social mobility came into play. While on one hand, there are people who see moving into an apartment as the next step to upgrading their standard of living, there are families that build incrementally over existing houses, meeting their space requirements. While the former mostly belong to the service sector, the latter majorly belong to the entrepreneurial class.'

'At the time of allotment, people faced challenges with respect to the quality of construction, at the time of building their houses. A lot of effort went into consolidating the entire house and putting it together to make it

liveable, which left them agitated. People saw an apartment as an easier option, as it is always handed over in a 'ready state'.'

Although the residents faced a few difficulties at the time of allotment, over time they have appreciated the provision of the plot and the flexibility to build that came along with it. They preferred having a plot, an independent home with each floor having an area of minimum 25 m^2 along with a terrace and an open courtyard, rather than living in cramped apartments.

The absence of large market space is compensated by the small provisional stores and street vending activity. Over the years, people set up small polyclinics as a part of their homes, and those absorbed the load of the larger healthcare institutions. While residents depend on these healthcare facilities on a daily basis, the quality of these facilities is below par, according to the interviewees. Private hospitals such as Oscar Hospital (1.6 km from Charkop Market bus stop), Bhagwati Hospital (5.2 km from Charkop Market bus stop), and Cloud Nine Hospital (5.4 km from Charkop Market bus stop) are not affordable for the low-income groups of people who reside in the neighbourhood.

7.5.3 Intervention assessment and lesson learned

From our interview with one of the urbanists, we gathered that allotting people plots of land instead of a real estate property like a home or apartment, has allowed the residents to build their houses incrementally. This has led to the development of multiple housing typologies, growing out of the needs of the people. This is not possible in other models of affordable housing like apartment buildings, where the level of infrastructure is higher (lifts, corridors, etc.) and the ready layouts are not easily adaptable, because of the difference in the patterns of usage and routines of low-income families. The Site and Services model, therefore, is a more adaptable model of housing.

In a city like Mumbai, other low-income settlements such as slums and chawls, have smaller pockets of open spaces in between them, that are mostly used for common household activities like washing and drying. In overly congested urban areas, open spaces are also compromised in order to meet the needs of the growing population. In such a scenario, the courtyards in between the housing clusters in Charkop can truly be considered as an asset to residents. They are safe spaces for their children to play, rather than playing on the streets, creating a sense of security.

The subdivision of land into plots and streets has led to the creation of a sense of intimacy at different scales, as one of the urbanists stated. The small housing units means residents spend a lot of time outdoors. Women and children feel safe at all times during the day owing to the 'eyes on the street' nature of the site layout. The commercial units that face the local shared streets also contribute to the safety of the neighbourhood, preventing the need for security guards. Residents on the local shared streets, however, have less privacy, as their homes directly open up onto the streets.

According to the senior policy-maker, MHADA and MMRDA considered the project to be successful, as the project costs were recovered. On the other hand, the World Bank considered it a failure, because the project did not acquire the scale to deal with housing problems and it relied heavily on the government. The objectives of the World Bank's housing policy evolved with every decade. The first decade (1970s) focused on implementing projects to provide affordable land and housing for the poor, achieving cost recovery and creating conditions for large-scale replicability of projects. In the second decade (1980s), more emphasis was placed on creating self-supporting financial intermediaries capable of lending long-term mortgage loans to low- and moderate-income households and also reducing and restructuring housing subsidies. In the 1990s, the policy focused on creating a well-functioning housing sector in the market that would serve the needs of consumers, producers, financiers, and local and central governments, and that enhanced economic development, alleviated poverty, and supported a sustainable environment (61). The World Bank also felt that this Site and Services scheme did not fit in with the evolved objectives of its housing policy in the 1990s. the senior policy-maker stated.

The policy-makers said that it would be difficult to replicate the Site and Services model as an approach for affordable housing for future development in Mumbai, as there is a shortage of clear, unclaimed land in Mumbai. When land has been claimed, it is difficult to subdivide it into individual plots for distribution. It is possible to develop the salt pan lands of Mumbai, but they currently fall under the protected CRZ, and they are not located close to existing or proposed transit networks. The proposed metro network is planned to

pass through already highly developed areas which makes it difficult to acquire land for such a scheme. With the development of the new metro line, the neighbourhood of Charkop is susceptible to price increases and displacement. Developers might upgrade existing buildings and build expensive new apartment buildings and not affordable housing in TOD regions making the area even more inaccessible for lower-income groups, according to the former senior MHADA official.

Extending the transit network to new areas would help increase the supply of land, a policy-maker mentioned. In a city like Mumbai, where real estate is the biggest economy, big developers will now aim at becoming stakeholders in salt pans, which may affect the affordability of projects on such lands, making them inaccessible to low-income groups of people.

One policy-maker said that such a scheme may work in places where the real estate contests are substantially lower, like Govandi and other areas on the outskirts of Mumbai. In the past couple of years, no new businesses have moved to Mumbai. The respondent said that the population of the city is no longer growing, since the number of immigrants moving into the city is decreasing. The average age of Mumbai's residents is 35 to 40 years, which in 20 years would be 55 to 60 years making Mumbai a potentially old city. They said that the Site and Services scheme is a model that will be suitable for such residents, as they would require infrastructure that holds people together, promotes community living, and provides security.

7.6 Pune: Yerwada

In late August and early September 2021, researchers interviewed three people involved in the Yerwada intervention, including the architect and urban designer for Prasanna Desai Architects, who was the appointed architect and urban designer for the intervention; an intervention coordinator who is now a senior government official with PMC; and an NGO representative involved with the intervention. Two interviews were conducted in Marathi, and one was conducted in a mixture of English and Marathi. The interviews were documented via notes taken during the interviews. The respondents included one female and two males.

7.6.1 Intervention background: goals, actors, process, and challenges

The PMC created a systematic project process with the help of NGOs. The project involved several stakeholders as shown in Figure 12. The process from identification of beneficiaries through denotification of slums is lengthy. However, one of the interviewees confirmed that the denotification process is still not completed due to multiple challenges. The denotification includes removing the status of 'slums' from these new tenements and regularising them under the standard process of property tax, other services, etc. (T1).

Figure 49: Redevelopment process

Surveys & classification of tenements
Beneficiary identification
Consultations: introduction
Approval of beneficiaries
Design resolution
Opening a joint bank account between the beneficiary and PMC
Consultations: One-one discussions on designs
Design revisions
Estimates
Final approval on the designs by beneficiaries
Agreements, commencement process
Transition and demolition of old houses
Stagewise funds disbursement by PMC
Possession and final payment
Completion certificate by PMC
Slum denotification (not completd till 2021)

Source: Desai, 2010. ITDP interview

Figure 50: Stakeholders and institutional structure

State nodal agency MHADA → Implementing agency (Pune Municipal Corporation) → Detailed Project Report (Omkar Consultants); Developer/ Contractor SPARC alliance & Mahila Milan (NGOs) → Architect Prasanna Desai
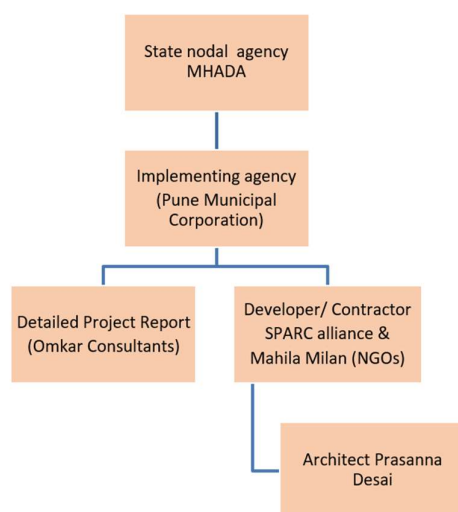
Source: Prasanna Desai

The first phase of BSUP in Pune was focused on relocation, and the authorities said they provided medium-rise apartments to slum dwellers on the periphery of the city. However, the policy-makers said the slum dwellers were reluctant to relocate, and the projects were not as successful as expected. Adjusting for this, in the second phase sites were upgraded in situ, with government-mandated NGO involvement. While the process was slow, the stakeholders were satisfied with the 'in situ approach'.

7.6.2 Intervention impact: access, inclusion, affordability

The interview of a senior PMC official conducted by ITDP in 2021 highlighted that housing is affordable for low-income residents who already own a house in the area. The housing policy allowed most residents of the

area to upgrade their house from a kutcha structure to a permanent one. One respondent said that accessibility improved because of the creation of new pathways to connect different blocks. While no low-income resident has left the area because it was unaffordable to continue living here, the area is no longer affordable for low-income residents to buy or rent a house in the area.

7.6.3 Intervention assessment and lessons learned

The case study area is an ideal example of in situ development through participatory planning. The secondary research and interviews highlight that the intervention has resulted in better living conditions for the residents. A policy-maker proudly stated that 'better houses have resulted in better lifestyles and more space for their kids to study.' She feels that overall, it might have led to a better literacy rate. The improvement in basic services like toilets inside the houses has provided safer conditions for women and improved hygiene for all. The study highlights that the participatory approach helped to gain the confidence of beneficiaries about the project. Residents who were positive for the project to take place converted opinions of others who were not confident about PMC's proposal. Another policy-maker mentioned that irrespective of the exhaustive participatory process, some residents did not participate in the program when it happened, but now they are regretting their decision. The biggest attraction for women was toilets and water tanks inside their houses, which have improved their family's hygiene.

One interview subject highlighted that the process could have been quicker if the single window clearance system (a centralised system) had been established at the beginning of the project. The ideal way to bring people together could have been creating a cooperative society before initiating the project. A policy-maker strongly feels that the process could have been faster and better if the sequence was the formation of a cooperative society, area finalisation, designing, construction, allotment and then denotification. The scheme could have been implemented to make individual tenements more affordable.

Architect Prasanna Desai emphasises that the local area plan could have been better if all the residents agreed to join the project. The resistance by some residents made it difficult to design the abutting houses of the beneficiaries. For instance, if there are five tenements in a row and only one of them refused to join the project, it was extremely tough to design and construct the remaining four tenements without disturbing the one that was not part of the project. Hence, there should have been a mechanism to help all residents reach agreement. The same challenge was observed while designing streets to make the network better. Some residents disagreed with handing over part of their area for the street and public space, resulting in fewer public spaces than envisaged by the designer and PMC.

The denotification of slums is an important step in the entire process, and the delay in that might have adverse impacts, especially as the upcoming TOD DCRs may shift development patterns towards more car-centric and less-affordable development.

8. SITE OBSERVATIONS

In the course of collecting TOD Standard data, conducting surveys, and carrying out interviews, researchers made a number of observations about the site. These provide additional insight into the conditions at each case study location.

8.1 Addis Ababa: Gotera Condominium

From visiting the site, we observed that the local and collector streets are not well paved, and were often occupied by street vendors, construction material, and solid waste. The streets are not inclusive for people with disabilities and elderly people, as there are no ramps on the streets. We did not observe speed-calming measures on the site, and we noted high vehicle speeds. We observed that solid waste is collected from households by Small and Micro Enterprises (SMEs) periodically by using push-carts and accumulated in detachable garbage containers then taken away by truck.

8.2 Addis Ababa: Jemo Condominium

Like Gotera, most local and collector streets at Jemo are not well paved, and we observed construction material and solid waste disposed of on the sidewalks. The local streets inside the condominium were mostly

cobblestoned and a few were paved with asphalt. We observed that the streets did not include measures such as curb ramps designed to assist older people and people with disabilities. Researchers did not observe speed calming measures on the site and did note vehicles moving at high speeds.

We observed that the houses with toilets, but no piped water use jugs of water to manually flush the toilets and take baths. We observed that dry waste is periodically collected door-to-door through push-carts. The trash is then loaded on the garbage collection trucks managed by the city administration through SMEs.

8.3 Dar es Salaam: Tandale Argentina BRT station

Researchers at the Tandale Argentina BRT station observed dirty, presumably contaminated water running along neighbourhood streets and streams. We assume that the contamination is likely due to on-site sanitation that is deposited in the street drains. Researchers observed residents dumping waste in open spaces or streams or carrying waste to major roads that have streets accessible for garbage collection.

8.4 Ahmedabad: Gupta Nagar

In Gupta Nagar, researchers observed closed drainage systems throughout the neighbourhood. We observed that the availability of sewer lines connected to toilets, allow for better sanitary and hygienic conditions in the neighbourhood. We also observed that all houses in the area have electricity connections.

Figure 51: Closed drains connected to sewer network on the internal streets in Gupta Nagar

Source: Jacob Baby

Gupta Nagar is alongside the major roads in Ahmedabad, and we observed that it is fairly well connected to most parts of the city by public transport, rickshaws, etc. Street spaces are shared by pedestrians, motorists, and vendors. Access within the neighbourhood was observed to be easier because of paved roads and well-connected internal streets. The presence of mobile vendors and shops along the major streets gives most households easier access to amenities such as fresh food and healthcare. Community toilets were also visible in some parts of the neighbourhood, operated and maintained by the municipal/city government.

During site visits to Gupta Nagar, it was observed that household solid waste is collected door-to-door by a garbage collection truck (or 'Chota-Hathi') from the municipal corporation. Daily garbage from small green bins, which are found on almost every household, is collected door-to-door. Large community garbage bins or silver-coloured bins were observed at major junctions in the neighbourhood. It was observed that garbage is often strewn around them, which is unpleasant for residents and others.

Figure 52. Green garbage bins (highlighted in red boxes)

Source: Jacob Baby

Figure 53: 'Chota-Hathi' or garbage collection trucks

Source: Jacob Baby & Arjun PB

8.5 Mumbai: Charkop sites and services scheme

Researchers observed that parking is not well managed in the area, with residents of each cluster parking their two-wheelers in the courtyards and four-wheelers along the local shared streets. We observed that the residents of Sector 3 park their four-wheelers on undeveloped land, reserved as 'open space', while no open space is allocated to parking in sectors 1 and 5. We observed that the internal streets form loops and are shared by pedestrians, motorists, and vehicles.

During the on-site data collection in February 2021, residents of housing units along the local shared streets informed researchers that the footpaths were constructed to conceal the sewer lines and now additionally function as plinths to the units.

On visiting the study area, we found that cycles are mostly used by children for recreational purposes and not for travel. We did not observe many middle-aged men using cycling as a means of getting around in the neighbourhood.

Figure 54: Closed drainage layouts and footpaths on local shared streets

Source: Bina Bhatia & Sagarika Nambiar

Researchers observed that outdoor spaces like the streets and community grounds are well-lit at all times, due to the presence of streetlights and lights from the houses along the local shared streets. We also observed that dustbins were present in each housing cluster to collect daily household solid waste.

8.6 Pune: Yerwada

Researchers observed that the Yerwada area still has community toilets as not all units have a toilet within the house. We observed a tendency of residents to use the verandah (space near the entrance) for washing utensils and clothes. This practice may result in unhygienic conditions, but these are mitigated by closed drains, which reduce the impact of run-off water in the narrow lanes. Cycling was mostly a children's activity.

9. CONCLUSIONS

Based on the TOD Standard scores, household surveys, street audits, interviews, and observations above, we are able to make some preliminary observations on the performance of the sites as they relate to the goals of inclusive TOD. These observations reflect the entirety of the sites we assessed, which in multiple locations include site aspects and areas not affected by the policy intervention. The assessments here are helpful in better understanding the conditions in the locations we studied, as few inclusive TOD assessments have been conducted in Africa and India.

9.1 Reflections on Applying TOD Standard to low- to middle-income countries

The TOD Standard was initially designed to assess new developments, but it has since been adapted to score station areas as well. The tool calls for adaptations based on data availability and context; however, it does not give clear guidance on troubleshooting data sourcing or considerations for local conditions, particularly in low-income countries and informal settlements. When we applied the TOD Standard in the informal settlement context, we noted a few areas where it could be modified or improved to better reflect local conditions. We describe these below.

The TOD Standard does not consider basic infrastructure such as running water, sewage treatment, and trash removal for scoring. We recognised that TOD analysis also needs to look at these characteristics, because provision of basic infrastructure is an issue in low-income countries. While the TOD Standard highlights affordable housing, it does not discuss the issues of housing material quality or overcrowding.

There is a need to adapt the considerations for walkable footpaths and crosswalks. The TOD Standard calls for footpaths of adequate width (2 m), demarcated (if along roadways of traffic speed greater than 15 km/h) and paved. However, while lack of adequately paved and demarcated footpaths is an apparent issue, many unpaved footpaths have a smooth surface that does not preclude walking, even for people with disabilities.

Generally, informality is not discussed well in the TOD Standard in terms of the assessment of density of people or activities. Informal income-generating activities such as street vending and home-based businesses are not discussed in the TOD Standard for the consideration of non-residential density. TOD Standard metric Access to Services looks at stationary facilities such as healthcare, schools or sources of fresh food. In our analysis we also considered mobile food vendors, because they are an important source of nutrition for local communities, and they are often present at streets and walkways in a variety of contexts.

Informal parking, both on- and off-street, is not discussed in the TOD Standard. In many low-income countries, informal parking is a major issue, especially when vehicles encroach on walkways and informally occupy street space and vacant lots.

9.2 Assessment of Interview Data

The following section contains assessments made by the research team based on the household surveys and interviews. While we aimed to interview a diverse set of residents, we were forced by time and resource constraints to use a convenience and snowball method of recruiting interview subjects. Because of this, we were not always able to interview representatives from every group. In some sites, we did not interview any residents with disabilities, and in other locations we did not interview any older residents. In those locations, the results do not reflect the perspectives of groups that were not interviewed.

9.2.1 BASIC INFRASTRUCTURE AND SERVICES

9.2.1.1 Basic infrastructure and services improve lives

In all six sites, residents reported that the improvement of infrastructure and basic services, including improved housing, paved streets and footpaths, water connections, electricity, and sewer access, greatly improved the lives of local residents. In Pune, residents reported spending less time fetching water or waiting in queues for water, a task they said was primarily done by women. Residents in Pune reported that waste removal led to less dumping of trash in the streets and greater cleanliness and hygiene of the area. In Ahmedabad healthcare was previously a major expense for low-income residents, and improvements greatly reduced those costs and improved their lives. Having access to water and sewage connections seemed to be more significant for women, in part because it was their responsibility to collect water, as noted above, but also in terms of being able to use toilets more often or more freely, and not just in the early morning or at night, as women mentioned in the interviews. Not discussed but probably also applicable is that access to toilets enables girls and women to better accommodate menstruation.

9.2.1.2 Basic infrastructure and services need ongoing investment

Another finding was that many sites still struggled to provide basic services. In multiple cases, residents reported that water access was intermittent, and residents often reported using cisterns to store water between access times. In one case, basic service infrastructure was installed but not maintained, leading to deterioration of services.

9.2.2 ACCESS

9.2.2.1 Basic infrastructure and services improve access

Residents reported that in most of the sites, the improvement to basic services also improved access. Better street drains reduced flooding on streets, which was described by multiple residents in sites as a key impediment to access. Sewer connections and waste-removal services also improved access by reducing the dumping of trash on the streets, which residents also cited as a barrier to access. In the Tandale Argentina BRT station site, the lack of waste-removal services led many residents to dump waste in streams and drainage channels, which then became clogged and flooded the streets, impeding access. Electricity connections enabled better streetlighting, which led many people, especially women, to feel safer travelling at night. In Ahmedabad, residents described improved social connection that stemmed from better access.

9.2.2.2 Walking and public transport need improvement

In multiple sites, residents described issues with walking, including obstructed paths, poor infrastructure maintenance, and clogged drains. Similarly, residents in multiple sites described overcrowded, slow, and unreliable public transport, leading many to prefer individual motorised modes, which occupy more space and are more expensive for residents.

9.2.2.3 Narrow streets both facilitate and limit access

In Dar es Salaam, residents said that the narrow streets and pathways acted as de facto traffic demand management measures, preventing people from driving four-wheelers on them and forcing car owners to park far from their homes. This made these paths safe places for people to walk and cycle. However, because houses cannot be accessed by vehicles, residents said that it was difficult to use ambulances and firefighting services. Since cars and motorcycles cannot access the majority of houses, it is hard to get older people to health facilities.

9.2.2.4 Building infrastructure isn't enough

In Dar es Salaam, there were several instances where infrastructure was built but did not lead to the desired outcomes. Despite new water infrastructure, residents said not all the houses are connected to piped water because of high connection fees. While the intervention also included upgrades to the streets, policy-makers noted that there was no mechanism to maintain the infrastructure, and much of it has fallen apart or is encroached upon by settlements. In multiple case study locations, space and infrastructure for walking and accessibility (for people with disabilities) need improvements for comfort and safety. Problems included trash and debris on walkways; damaged or missing sidewalks; encroachment by buildings, parked vehicles, and street vendors; and high motorized-vehicle speeds. The three cases from India, where extensive consensus and community-building processes took place reported residents maintaining semi-public spaces, such as inner walkways and courtyards. Improved resident maintenance may be linked to these consensus-building activities.

9.2.2.5 To reduce trip distances, larger markets may attract more use

The goal of mixed-use development is to reduce walking distances, but in Addis Ababa, residents said that they often travelled past the small number of local vendors to go to the larger markets, where food was significantly cheaper, likely due to economies of scale and competition. This indicates that as part of TOD interventions, there may be a benefit to creating larger market areas that are able to achieve low prices that attract users, decreasing their trip distances.

9.2.2.6 Cultural attitudes towards cycling may pose a challenge

In multiple case studies, residents described cycling as an activity for children, not as a viable means of transport. This perspective may make it more challenging to create infrastructure and services that support cycling, and it may lead to those facilities not being well used, or being used for other purposes, as was described by policy-makers in Dar es Salaam.

9.2.2.7 Play areas for children

In the Addis Ababa (Jemo), Mumbai, and Pune sites, participants mentioned places for children to play as critical for quality of life in the neighbourhoods. They mentioned that places for play needed improvement—they were either too small or lacking entirely in some places. For example, residents reported that in Pune, lack of space forced children to play in wider streets with motorised traffic, and in Jemo, motorised traffic created hazards for children playing. In Mumbai, participants emphasise places for children to play as a crucial amenity.

9.2.2.8 Unmanaged parking leads to perception of parking shortage and access issues

In Mumbai and Ahmedabad, residents described vehicles parked informally in open spaces and on the street. They also talked about a parking shortage or parking problem, which residents in multiple case studies said negatively impacted access. Experience in other areas, such as Bogotá, Moscow, Guangzhou, and Mexico City, has shown that better parking management can change this perception and direct parking toward designated areas where access isn't impeded.

9.2.3 AFFORDABILITY

9.2.3.1 Improvements increased land values often excluding new low-income residents

Residents and policy-makers in five of the six sites reported that the interventions and improvements have increased the value of the land and the homes in that location. In the Gotera Condominium site in Addis Ababa, many low- and middle-income homeowners have sold or rented their homes and moved to housing in areas farther away. Residents in Pune, Ahmedabad, and Mumbai said that it was no longer affordable to new low-income residents, although many existing low-income residents have remained. In Mumbai, some low-income residents sold their larger homes and moved to smaller ones, allowing them to generate household savings. At all three sites in India, residents were concerned that future metro stations would further increase housing prices.

Residents of the Dar es Salaam site found the site affordable and said that the main reason why people left the area was because of poor services. The site appears to have significantly fewer and less comprehensive services than the five other sites. Residents in Pune and Mumbai were concerned that the future metro stations to be built near the sites would attract developers and further increase prices. Overall, it appears that when improvements are made to low-income neighbourhoods, the areas may not remain occupied by people with lower incomes for long unless other interventions and policies are enacted.

9.2.3.2 Land tenure issues must be considered

In the Ahmedabad case study, much of the land ownership is disputed, making any land tenure (the right to occupy the land and housing) unstable. When you could be evicted from the housing you live in, there is a strong disincentive from investing in the house and the community. The unresolved tenure status also locks properties out of the formal housing market, so residents cannot sell their property. If they move, they won't be able to benefit from the improved land values, and many people said they can't afford to move. In Ahmedabad, policy-makers said that tenure disputes often take many years to resolve. Working to speed up the resolution of tenure disputes is important. It also appears that shorter-term no-eviction guarantees may help to provide security to tenants as tenure disputes are resolved. This is not an issue on public land, though.

9.2.4 INCLUSION

9.2.4.1 Cohorts may help establish community in new developments

New developments may suffer from weak community bonds, when all members come from different parts of the city. In the Mumbai case study, they addressed this by requiring cohorts of people to apply for housing in blocks, including people from specific groups that the development aimed to support. This helped to ensure a sense of community when residents moved to the new development. Indeed, in the interviews, residents spoke highly of the sense of safety and community in the Mumbai case study area.

9.2.4.2 Transparency is needed in the housing allocation process

A key concern among policy-makers in Addis Ababa was a lack of transparency in the process of selecting residents to participate in affordable housing schemes. This led to speculation that the housing was only provided to people who supported a specific political party, which was not a stated requirement for access to the program. More transparency may foster increased acceptance of the program as being for everyone who qualifies, not tied to political affiliations. This may also help to sustain programs across administrations from different political parties.

9.2.4.3 Minimum residency requirements may exclude vulnerable groups

In the Mumbai case study, applicants for the development were required to have a minimum period of residency in the city in order to apply. This left out many poor people who had recently moved to the city and were looking for affordable housing.

9.2.5 PROCESS

9.2.5.1 International actors play an important role

One of the projects (Gotera, Addis Ababa) received strong support from the GIZ (German Development Agency), and another two (Tandale, Dar es Salaam and Charkop, Mumbai) were financed by the World Bank. This shows that international actors can have an important role to play in developing and financing inclusive

TOD projects. However, policy-makers noted that because of the World Bank's changing approach to housing (i.e., more market-oriented) in the 1990s, the 'sites and services' approach fell out of favour and Charkop was deemed a failure. However, our findings have documented the considerable successes of Charkop, despite its imperfections. As such, the effect of changing doctrines at influential international finance institutions on achieving inclusive TOD could merit further reflection.

9.2.5.2 Partnerships can create a more holistic approach

Many of the policy-makers viewed the Ahmedabad case study as a particular success at delivering a holistic set of improvements to the local residents. They saw broad cooperation with NGOs and civil society organisations as a key part of the success. The intervention included NGOs that had operated medical and nutrition camps prior to the intervention. The camps helped educate local residents on the importance of sanitation and waste management, and they built trust and support from residents for the intervention.

9.2.5.3 Community outreach can lead to success but is hard to scale

In the Ahmedabad case study, policy-makers felt that the strong efforts to create buy-in from the community helped ensure the success of the intervention. Residents paid for some of the costs of the interventions they benefited from, although policy-makers said that it was difficult to determine the contribution amount. The process of building trust took a long time and residents were very sceptical at first. However, the five year no-eviction guarantees were an important part of this effort to show that the government was committed to helping.

Other policy-makers, however, cited the long time required to create such a holistic, inclusive approach as an impediment to widely expanding the program or even starting the process in some cases. They noted that the local government now prefers mass-produced housing built by the private sector as a faster means of delivering affordable housing, but that it is not as holistic or inclusive. It is not clear that mass-produced housing is more sustainable—the case of the condominiums in Addis Ababa, for example, where the construction quality was poor.

9.2.5.4 Strong results of 'sites and service' models as process, with some limitations for residents

The experience in Mumbai with Sites and Services led to generally strong results, with some limitations. Policymakers viewed the approach as more adaptable for households as they grow and change. Apartments, on the other hand, are much harder to adapt to changing family needs. However, the quality of construction by homeowners who are not trained in construction can be poor. The Dar es Salaam Sites and Services intervention deteriorated when the improvements were not maintained. More research is needed into Sites and Services approaches.

10. DISCUSSION AND POLICY IMPLICATIONS

This exploratory research sought to identify key characteristics of settlements in India and Africa in terms of inclusive TOD. Although these settlements were not explicitly designed as TOD, we chose to analyse them for this research because we had identified that they included TOD-like characteristics, including the presence of public transportation, relatively favourable conditions for walking, and compact, dense urban form. We used both quantitative and qualitative methodologies to examine the characteristics of the six case studies.

In this section, we will first triangulate the findings from the qualitative and quantitative research. Commonly used in multimethod research, data triangulation compares findings of multiple sources of data to increase the internal validity of the findings (62). As stated above, the interviews are from a non-representative sample, so they do not reflect the full spectrum of residents in the area, but we used the data that we were able to collect to understand the case studies as accurately as possible.

We will then present policy implications from our research. We divided these into two categories: 1. Existing development patterns that appear to facilitate inclusive TOD characteristics without specific government interventions, and 2. TOD elements that require government action to be realised.

Finally, we end with a discussion of how the lessons of this research might relate to efforts to create inclusive TOD across entire cities and regions. This includes a more theoretical discussion of the timeframe to implement policies, resource needs, and necessary political support for ubiquitous, inclusive TOD.

10.1 Triangulation of quantitative and qualitative data

The results from the quantitative and qualitative analyses strongly agreed on several key points and diverged on others. One major point of agreement was walking. 'WALK' was one of the worst-performing metrics of the TOD scores. In gathering data for the TOD scores, field researchers registered missing or incomplete sidewalks; obstacles in walkways, including parked vehicles; garbage, and debris; vendors; and long street segments. Residents across the sites reported similar issues. In the cases in Africa, residents in the two sites in Addis Ababa and in Dar es Salaam mentioned lack of proper pavements, debris, and fast-moving traffic. In the case from Dar es Salaam, site observations and decision-maker interviews pointed to the issue of lack of proper sanitation infrastructure, with sewage on the streets, which degraded the pedestrian environment.

While the sites in India scored only slightly higher than the cases in Africa in terms of TOD scores for walking, the qualitative data showed that conditions for pedestrians had improved considerably since the policy initiatives to upgrade the informal settlements there. Residents and policy-makers in these cases said that the paving of streets, often created to accommodate sewage infrastructure, had created improved conditions for pedestrians, and site observations in Ahmedabad and Mumbai concurred. Women residents in these two cases also reported feeling safe while walking, and in Pune, residents reported feeling safe from crime too. In the Ahmedabad and Mumbai cases, walking was also made safer by lights (streetlights in the former case, stated by residents, and lights from houses abutting streets in the latter, according to site observations). Residents in these two cases said social cohesion also made walking safer, and the decision-maker interviews confirmed this. However, obstacles, particularly parked vehicles, and high vehicle speeds made walking difficult, particularly for wheelchair users and seniors, according to residents, decision-makers, and site observations. Site observations in the Ahmedabad and Mumbai cases noted that streets are shared by pedestrians, motorised vehicles, and vendors, and this may create conditions that make walking difficult for vulnerable groups, including wheelchair users, seniors, and children.

For 'MIX,' which was one of the better-performing TOD metrics, there was moderate agreement across data sources. Access to parks and green spaces was missing across the sites, with no points scored (except for the Mumbai case). Resident interviews confirmed this in Addis Ababa (Jemo), Ahmedabad, and Pune, referring specifically to a lack of spaces for children to play. Access to basic services (within walking distance to fresh food sources, healthcare/pharmacies, and elementary schools) scored well across the sites, and interviews and site observations confirmed this. However, this finding was related to the presence of street vendors selling fresh food, which likely also created obstacles for pedestrians and may degrade walking conditions. Residents in the Ahmedabad case stated that they carried out most nonwork trips by walking, which is consistent with the relatively high scores (4 out of 8 points) for complementary uses there (cases in Addis Ababa [Jemo], and Dar es Salaam received the same score for this metric).

The maximum points scored for the three Indian cases for the metric for housing affordability (also part of 'MIX') was contradicted by residents and decision-makers, who stated that although the units in the settlements were affordable for low- and middle-income residents at the time of project implementation, this was no longer the case. For the African cases, the absence of points scored in all three sites was consistent with resident and policy-maker interviews in Gotera and Jemo. However, for the case in Dar es Salaam, qualitative data from both residents indicated that housing was at least somewhat affordable, though this was not reflected in the TOD score for this study area (zero points for affordable housing).

The TOD metrics related to cycling received few points across sites, and resident interviews and site observations confirmed that cycling was mainly viewed as a recreational activity for children in the Mumbai and Pune cases. Jemo (Addis Ababa), was the one site that had specific cycling infrastructure, though a decision-maker reported little use of cycling as a transport mode and stressed the need to better protect the bike lane from encroachment by motorised three-wheelers. However, the same decisionmaker reported that the monthly car-free day was a big success in the area. In general, the low scores for the CYCLE metric were consistent with the qualitative data, which indicated the minor role of this mode in the six cases.

Data sources generally agreed with the high TOD scores across sites for the SHIFT metric, which measures space dedicated to car travel, car parking, and driveways. This was particularly true in Dar es Salaam, where residents reported walking long distances to get to parked cars. Further, household surveys reported relatively low ownership of private motorised vehicles (70% of households in the Pune case, 62% in Mumbai, 61% in Ahmedabad, 40% and 36 % in Addis Ababa (Gotera and Jemo, respectively), and 2% in Dar es Salaam.

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This was also consistent with the high TOD scores for the 'SHIFT' metric. Interestingly, in the cases in Africa, motorised vehicles were almost exclusively cars, while in India they were nearly all motorised two-wheelers, often referred to as 'Activas'. However, the lack of formal parking spaces, while good for the 'SHIFT' metric, may have a negative effect on the walking environment, as interviews and site observations noted that vehicles parked haphazardly on streets created obstacles for people walking.

Regarding public transportation, no points were assigned for this metric on the TOD scores as the sites fulfilled this requirement by definition: All were based 500 m of a public transportation stop. Nonetheless, qualitative data showed that public transportation was deficient across all sites. Complaints from residents from all sites included long wait and travel times and crowded conditions on public transportation. Residents in the cases in Ahmedabad and Pune specifically stated that they preferred motorised private transportation (motorised two-wheelers) to public transportation (in Ahmedabad, due to shorter travel times and greater comfort). Decision-makers in Addis Ababa (Jemo) and Mumbai also stated that public transportation was deficient in those cases, with long wait times and crowded vehicles.

Although not a part of the TOD scores, quantitative data on basic services, gathered in the household surveys and in resident and decision-maker interviews, showed strong agreement with the qualitative data sources. Surveys from the two cases in Addis Ababa showed that around 80% of households had access to 'piped' water, but that it was inconsistent, with water being unavailable several days a week. This led residents to store water or buy it in large containers. In Dar es Salaam, only 27% of residents had access to piped water. Resident interviews showed that high connection fees for water contributed to this, leading some residents to buy water from neighbours who had connections to water. Only 73% of households in Dar es Salaam had toilets and baths.

Households in all three sites in India consistently had access to piped water. Although the water supply was often intermittent, residents stored water to ensure regular access. Residents in all Indian cases expressed satisfaction with their access to water and emphasised the great improvements that ubiquitous drinking water and toilets and sewage infrastructure had made in their lives. This sentiment was echoed in interviews with decision-makers from all three cases. For the Pune case, both residents and decision-makers emphasised the improvements drinking water supply and toilets/sewage infrastructure had made for women residents of those sites.

10.2 Government intervention to achieve inclusive TOD

As we previously stated, the six cases we set out to study were not intentionally designed as TODs, but rather were projects to improve existing, or provide new, housing for low and middle-income residents. However, we analysed these developments from a TOD perspective. We found that while the case studies displayed several characteristics of inclusive TOD as described by the TOD Standard, they were also deficient in multiple metrics of the Standard. As a result, we have developed two categories of TOD development patterns: development patterns that appear to foster inclusive TOD goals with little to no government intervention, and development patterns that appear to require direct government intervention to achieve inclusive TOD goals.

One of our key findings in the Baseline report (the first report in this research project) was that the limited capacity of governments was a key obstacle to enacting TOD policies. The taxonomy of development patterns laid out below may help practitioners in cities with limited government capacity and economic resources to formulate policies for achieving inclusive TOD by identifying measures that may need greater or less prioritisation to achieve.

10.2.1 Development patterns that facilitate TOD goals on their own

A major finding of this research was that in multiple case studies we saw patterns develop that support TOD goals which appeared to occur with little or no government intervention. These patterns were most apparent in the Dar es Salaam, Ahmedabad, and Pune case studies, which began as informal settlements but were later upgraded by the government, and in the Sites and Services case study in Mumbai. In these sites particularly, we observed strong scores for TOD Standard elements such as Visually Active Frontages and Physically Permeable Frontages (which support inclusive access, safety, and health), despite little to no policy intervention to support these elements. The case studies, which began as informal settlements, include a mix of buildings and land uses that appear to predate the interventions. In the Mumbai case study, the

government laid out plots that residents bought and built houses and buildings on. In all four of these cases, residents built most of the structures in the areas themselves, and the direct interventions and regulations that were applied as part of the upgrading and formalisation process do not appear to have changed these patterns. In the intervention for the Pune case study, though, the government encouraged residents to establish home-businesses and manufacturing. In the case studies where the government had a more direct hand in the construction of buildings (the two sites in Addis Ababa), we measured lower scores in these two categories. This suggests that informal settlement development patterns may create Visually Active Frontages and Physically Permeable Frontages with little government intervention or regulation.

Similarly, for the TOD Standard elements that actively discourage car use (Off-Street Parking, Driveway Density, and On-Street Parking and Traffic Area), we observed that all sites scored highly, as these elements were not prioritised in either the existing developments or in the interventions, and we observed little space dedicated to them. This was often due to the narrow-shared streets and paths that appear to arise in informal settlements, low car ownership, and the lack of specific parking spaces in the government-led developments in Addis Ababa. The lack of space for parking may contribute to fostering walking, in addition to possibly reducing housing construction and maintenance costs by consuming less land at no expense to the government or private owners.

However, residents and policy-makers noted that parking in these locations was also informal and unmanaged, often blocking pedestrian footpaths and impeding access. The limited amount of parking and street space may be due to lower incomes in these locations, where many could not afford a car when homes were built. It may be helpful to consider some government intervention to better manage parking and make sure there are clear places to walk and move in a wheelchair, as well as the creation of high-quality walking and cycling infrastructure. In wealthier locations, where demand for parking may be higher, more restrictions on the provision of parking may be needed. Residents noted that the lack of any streets that allowed car access made it challenging for older people to access services, such as ambulances to transport them to hospitals or waste removal services. As such, some wider streets (supportive of safe walking and cycling) may be helpful to facilitate access to a greater number of services. Our research indicates that wider streets may not develop on their own—some level of government intervention may be needed to create them.

The research also shows that nearly all the case studies scored relatively well on both the Non-residential Density and Residential Density elements of the TOD Standard, which are critical for inclusive access, health, efficient use of resources, and minimising environmental impact. In the resident interviews in the Indian cases, people described being able to walk relatively easily around their neighbourhood, and in Ahmedabad and Mumbai, residents described a sense of safety and community, with residents carrying out most nonwork travel on foot in the former case. We did not hear residents describe the streets as crowded, although people did discuss how vendors create impediments to walking. The prevalence of walking and the presence of vendors in walkways point to high-density settlements. Thus, it appears that in both informal settlements and more planned settlements, higher densities are being achieved. This does not guarantee that such densities will be achieved either with or without intervention; only that intervention may not be necessary to achieve densities that support TOD goals.

Finally, in five of the sites we found that Housing Preservation and Business and Services Preservation received high scores in support of TOD goals. In these five sites, the interventions did not demolish existing buildings, focusing instead on either upgrades to existing structures and infrastructure (Dar es Salaam, Pune, and Ahmedabad) or the creation of new structures and infrastructure on greenfield sites (Jemo and Charkop). The one site that scored poorly (Gotera) included government-led demolition of the existing structures, which were replaced. It seems that minimal intervention and a focus on upgrading existing settlements may lead to the least negative impact on existing communities.

10.2.2 TOD elements that require government intervention

In the Baseline report, stakeholders reported that the provision of basic services and access to infrastructure was one of the most challenging aspects of improving the lives of people in informal settlements. While this was not quantified in the TOD Standard, the household surveys indicated that the government interventions in all cases except Dar es Salaam were relatively successful in facilitating access to basic services and upgrading infrastructure. In the Indian cases, all homes we surveyed had access to electricity, water, sewer, indoor toilets and baths, and waste-removal services as well as public streetlights. Residents reported that

these were a direct result of the government intervention. In Dar es Salaam, the site with the most limited intervention, the access to services was the lowest. We also heard from residents that the improvement to basic infrastructure and services had dramatic impacts on their lives, especially for women. Improvements to sanitation and waste collection led to better health, resilience to floods, and clear paths for walking, improving access. Improved access to water saved time and money. Better streets and streetlights improved safety and security, which in turn improved access within the study areas. These improvements were clearly tied to strong government intervention. In the cases in Mumbai and Ahmedabad, we found evidence of clear intention from the government for ongoing support for maintenance to ensure that the infrastructure and services continue. A major deficiency of the case study in Dar es Salaam was lack of funds to maintain improvements implemented in the area.

Other infrastructure and services that improve access include walkways, bicycle paths, bicycle parking, and public transport. For access to public transport, all the sites fulfilled this requirement by definition, because we selected sites near public transport services. However, our qualitative data showed that the available public transportation options were deficient, with long wait times, crowded vehicles, and slow service. Residents in some cases described preferring private motorised vehicles. While the streets were often narrow, which may be conducive to walking and cycling, in all case studies the streets lacked high-quality facilities for walking and biking. While some of the informal settlements developed in a way that supports walking (narrow streets with slow vehicle speeds), none of the sites appeared to create complete walking or cycling infrastructure without specific government intervention. The same is true for public transportation. The one site where residents mentioned that public transportation had improved recently (in Dar es Salaam) had received a significant government investment in BRT.

Affordable housing is crucial to creating inclusive TOD, and it is a key element of the TOD Standard. In the TOD Standard assessment, three of the sites met the criteria for affordable housing. However, the residents in all sites described housing as growing less affordable over time. In the areas with the most intervention, residents described housing costs as the greatest concern. In the site with the most limited interventions, Dar es Salaam, some residents described housing as still affordable, although they also said that the primary reason for leaving the area was a lack of basic services. In multiple sites, residents said that they could afford to stay but that housing costs had risen beyond the means of new low-income residents. In multiple sites, low-income residents had either sold or rented their houses and moved to other, less-expensive parts of the city. In addition, unclear land tenure in the Ahmedabad case study excluded residents from the formal housing market and led to fears that existing residents might not be able to remain on the site. Given this context, it appears that government intervention is likely required to create affordable housing and formalise tenure status or establish no-eviction guarantees, alongside upgrades to basic services and infrastructure.

Government intervention may also be helpful to improve street layouts for pedestrian permeability and emergency vehicle access. While the informal settlements often had narrow streets that support walking, the block sizes varied widely, even within neighbourhoods, with even a single large block leading to uncomfortably long walk distances to other parts of the district. In addition, as mentioned above, there is a benefit to having some nearby access to streets that can accommodate wider vehicles (e.g., ambulances, small fire trucks, etc.) that can provide services. Some government interventions may be helpful in creating street standards for access.

In our interviews residents in the Mumbai case study noted the importance of access to open space for recreation, especially for children. Access to open space is also a key element of the TOD Standard, and it supports the TOD goals of access and health. We noted that one of the case studies (Mumbai) met the TOD Standard requirement for access to open space and specifically included open space in the site plan. This indicates that creating and maintaining open space may be a key role for the government.

In some cases, it appears that elements of shade have arisen organically in informal settlements, improving access and health by providing cover from rain and the hot sun. This was the case in the Pune case study, and it can also be seen to a lesser extent in the Mumbai case study. In other case study sites that first developed informally (Ahmedabad and Dar es Salaam), we observed limited shade of streets. This indicates that while shade may arise organically in some circumstances, direct intervention may be necessary to ensure shade.

10.3 Scale of government intervention

This research examined six urban case studies from an 'inclusive TOD' perspective. As described above, residents in all but one (Dar es Salaam) of the study sites stated that interventions and improvements led to increases in housing costs, preventing many low-income people from moving into these areas. Low-income residents in several of the case study sites were able to remain in place, even though prices continued to rise. Thus, there appears to be a strong need for more housing and in particular, more housing near amenities and in safe, walkable areas with the benefits of inclusive TOD. The question of how to create inclusive TOD at a large scale remains challenging.

The Addis Ababa interventions, which involved the government building new developments, were successful in creating relatively high-density housing in a relatively small timeframe, but there were many issues with housing quality and the process of allocating the housing fairly. The sites also performed worse on many of the TOD Standard elements than informal settlements that were subsequently upgraded.

The process for upgrading informal settlements was successful at meeting many of the elements of TOD, but the upgrading process appears to be rather slow. This may make it challenging to expand such interventions broadly if the current rate of urban growth continues.

The Sites and Services model also appears to be successful at creating large amounts of housing in a format that supports inclusive TOD. Creating the infrastructure from the start may provide a faster path to inclusive TOD than informal settlement upgrading. However, in larger cities there may be limited locations where such schemes are possible.

This research showed that all three Indian sites involved not just physical aspects of improving housing for low-income residents but also slow and labour-intensive processes of community and consensus building. The results of these processes appear to have been positive, according to the residents and policy-makers we spoke to, leading to areas that were safe from crime as well as resident maintenance of toilets and semi-private spaces. Although slower and more labour-intensive than simply building infrastructure, creating socially cohesive settlements may have considerable long-term benefits. Of course, whether the Indian experience is applicable to other contexts, such as in East Africa, is an open question.

For many cities, a combination of various approaches may be necessary. We will explore this in greater detail in the next activity of this research, where we work to develop specific policy guidance and tools to create inclusive TOD in the East African context. We will work with policy-makers in those locations to ensure that any guidance we produce is relevant and applicable for the local context.

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APPENDIX A: SURVEY PROTOCOLS

1. Protocol for field surveys

Inform the respondent about the objective of the survey, ensure that they are at least 18 years old and obtain consent.

We suggest using the following script, which can be adapted to suit the local context:

'We are working with ITDP, the Institute for Transport and Development Policy, an international NGO. We are conducting research that aims to understand how to improve access to affordable housing and transportation in Ahmedabad/Pune/Mumbai/Addis Ababa/Dar es Salaam.

Do you have five minutes for a survey on housing, services, and transportation in this area?'

2. COVID-19 Protocols

Stay at home if you are feeling unwell or if you have come into contact with anyone who has contracted COVID-19 and you have not had a negative COVID-19 test result since your last contact with that person.

In the field, always comply with the following three basic preventive measures:

- Maintain at least 1 m distance from others
- Wear a mask covering the nose and mouth at all times in the field
- Wash your hands frequently with soap and water or use a hand sanitiser.

COVID-19 Protocols adapted from:

https://www.who.int/emergencies/diseases/novel-coronavirus-2019/question-and-answers-hub/q-a-detail/coronavirus-disease-covid-19-small-public-gatherings

3. Interview Protocol

<div align="center">

DFID HVT TOD Project

Interview Protocol - Case Studies (Activity 2)

</div>

Jonas Hagen

01 July 2021

3.1 Overall study purpose, design and procedures

3.1.1 Study purpose rationale

In 2018 the UK's Department for International Development (DFID; today the Foreign, Commonwealth and Development Office, FCDO) engaged ITDP to research the implementation of 'High-Volume Transportation' (HVT)—urban transportation that improves access to destinations in an equitable, safe and environmentally friendly way. That study examined implementation strategies of public and private sector stakeholders for HVT systems in countries in South Asia and Africa. One of the main outcomes of that study was identifying the need for inclusive, equitable Transit-Oriented Development (TOD) in African cities. This research aims to identify opportunities for, and barriers to, the creation of TOD in East Africa; specifically, in Ethiopia and Tanzania. In the previous phase of research (presented in the *Baseline Report*, completed in January 2021, researchers gathered qualitative data from interviews with planners in national and municipal governments as well as private and civil sector organisations in Ethiopia and Tanzania. Those interviews included discussions of participatory planning, social equity, informal settlements, and related topics. The present phase of research examines case studies of inclusive TOD in Ethiopia, Tanzania, and India. This research includes a quantitative component (data gathered from a street audit of the case study areas) as well as qualitative data to be gathered from interviews. These interviews will be conducted in six case study areas, with residents who live within a 500 m network distance (walkshed) of a public transportation stop, as well as with policy-makers (government officials and staff from NGOs) who were involved in policy interventions in these six areas. This research intends to inform a research and capacity-building programme that can contribute to creating inclusive, equitable TOD in Ethiopia and Tanzania.

3.1.2 Study design

This research is an exploratory, embedded case study (Yin, 2013). It uses quantitative methods to score 500-m walksheds of six case study areas in Ethiopia, Tanzania, and India using ITDP's TOD Standard as well as qualitative data to understand the characteristics of access and housing affordability, as well as potential impacts of policy interventions in these areas. This qualitative data will come from interviews. The study employs mixed methods (both quantitative and qualitative methodology) to gather information on the six case studies from the perspective of policy-makers and residents. The quantitative methodology is described elsewhere (Case Study Report dated March 2021); this document is specifically geared towards the qualitative data researchers will gather from interviews. The researchers plan to interview 48 to 90 policy-makers and residents. No children or minors will be interviewed.

We employed an exploratory qualitative case study approach for this research (Yin, 2013). This approach is commonly used when seeking to perform an assessment of a problem that has not previously been analysed clearly, where researchers aim to set priorities and create organisational definitions. This approach may be useful for exploring cases where the researcher does not expect to produce a specific set of results. Exploratory case studies are relevant to research where the primary questions are 'what' and 'how' (Baxter & Jack, 2008)—in this case: 'What are the main characteristics of access and housing affordability in the case study areas?' and 'How were these conditions created?'

3.1.3 Research questions

Note: These are not the specific interview questions but rather questions that guide the entire research process.

What are the main characteristics of the six case study sites in the selected cities in Ethiopia, Tanzania and India in terms of access, basic services, and housing affordability? What are the key impacts of policy interventions in these cases, and how were policy interventions developed and implemented? What lessons can be learned from the cases for creating inclusive TOD in developing countries?

3.1.4 Scientific abstract

The broad objective of this study is to inform a research and capacity-building programme that contributes to the successful implementation of inclusive, equitable TOD in Ethiopia and Tanzania. This study employs a participatory action research approach, where together with the community of study participants, the researchers seek to collaboratively understand and reflect on the topic (in this case, urban growth and the role of TOD) and positively impact change in this sphere (Forester, 1999; Kemmis et al., 2014). The subject population is residents of the six case study sites and the public and civil sector planners of these systems. The subject population is a non-representative (convenience and snowball) sample of residents and practitioners in these cities. Researchers will analyse qualitative data from interviews with these residents and planners to determine the characteristics of these case study areas in terms of access and housing affordability, as well as potential impacts for policies implemented in these areas. This analysis will seek to uncover common characteristics and key differences in terms of access and housing affordability in the case study areas, as well as emerging topics for inclusive TOD in Ethiopia, Tanzania, and India.

Research will be conducted in two cities in East Africa—Addis Ababa (Ethiopia) and Dar es Salaam (Tanzania)—and three cities in India: Ahmedabad, Mumbai, and Pune. The countries and cities in the sample have been selected because they are places where ITDP staff and consultants have ongoing relationships with decision-makers and practitioners (convenience sample) and because there is urban development that can broadly be defined as TOD in these places.

The participants in the study will be selected via convenience and snowball methods. A first group of participants will be recruited based on pre-existing relationships (a convenience sample) with the researchers and their experience with implementing policies in the six case study areas (for policy-makers), and through local political leaders (residents). Researchers will then ask these participants to recommend other interview subjects (snowball sample).

Interviews will be recorded (by hand and possibly electronically) and transcribed by field researchers. The transcriptions and any electronic recordings will be stored in a central database. The researchers will use 'lean coding' (Creswell, 2013, p. 143) to organise the content of the interviews into themes.

This research aims to uncover key factors that could facilitate the successful implementation of TOD in the target cities. The researchers hope that this study can also shed light on possibilities for TOD throughout Africa and India. To the best of our knowledge, this is the first study that examines this topic. As such, this study may be of great use to researchers and practitioners who seek to improve the social equity and environmental sustainability of urban development in Africa, India, and throughout the developing world.

3.1.5 Study procedures

This study uses qualitative research methods. Researchers will conduct open-ended, in-depth interviews to collect data from residents in predefined 500 m walksheds of public transportation stations, and policy-makers from government and civil sector organizations involved in policy interventions in those areas.

3.1.5.1 Study setting

The study's participants are residents of pre-defined 500 m walksheds of public transportation stations (the six case study areas) or are (or were) employed in national and municipal governments and civil and private sector organizations in the five target cities. These cities have significant populations living in informal settlements, and informal public transportation systems are also present in all sample cities.

3.1.5.2 Study participants

The researchers estimate that 48 to 90 subjects will participate in this study, with each interview lasting approximately 40 minutes. The target groups of this study are residents of the six case study areas (five to 10

residents per case study) and policy-makers from government and civil-sector organisations that advocate for improved urban settlements (three to five policy-makers per case study).

Although this will be a non-representative sample, we will make an effort to reach a varied sample in terms of gender, age, income groups, and to the extent possible, ethnic groups and vulnerable and disadvantaged populations. The majority of the individuals in this study may be men, given that many policy-makers and practitioners in these counties are male. Civil-sector leaders tend to be more equally divided between men and women, as, of course, are residents of the six case study areas. There will be no children interviewed for or involved in this research.

Participants will be selected to reflect a broad understanding of the problems and issues regarding urban development and will serve as community representatives when interacting with the government.

3.1.5.3 Data collection

The lead researchers and field researchers are employees of or affiliated with ITDP, an international NGO that has been working in Africa since the mid-1990s. As such, ITDP has pre-existing relationships with some potential interview subjects in these cities, particularly among policy-makers.

Staff in ITDP field offices and consultants in Ethiopia, Tanzania and India will identify potential interview subjects for this study based on their knowledge of, and relationships with, urban planners in the selected cities. Further, when needed the field staff and consultants will ask these planners to identify other potential interview subjects. Field staff and consultants will also reach residents that may be able to give suggestions for additional people to speak with. As such, the interview subjects will be a non-random sample of policy-makers and private-sector actors and will be recruited using the convenience and snowball methods.

Researchers will carry out in-depth interviews with interview subjects via telephone or web-based video conference (such as Zoom or Google Meet), or face-to-face interviews. Face-to-face interviews will follow strict protocols to minimise the risk of transmission of COVID-19. These protocols are also used to collect the quantitative data (from street audits) during this phase of research. They are adapted from World Health Organization (WHO) guidelines. This approach is culturally sensitive to the current state of the COVID-19 pandemic and to the social norms of each group of participants.

The objectives of the in-depth interviews are to gain a deeper understanding of access and housing affordability in the case study sites, as well as possible impacts of policy interventions in these sites. A better understanding of these elements could allow for the implementation and ongoing successful functioning of inclusive, equitable TOD in these regions. The research's intention is to inform a capacity-building and research programme that can effectively support the creation of such urban settlements. The information obtained will be transcribed from hand-written notes and recordings for analysis. A direct form of content analysis will not be used, but categories will be created and analysed to identify sub-themes and themes, and to determine the areas of urban development and TOD with the potential for high-impact capacity-building and research.

3.1.6 Recruitment

Researchers will recruit study participants through telephone and/or email notifications (policy-makers and residents) and from contacts made in situ at case study sites (for residents).

Field researchers will initially use their professional networks to recruit interview subjects (convenience sample). For subjects recruited via snowball methods, researchers will explain that the potential subject's contact information was obtained through a colleague or acquaintance who knows the subject.

3.1.7 Informed consent process

Local cultural norms dictate that no formal consent for the interview, beyond the participants' agreement to the interview itself, is appropriate. Researchers from ITDP's field offices in Ethiopia, Tanzania and India indicated that more formal consent to participate in the subject (e.g., verbal or written consent, typically used in wealthy-country settings), would be considered inappropriate in the study setting; as such, formal consent will be omitted.

At the beginning of the interview, the co-investigator may verbally express their name and professional role, and the reasons for the study. During the interview, the co-investigator may verbally express the fact that the interview subject is not obligated to answer any questions that would make them uncomfortable, and that they have a right to stop the interview at any time. The researchers will also ask permission at the beginning to record the conversation in written notes and electronically.

At the close of the interview, the field researchers will offer the possibility of keeping the identity of the interview subjects confidential (if that is the preference of the participant).

3.1.8 Potential risks

There are only minimal risks associated with participation in this research. Interviewees who feel uncomfortable will be told that they may stop participating at any time. During interviews participants will not be asked to reveal insider information about their organisations, which could pose a risk to their professional or social standings if their responses were disclosed. The investigator will ask interview subjects explicitly if they prefer not to identify their names in the study. In this case, the researchers will not identify subjects except generically in reports and/or research papers—for example, as 'government official, Addis Ababa.'

3.1.9 Data and safety monitoring

Data backups of notes from library research and transcriptions of interviews will be stored locally on the ITDP field office's network and backed up in an online directory ('cloud') that is only accessible to ITDP staff and associates directly related to this project.

The Project Director for this project, Jacob Mason, will be performing the data and safety monitoring for this protocol.

If adverse events or unanticipated problems occur, Jacob Mason will consult with the team leads of this project and contact the FCO and project management group INC if necessary.

3.1.10 Potential benefits

This research project has the potential to identify ways in which TOD can be effectively implemented in Ethiopia, Tanzania and India. It will inform collaborative capacity-building programmes in the selected countries that will be carried out by ITDP directly following the conclusion of the data-gathering and analysis portion of this study. As such, the study will directly inform these capacity-building efforts, helping ensure that these will be effective in supporting HVT systems and TOD in the places of study.

3.2 Instructions to field researchers

3.2.1 Overview and procedure

We will be conducting 48 to 90 interviews with residents of six case study areas and policy-makers from government and civil-sector organisations.

Team leaders have identified potential interview subjects (also referred to as 'participants' or 'study participants') and organisations to recruit participants from and through. However, there is some flexibility here and you can feel free to suggest additional interview subjects to your direct supervisor for this project and ITDP's internal research manager, Jacob Mason.

You may conduct interviews individually or have multiple participants sit for the same interview; we will leave this to your discretion.

3.2.2 Participant recruitment

We will recruit study participants in two ways: 1) ITDP field staff and consultants in Ethiopia, Tanzania, and India have existing contacts with, or knowledge of, people whose professional role is related to urban development and TOD in the six case study sites; 2) other professionals that the first group of participants

may recommend we speak to; and 3) residents that we will contact through local political leaders or by identifying through in situ fieldwork.

Use the method of contact that you feel will be most effective, whether it's via email, telephone, or contacting in the field. You may wish to combine methods, such as by calling first and following up with an email.

Although this is primarily a convenience sample, meaning we will recruit people that we have relatively easy access to rather than strive for a representative sample, please seek to diversify the sample to some degree, particularly for residents. Please seek to distribute the sample of resident study participants in terms of:

- Where participants live (in project area or outside project area)
- Gender (balance between male, female and other)
- Income (balance between low, middle, and high)
- Age (balance between age-groups)
- Vehicle ownership (participants that own vehicles and those who do not)

Below is a one-page draft description of the project that you can use to contact potential interview subjects (also referred to as 'participants' or 'study participants'), as well as a draft email. We encourage researchers to modify these texts to suit their needs. For example, researchers in India might wish to modify this description to emphasise the research in that country.

For potential participants that you do not know yet, please add something like: 'Jane Smith at the Municipal Urban Development Secretariat recommended that I contact you because of your in-depth experience with the Jemo Condominium development.'

3.2.2.1 Draft 1-page description of study

High-Volume Transport: City Retrofit for All

ITDP is pursuing this research project, funded by the UK government, to foster the creation of healthier, more inclusive, more accessible, and safer cities in low-income countries (LICs) in Africa and India. One of the greatest drivers of both climate change and inequity is urban sprawl. Many cities in Africa and South Asia are growing rapidly, with informal settlements multiplying along major roads. Sprawl leads to higher transport costs, limited access to jobs and services, lower productivity, and unsafe conditions for walking, all of which are disproportionately felt by the poorest communities. The research has also shown that urban highways, often pursued to reduce congestion, typically lead to *increased* congestion and sprawl.

Inclusive, equitable, transit-oriented development (TOD) has been shown to mitigate many of the impacts of urban sprawl. Through increased densities and a greater mix of uses, travel distances and the cost of transport decrease. Less travel reduces air pollution and the related public health impacts. Through inclusive planning, lower-income residents are able to live closer to work, reducing the money and time burden of transportation. By designing streets for walking and cycling and low vehicle speeds, traffic safety is improved. Taken together, TOD has been shown to facilitate strong social networks and communities that provide additional support to lower-income residents.

Our research is based on the goal of transforming low-density sprawl into transit-oriented development (TOD). While attempts have been made to simply copy TOD models from wealthier countries, there has been little research on how to effectively create TOD in the African and Indian contexts. The purpose of this research project is to understand how to implement TOD within the existing built-up area of rapidly urbanising cities in low-income countries in Africa, particularly Ethiopia and Tanzania. Since improvements can make an area more attractive and expensive, potentially harming more vulnerable populations, we seek to identify potential impacts of policies on lower income, disadvantaged populations, especially in informal settlements, and to pursue ways to mitigate harm.

The research project aims not only to fill gaps in knowledge but to transform that knowledge into guidance and tools that are designed for the local context and can be readily used by decision-makers in those areas. We also will host capacity building workshops to train practitioners in what we create. The project consists of three activities:

- **Activity 1: Baseline Analysis** – Document the context for urban growth in LICs in Africa
- **Activity 2: Case Studies** – Examine cases of TOD policies in informal settlements in India and Africa
- **Activity 3: Tools and Guidance** – Develop knowledge and tools for implementing TOD in LICs in Africa, particularly in informal settlements

As part of Activity 2 of the research, we are looking to document potential impacts of policy interventions in specific areas of the city in terms of transportation and housing affordability. This information will help us to develop recommendations for TOD policies that are appropriate for the local context. We will document these findings and review them with local stakeholders, such as yourself, to ensure they are appropriate for the local context. With your assistance, we will develop guidance to help you and other decision-makers create safer, cleaner, more equitable, and more financially stable cities in Africa.

3.2.2.2 Draft participant recruitment email

Dear _____,

As we have discussed previously, the UK government is supporting ITDP's research into Transit Oriented Development (TOD) in Africa and India. The study intends to inform a research and capacity-building programme that can contribute to supporting the successful implementation of TOD in these places.

If possible, I would greatly appreciate the opportunity to speak to you to gather information for this study; specifically, I wish to get your perspective on the implementation of TOD in [Case Study Site]. I would like to conduct a brief interview with you and ask you questions about this topic. Your total time commitment to the project would be 40 to 60 minutes.

This interview can take place at a location that is convenient for you. If possible, we would like to conduct this interview in-person, at a quiet place of your convenience, but we could also speak over the telephone.

Thank you very much for your time.

Best regards,

_____

3.2.3 Interview description

The interviews will be open-ended, meaning that the questions and answers are not as specific as in a survey, which only has a limited number of possible responses.

As such, please think of the script as a guide for a conversation, rather than something that must be extremely closely adhered to. For example, you may feel that the participant has already spoken about housing affordability when they spoke about living in the area. If this is the case, you may not want to ask about housing affordability again.

Please be as polite and appreciative as possible. We are interviewing busy residents and professionals who are helping us greatly by giving us their valuable time.

We are not offering compensation for participation in this study.

We will offer the option to keep participants' (both residents and policy-makers) names anonymous for this study to guard their identities and protect them from any possible harm. We may keep participants' contact information (complete with names) in separate documents but do not include names in documents to be included in the final report.

Please try to keep the interview to around 40 minutes. If the participant speaks for longer than 40 minutes and appears not to mind speaking longer, do not cut the interview short, but rather end the interview when it seems the participant has said all they want to say.

Please remember to:

- Make the participant comfortable and let them know that we greatly appreciate their time
- Ask how they wish for us to attribute the interview (i.e., by name or anonymously)
- Let them know that you are available to answer any questions they might have at any point

3.2.3.1 Languages

Researchers will translate the questions into local languages as appropriate. These include Marati (Mumbai and Pune), Gujarati (Ahmedabad), Hindi (all three Indian sites), Amharic (Addis Ababa), and Swahili (Dar es Salaam).

3.2.4 Note-taking and transcription

We find that the most time-efficient way to gather the interview information is to take as complete notes as possible by hand while the interview is taking place and recording the interview electronically at the same time.

After the interview is over, begin to transcribe your notes as soon as possible, e.g., immediately after the interview. At this time the interview will still be fresh in your mind, and you will remember many details. Try to transcribe the interview in the voice of the participant, using the same language that they used.

If there is something you are unsure of, consult the electronic recordings (if any).

You can also check for the consistency of what you have written against the electronic recordings.

If you wish, you can also transcribe the electronic recordings verbatim.

3.2.5 Interviews: residents

Notes to researchers regarding COVID-19:

1. Follow all COVID-19 precautions as described below and in the interview protocol for this research
2. Residents' travel patterns may be disrupted by the current COVID-19 pandemic—for example, residents may use public transportation less frequently than normal. If possible, try to gather information about pre-pandemic (normal) travel patterns.

Note: The following interview guide is for Tandale/Argentina BRT station (Dar es Salaam, Tanzania). Please access interview guides for other TOD sites HERE.

Introduction

I am *staff at/a consultant for* the Institute for Transport and Development Policy's office in Dar es Salaam. On behalf of the UK's Department for International Development, ITDP is conducting a study on the implementation of Transit-Oriented Development (or TOD) in cities in India and Africa. We understand TOD to be places where it's easy and safe to walk, cycle, and to use public transport instead of using cars or motorcycles. These places should also be affordable to low and middle-income residents.

I want to ask you some questions about transportation and housing affordability in Tandale around the Argentina BRT Station.

We hope that you will speak freely, and we will not use your name in the report for this study. We would attribute your comments anonymously, for example: 'Resident, Tandale.' Would this be OK with you?

I would like to record our conversation, so that I can get your words accurately. May I record our conversation?

QUESTIONS:

[NOTE TO INTERVIEWER: If any questions were already answered when you get to them, feel free to skip to avoid repetition]

1. Where do you live? [For interviewer: Is this in the intervention area?
     Please circle one: **inside intervention area / outside intervention area**]

1.   When did you move here? [For interviewer: Is this before the intervention was implemented?]

1.   How do you usually get to places, such as for work, education, shopping, and healthcare?
     [Ask for as much detail as is reasonable to collect in a few minutes, such as:

     3.A. What modes do you use? (Metro, bus, paratransit, walking, cycling, etc.)
     -how long do trips usually take?
     -how often do you make these trips?

     3.B. Do you find it easy or difficult to get to these places? Why [do you find it easy/do you find it difficult]?

     3.C. Do you find it safe to get to these places? If not, why?

1.   How often do you go to the Argentina BRT station?

     4.A. If not often/never: Is there another station that you go to more frequently? Which station/where is it? Why do you go there?

1.   [If they go to a station at all] Tell me what it is like to get to the station.

     5.A. How do you get there?

     5.B. Is it easy or difficult to get there? Why [is it easy/difficult to get there]?

     5.C. If you have any problems getting there, what are they?

1.   Tell me about walking around this neighbourhood (for example, is it easy or difficult to walk around, and why?)

1.   Do you cycle in this neighbourhood?

     7A. [If yes] Tell me about cycling around this neighbourhood (for example, is it easy or difficult to cycle around, and why?)

     7B. [If no] Tell me about why you don't cycle.

1.   Why did you move here?

1.   Since you moved here, what have been the biggest changes in this area?

1.   Do you find housing affordable or expensive in this area? Why [do you find it expensive/do you find it affordable]?

      10.A. How affordable is this area for lower-income residents? Is it affordable or too expensive/Why?

      10.B. Do you think lower-income people have left this area because it has become too expensive? If yes, please elaborate if possible

      10.C. How could this area be improved to make it easier for lower-income people to live here?

1.   How could this area be improved to make it easier for other vulnerable groups, such as women, people with disabilities, etc., to live here?

1.   Let's talk about basic services, like water, electricity, sanitation, Internet, and cell phone connectivity in this area.

      12.A. Do you have access to basic services?

      12.B. Do you have any problems with these services?

[If participant knows area before intervention]

1.   What has changed about getting around the Tandale/Argentina BRT station area since the area improvements in terms of walking, cycling, and using public transportation, if anything?

1.   What has changed about the Tandale/Argentina BRT station area since the area improvements in terms of housing for lower-income residents, if anything?

1.   Can you think of any impacts of the improvements in the area on vulnerable groups, such as women, people with disabilities, and people with low incomes, etc.?

OPTIONAL QUESTIONS: (Use as appropriate)

1.   Are you a member or representative of any marginalised groups? If so, which group, and what were the specific impacts on people in that group?

Thank you for your time and the valuable information

1.   Demographic questions. Now I'm going to ask you a few basic questions about your profile. Feel free to skip any question you don't want to answer.

      17a. Gender: Male/female/other

      17b. Do you own a vehicle? If so, which type and how many? Car/motorcycle/moped/bicycle

      17c. Occupation: (for example) Caregiver/labourer/professional/student

      17d. Age: 18–30/30–65/65+

      17e. Income range: Low/middle/high

3.2.6 Interviews: policy-makers

Interview Subjects

- Government administrators
- Civil society representatives

I am *staff at/a consultant for* the Institute for Transport and Development Policy's office in Dar es Salaam. On behalf of the UK government's Department for International Development, ITDP is conducting a study on the implementation of Transit-Oriented Development (or TOD) in cities in India and Africa. We understand TOD to be relatively dense, mixed-use urban development where residents can use high-quality public transportation, or safely walk or cycle to destinations, instead of relying on private automobiles or motorcycles for travel. TOD can also be an opportunity to ensure that urban areas are affordable for low and middle-income residents.

I want to ask you some questions about access to transportation and housing affordability in the Tandale/Argentina BRT station area, as well as about possible impacts of policy interventions there.

We will not use your name in the report for this study. We would attribute your comments anonymously, for example: 'Dar es Salaam government official.' Would this be OK with you?

I would like to record our conversation so that I can get your words accurately. May I record our conversation?

Interview Questions

[NOTE TO INTERVIEWER: If any questions were already answered when you get to them, feel free to skip to avoid repetition]

1. Please tell me what your position is.

1. What was your role in the Tandale/Argentina BRT station area improvements?

1. We are interested in the history of the Tandale/Argentina BRT station area improvements.

    3.A. What were the goals of the improvements?

    3.B. How did the projects develop?

    3.C. Which institutions were involved?

    3.D. Were there any major challenges with the projects that you would like to mention?

1. What do you see as the main impacts of the Tandale/Argentina BRT station area improvements for residents?

1. Can you tell me about walking [and cycling] in the neighbourhood?

    5.A. How did the Tandale/Argentina BRT station area improvements impact walking [and cycling] in the neighbourhood, if at all?

1. Can you tell me about residents' access to public transportation?

6.A. How did the Tandale/Argentina BRT station area improvements impact residents' access to public transportation, if at all?

1.   How affordable is the area for low and middle-income people?

7.A. How did the Tandale/Argentina BRT station area improvements impact housing affordability, if at all?

1.   Are there any other impacts of the Tandale/Argentina BRT station area improvements you would like to tell me about?

(Can mention: health, safety, air quality, transportation, housing, basic services)

8.A. Are there any impacts for vulnerable groups, such as women, people with disabilities, and people with low income, etc., that you would like to tell me about?

1.   Based on the original policy goals [as discussed in 3.A]: What worked for this intervention, what didn't, what would you do differently for a future intervention?

1.   Given your understanding of inclusive TOD (compact, walkable, transit-accessible, affordable and inclusive neighbourhoods, with basic local services): What worked for this intervention, what didn't, what would you do differently for a future intervention?

1.   What, if anything, could be done to improve transportation in the Tandale/Argentina BRT station area?

1.   What, if anything, could be done to improve housing affordability in the area of the Tandale/Argentina BRT station area improvements?

Have these types of projects been replicated in the city? If yes, in which area and how? If no, why not?

3.3 COVID-19 protocols

The safety of our researchers and the general public is our primary concern during this pandemic. Researchers must prioritise their health and the health of others over the objectives of this research project. As such, we require that ITDP staff and consultants associated with ITDP follow this COVID-19 protocol:

Stay at home if you are feeling unwell or if you have come in contact with anyone who has contracted COVID-19 and you have not had a negative COVID-19 test result since your last contact with that person.

In the field, always comply with the following three basic preventive measures:

• Maintain at least 1 m distance from others.
• Wear a mask covering the nose and mouth at all times in the field.
• Wash your hands frequently with soap and water or use a hand sanitiser.

COVID-19 Protocols Adapted from World Health Organization:
https://www.who.int/emergencies/diseases/novel-coronavirus-2019/question-and-answers-hub/q-a-detail/coronavirus-disease-covid-19-small-public-gatherings

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APPENDIX B: TOD STANDARD SCORES

1. Full scorecards

TOD Element		MAX	TOD Scores					
			Ethiopia		Tanzania	India		
			Addis Ababa		Dar es Salaam	Ahmedabad	Mumbai	Pune
			Gotera Condominium	Jemo Condominium	Tandale Argentina BRT Station	Gupta Nagar	Charkop Site and Services Area	Yerwada
WALK		**15**	**3**	**2**	**6**	**7**	**6**	**9**
1A1	Walkways	3	0	0	0	1	0	1
1A2	Crosswalks	3	0	0	0	0	0	0
1B1	Visually Active Frontage	6	3	2	4	4	4	5
1B2	Physically Permeable Frontage	2	0	0	2	2	2	2
1C1	Shade and Shelter	1	0	0	0	0	0	1
CYCLE		**5**	**0**	**1**	**1**	**3**	**3**	**1**
2A1	Cycle Network	2	0	1	1	2	1	0
2B1	Cycle Parking at Transit Stations	1	0	0	0	0	0	0
2B2	Cycle Parking at Buildings	1	0	0	0	1	1	1
2B3	Cycle Access in Building	1	0	0	0	0	1	0
CONNECT		**15**	**0**	**4**	**4**	**11**	**1**	**13**
3A1	Small Blocks	10	0	4	4	6	0	10
3B1	Prioritised Connectivity	5	0	0	0	5	1	3
TRANSIT		**-**	All sites contain a qualifying transit station					
4A1	Walk Distance to Transit	-						
MIX		**25**	**3**	**12**	**12**	**18**	**17**	**14**
5A1	Complementary Uses	8	0	4	4	4	0	0
5A2	Access to Basic Services	3	3	3	3	1	3	1
5A3	Access to Green or Open Space	1	0	0	0	0	1	0
5B1	Affordable Housing	8	0	0	0	8	8	8
5B2	Housing Preservation	3	0	3	3	3	3	3
5B3	Business and Services Preservation	2	0	2	2	2	2	2
DENSIFY		**15**	**15**	**15**	**13**	**11**	**13**	**13**
6A1	Non-residential Density	7	7	7	5	7	5	7
6A2	Residential Density	8	8	8	8	4	8	6
COMPACT		**10**	**10**	**8**	**10**	**6**	**10**	**10**
7A1	Urban Site	8	8	6	8	4	8	8

7B1	Transit Options	2	2	2	2	2	2	2
	SHIFT	**15**	**12**	**15**	**15**	**15**	**15**	**15**
8A1	Off-Street Parking	8	8	8	8	8	8	8
8A2	Driveway Density	1	1	1	1	1	1	1
8A3	On-Street Parking and Traffic Area	6	3	6	6	6	6	6
	TOTAL	**100**	**43**	**57**	**61**	**71**	**65**	**75**

2. Addis Ababa: Gotera Condominium

2.1 Walk: 3/15

The Gotera site has a relatively high volume of walking as transportation, and the major activity in the area is residential and service-based. Most people walk for a short distance from home to services and nearby commercial centres.

The walking infrastructures within the condominium sites are comfortable and well paved. The walkways are raised from the carriageway level, but they lack universal access for people using wheelchairs or who have other disabilities. Crossings are rarely provided, either where one smaller street joins another or where smaller streets meet the major streets. On the major streets when crossings are provided, they tend to be encroached upon by vendors or parking.

Figure 55: Pedestrian crossing encroached upon by street vendors and car parking

We conducted a survey on the availability of shades from structures and trees, and the result shows that around 55%of the street with less than 50% of shade covered along the streets.

Figure 56: A collector and local street with no shade covers

Source: ITDP

Figure 57: The Visually Active Frontage map for Gotera site
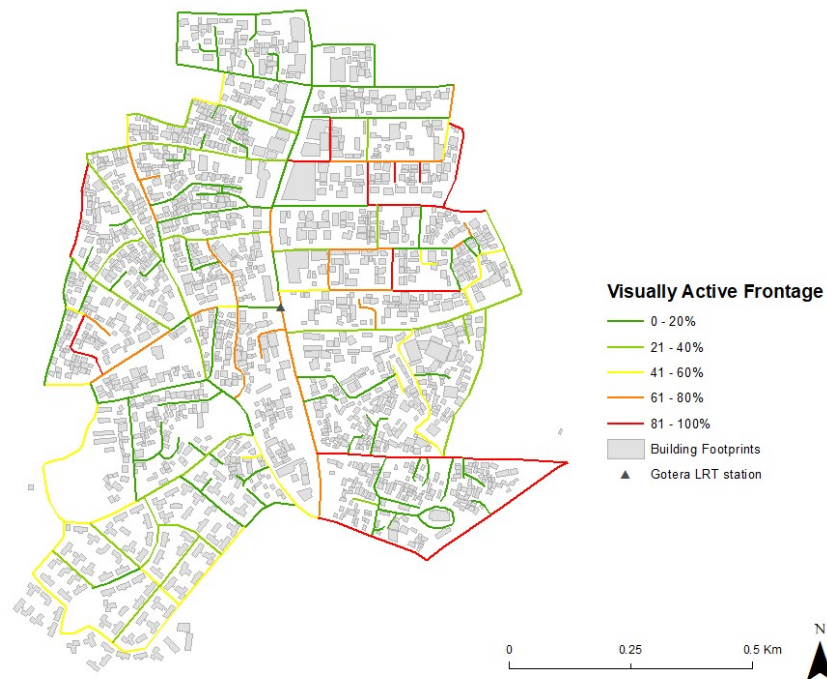
Source: ITDP

A Visually Active Frontage survey was conducted on the Gotera site, on a total of 16.5 km on 165 street segments. The results show that around 66.54% of the streets are within the range of 0% to 25% of having an active frontage; 30.1% of the streets are within 25% to 50%; 3% of the streets are within 50% to 75%; and around 0.3% of the streets are above 75%.

Figure 58. Physically Permeable Frontage for Gotera Site
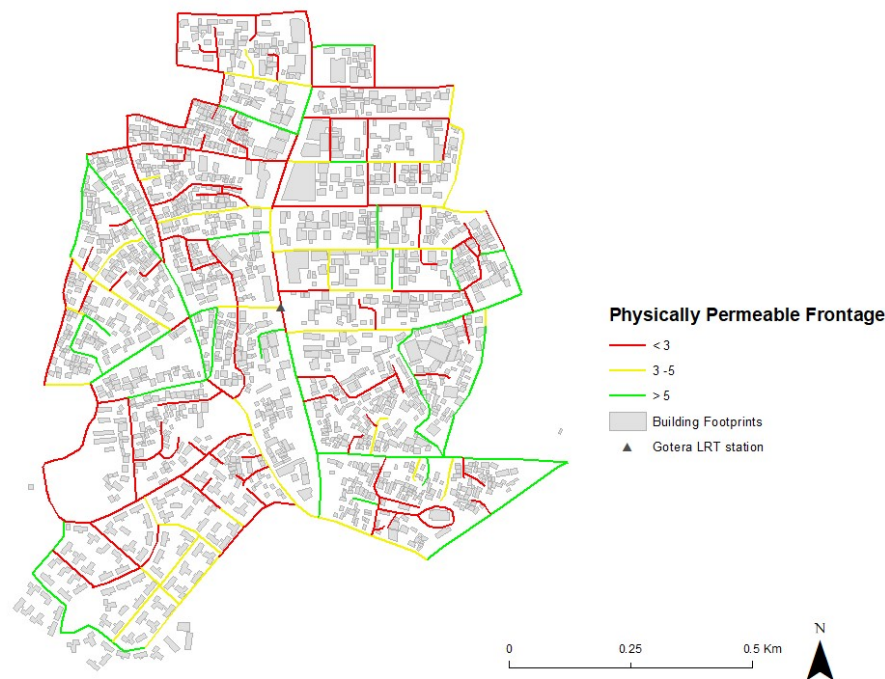
The survey of physical permeability or the number of entrances per 100 m of a street was conducted on the Gotera site. A total of 165 streets with a total length of 16.5 km were surveyed. The result shows that 68.8% of the streets have fewer than three entrances, 19.2% of the streets have three to five entrances per 100 m and the remaining 12% have more than five entrances. In the Gotera Condominium intervention area, the design and construction of the site provide several fences inside, and most streets on the site face the back of the buildings.

2.2 Cycle: 0/5

Cycling transportation is negligible on the site, with a few kids and older adults riding a bike for exercise and recreation. There are no dedicated safe cycle corridors or safe shared streets for cyclists to ride on, the cyclists use the walkway infrastructure or share the vehicle carriageway, where speeds exceed 15 km/h.

2.3 Connect: 0/10

The Gotera site is connected to different parts of the city centre by major streets and different transport modes. The site is connected to the north with Leghare, Addis Ababa's main city centre, and to the south with Kality centre. To the east the site is connected with Bole airport by a 30 m arterial street.

More than 90% of the streets are small, shared streets or cul-de-sacs that serve as a property access, and there is only one major street with the LRT line that crosses the site from north to south. There are 68 intersections in the area that are used both by vehicles and pedestrians, and there are no pedestrian-only corridors.

Figure 59: The block length map for Gotera site
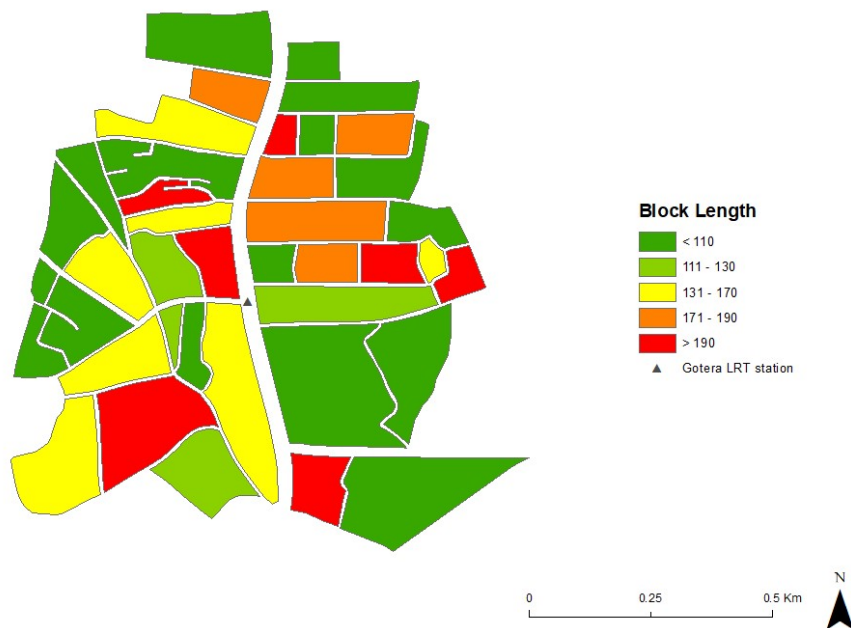
Source: ITDP

Figure 60. One-way traffic corridors in Gotera Condominium site

Source: ITDP

2.4 Transit

The major transportation mode at the Gotera site is light rail transit that connects the Gotera area to the southern secondary centre (Akaki-Kality area); to the northern part of the city where there is a large market area like Merkato (the largest open market in Africa); and to the historical part of the city, where the St. George church and Piazza are located.

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Figure 61: The existing LRT lines in Addis Ababa city
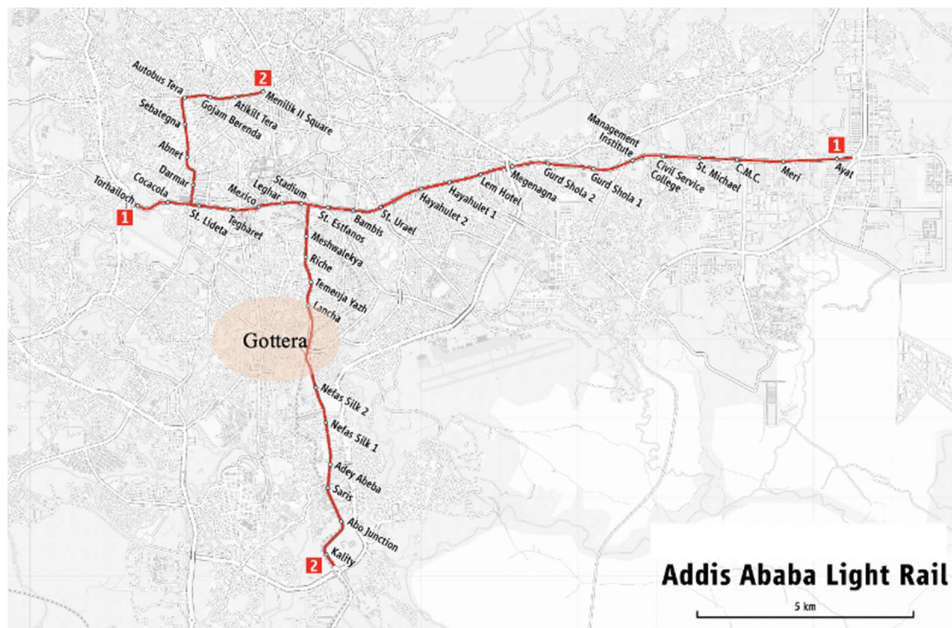
Figure 62: The existing LRT station at Gotera Lancia
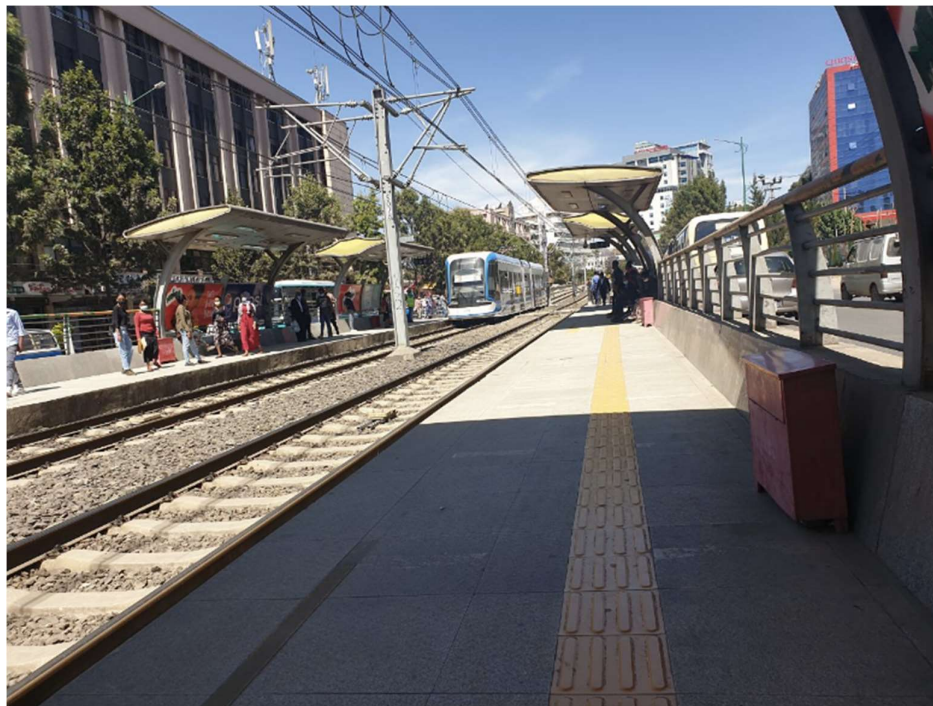
Source: ITDP

2.5 Mix: 3/25

The predominant land use in the area is residential. The residential sites are mixed with services like hotels, hospitals, small shops, market areas, and a few open spaces.

The main services required by the TOD Standard such as sources of fresh food, health facilities and elementary schools are found throughout the site.

Figure 63: General Hospital inside Gotera Condominium

Source: ITDP

Figure 64: Existing land use map in Gotera site
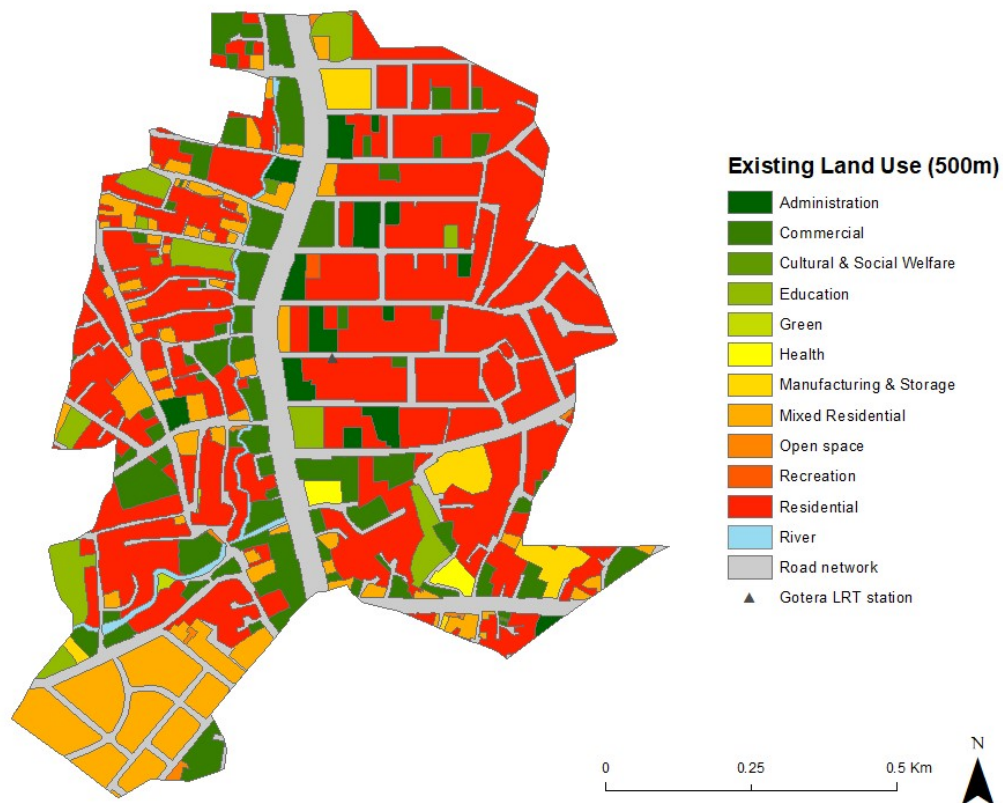
Source: ITDP

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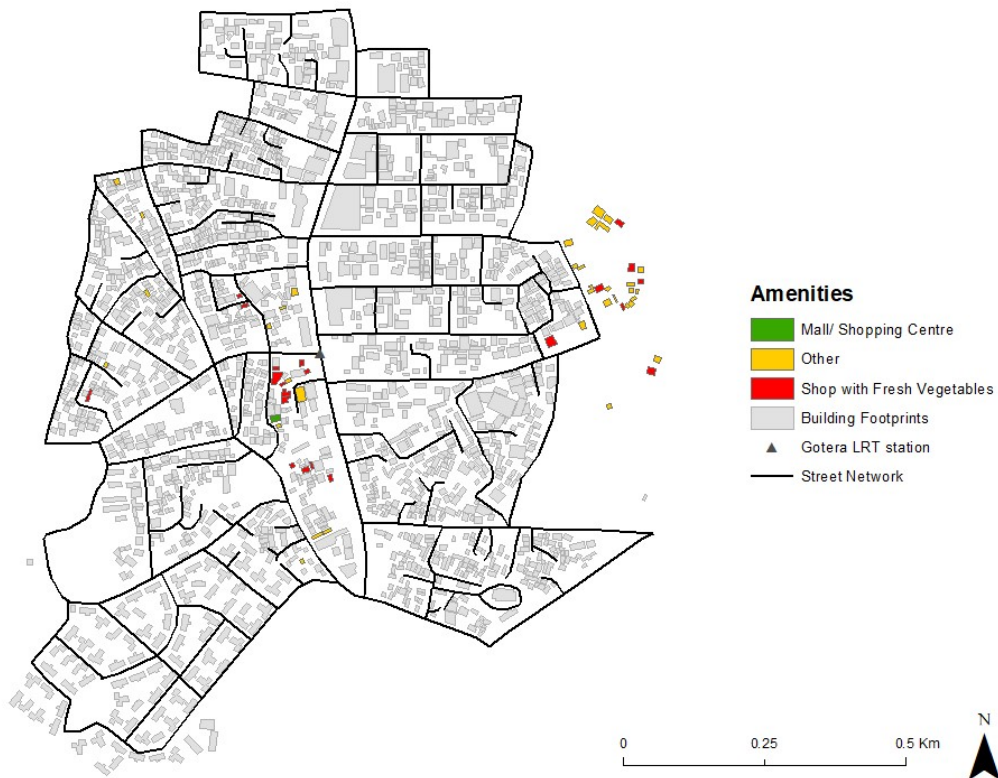
Source: ITDP

2.6 Densify: 15/15

Residential density is the dominant share. According to the city master plan, the buildings along the major roads are expected to be constructed as high-density, mixed-use complexes.

The residential density in the area is higher than in the surrounding area because of the Gotera Condominium housing project and the slum urban quarters to the north and east. Around 58.3% of the buildings are used for residential purposes.

2.7 Compact: 10/10

The site is more compact around the condominium site but gets relatively less compact as you move far from the condominium site. To the north of the site there are slum settlements called Chirkos area, with many smaller housing units and poor-quality urban environment. There are a lot of car-repair companies in the western Kera area.

Figure 66: Major land use activities around the Gotera site

Existing Land Use (500m)

- Administration
- Commercial
- Cultural & Social Welfare
- Education
- Green
- Health
- Manufacturing & Storage
- Mixed Residential
- Open space
- Recreation
- Residential
- River
- Road network
- ▲ Gotera LRT station
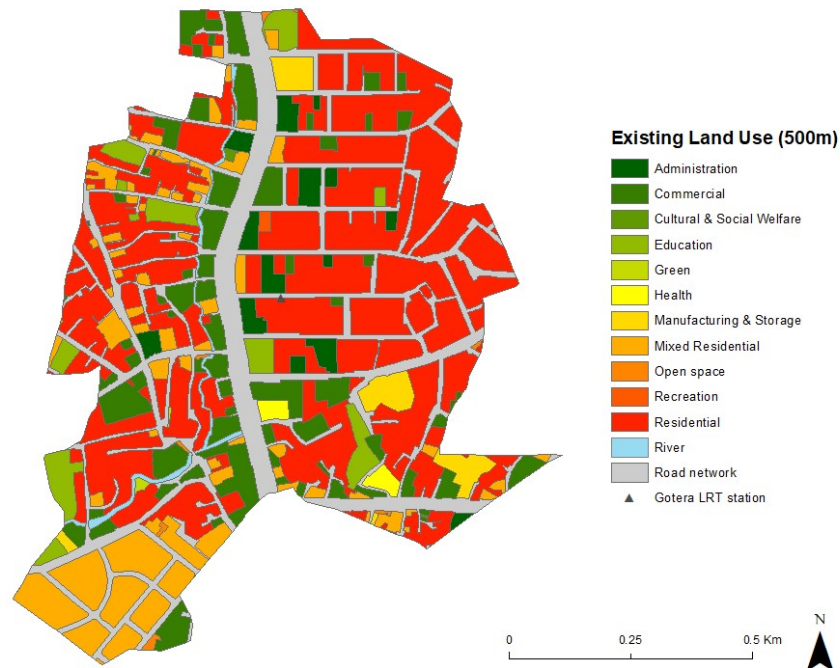
Source: ITDP

In addition to the LRT, the area is served with many midi buses, regular large buses, and digital taxis.

2.8 Shift: 12/15

On-street parking is common inside the Gotera Condominium site, and we observed vehicles parked on the walkways. The streets inside the condominium are shared and the walkways are less than 2 m wide on both sides of the street. In addition to on-street parking, there are surface car parking spaces in front of the condominium. From the total of 87 hectares of land, around 2 hectares are used for off-street parking.

2.9 TOD score: 43/100

3. Addis Ababa: Jemo Condominium

3.1 Walk: 2/15

Walking is a dominant mode of transport inside the condominium site. There are shared streets that have relatively high-speed vehicles running through them. The walking infrastructure is in poor condition and like the rest of Addis Ababa city streets, universally accessible conditions for people with disabilities are missing on most of the local and collector streets. We observed zebra crossings on the major arterial street.

Figure 67: Visually active frontage map for Jemo site
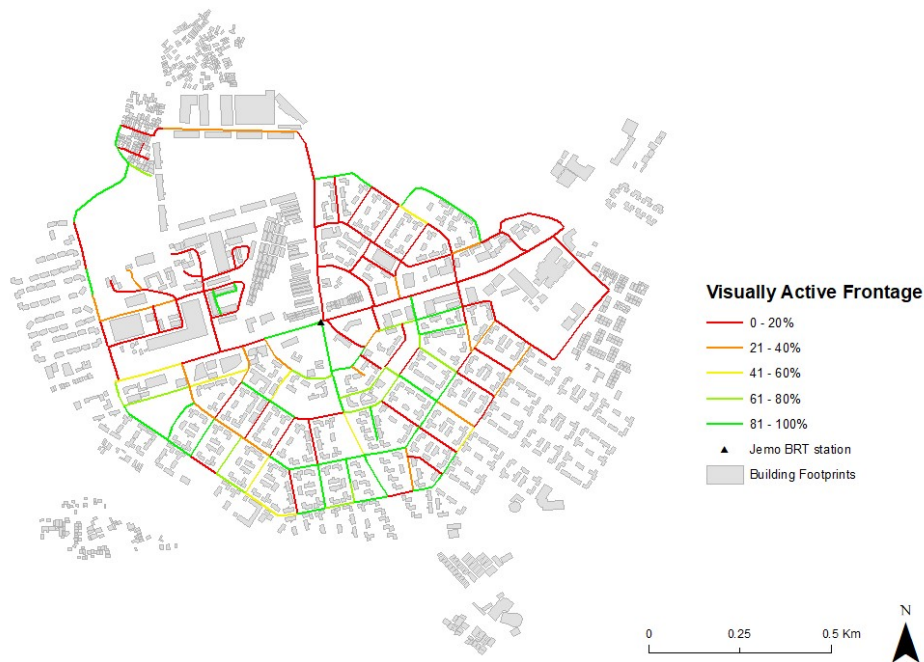
Source: ITDP

The survey was conducted on 151 street segments with a total length of 15.14 km. The visually active frontage survey shows that 9.4 km or 62% of the streets lie with the range of 0% to 25% of visually active frontage; 2.6 km or 17.2 % of the streets have between 25% and 50%; 1.93 km or 12.7% of the streets have 50% to 75%; and 1.2 km or 8.2% of the street have over 75% visually active frontages.

The site survey result shows that the streets within the Jemo area are not active because there are dead walls and several fences inside and outside of the condominium. Only 20% of the streets along the major arterial streets have a visual frontage of 50% or more.

Figure 68: Physically permeable frontage map for the Jemo site
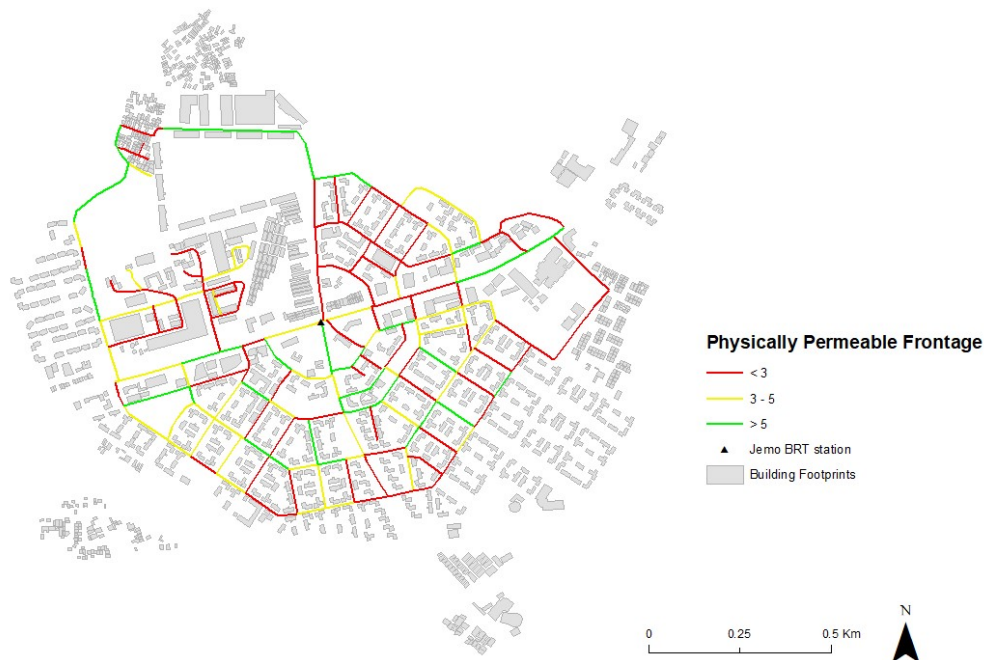
The permeability survey to calculate the number of entrances per 100 m of a street was conducted on 145 street segments with a total length of 16.5 km. The result indicates that 8.6 km or 52% of the street have less than three entrances along the corridor; 5.14 km or 31% of the street have three to five entrances; and 2.84 km of the street have more than five entrances along the corridor. The survey results show that more than 50% of the streets are not permeable.

Most of the streets are designed and constructed with no pedestrian crossings, and for the major streets the crossings on the major streets are not used by pedestrians because their locations are not convenient.

Figure 69: Shared streets at Jemo Condominium with no shades and pedestrian crossings

3.2 Cycle: 1/5

Addis Ababa city has introduced the first bike project that runs from Jemo to Lebu area, which is a residential area in the eastern part of the city. The cycle lane is provided along the major street of 30 m right-of-way

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width. Bicycle parking was not observed—people using bicycles had to take them to nearby workplaces or homes. The city permits informal bike rental companies to operate on the corridor. The companies rent bikes by holding riders' identification cards, and the riders use the walkways for bicycle parking and maintenance.

**Figure 70: Existing cycle lane at Jemo site (left); bike parking and maintenance on walkway (right)**

Source: ITDP

3.3 Connect: 4/10

The Jemo site is connected to the central part of the city with two major arterial streets, one that leads to Mexico area, which is the city's main centre, and the other feeds to the western urban express ring road. Within the Jemo Condominium, the blocks are mainly fenced and have one or two entrances for every cluster of five to six condominium buildings.

The condominium site covers almost 43% of the site and has a block size of less than 130 m. The glass manufacturing industry and the children's care centre together cover around 50% of the site and have a block length of less than 110 m.

Figure 71. Block length map for the Jemo site
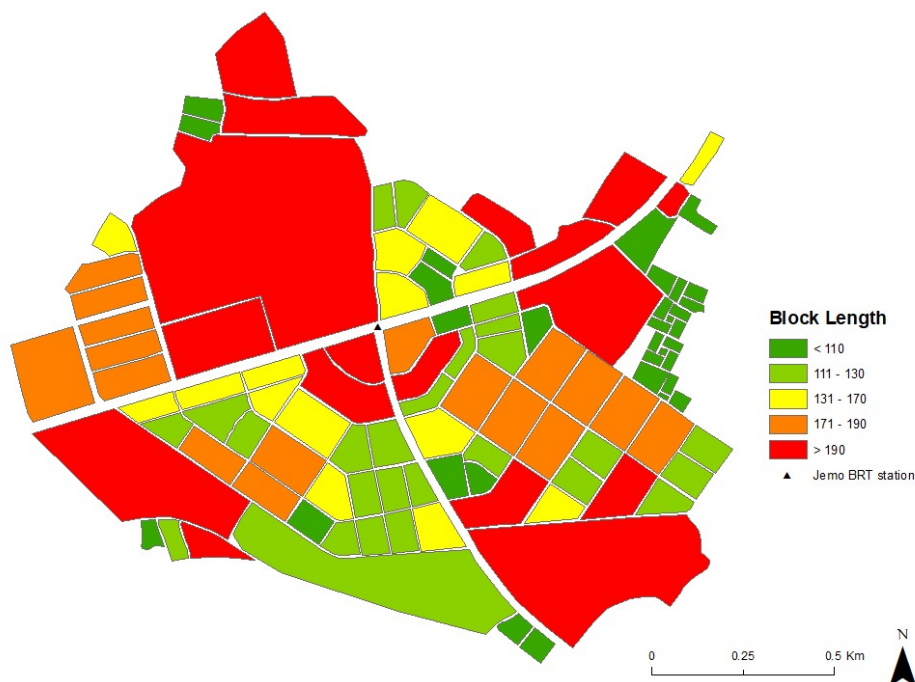
Source: ITDP

3.4 Transit

The major transportation services in the site are regular buses provided by government-owned enterprises and minibuses taxis that connect long-distance. The master plan of Addis Ababa had proposed and started the design process to construct the BRT service as the second project that aims to connect the eastern and western parts of the city.

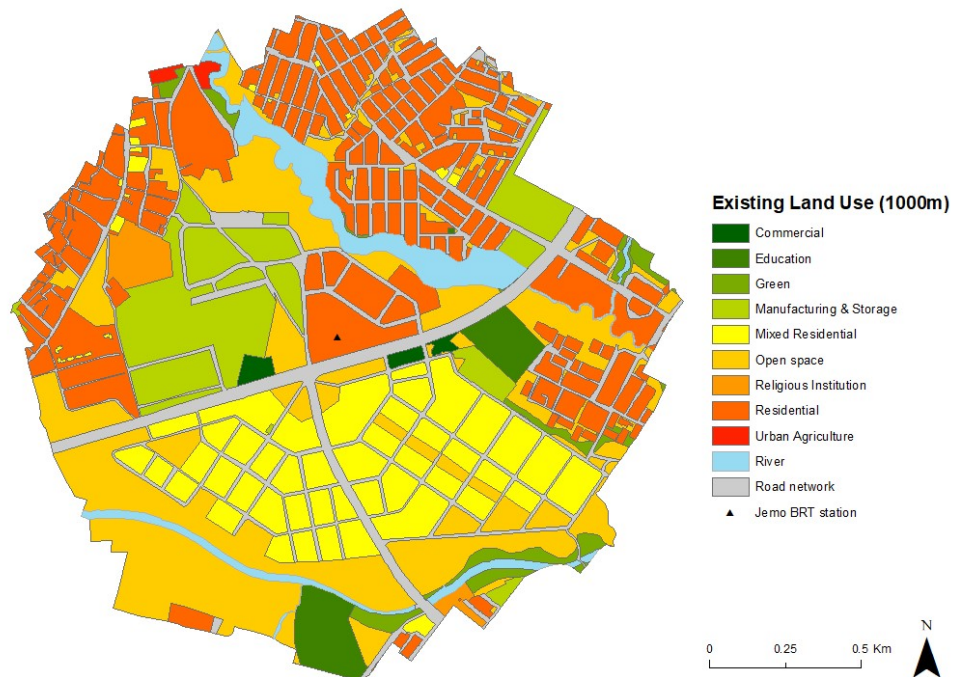**Figure 72: Morning-peak passengers waiting for transport at Jemo**

Source: ITDP

3.5 Mix: 12/25

The land use at the Jemo site is mainly residential and service areas. The service types are hospitals, market areas, and smaller shops on the ground floor of the condominium buildings.

The dominant land use is residential, with 14 hectares of land.

Figure 73: Land use around Jemo site

Existing Land Use (1000m)

- Commercial
- Education
- Green
- Manufacturing & Storage
- Mixed Residential
- Open space
- Religious Institution
- Residential
- Urban Agriculture
- River
- Road network
- ▲ Jemo BRT station

0   0.25   0.5 Km   N

Source: ITDP

Figure 74: Amenities map for Jemo site

Amenities

- Office
- Other commercial
- Retail
- Utility
- ▲ Jemo BRT station
- Building Footprints
- Street Network

0   0.25   0.5 Km   N

Source: ITDP

3.6 Densify: 15/15

The condominium site is highly densified, with residential condominium buildings. Most of the buildings that face the streets have a ground floor of commercial, cafeterias and shops. From a total of 100.8 hectares, residential use covers 43 hectares, the glass manufacturing industry at the northern part covers 30.6 hectares, 6.8 hectares are used for a childcare centre and the remaining land goes to other uses. The residential use will cover over 43% of the total uses.

3.7 Compact: 8/10

The site is more compact only around the condominium site, with farmlands and open spaces beyond. The site is in the southwestern outskirts of Addis Ababa. The city built several condominiums around the site outside the 1,000 m catchment area; there are also several manufacturing and storage facilities, informal settlements on the northern part of the site, and urban agriculture in the south, and these are the major land uses.

3.8 Shift: 15/15

On-street parking is common at the Gotera site, and a few times the vehicles were observed parked on the walkways. The streets inside the condominium have a shared use when the walkways are less than 2 m wide from both sides. The Jemo catchment area covers around 100.8 hectares of land, and off street-car parking space uses around 5 hectares of land or 5% of the site.

3.9 TOD score: 57/100

4. Dar es Salaam: Tandale Argentina BRT station

4.1 Walk: 6/15

Walking is the predominant mode of movement within the study area. Public shared streets make up 60% of the total street length. Crossing facilities are non-existent, except along the BRT corridor, which has a tabletop pedestrian crossing at each end of the Tandale Argentina station. No defined on-street parking areas were observed in the study area, resulting in haphazard parking. Solid waste was observed on some of the streets, and this is due to poor waste management in the study area.

While we observed that many of the streets in the study function as shared streets, they were not paved and did not qualify for points as shared streets.
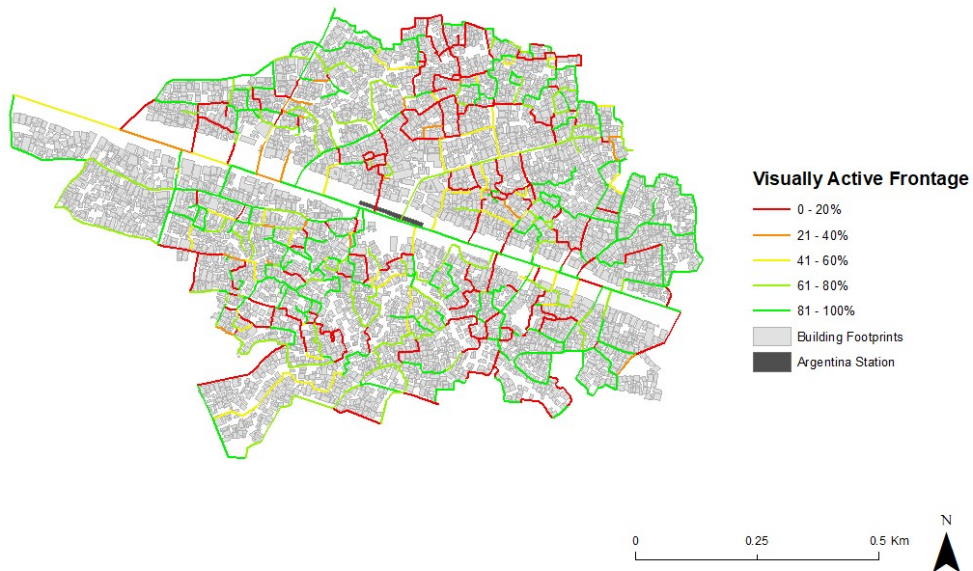
Figure 75: Shared street in Makurumla sub-ward-Tandale, Dar es Salaam
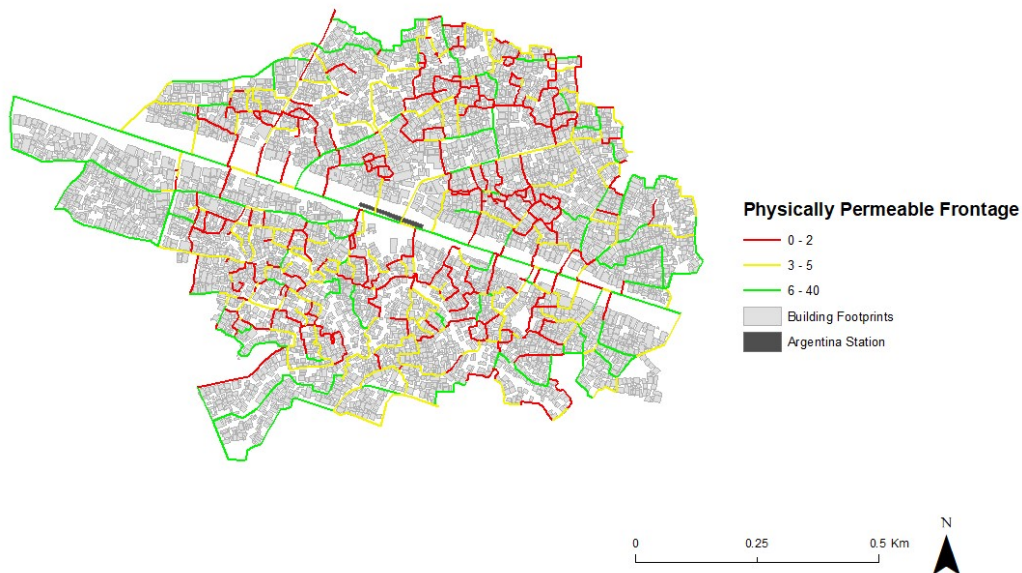

Source: ITDP

Figure 76: Visually active frontage map in Argentina BRT station area

Figure 77: Physically permeable frontage map in Argentina BRT station area

4.2 Cycle: 1/5

The BRT corridor line 1 runs through the study area and contains a well-articulated cycle track and footpath on each side of the road. Both the cycle tracks and footpaths are well paved, allowing smooth movement of nonmotorized transport users. However, away from the BRT corridor, cycling is not a preferred mode of transport in this area because of traffic conditions. We observed encroachment on the cycle and pedestrian lanes, particularly at the stations where street vendors display their goods for sale to BRT passengers.

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Movement of vehicles into the BRT corridor is limited to a few access roads that join the major road. There are a few shared streets with vehicle speeds of over 30 km/h. Up to 85% of the streets are not in good shape—they are mostly gravel roads with speeds of less than 15 km/h and few cyclists.

Specific parking areas for cycles were not observed on the BRT corridor or within the housing areas. DART is now advocating the use of cycles as the last/first mile mode by constructing cycle parking facilities at BRT terminals.

Figure 78: The bicycle path along the BRT corridor adjacent to Argentina station

Source: ITDP

4.3 Connect: 4/15

The majority (about 75%) of the blocks are long (>190 m). This is likely because the area is unplanned, and each landowner wants to maximise use of their land. However, the community seems to be highly stitched and connected though narrow footpaths. The blocks were thus demarcated following existing streets or wider foot paths. However, there are few blocks with lengths shorter than 110 m. Most of the shorter blocks are found at the periphery of the study area.

Figure 79: Block lengths in Argentina BRT station area
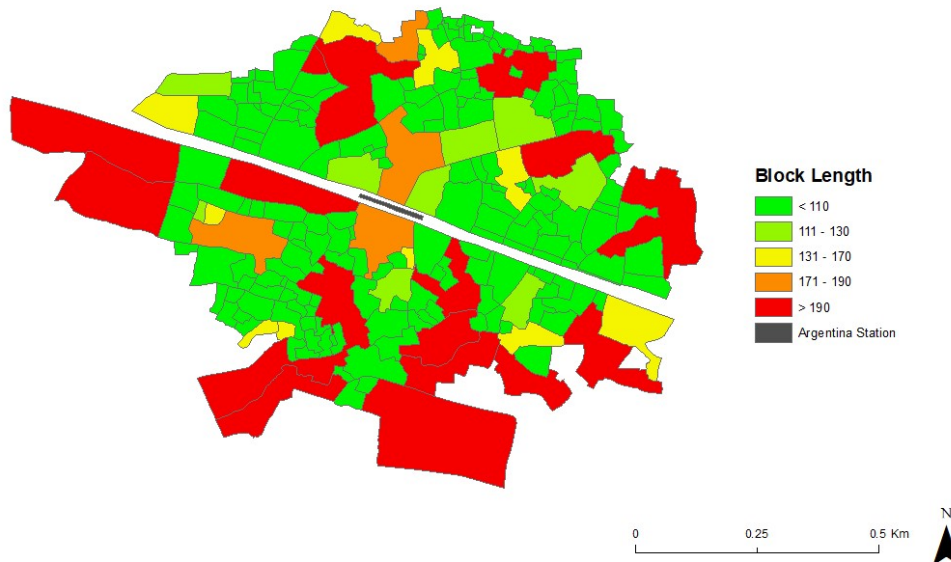
Source: ITDP

4.4 Transit

The study area is served by the high-capacity BRT, which started operations in mid-2016. The Argentina BRT station is easily accessible by foot, as there are no geographical barriers. The study area is close to the city business district (approximately 20 minutes), so there is easy access especially with the BRT buses. To complement transit in this area, there are other city buses known as *daladalas*. However, we observed the *daladala* system to be unreliable and overcrowded, offering poor service compared to the BRT.

Figure 80: BRT operations on dedicated bus lanes

Source: ITDP

Figure 81: Argentina BRT station

4.5 Mix: 12/25

The land use at Argentina/Tandale is mostly residential, with small units in one-story buildings. We also observed a few high-rise hotel buildings within the site. The area has schools for children and kiosks for fruit vendors, and many building frontages are used for small businesses. A larger part of the study area (75%) contains residential units. Its population constitutes a low-income group in informal settlements in the city. In most cases, many non-residential units are found along the segments.

Figure 82: Existing land use near Argentina BRT station
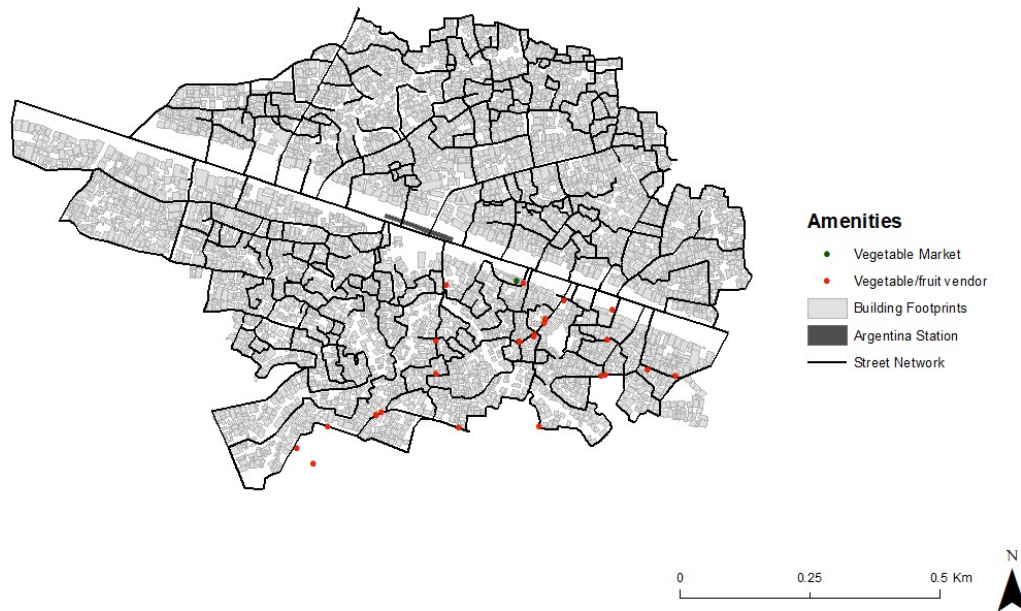
Source: ITDP

Source: ITDP

4.6 Densify: 13/15

The study area is highly densified with residential housing units, and small traders use front rooms facing the streets.

4.7 Compact: 10/10

The study area is compactly developed by the private sector with few vacant areas. Some of the planned interventions like development of public grounds under Dar es Salaam Metropolitan Development Project (DMDP) were not done because of a lack of open areas.

4.8 Shift: 15/15

Car ownership is relatively low in the study area. On-street parking was observed during the survey mostly due to scarce parking space within the plots. We observed that for the plots with no accessibility, car owners leave their vehicles in a designated places and pay a nominal parking fee overnight. The streets have no predefined walkways forcing pedestrians and vehicles to use the available space concomitantly.

Figure 84: Unpaved streets with no clear on-street parking

Source: ITDP

4.9 TOD score: 61/100

5. Ahmedabad: Gupta Nagar

5.1 Walk: 7/15

Gupta Nagar abuts two major roads, the Vasna-Ashram Road and the 132 Feet Ring Road, a major arterial road that connects Vasna to the rest of Ahmedabad. While both roads have pedestrian footpaths, the traffic, shop spillovers, cattle, and other activities make walking difficult. The footpaths along the arterial roads in Gupta Nagar do not include universally accessible features such as curb ramps for the differently abled. While at-grade crosswalks are present on the major roads, they do not have refuge islands or other support for people with disabilities.

Figure 85: Footpaths on major roads occupied by parking and shop spillover

Source: Jacob Baby & Mallika Seghal

Local and pedestrian-heavy streets make up most streets inside these settlements. The Slum Networking Project laid out paved, complete street networks that support walking, cycling, and slow traffic. However, most of these walkways are obstructed by shop spillovers, vending, and on-street parking. Safety is achieved through 'eyes on the street', as most houses open to the street and interior activities are visible through doors and windows, as shown in Figure 86 and Figure 87, which show visually active and physically permeable frontages.

Figure 86: Visually active frontage map of Gupta Nagar

Figure 87: Physically permeable frontage map in Gupta Nagar
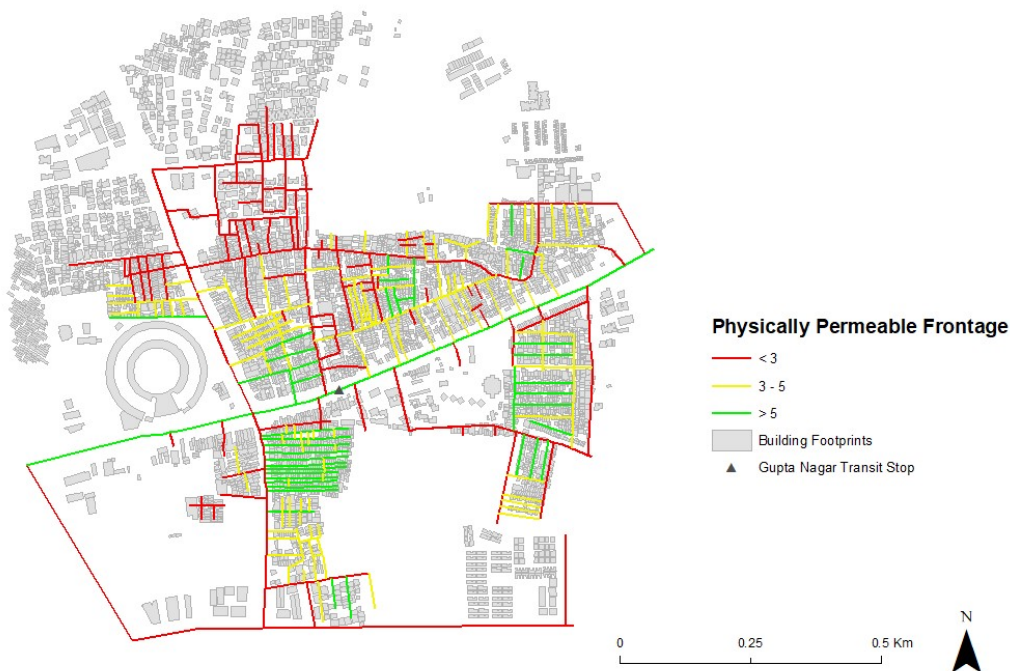
5.2 Cycle: 3/5

Around 92% of the streets are local shared spaces and pedestrian/cycling paths in Gupta Nagar. Along these streets, we observed slow vehicle traffic, pedestrians, and some people cycling, mostly for work. We did not

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observe dedicated cycle tracks on any of the roads, and on the major roads, cyclists shared space with fast-moving automobiles, pedestrians and other encumbrances on the street.

We did not observe specific bicycle parking racks or spaces in the settlement. In buildings that opened to internal lanes (carrying most of pedestrian and cycling traffic), bicycles were parallel-parked outside the homes or kept inside. Exclusive bicycle parking inside buildings is not required by the building regulations/byelaws; however, in buildings with ground floor use as parking, bicycles share parking spaces with other vehicles.

Figure 88: Cycles parked close to homes on the street

Source: Jacob Baby & Mallika Seghal

5.3 Connect: 11/15

The block lengths for the entire area (including vacant/empty plots) were 100 m to-450m. When we exclude the vacant plots, 78% block lengths are found to be shorter than 110 m. These shorter block lengths support walking and cycling and offer shorter routes to several areas.

Figure 89: Maps of Gupta Nagar showing block lengths
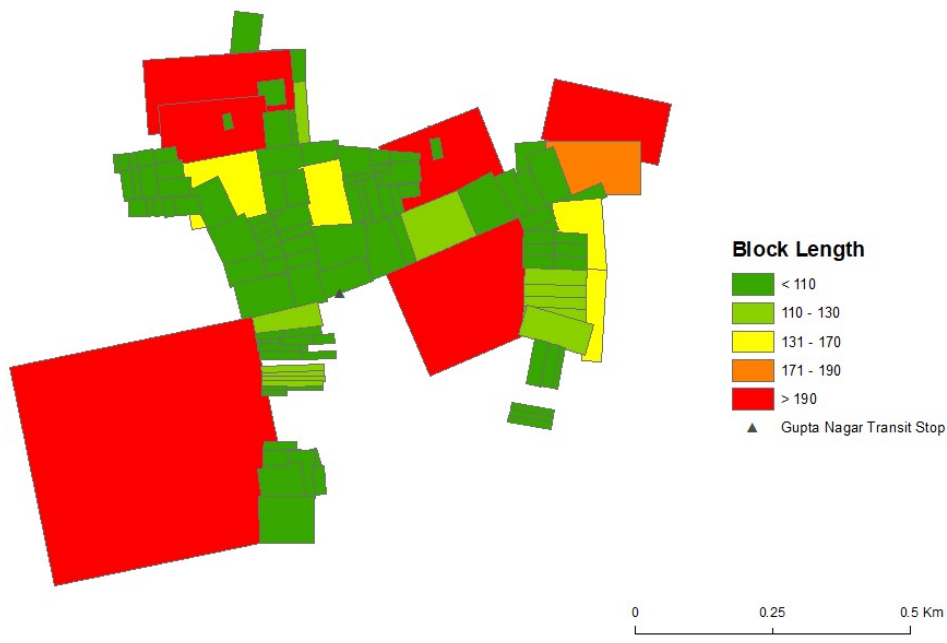
Source: ITDP

The huge number of pedestrian and shared-space intersections (76% of the total intersections) indicates that the street network supports non-motorised travel modes such as walking and cycling over motorised connectivity.

5.4 Transit

Gupta Nagar settlement is well connected to the city with AMTS bus service public transit routes. Paratransit services such as auto-rickshaws operate along the major roads and within the internal shared spaces of the settlement. Shared autos (more than three passengers) are observed along the public transit routes, offering cheaper fares and convenience over the public bus. The walking distance to the bus stop from the farthest building is approximately 550 m to 600 m. Gupta Nagar is adjacent to an upcoming MRTS station being built under the Ahmedabad Metro Project.

5.5 Mix: 18/25

The predominant building use in the area is residential, occupying close to 80% of the total floor space. We observed mobile vendors offering fresh vegetables and fruits on most of these streets, particularly on the large network of local shared and pedestrian spaces. Around 36% of the streets have some kind of vending activity during the day, and almost 90% of the buildings are close to these fresh food sources. Around 40% to 42% of the buildings are within a 1 km walking distance of a school and healthcare facility.

The SNP project ensured that households would not have to relocate from the existing site and would be connected to the city's infrastructure systems. The houses were incrementally upgraded, and housing prices were found to be within the median incomes and housing prices of Ahmedabad. Over 50% of these houses are affordable. New developments in the region have brought in newer business and have not displaced existing businesses.

Figure 90: Map of Gupta Nagar showing predominant land use

Source: ITDP

Figure 91: Map of Gupta Nagar showing amenities
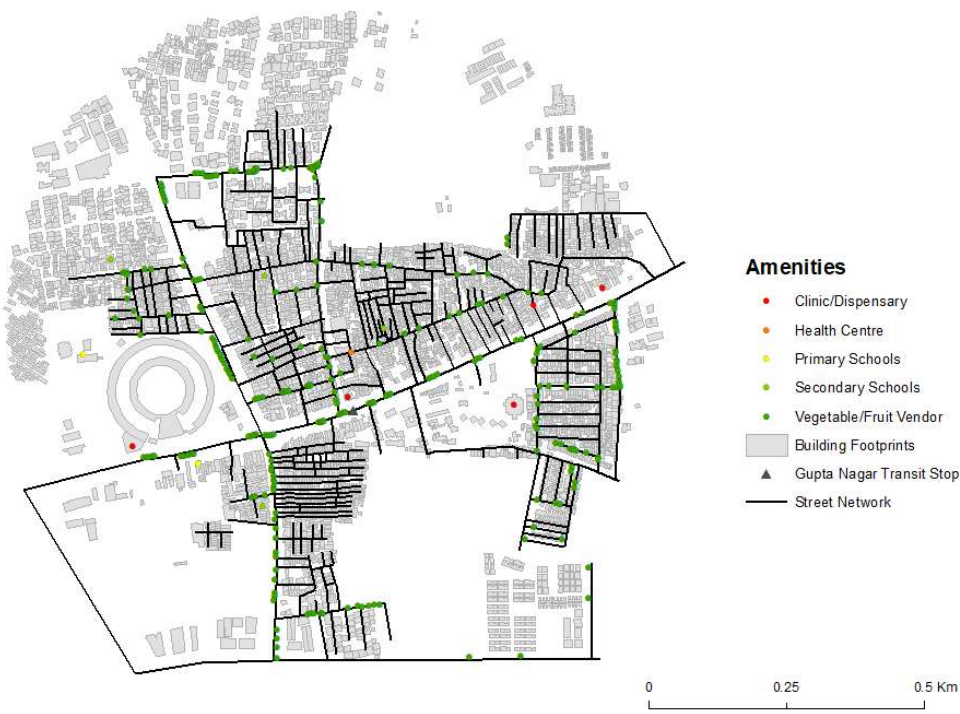
Source: ITDP

5.6 Densify: 11/15

The non-residential density was estimated using the number of jobs/workers in the area. We obtained these figures from the Primary Census Abstract (PCA) of Census 2011, and we obtained ward-level data from the Municipal Corporation. The non-residential density for the station area is well above the baseline of the city. This indicates that the area is home to many jobs.

We estimated the residential density using the total housing units or dwelling units in the area and an estimate of housing occupancy. The residential density within the station area was slightly higher than the baseline residential densities in the city.

5.7 Compact: 6/10

We assessed the compactness of the site on the surrounding developable areas. While Gupta Nagar qualifies as an urban site, the presence of vacant lands on two sides decreases its score considerably. These lands are empty/vacant because of legal disputes over titles and ownership, and they could open up for development once there is a clarity or consensus in these disputes. As mentioned earlier, the site has multiple transit options in modes such as public buses and paratransit vehicles. However, a bikesharing scheme is absent.

5.8 Shift: 15/15

Off-street parking comprises 2.25% of the total site area. This parking is mostly within buildings on designated parking floors. Formal on-street parking lanes and zones were not present on site, but we observed informal parking of cars and other vehicles on the roadsides and sometimes on the footpaths. In the local shared spaces and some pedestrian lanes, cycles, M2Ws, and auto-rickshaws occupy space along the streets by parking in angular or parallel fashion.

Of the total site area, 14% is occupied by roads and on-street parking spaces. Around 120 driveways intersect the walkways, which is less than two driveways per 100 m.

Figure 92: Some of the lanes being used as parking spaces in Gupta Nagar

Source: Jacob Baby & Mallika Seghal

5.9 TOD score: 71/100

6. Mumbai: Charkop sites and services scheme

6.1 Walk: 6/15

Local shared streets (9 m right-of-way) constitute 50% of the total publicly accessible streets. A total of 32% of the streets are sub-arterial or collector and the rest are shared pedestrian and cycling paths. All the streets are well-lit; however, only around 46% of the streets in the scheme are predominantly shaded.

We observed that pedestrian movement on the footpaths along the sub-arterial and collector roads is obstructed by shop spillovers, vendors, solid waste, bus stops, and vegetation. On-street parking is one of the major issues in this area, making it an unpleasant walking experience. We observed crosswalks and refuge

islands on the main traffic junctions. The sidewalks do not have access ramps, which makes them inaccessible for persons with mobility impairments.

Buildings flank the local shared streets, which increases the perception of security. The shared streets have traffic-calming elements such as speed bumps that reduce the average vehicular speeds to less than 15 km/h.

Figure 93: Publicly accessible local streets
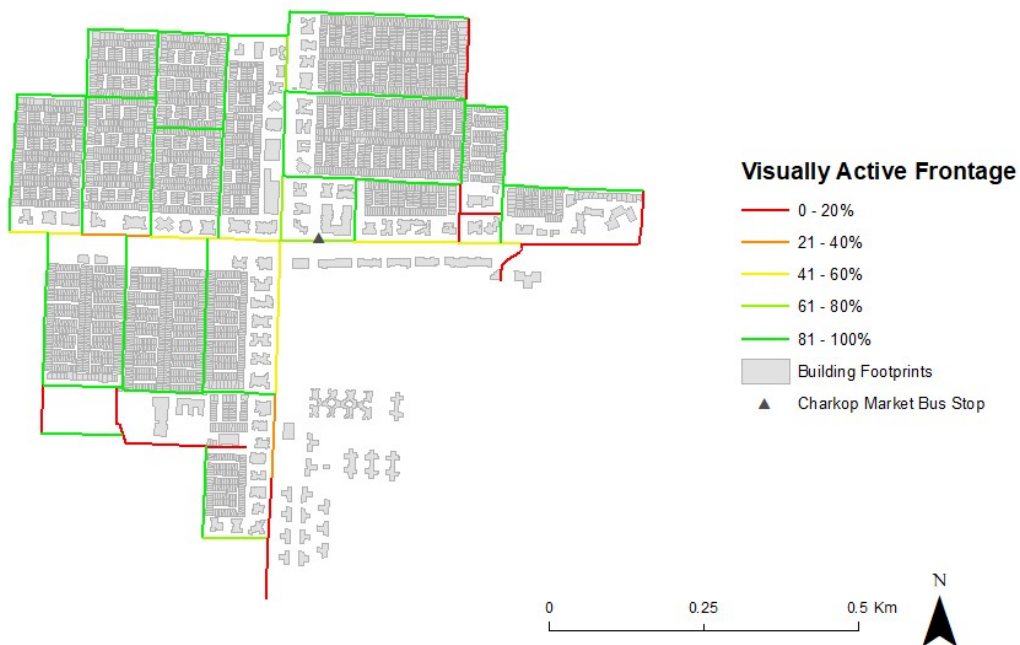

Source: Sonal Shah

Figure 94: Map showing percentage of visual activity on each street

Physically Permeable Frontage

— < 3
— 3 - 5
— > 5

▢ Building Footprints
▲ Charkop Market Bus Stop

0   0.25   0.5 Km

N

Source: ITDP

6.2 Cycle: 3/5

Around 70% of the public streets are conducive for cycling, thanks to traffic-calmed local streets with average vehicular speeds of less than 15 km/h and walking and cycling paths (as observed in the images below). We observed moderate cycling activity on most of these local shared streets and paths. The sub-arterial and collector roads do not have cycle tracks.

Sheltered and dedicated cycle parking was not observed on-site or at bus stops. However, bicycles are parked informally along streets, within the compounds of apartment buildings, and in public areas that are under surveillance.

**Figure 96: Walking and cycling paths on site**

Source: Sonal Shah

6.3 Connect: 1/15

The site was planned with a network of well-connected streets, which over time have been closed by different residential societies. A total of 62% of the blocks have lengths greater than 110 m, with the longest block measuring 395 m. The distance between intersections on the shared streets and sub-arterial roads results in longer block lengths and increased block sizes. Intersections along the sub-arterial roads are extensively used by pedestrians to cross over to the other side. However, no safe crosswalks are present, so these do not qualify for points.

Figure 97: Map showing varied sizes of blocks based on block lengths
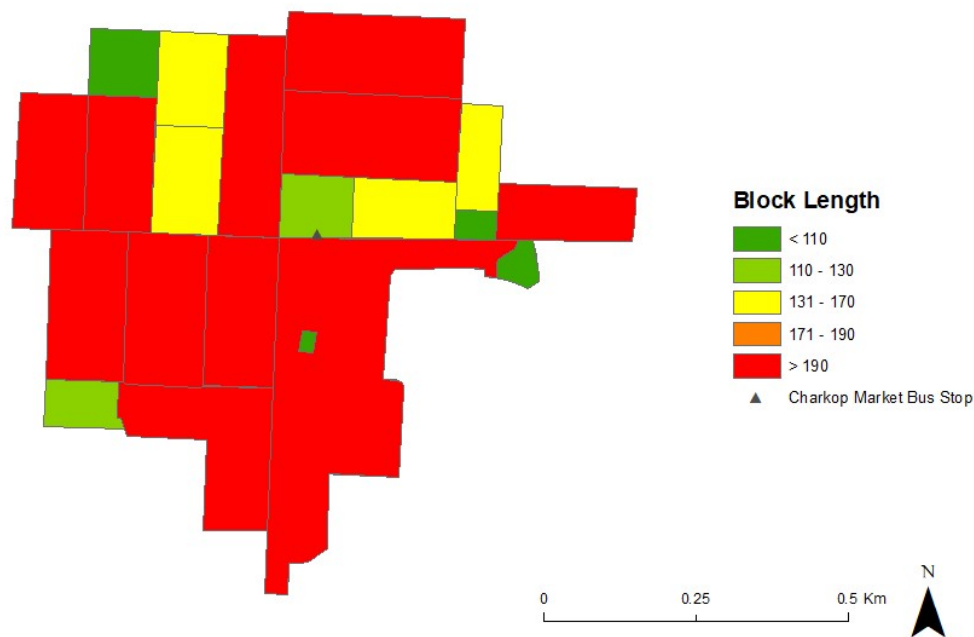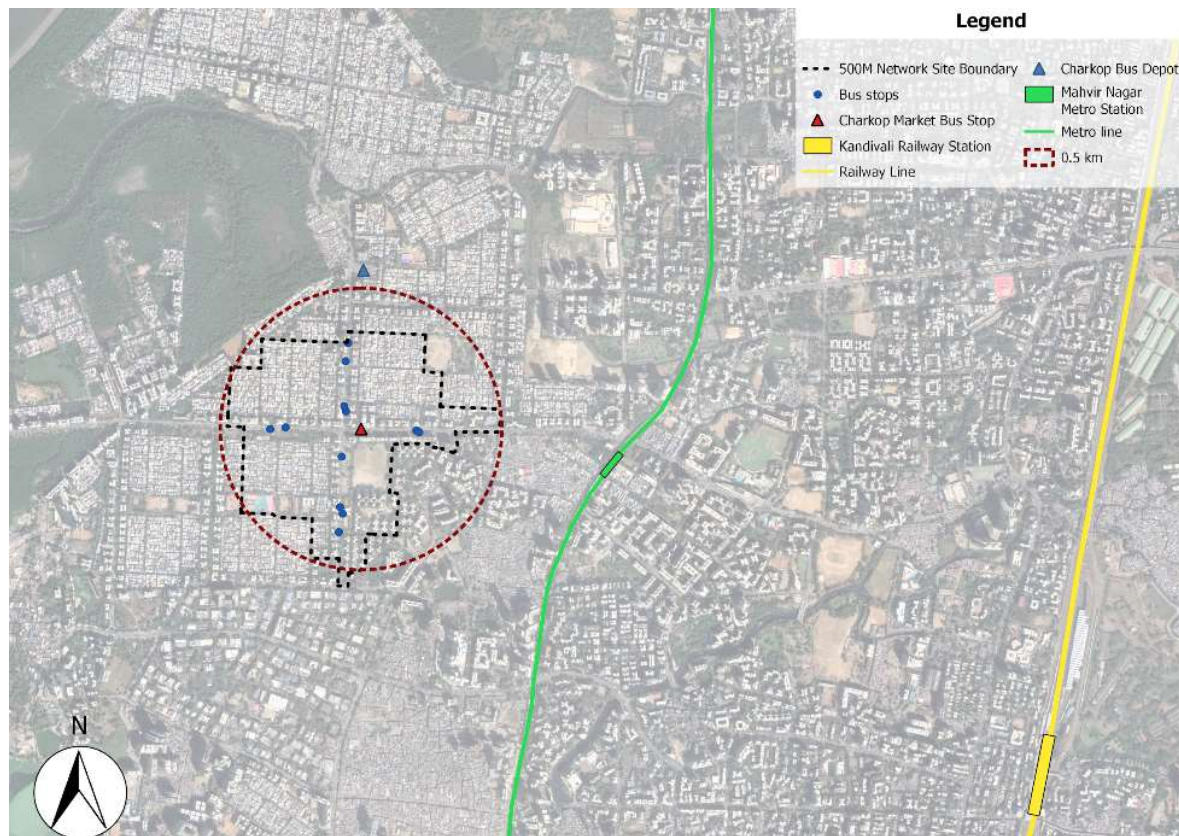

Source: ITDP

6.4 Transit

The area is well connected by bus stops and the maximum distance of the farthest building from a bus stop is 760m. The following mass rapid transit stations and depots are located at varying distances from the Charkop bus stop:

- Kandivali railway station (west): 3.5–4.5km
- Proposed metro station: 1 km
- Charkop bus depot: 650 m

Figure 98: Map showing the location of transit stations and depots closest to the site

Source: ITDP

6.5 Mix: 17/25

Since this scheme is a greenfield site, no households or businesses were relocated in the process. A total of 87% of the study site is predominantly residential: Row houses make up 85%, and the rest is apartment buildings. Most of the apartment buildings located along the sub-arterial and collector roads have commercial use on the ground floor, with pharmacies, retail, general stores, and real estate agencies. As a part of each cluster, the row houses that abut the streets have partially converted their ground floors into shops offering services like tailors, laundries, beauty parlours, grocery stores, and fitness studios, along with healthcare clinics and tuition classes. However, the internal houses facing the shared courtyard are predominantly residential.

The site is well served by amenities. At least 80% of the buildings are within 500m walking distance of a fresh food source provided by street vendors and grocery stores, whereas 100% of the buildings are within 1 km of a primary health centre/clinics/hospital. Additionally, 70% of the buildings are within 500 m walking distance of a public park.
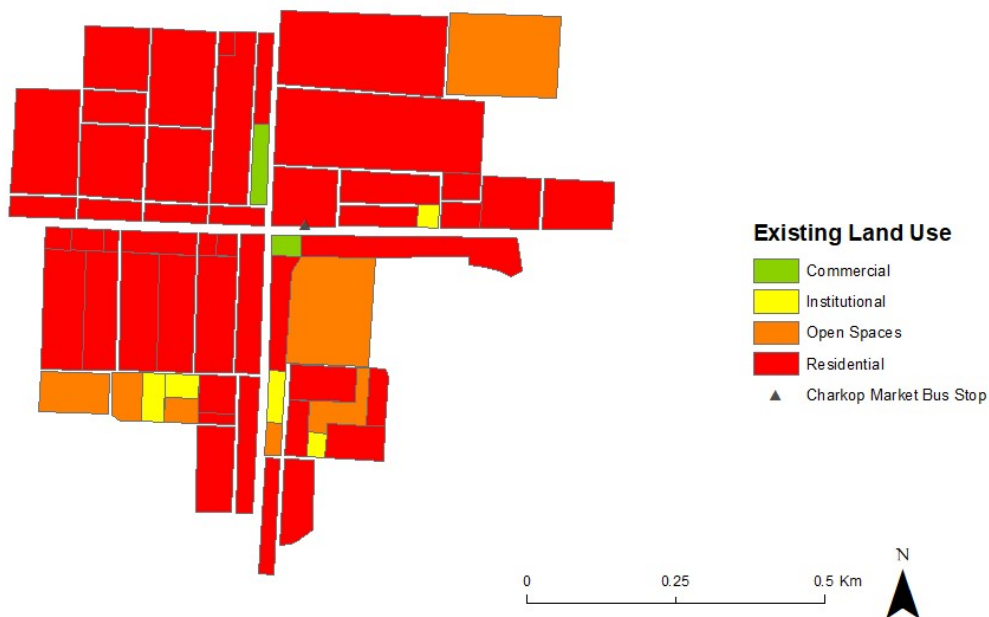
Figure 99: Commercial activity along the local shared streets
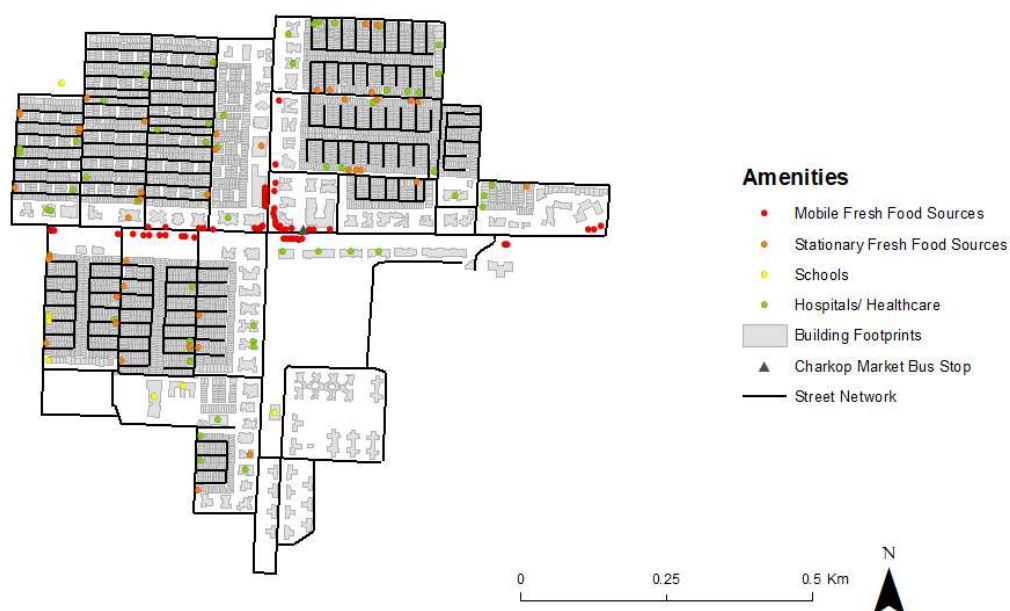

Source: Sonal Shah & Sagarika Nambiar

Figure 100: Land use map of the Charkop study area

Source: ITDP

Figure 101: Map showing locations of different amenities on site

6.6 Densify: 13/15

The residential density in the site (150 dwelling units/Ha) is more than that of the city (75 dwelling units/Ha) and the ward level (86 dwelling units/Ha). The non-residential density is 1694 jobs/Ha, whereas compared to the baseline density of the city is 223 jobs/Ha. This may be due to the nature of non-residential activities in the site, which includes not only commercial retail on the ground floor of apartment buildings but conversion of household units into small-scale home businesses, offices, and retail stores.

6.7 Compact: 10/10

About 95% of the site is developed and is surrounded by existing built-up areas on all sides. These sites include residential and industrial areas. Nine bus stops (serving 11 different bus routes) are located along the sub-arterial and collector roads within the site, and auto-rickshaws are available for hire throughout the day. The presence of different modes of local transport connects people to different parts of the city and meets their diverse needs. This encourages people to use transit and rely less on private vehicles.

6.8 Shift: 15/15

Parking and dedicated traffic lanes constitute less than 10% of the total site area. On-street and off-street parking constitutes less than 5% of the total site land area. Off-street parking is observed within the shared courtyards in the housing clusters or as stilt parking within apartment buildings. About 30% of the on-street parking is on the sub-arterial and collector roads occupying 20% of the carriageway. These predominantly include two-wheelers, three-wheelers, and four-wheelers.

6.9 TOD score: 65/100

7. Pune: Yerwada

7.1 Walk: 9/15

The six slum settlements and surrounding area are situated along the Airport Road and Pune–Ahmednagar highway. The arterial, sub-arterial, and collector roads constitute only 21% of the total street network. While

these roads have footpaths, and crosswalks are well lit, they lack ramps and bollards on the edges, so they are not universally accessible. Most intersections along these streets do not have crosswalks, reducing safety.

The local shared streets and pedestrian pathways create an intricate network that allows easy access throughout the site. This network of narrow lanes, ranging from 0.75 m to 1.5 m wide is carved out in the compact built form. These paths, however, suffer from inadequate lighting as well as temporary obstructions from two-wheeler and cycle parking, as well as spillover of domestic activities like washing clothes and utensils. These factors make some of the pathways inaccessible for parts of the day.

The compact residential form with commercial ground-floor use along the edges creates a visually active and physically permeable frontage, with adequate shade and shelter. Though the pedestrian pathways and local streets are not planned along a grid, they facilitate walkability across the site.

Figure 102: Inaccessible street (left); parking and vending obstructing the footpath (right)
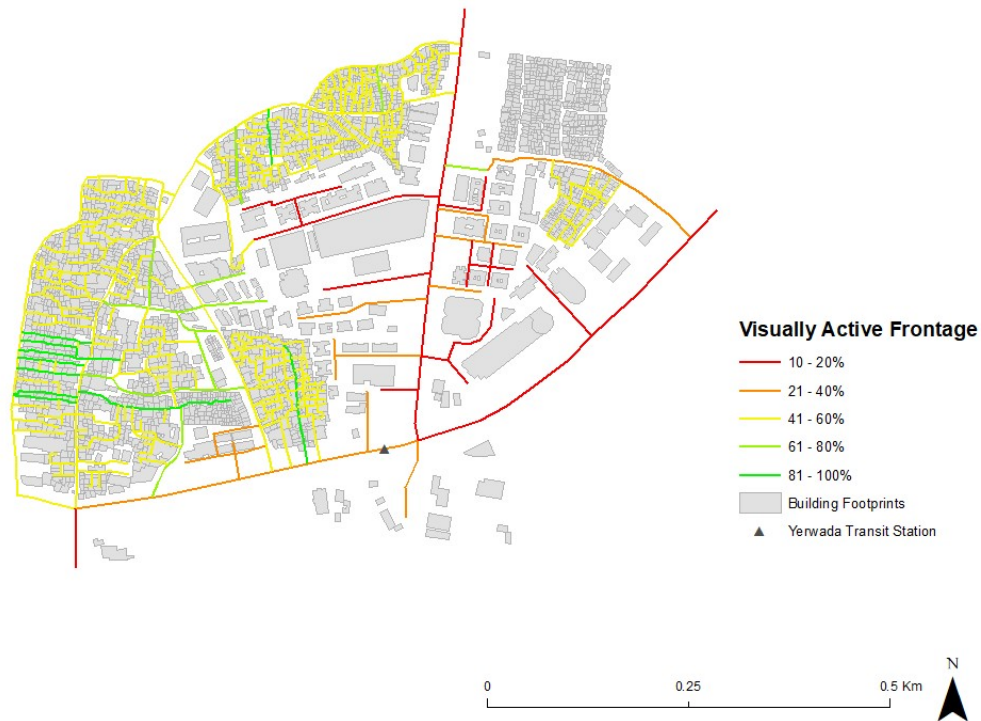

Source: ITDP

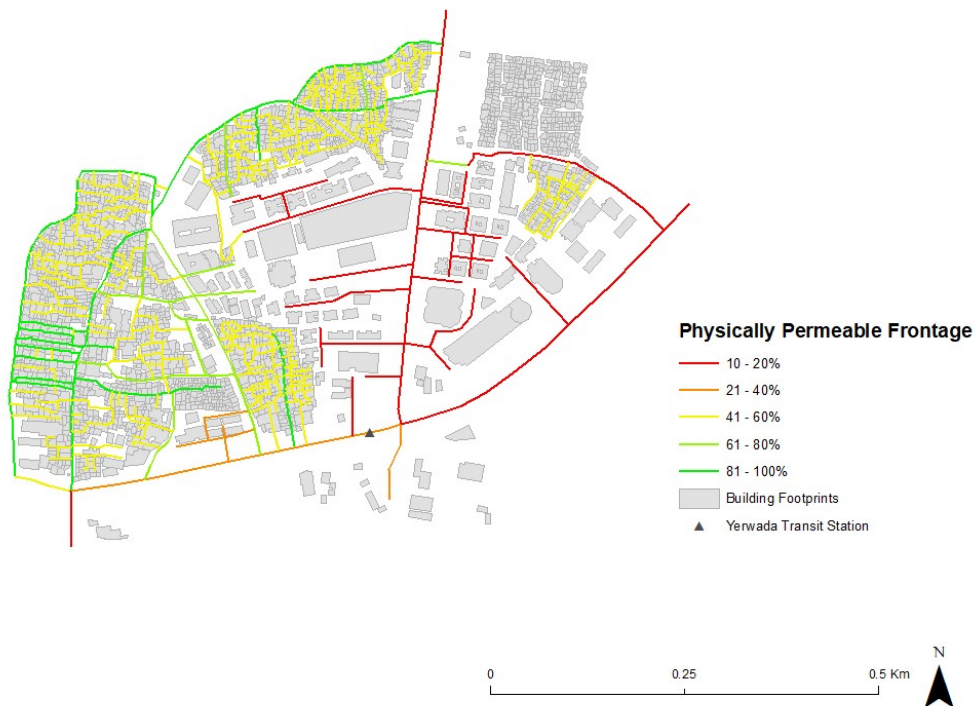**Figure 103: Local shared streets and pedestrian pathways**

Source: ITDP

Figure 104: Maps of Yerwada and other clusters showing visually active frontage

Source: ITDP

Figure 105: Maps of Yerwada and other clusters showing physically permeable frontage

Source: ITDP

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### **7.2** Cycle: 1/5

Despite the absence of a dedicated cycle track or cycling lane, we observed moderate cycling activity on all streets, along with vehicular and pedestrian activity. We observed great cycling activity on local shared streets with an average vehicular speed less than 30km/h. However, despite the presence of people cycling, few of the streets are conducive to cycling. We observed informal bicycle parking outside buildings or along the street edge because there is a lack of bicycle parking infrastructure at transit stations and at residential and commercial complexes. While building regulations do not require cycle access, gated complexes, though small in numbers, allow for secure cycle parking. Though a secure and complete cycle network is lacking on arterial streets, it has not affected the work trips made using cycle as a mode share.

Figure 106: Cycle parking outside houses
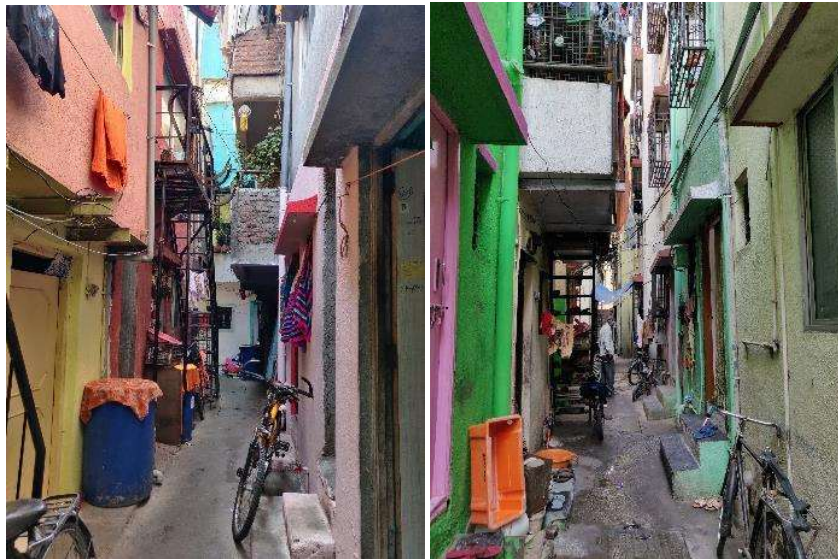
Source: ITDP

7.3 Connect: 13/15

The pedestrian and cycling pathways constitute 52% of the street network, resulting in smaller blocks. Out of 158 blocks, three blocks have a block length more than 150 m. However, these large, nonpermeable blocks occupy about half of the area, making walking routes limited for pedestrians. The three blocks consist of gated communities and commercial complexes. The policy intervention area (slum settlements) has an intricate pedestrian network resulting in smaller block lengths that allow for better connectivity, resulting in short, direct and varied routes. It should be noted that an average score for the number of blocks in the area does not capture the variability in conditions.

Figure 107: Maps of Yerwada and other clusters showing block length

Block Length
- < 110
- 110 - 130
- 131 - 170
- 171 - 190
- > 190
- ▲ Yerwada Transit Station

0   0.25   0.5 Km

N
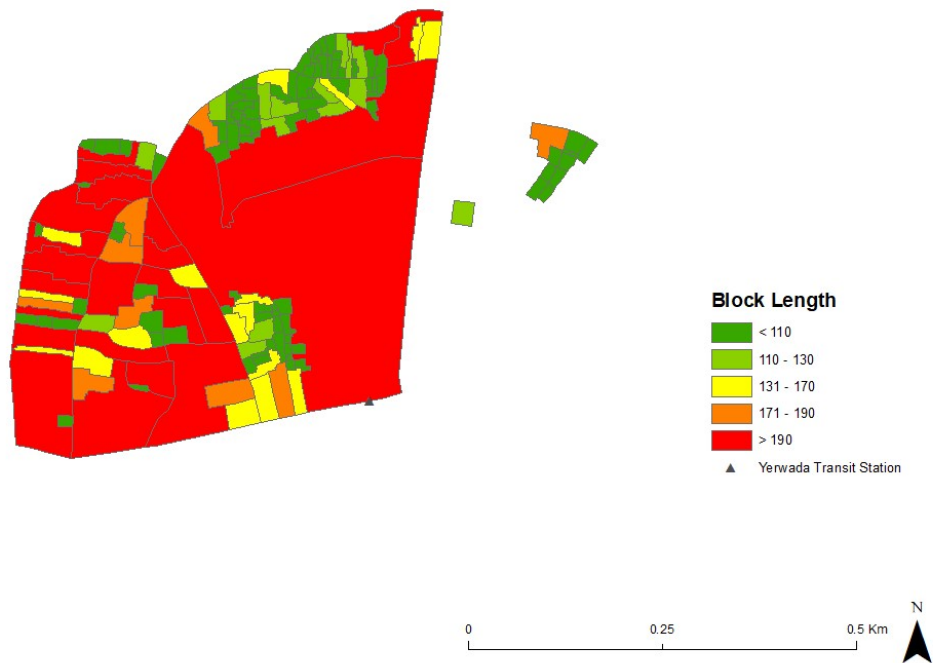
7.4 Transit

Walking distance from the farthest building to the BRTS stop considered the central point for the study area is 706 m. Despite this, public transit is accessible due to the presence of three BRT stops, two proposed metro stations, and multiple PMT and state transport bus stops along the arterial and subarterial roads. The slum settlements are well connected to the city centre, international airport, and other peripheral settlements, indicating an enhanced connection to jobs, livelihood, and social opportunities.
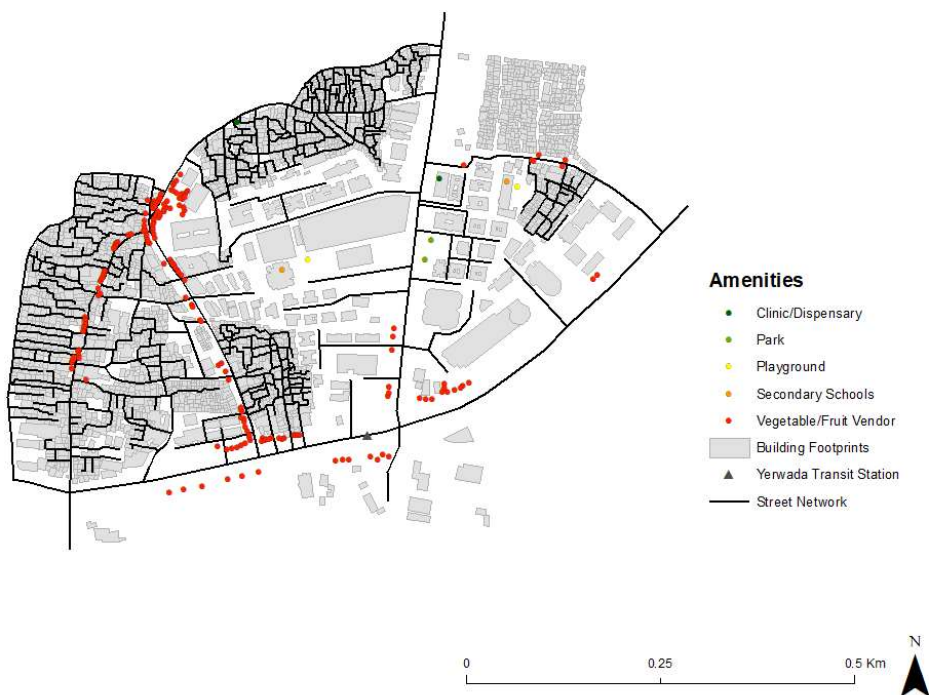
7.5 Mix: 14/25

The site area is predominantly residential, constituting 75% of the total floor space. Ground floor use of buildings along the edges is commercial, irrespective of the predominant building use. There is low access to local services, since only 40% to 50% of buildings are within walking distance of elementary schools and healthcare. On the other hand, 85% of buildings are within walking distance of a source of fresh food, resulting in active streets. The site lacks public open space because of the compact nature of built form in the slums and gated communities in the surrounding area. The BSUP scheme focused on integrated development of slums ensuring in situ redevelopment of houses from a community perspective and hence the houses fall under affordable housing. Commercial use along the street edges of the local roads and major arterial roads provides diverse demographics and income ranges of businesses and services. Certain parts of the site have a mix of opportunities and services within walking distance.

Figure 108: Map showing existing land use

Existing Land Use

- Commercial
- Institutional
- Residential
- Transport
- Vacant
- ▲ Yerwada Transit Station

0   0.25   0.5 Km

N

Source: ITDP

Figure 109: Map showing locations of different amenities on site

Amenities

- Clinic/Dispensary
- Park
- Playground
- Secondary Schools
- Vegetable/Fruit Vendor
- Building Footprints
- ▲ Yerwada Transit Station
- — Street Network

0   0.25   0.5 Km

N

Source: ITDP

7.6 Densify: 13/15

We found high densities in this area, which is characterised by low-rise, smaller-footprint settlements. Further higher residential and non-residential densities around transit indicates that there are higher chances of increased ridership.

7.7 Compact: 10/10

The site is completely developed, with no open or vacant lands, indicating a compact urban form. At the same time, because of higher densities and higher compactness, the area also has a great degree of access to local transit options, which could mean better access to other parts of the city and therefore better access to jobs, livelihoods, and other social and recreational needs.

7.8 Shift: 15/15

A toral of 4.2% of the developed area is devoted to off-street parking, with 137 driveways intersecting a walkway. Area dedicated to vehicle use is 14% of the total study area. These values indicate that the site is not conducive to the use of private vehicles and suggests that there is a higher potential of people accessing the site by means of active mobility (NMT + Pedestrian). Nonetheless this value does not capture the quality of NMT + pedestrian infrastructure and therefore can also be read as a measure of potential to create better infrastructure for active modes.

7.9 TOD score: 75/100