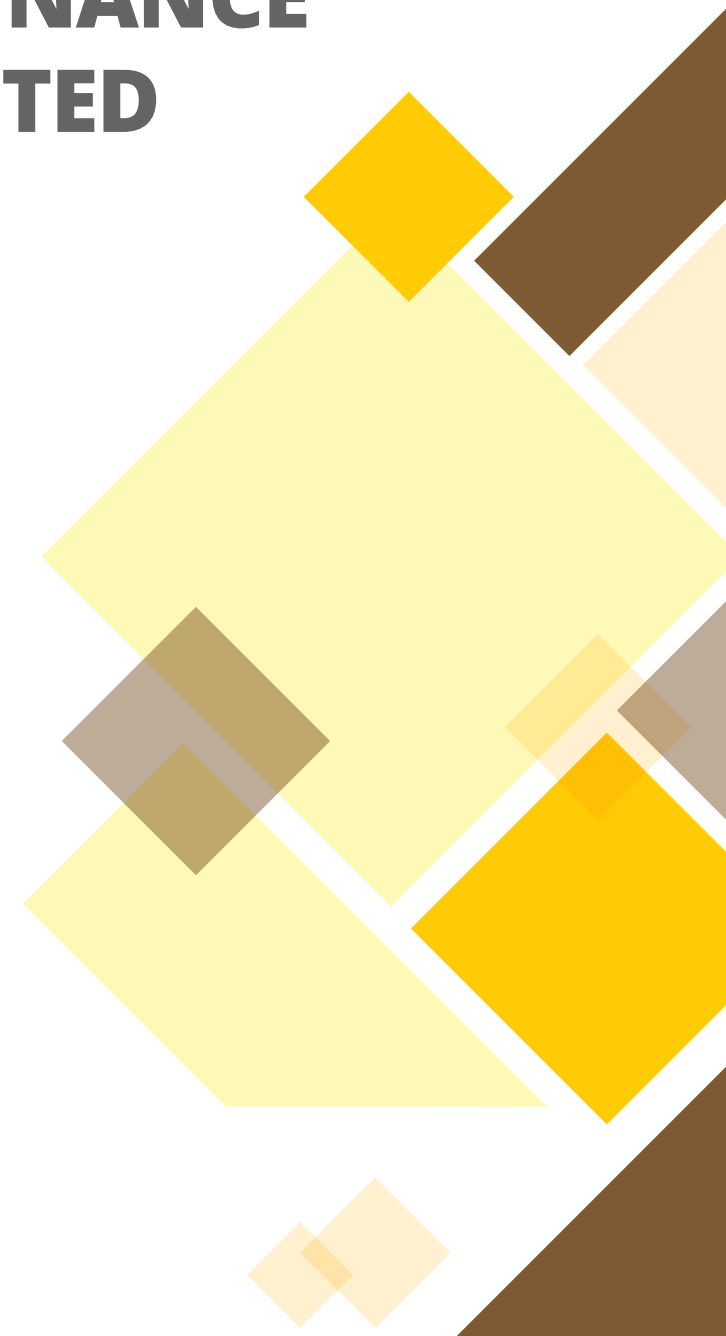
Knowledge Product 1

VALUE CAPTURE FINANCE IN TRANSIT ORIENTED DEVELOPMENT

A Guide to Implementation



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Preface

Transit Oriented Development (TOD) is a globally recognised approach for achieving sustainability through land-use-transportation integration. It can be used effectively to create high density, compact neighbourhoods supported by public transit, to reduce the dependence on private vehicles and the pollution and congestion resulting from it. The Ministry of Housing & Urban Affairs' (MoHUA) National Smart City Mission presents a timely opportunity and support for many Indian cities to adopt TOD as an approach to address some pressing issues of housing, mobility and infrastructure that they are struggling with currently. As these cities are in the process of implementing their Smart City Plans, they face the great challenge of operationalising their proposed TOD projects and sustaining them to deliver long term improvements (beyond the immediate framework of the Smart Cities Mission) in the quality of life for its citizens.

In 2017, NIUA completed a study on TOD in Indian Smart Cities for the Prosperity Programme of the FCO-UK. The study aimed to and achieved providing technical support to the Indian Smart Cities planning to implement TOD/land-use-transportation integration through immersion visits, domestic and international workshops for about 15 Indian city commissioners and technical documents regarding complex TOD issues. All the generated knowledge products are available at www.tod.niua.org. During and after the completion of the project, NIUA supported the development of policy briefs for MoHUA regarding National Value Capture Policy and National Transit Oriented Development Policy drawing upon its findings from the study and numerous interactions with the municipal commissioners, TOD experts and the private sector.

Findings from international examples indicated that successful global implementations of TOD have managed incorporating technical & program management with due course corrections, however, Indian cities, over the last decade have begun to solely implement the technical components of TOD without necessarily integrating the program management component. Thus, the pressing rationale for this particular study is to help these cities develop a formal approach to raising resources, developing business case, planning for O&M costs through value capture, engaging various private and public stakeholder buy-in and support and develop the TOD proposal to project ready for ground breaking.

The main aim of this project was to assist any one Indian city towards implementation of its proposed TOD in its Smart City Plan or otherwise. However, after preliminary consultations with the cities of Pune & Ranchi that had identified TOD projects in their Smart City Plans and the National Capital Region Transport Corporation (NCRTC) that is in the process of implementing the Regional Rapid Transit System (RRTS), NIUA signed a Memorandum of Understanding with the National Capital Region Transport Corporation for providing technical assistance for implementing TOD & related Value Capture mechanisms along the proposed Delhi-Ghaziabad-Meerut RRTS corridor. The entire process is documented in the form of knowledge products that can be used by other interested Indian cities for demarcating TOD zones and exploring options for value capture financing in the context of Transit Oriented Development.

The Course of Implemenation for TOD that NIUA has devised, based on its extensive research on the subject and experience from the implementation project is depicted in the knowledge products with steps and components thereof for easy understanding.

Course of Implementation of TOD

Knowledge Product 1:

Value Capture Finance in Transit Oriented Development

A Guide to Implementation

This document is the first knowledge product developed as a part of the technical assistance. It emphasizes the importance of Value Capture Financing and the role it plays in implementation of Transit Oriented Development.

Further its also covers the process of identification, demarcation and area estimation of Influence Zones around transit stations and Special Development Areas identified in the vicinity (step 0-1) and talks about different instruments that can be used for VCF, their enforcement and regulatory mechanisms by detailing out the strategy followed for Delhi-Ghaziabad-Meerut RRTS (step 2).

0

Baselining

a. Background study; understand existing Regional Plans, Master Plans, Zonal Plans and the respective Development Control Regulations
b. Formulate a vision for the corridor including each individual TOD nodes after extensive consultation with city government officials
c. Arrive at appropriate land use mix for each IZ & SDA

1

Identification & Delineation of Transit Oriented Development zones

a. Delineation of TOD zones after consultation with city government officials.
b. Define the criteria for calculation of the amount of land that will undergo development/ redevelopment through the project lifecycle.
c. Develop appropriate scenarios to derive the total amount of developable land (conservative, realistic and optimistic scenarios)

2

Resource Mobilisation Plan

a. Identify & shortlist potential revenue instruments
b. Generate VCF scenarios (Conservative, Realistic, Optimistic)
c. Fund management mechanism
d. Evaluate Land Value Capture opportunities through real estate development

3

Planning of a TOD node

a. Undertake demand studies to identify key economic drivers and activities
b. Prepare a Zonal plan for each Influence zones & Special Development Areas including:
   - Land use plan and zoning
   - Development Control Regulations
   - Form based codes, design and sustainability guidelines
   - Traffic integration strategies
c. Follow a consultative process with participation from:
   - City Government officials
   - Private developers, potential occupiers and tenants
   - Citizens

4

Local Governance

a. Facilitate inter agency coordination and shared ownership of the TOD project
b. Amendments to Acts, Policies, Regulations, etc
c. Institutional framework & governance mechanism

Knowledge Product 2:

Land Value Capture for Transit Oriented Development

A Demonstration

The second document focusses on the concept of Land Value Capture and different aspects of the same (step 2-d). Essentially it presents the case of Sahibabad where the project team demonstrated Land Value Capture by leveraging publicly owned lands as a trigger for development.

Message from Ministry of Housing & Urban Affairs

As cities around the world strive to achieve goals of sustainability and liveability, challenges around land, housing, mobility and informal economy remain unaddressed to a large extent. Amongst the above, mobility overlaps to a great extent with the goals of sustainability, climate change adaptation, and mitigation. Transport lines are the lifelines of a city, and need large investments to provide for ever-growing needs.

Government of India's Smart Cities Mission has supported investments for upgrading infrastructure for mobility corridors in several cities, as they cope with the challenges of land use and transport integration. Transit-Oriented Development (TOD), which is an ancient concept has emerged to be one of the most effective choices. Few cities in the west such as Curitiba, Bogota and London have adopted the concept in a renewed manner with some excellent results to showcase. Several cities in the Asia have also attempted the same to overcome their respective challenges. TOD not only helps in reducing carbon footprint through minimised private vehicle usage, but it also encourages walkability and other modes of non-motorised transport with compactly designed neighbourhoods. It is very encouraging to see that cities want to implement such sustainable solutions for a more sustainable and liveable future. I am also glad that the topic of TOD along with ways of implementation is being deliberated upon among experts and planning professionals today.

Value Capture Finance (VCF) is yet another concept that is gaining importance as an execution mechanism for funding of large scale infrastructure projects. Few cities in India such as Pune & Nagpur have been experimenting with several instruments of VCF, however, there is a pertinent need of bottom-up & data-driven approach, and citizen participation to be designed into this entire process. Further, the methodology, along with challenges and lessons needs to be captured and documented as knowledge forfurther dissemination.

I commend NIUA's efforts of working with NCRTC on their RRTS project and simultaneously documenting the process, challenges and lessons in the form of these knowledge products. They shall certainly be of lot of help to other cities chasing similar goals for a sustainable and climate-responsive future. Lastly, a special mention of the Shakti Sustainable Energy Foundation for making this study happen with generous financial support.

My congratulations to the team and best wishes to the cities benefiting from the products to take it forward.

Kunal Kumar (IAS)
Joint Secretary-MoHUA & Mission Director-Smart Cities

Foreword

Transit Oriented Development (TOD) is a globally recognized approach to maximise the amount of housing, work and leisure that is within walking distance from high quality public transport infrastructure. It is characterised by high density, compact and diverse land-use neighbourhoods supported by a continuous and direct street network, with high quality public transport, walking and cycling infrastructure. Such developments reduce the need for motorised trips and enable a shift toward public transport, thereby reducing the energy and emission intensity of the transport system. With many Indian cities investing in mass transit systems such as metro rail and Bus Rapid Transit (BRT) systems, adopting a TOD approach can help maximise patronage to these public transport systems.

In 2017, the Ministry of Housing and Urban Affairs (MoHUA) released the National TOD Policy acknowledging the importance for cities to adopt TOD within their development plans. Many states have adopted and released their own TOD policies. However, despite policy action, two critical barriers to implement TOD remained unaddressed. The first was the lack of adequate urban planning tools that enabled area level interventions necessary for TOD; the second was the challenge of sustainably funding high quality transit and urban infrastructure required to build TOD in our cities.

Recognising this challenge, Shakti Sustainable Energy Foundation supported National Institute of Urban Affairs (NIUA) to provide technical assistance to the National Capital Region Transport Corporation (NCRTC), on overcoming these barriers while implementing TOD along the proposed Delhi – Meerut Regional Rapid Transit System (RRTS). Over a period of two years, NIUA provided targeted inputs to NCRTC on implementing this project, incorporating the means to sustainably finance TOD through Value Capture Finance (VCF) mechanisms.

In our endeavour to ensure that best practices may be adopted at scale, this project presented a unique opportunity to ensure that relatively niche subject area such as VCF for TOD, could be made more accessible to a range of expert working in the field of sustainable transport and urban development. With this objective, NIUA developed a process document, which captures the various steps and considerations for effective implementation of VCF while executing TOD along a mass transit project.

These Knowledge Products provide perspectives on the value the VCF approach brings to sustaining large-scale public transport and urban development investments, while discussing a bouquet of tools that can be used to deploy VCF, comparing their enforcement and regulatory mechanisms and lastly demonstrating Land Value Capture at one of the nodes along the RRTS corridor.

I trust these Knowledge Products will provide meaningful guidance to other Indian cities and transport entities to realize their TOD projects. I take this opportunity to thank our grantee partner, the National Institute of Urban Affairs, for their efforts in supporting NCRTC and developing these Knowledge Products.

Chinmaya Acharya
CEO (Interim)
Shakti Sustainable Energy Foundation

Foreword

NIUA, with its research base in several urban themes ranging from urbanisation & economic growth, urban governance & finance, urban infrastructure & built environment amongst others, has over the years emerged as a thought leader and a knowledge hub for urban development in India through its competencies in research, knowledge management, policy advocacy and capacity building to address urban challenges and has continuously strived to develop sustainable, inclusive, and productive urban ecosystems in the country.

In 2017, NIUA was engaged in a research project on Transit Oriented Development in Indian Smart Cities that was financially supported by the Foreign & Commonwealth Office of Government of United Kingdom. The project produced outputs that established constructs of Urban Density, Urban Diversity, Urban Design, Housing and Mobility — as core themes in a Transit Oriented Development, followed by a series of publications that outline tools for financial sustainability of TOD and assessment of Smart City plans that featured TOD projects with respect to the identified TOD constructs.

Subsequent to the above, NIUA received a generous grant from Shakti Sustainable Energy Foundation (SSEF) to take forward the implementation of TOD in an Indian city. After screening across the country, NIUA partnered with the National Capital Region Transport Corporation (NCRTC), as their RRTS project had TOD as a stated intention and work was on a fast pace. NIUA deployed a team for technically assisting NCRTC for TOD implementation and related value capture mechanisms along the proposed Delhi-Ghaziabad-Meerut RRTS corridor.

As the engagement with SSEF on this project comes to an end, NIUA is now pleased to publish knowledge products that capture the process that was followed for the project, documenting the challenges faced and key lessons learnt and thereby providing a guide for other cities and transport entities to follow; to realise their TOD-based projects and proposals through several financial mechanisms and tools. The products primarily focus on providing an understanding into the course of implementation of TOD & VCF related instruments and tools with supporting references drawn from Delhi-Ghaziabad-Meerut RRTS corridor. Further, based on evidence and decision-making methods, the team has formulated a step wise methodology for assessment and revenue estimation for various VCF instruments.

NIUA is thankful to Shakti Foundation for its gracious support and commitment to the cause of a cleaner tomorrow. I appreciate the encouragement of Mr. Chinmaya Acharya (interim CEO), Mr Vivek Chandran & Ms Avni Mehta throughout our engagement of more than two years. We also appreciate the inputs provided by group of experts who shared their wisdom and experience with the team at NIUA and helped in refining these knowledge products. Finally, I would like to acknowledge the hard work and dedication put in by our project team in developing these products. We hope that these knowledge products prove to be a useful tool for other cities in implementation & decision making for Value Capture Financing in Transit Oriented Development.

Hitesh Vaidya
Director
National Institute of Urban Affairs (NIUA)

ABBREVIATIONS

ABD: Area Based Development
DOT: Development Oriented Transit
DPR: Detailed Project Report
FCO-UK: Foreign & Commonwealth Office- United Kingdom
IAC: Infrastructure Augmentation Charges
IZ: Influence Zone
KTCP : Karnataka Town and Country Planning
MoHUA: Ministry of Housing & Urban Affairs
MRTS: Mass Rapid Transit System
NCR: National Capital Region
NCRPB: National Capital Region Planning Board
NCRTC: National Capital Region Transport Corporation
NIUA: National Institute of Urban Affairs
NMT: Non-Motorized Transport
RRTS: Regional Rapid Transit System
SDA: Special Development Area
TAD: Transit Adjacent Development
TJD: Transit Joint Development
TOD: Transit Oriented Development

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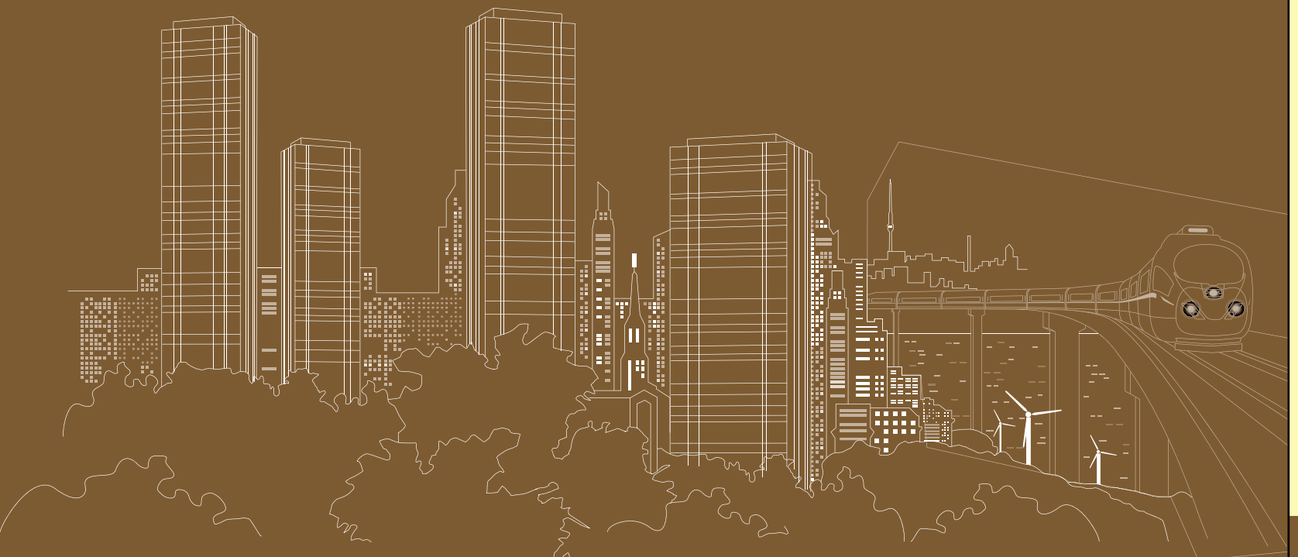


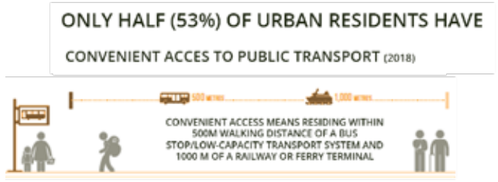
Introduction

01

The world today is experiencing the most rapid urbanizing trend in its history. The United Nations report on 'World Urbanization Prospects 2018' states that today, 55% of the global population lives in urban areas as compared to the 1950s, when this number was close to 33%. The report also mentions that by the year 2050, around 68% of the world's population will be living in towns & cities. About 90% of the growth of the urban population of the world is driven by Africa and Asia combined. Just three countries – India, China and Nigeria – are expected to account for 35% of the world's urban population between 2018 and 2020. However, the Asian Region is one of the fastest urbanizing regions in the world.

In accordance with the Agglomeration Index, the World Bank in their report, 'Leveraging Urbanisation in South Asia: Managing Spatial Transformation for Prosperity and Livability', has estimated that urban sprawl actually accounts for 55.3% of India's total population, indicating a wide gap between the official census figure of 31%. The report estimates that urban footprints are growing at twice the rate of urban populations, reflected directly in the increasing urban sprawls (Ellis and Roberts, 2016). The United Nations relates urban growth to the top three aspects of sustainable development – Economic, Social and Environmental.

Figure 1: Status of access to public transport



Source: The Sustainable Development Goals Report 2019, United Nations

Figure 2: Principles of TOD feature as targets in SDG 11

Source: https://www.ihs.nl/en/resources/library/sdg-11-knowledge-hub

Rapid urbanization, as evident today, if not managed well, can have adverse impacts on all the three aspects – leading to economic, social and environmental degradation. However, strategically planned urbanization can maximize the benefits of agglomeration and reduce as many potential adverse effects as possible. As part of the Sustainable Development Goal (SDG)-11 of 'Achieving Sustainable Cities and Communities' by 2030, sustainable planning and management of human settlements and their constituent systems – transport, amongst others are the key constituents of achieving inclusive and sustainable urbanization (UN, 2015). SDG 11 also mentions the need for accessible, affordable and sustainable transportation systems for urban areas – highlighting the need to expand public transportation (thereby implying the need to move away from private modes of transport) – in order to ensure sustainable urbanisation. This has also been evident through the global discourse in the past two decades that has repeatedly stressed on a better approach in understanding the way city systems such as transportation networks affect the growth of urban centres.

As established earlier, the greatest need for sustainable urban and transport planning– is required in the middle- and low-income nations, which are the fastest urbanising regions in the world. Owing to relatively lower levels of development, special efforts have to be undertaken, for better understanding of urban dynamics in these regions– and to better plan for sustainable integration of land use and transportation–such that adverse effects of hap hazard urban growth are minimized.

Undoubtedly, the overall urbanisation process has generated positive externalities for India's development with increased access to physical, economic and social infrastructure. However, the pattern of urban growth (low density sprawl continuum across mega regions) has also produced negative outcomes; all Indian cities are facing a severe shortage of water supply, sewerage network, affordable housing, affordable transportation and other facilities. Indian cities are experiencing an unending spiral of habitats developing on peri-urban areas that lack infrastructure, yet are home to populations that cannot afford housing in the cities and commute to jobs within core cities using unsustainable commuting modes. (NIUA, 2017)

The relationship between urban spatial structure and the transportation network within an urban area can drive or hinder the economic productivity and quality of life of the city. Undoubtedly urbanisation has allowed economic mobility for citizens due to agglomeration of jobs, technology, healthcare, education and information. These agglomeration benefits account for 80% of South Asia's GDP (Ellis and Roberts, 2016). However, this has also increased the use of private vehicles in the city agglomerations. The Indian vehicle population that stood at approximately 60 million at the beginning of the millennium has doubled to 120 million vehicles by 2009 (IIHS, 2011). The majority of this growth has occurred in the ownership of two-wheelers (84 per thousand in 2012) followed by cars/jeeps (13 per thousand in 2012).

Investments for large scale public infrastructure projects in India

For the past decade Government of India has committed funds for projects on Urban Transformation that have included mobility as an essential component. It began with Jawaharlal Nehru National Urban Renewal Mission (JnNURM)) in the year 2005, which extensively supported transport interventions in cities and followed by other schemes of Atal Mission for Rejuvenation and Urban Transformation (AMRUT, 2015) and Smart Cities mission(2015), where a considerable investment in upgrading infrastructure for mobility was visible.

Kolkata and Delhi were the first two Indian cities with successful metro network operational since 1995 and 2002 respectively. With technology advancement and a focus on sustainable mobility as the need of the hour to cater to congestion on streets, increasing pollution levels, there have been more mass transit systems proposed, planned and implemented across the country. Until 2018, 27 more Indian cities proposed mass rapid transit systems. The Centre has extended financial support in partnership with the respective State Governments for 82% of the operational & under construction projects while the others have been funded by the State Governments entirely or through supplementary funding sources. Out of a total length of 1459 km of approved length in the different cities across the country, 664 km (45%) is operational and 795 km (55%) is still under construction. Additionally, 1165 km of corridor length has been proposed. This amounts to nearly 1715 more planned transit stations.

Some of India's current and proposed investment in public transit and TOD include the following:

- As of 2018, 27 Indian cities are building metro systems with an approved corridor length of 1459 km. In addition to this, 1165 km of corridor length has been proposed, which amounts to nearly 1715 stations with a total estimated project cost of INR 2,14,287 Cr.
- National programmes such as Railway Station Redevelopment under the Railway Land Development Authority (RLDA) is engaging with city governments to redevelop 400 A and A1 railway station buildings to include commercial use.
- The Regional Rapid Transit System (RRTS) by National Capital Region Transport Corporation (NCRTC), connecting Delhi-Meerut, has proposed to develop self-contained TOD pockets with job centres along the corridor at strategic locations.
- Out of 60 Smart Cities announced, 24 Smart Cities have proposed TOD and another 17 Smart Cities have proposed projects that address TOD principles in their Smart City Plans (SCPs).

Table 1: Costs of metro projects in India

Metro	Length	Total Costs (in INR) (without land)	Cost/km (without land)	Total Cost (in INR) (including land)	Cost/km (including land)	Price level base year
NAGPUR METRO Phase 1 Line 01	19 km (15 elevated; 4.6 at grade)	2593 Cr.	136.47 Cr.	3015 Cr.	158.68 Cr.	2012
NAGPUR METRO Phase 1 Line 02	18.5 km (18.5 elevated)	2763 Cr.	149.35 Cr.	2984 Cr.	161.29 Cr.	2012
JAIPUR METRO Phase 1	12 km (1.14 underground; 1.64 underground; 9.27 elevated)	2290 Cr.	190 Cr.	2399 Cr.	199.91 Cr.	2011
JAIPUR METRO Phase 1A	9.7 km (0.4 underground; 9.27 elevated)	1500 Cr.	154.64 Cr.	1609 Cr.	165.87 Cr.	2011
BANGALORE METRO Phase 2	22.4 km (13.8 underground; 8.18 elevated)	6769 Cr.	302.18 Cr.	7526 Cr.	335.98 Cr.	2011
PUNE METRO Phase 1 Corridor 1	16.59 km (4.11 underground 0.9 underground; 11.57 elevated)	4750 Cr.	286.32 Cr.	5333 Cr.	321.46 Cr.	2015
PUNE METRO Phase 1 Corridor 2	14.66 km (14.66 elevated)	2445 Cr.	166.78 Cr.	2797 Cr.	190.8 Cr.	2015
KOCHI METRO	26.61 km (26.61 elevated)	3111 Cr.	116.91 Cr.	3733 Cr.	140.28 Cr.	2011

Source: Compiled from several secondary sources

Considering the fact that mass transit projects are capital intensive, it is essential to explore alternative and innovative sources of funds to supplement the budgetary resources. Addressing this need, the Ministry of Housing and Urban Affairs (MoHUA) unveiled the new Metro Rail Policy in 2017 gathering focus on 'development of integrated public transport network', 'Make in India and' and 'Private Participation' in metro rail projects. The policy lists options for financial assistance from the Central Government for metro projects including Public Private Partnership (PPP), a 10% of project cost (excluding private investment, cost of land, rehabilitation & resettlement and tax) as a grant and equity sharing where the Centre's share would be a maximum of 20% of the project cost (excluding private investment, cost of land, rehabilitation & resettlement). The policy also sheds light on methods for enhancing revenues that include providing a feeder system to the metro rail, Transit Oriented Development (TOD) and Value Capture Finance (VCF) and Commercial or Property Development at stations and on adjacent land outside the station box. A promising fact is that the Metro Rail Policy highlights the concept of Transit Oriented Development (TOD) as a part of the transit corridor planning.

Source: https://www.livemint.com/Companies/tlyTWDPobz3Bve7bmwJEAJ/Bangalore-Metro-Rail-to-build-office-complex.html

TRANSIT ORIENTED DEVELOPMENT

The term 'Transit Oriented Development', popularly addressed as 'TOD' was first codified in North America by Peter Calthorpe and was defined as an accessible, mixed-use form of development within walking and cycling radius of a mass transit station. Such pedestrian-oriented developments encourage people to live near transit services and to decrease their dependence on private vehicles (Still, 2002). Further, Michael Bernick & Robert Cervero defined TOD as a compact, mixed-use community, centered around a transit station that, by design, invites residents, workers, and shoppers to drive their cars less and ride mass transit more. India's National TOD policy defines TOD as an integration of land use and transport planning aiming towards development of planned sustainable urban growth centers, having walkable and livable communes with high density mixed land-use.

Although the over-arching objective of TOD is a dense, compact, walkable development with mixed-use, globally several organisations and agencies have formulated different principles and constructs that help cities achieve the desired results of TOD. On the adjacent page is a snapshot of the principles as identified and coined by some of the leading organisations working in the realm of TOD.

NIUA's publication 'Assessing TOD; A List of Indicators' from the earlier study on TOD encapsulates the different principles within 3 major constructs of 'Design-Density-Diversity'. However, it also acknowledges the fact that similar components occur in different constructs across the multiple adoptions, possibly because of the interconnectedness between the constructs. The focus then, rightly so is on addressing the principles of those components rather than placing them within a construct. Therefore, components of 'Housing' and 'Mobility' are identified as separate constructs given their significance in realizing a Transit Oriented Development. Given the multiple benefits of TOD, the concept along with its variants of Transit Adjacent Development (TAD), Development Oriented Transit (DOT) and Transit Joint Development (TJD) have been encouraged in North & South America since the late 20th Century. Certain examples have also been demonstrated in Europe and East-Asia. In India, Mumbai was one of the first cities to realise the opportunity of nodal development along the suburban railway network and orient the growth of the city. It was followed by Delhi where the city demonstrated the DOT approach by connecting the peripheral suburbs of Dwarka, Rohini, Mayur Vihar and cities of Gurgaon, Noida and Faridabad by the Metro rail network.

Government of India (Ministry of Housing & Urban Affairs, erstwhile Ministry of Urban Development) in 2017 released the National TOD Policy that proposed a 3-fold vision, (i) To Enable Transformation, Provide Accessible Public Transport and (iii) Create Compact Walkable Communities. Government of India's additional focus on Area Based Development (ABD) under the Smart Cities Mission and on sustainable mobility since 2015 has encouraged the states and the cities to plan for and implement Transit Oriented Development along their mass transit corridors. Following the Government's introduction of the concept of TOD in the policy framework of Delhi, State Governments of Jharkhand, UP, Haryana, Madhya Pradesh, amongst others have formulated respective TOD policies. A comparative analysis of the National policy & few state policies is appended in this document.

Figure 3: TOD principles as formulated by leading global organisations

	TRANSIT ORIENTED DEVELOPMENT INSTITUTE	WORLD BANK	INSTITUTE FOR TRANSPORTATION AND DEVELOPMENT POLICY	WORLD RESOURCES INSTITUTE
	REDUCE DEPENDENCE ON DRIVING	DEVELOP NEIGHBOURHOODS THAT PROMOTE WALKING	WALK	COMPLETE STREETS
	ALLOW RESIDENTS TO LIVE WORK AND PLAY IN THE SAME AREA	DEVELOP NEIGHBOURHOODS THAT PROMOTE CYCLING	CYCLE	DEVELOPING NMT NETWORK AND ENCOURAGE CYCLING
	REDUCE THE AREA CARBON FOOTPRINT OR NEGATIVE IMPACT ON ENVIRONMENT	CREATE VIBRANT, PEOPLE-CENTRIC PUBLIC SPACES AROUND MASS TRANSIT STATIONS MANAGE DEMAND FOR PRIVATE VEHICLES	CONNECT	NEIGHBOURHOOD CENTRES AND VIBRANT GROUND FLOORS CAR USE MANAGEMENT
	PROVIDE ACCESS TO BETTER LIFE SERVICES	DEVELOP GOOD-QUALITY, ACCESSIBLE, AND INTEGRATED PUBLIC TRANSIT	PUBLIC TRANSPORT	ACTIVE TRANSPORT QUALITY PUBLIC TRANSIT TRAVEL DEMAND MANAGEMENT
	STIMULATE THE ECONOMY	ENSURE THE RESILIENCE OF AREAS CONNECTED BY MASS TRANSIT	SHIFT	INTEGRATED TRANSPORT NETWORK
	PROVIDE BETTER ACCESS BETWEEN URBAN AND SUBURBAN AREAS	ALIGN HUMAN DENSITIES, ECONOMIC DENSITIES, MASS TRANSIT CAPACITY, AND TRANSIT NETWORK CHARACTERISTICS FOR GREATER ACCESSIBILITY	DENSIFY	MIXED USE ACTIVE EDGES
	PROVIDE ACCESSS TO BETTER ENTERTAINMENT OR RECREATIONAL SERVICES	PLAN AND ZONE FOR MIXED-USE AND MIXED-INCOME NEIGHBOURHOODS AT A CORRIDOR LEVEL	MIX	MIXED-USE NEIGHBOURHOODS WITH EFFICIENT BUILDINGS COMMUNITY PARTICIPATION AND COLLECTIVE IDENTITY
	PROVIDE ACCESS TO BETTER JOBS	CREATE COMPACT REGIONS WITH SHORT COMMUTES	COMPACT	PUBLIC SPACES
	REVITALIZE URBAN AREAS			ENVIRONMENTAL AND CULTURAL LANDSCAPES

Influence Zones in Transit Oriented Development

The National TOD policy of MoHUA defines an 'influence zone' in Transit Oriented Development as the area in the immediate vicinity of the transit station, i.e. within a walking distance, having high density compact development with mixed land use to support all basic needs of the residents

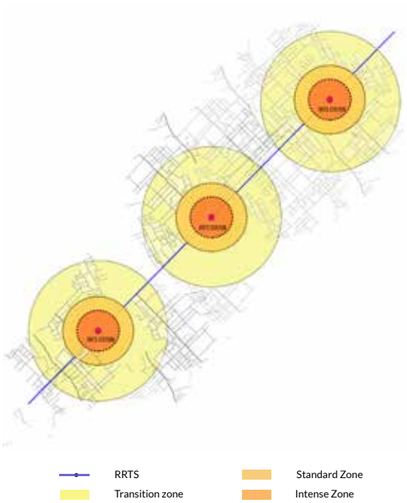
An Influence Zone (IZ) may be established either around a transit station or along the transit corridors. The standard demarcation of an influence zone is considered of an approximate radius of 500-800m around the transit station, which is a favourable walking distance. In case of mass transit corridors within a city, where the distance between the transit stations is at times less than 2km, there tends to be an overlap of the influence zones. In such cases, the influence zone is demarcated as a running corridor of 500m on either side of the transit corridor (Figure 4).

However, the same influence zone demarcation for a regional transit corridor does not result into a running corridor, but independent zones around each station as the stations are approximately 10-15km apart (Figure 5). A regional transit corridor caters to intercity travel and the stations tend to be further apart and hence its impact area is larger. Thus, to bring maximum people closer to the mass transit, either within a walking distance of 300-500m, a cycling distance of 800m or within a distance of 1500m with an efficient last mile connectivity, influence zones of an approximate radius of 1500m are recommended around regional transit stations. These are envisaged to be planned with high-density mixed-use development so that the public transit is used to its optimum capacity and benefits.

It is imperative to demarcate and notify such influence zones through statutory instruments such as the Master Plan or Development Plan and corresponding Local Area Plans. The National TOD policy also indicates provision for the influence zones to be demarcated and notified in phases in case where the TOD is planned to be implemented in a phased manner. However, it states that the principles for delineating the influence area should be clearly indicated so that there is no speculation or misperception regarding the demarcated & notified influence zone.

Figure 4: Influence zones for a mass transit

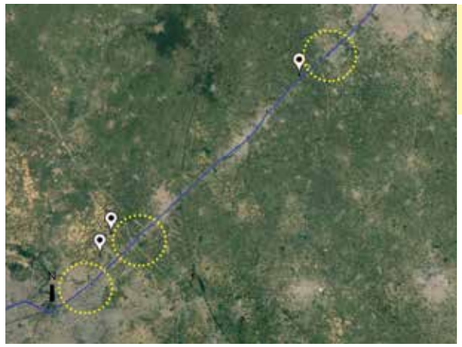
Figure 5: Influence zones for a regional transit



Special Development Areas

In case of a transit corridor passing through a developed city or region, the area available for further development following TOD norms may be limited to a few scattered parcels, either vacant or parcels with under-utilised built-up area (Please refer to page 50-52 for steps demonstrated for estimating develop-able land in a transit influence zone). To address the scenario, vacant greenfield contiguous land parcels can be identified closer to the influence zone of the transit station, where there exists potential for development or a possibility of densification. These could be considered as 'Special Development Areas' for implementing Transit Oriented Development and the steps for identification & demarcation are articulated below.

Figure 6: Identification of potential locations along the transit corridor



Step 1: Identify potential areas along a transit corridor for high-density mixed-use development following TOD principles (Figure 6)*

Figure 7: Area Appraisal of the identified potential site

Step 2: Appraisal of the identified areas with respect to the location and neighborhood, current and proposed infrastructure for connectivity to the nearest urban or regional centre. (Figure 7)*

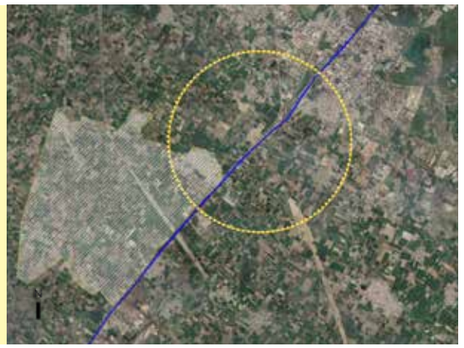
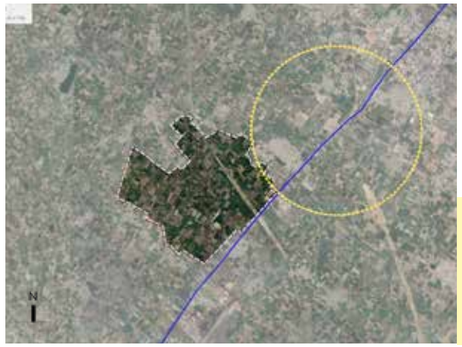


Figure 8: Demarcation of definite boundary of SDA



Step 3: Actual demarcation of potential sites governed by factors such as natural or geological features (if any), existing roads, highways, railway lines and other trunk infrastructure and existing settlements. (Figure 8)*

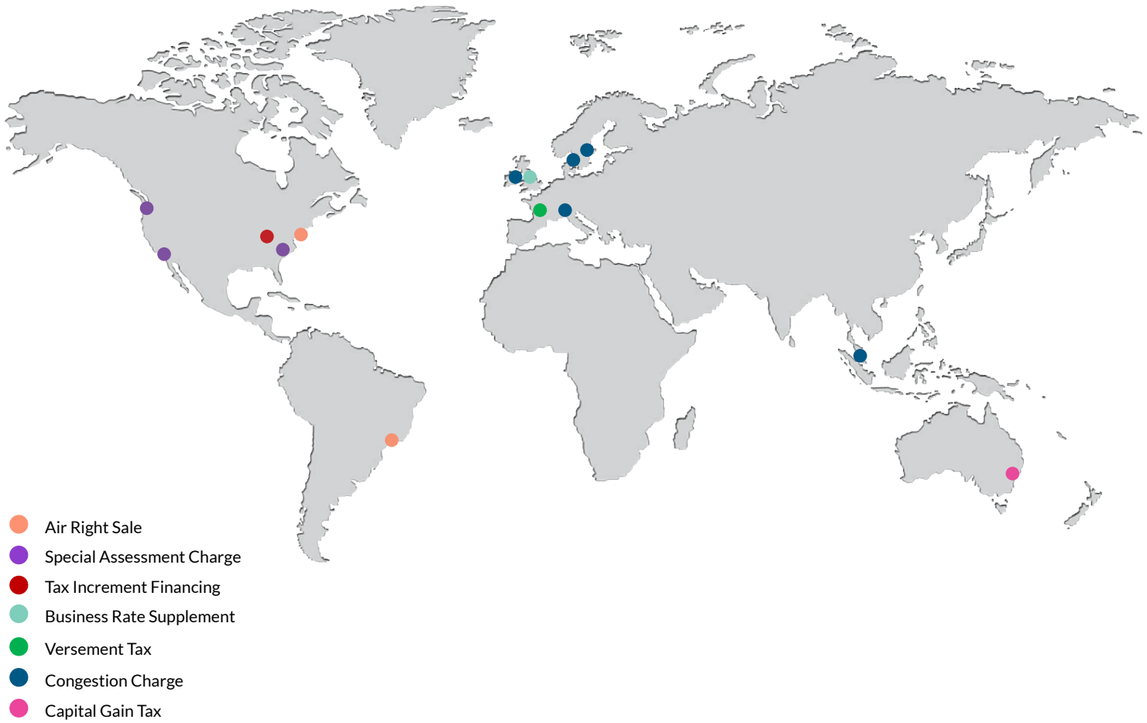
** All figures are indicative*

VALUE CAPTURE FINANCE

Value Capture Finance (VCF) basically rests on the principle of 'beneficiary pays', implying that the direct and indirect beneficiaries of any urban infrastructure project shall contribute to the capital cost of the infrastructure or the operation expenses through various tools. It is essentially an innovative mechanism to optimize or enhance local Government's resource management. The Value Capture Policy Framework 2017 of MoHUA identifies Value Capture as one of the prime mechanisms to generate value from the private land and buildings in the vicinity of public infrastructure projects. This generated value is then realized, captured and used again for project investment.

The concept of Value Capture Finance can be used for several purposes such as augmentation of public infrastructure leading to densification (TOD), conservation & protection of sensitive areas of historical or ecological importance in a particular area of a city, amongst others. This can be done through enforcement of certain VCF instruments or mechanisms. Page 11 presents an overview of the instruments that are enforced or proposed globally for a variety of purposes supported by the map in figure 9. Similarly, page 12 presents an overview of the instruments that are enforced or proposed in India supported by the map in figure 10.

Figure 9: Various VCF instruments proposed/enforced globally



Value Capture Finance Instruments used globally

Business Rate Supplement

Enforced under The Business Rate Supplements (BRS) Act 2009, it enables authorities to levy a supplement on the business rate to support additional projects aimed at economic development of the area. Since April 2017, the Crossrail BRS is applied only to assessments (business and other non domestic premises) with a rateable value of over £70,000 on the local rating lists of the 32 London boroughs and City of London Corporation.
https://www.london.gov.uk)

Tax Increment Financing

Tax Increment Financing (TIF) is a special funding tool used by the City of Chicago to promote public and private investment across the city. Funds are used to build and repair roads and infrastructure, clean polluted land and put vacant properties back to productive use, usually in conjunction with private development projects.
(https://www.chicago.gov/city/en/depts/dcd/provdrs/tif.html)

Special Assessment Charge

Special Assessment Charge is levied in a specific geographic area known as a Special Assessment District (SAD). A special assessment may only be levied against parcels of real estate which have been identified as having received a direct and unique "benefit" from the public project. This has been practiced in the United States.

Air Rights Sale

Air rights are a form of value capture that involves the establishment of development rights above a public utility-mostly a transportation facility that generates an increment in land value. Generally, these rights are sold through auction. The logic behind selling air rights is that owners should contribute to infrastructure construction costs in proportion to the volume of their air rights use, as higher densities require additional infrastructure investments. In New York, air rights signify transfer of un-built FAR (unused development right) on private property to feasible and adjacent public property and provide it for sale to raise finances.

(Horoaki Suzuki, J. M.-H. (2015). Financing Transit-Oriented Development with Land Values, Washington: World Bank Group
Game Changers in Transit Oriented Development, NIUA, 2017)

Capital Gain Tax

Capital gain tax is a tax on the profit realised on the sale of land or property that has incurred a value addition due to the public investment. Though partial in its application, capital gains tax is a value capture mechanism as it increases with value. This tax is applied at the point of sale.

(Game Changers in Transit Oriented Development, NIUA, 2017)

Congestion Charge

Congestion pricing or congestion charges is a system of surcharging users of public goods that are subject to congestion through excess demand, such as through higher peak charges for use of bus services, electricity, metros, railways, telephones, and road pricing to reduce traffic congestion.

It has only been introduced in the city of London since 2003. Transport for London (TfL) is the responsible body for collection of the charge. During the first ten years since the introduction of the scheme, gross revenue reached about £2.6 billion up to the end of December 2013.

(TfL, January 2014, "Public and stakeholder consultation on a Variation Order to modify the Congestion Charging scheme Impact Assessment" (PDF). TfL. Retrieved 15 February 2015)

Versement Tax

The Versement Tax is levied in Paris and paid by all employers in the region with 10 or more employees, and the rate of tax ranges from 1.4% to 2.6%, depending on how centrally-located the business is. The most central areas pay a 2.6% payroll tax, less central areas pay 1.7%, and areas at the edge of the region pay 1.4%. These taxes are collected by the Syndicat des transports d'Île-de-France (STIF), or Paris Transport Authority, which provides the budget for operation, maintenance and modernization. The STIF then distributes the revenue to Régie Autonome des Transports Parisiens (RATP), a company that operates much of the actual transport system including the Paris Metro, trams, buses and regional lines and to other public transport operators in the region. The payroll-based Versement Tax in the Paris region raised approximately €3.1 billion in 2012, which is nearly 40% of the total operating budget for public transit in Paris.

(Salon, D. (2014). Location Value Capture Opportunities for Urban Public Transport Finance, London)

Value Capture Finance instruments used in India

Betterment levy

Considered to be the most direct form of value capture, it is a one-time upfront charge on the land value gain caused by public infrastructure investment. This occurs in two forms-revenue source for improvement schemes and for specific projects.

(MOHUA VCF policy framework, 2017)

Additional Stamp Duty

Stamp duty is one time levy by the State to validate the registration of property in the buyer's name. An additional levy on the Stamp duty enables the government to capture the increase in property value.

Change of Land use fee

Land revenue codes provide for procedures to obtain permission for conversion of land use from agricultural to non-agricultural use.

(MOHUA VCF policy framework, 2017)

Additional FAR

This tool allows for additional development rights beyond the permissible limits. However, in this mechanism, a two-tier FAR structure should be designed, with a certain basic FAR bundled with property right and the remaining to be purchased, to enable value capture. The efficient mechanism for FAR sale is to define variable FAR limits in various parts of the city depending on the existing and new infrastructure and then auctioning the FARs in the market

(Game Changers in Transit Oriented Development, NIUA, 2017)

Transfer of Development Rights

This instrument involves separating the permissible development potential of the land from the land itself and allowing its transfer. Accordingly, the land owner is compensated with additional FAR of an equivalent extent which can be used by him or transferred to a third party for use elsewhere in another zone (receiving zone) provided the infrastructure in the receiving zone supports the transferred FAR. A TDR certificate is issued to the land owner and this certificate can be redeemed elsewhere. This opens up the possibility of a market where such development rights can be bought and sold.

Game Changers in Transit Oriented Development, NIUA, 2017)

Land Value Tax

Land value tax (LVT) is an annual tax on the increment of land value. It is the most common form of a finance based value capture. A land tax encourages high density development that consequently enhances land use efficiency. It also helps to stabilize property prices and discourages speculative investment.

(Horoaki Suzuki, J. M.-H. (2015). Financing Transit-Oriented Development with Land Values, Washington: World Bank Group)

Vacant Land Tax

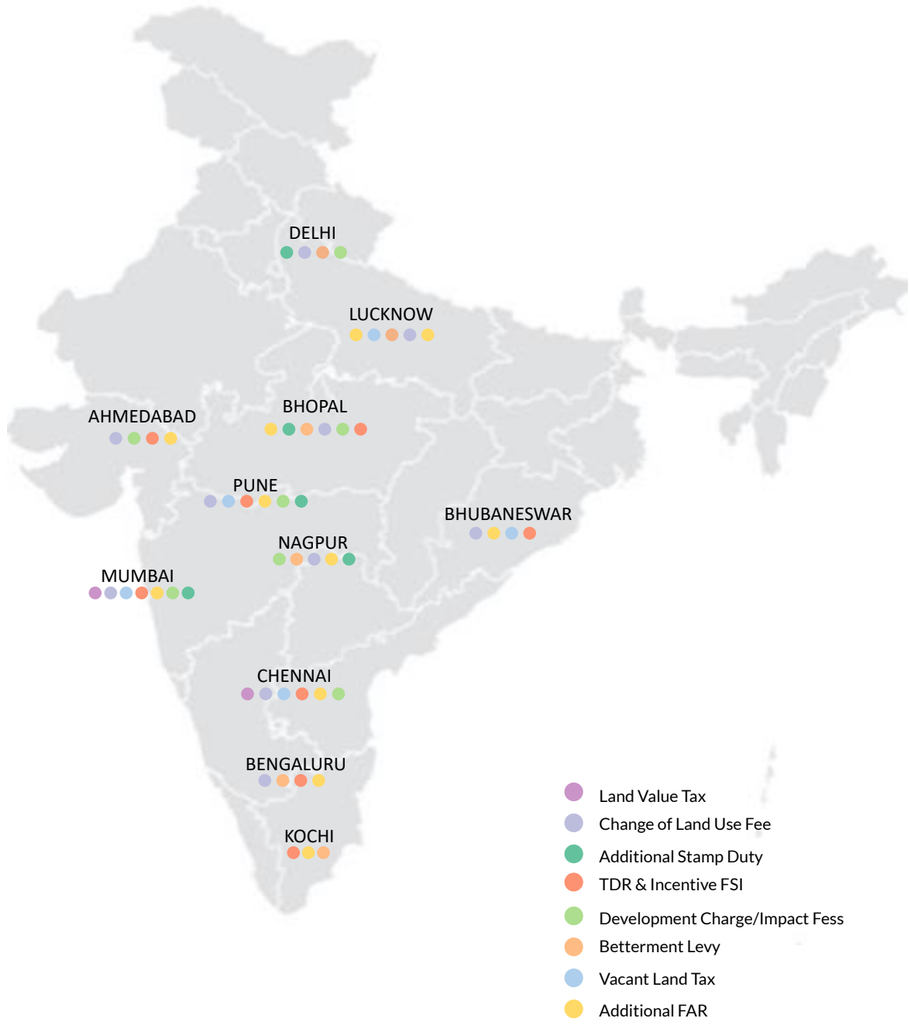
Vacant land tax can be considered as an augmentation to the Land Value Tax tool, which encourages land owners to develop vacant or under utilised land and discourages speculative investment. In Andhra Pradesh, the Greater Hyderabad Municipal Corporation imposes a tax of 0.5% of the registration value of the land if not used exclusively for agricultural purpose or is vacant without a building. On the other hand in Karnataka, the excess vacant land tax is charged at 20% of the Taxable Annual Value (TAV) for residential use and 25% of TAV for non-residential use

Development Fee/External Development Charge/Infrastructure Development Charge

Development charges and Impact fees, theoretically have separate definitions where Development Charges are used to finance specific large new infrastructure projects, and not basic civic utility services. They are levied to recover at least a share of the investment made. It is usually collected when the landowner applies for new construction permission. These are often named as Infrastructure Development Charges (IDC). However, Impact fees are levied, apart from the development charges, on new constructions in an area where a large new public investment has been announced. The fee is calculated based on the total cost of the project investment proposed and the development potential within the influence area. Therefore, impact fee is unique for each project area and would require a project wise notification. In case of metro projects, these are also termed as Metro Cess or TOD Cess (proposed in Bengaluru) for encouraging Transit Oriented Development in the Influence Zone.

External Development Charges (EDC), also called as Development Fee is currently levied only in few cities in India. It includes maintenance of trunk infrastructure such as roads, sewerage, water and electricity supply outside the project.

Figure 10: Various VCF instruments proposed/enforced in India



ROLE OF VALUE CAPTURE FINANCE IN TRANSIT ORIENTED DEVELOPMENT

The 12th Five Year Plan (2012-17) envisaged an investment of over INR 3 lakh crore ($ 50 trillion) in urban transport, broadly divided into components of street network – new areas, street network–upgrades, public transport, parking, institutions and capacity building, non-motorized transport and intermediate para-transit system projects, innovation, research and development and pilot projects (Operations Document on UTF, MoHUA 2016).

The State and City Governments constantly struggle with the challenge of financing of the urban transport projects when it comes to such large investments. Innovative methods of financing have been explored worldwide to address such challenges. Most of the times, benefits of public investment are not limited to direct beneficiaries (users of the facility or system); the activities supported by the public investment also generate a variety of indirect benefits to the residents and property owners in the proximity in the form of an increment in value of land and property.

Any transit project after its successful implementation creates an increase in real estate values which needs to be captured through value capture financing instruments. This involves interventions at state level as well as the level of private sector. At the state level, the competent authority needs to bring in regulations pertaining to development norms, notification of IZs and VCF instruments in a timely manner. Any delay in this would result in lesser amount of VCF revenue being tapped. The competent authority also needs to put an appropriate institutional framework to implement this successfully on the ground. The VCF revenue needs to be collected in a dedicated fund and a part of it may be dedicated to servicing the debt of the transit project. The rest of the proceeds should be used in developing/upgrading the infrastructure within the TOD zones. Even the development with private sector, following the TOD norms will materialize depending upon the demand in the real estate market.

Value Capture Financing can play an essential role in implementation of TOD as,

a. TOD is a capital-intensive development which needs large amount of funding from public & private sector to build and operate the assets and
b. TOD creates a value increment that will increase the value of land, property and businesses.

Cities are almost always under a severe fiscal constraint, they face great challenges in financing capital-intensive mass transit systems and other developments such as high-density mixed-use living, to reverse car-dependent urbanisation (Suzuki, 2015). Such investments are essential for ensuring a good quality of life. VCF can be considered as one of the critical mechanisms to supplement the cost of infrastructure development where mass transit projects are envisaged and planned for.

TOD also creates additional value to land, property and businesses, with better accessibility and more efficient use of land with higher density, leading to agglomeration benefits. VCF mechanisms give opportunity to capture the value of these benefits from the beneficiaries. As various projects within TOD address the constructs of Urban Density, Urban Diversity, Urban Design, Mobility and Housing to create compact, dense, walkable, mixed-use communities that are accessible by a mass transit mode, large investments turn out to be pivotal in the success of a TOD.

Source: https://todresources.org/blog/ideas-for-transit-oriented-housing-reach-new-heights/

Large expenditure associated with building transit systems is evident worldwide; the metro construction costs range from $4 billion (Seoul Subway Line 9-Phase 1) (www.codatu.org) to $7.77 billion (Singapore Thomson MRT Line) (Singapore Land Transport Authority), whereas in India the total estimated project costs of metro range from $987 million (Delhi metro-Phase I, II & III) to $5.7 billion (Bangalore metro Phase I & II) and $8.9 billion (Chennai metro-Phase I & II) (Source: Detailed Project Reports of DMRC, BMRL & CMRL). These projects also have a high operation and maintenance (O&M) costs, often exceeding cities' fiscal means. Traditionally, fare box collection is the source of revenue to transit companies. Cities such as Hong Kong and Singapore show a surplus of fare box revenue; but other cities with a dense network and high transit ridership such as New York and London show only 40% and 90% of O&M recovered using fare box revenue (Salon, 2014).

Table 2: Ratio of fares collected to operating expenses of public transit in various countries

City	Public transport system	Year	Ratio of Fares Collected to Operating Expenses
Tokyo	Tokyo Metro Corporation	2010	1.8
Hong Kong	Mass Transit Railway Corporation	2012	1.8
London	Tube	2012	1.2
Montreal	Subway	2013	0.8
New York	New York City Transit (subway and city bus)	2012	0.5
Washington, D.C.	Metro	2013	0.5
Paris	Metro	2012	0.4

Source: Deborah Salon; 2014; Location Value Capture Opportunities for Urban Public Transport Finance

Global cities also illustrate that value capture can not only support transit agencies to meet operating cost, but also can raise funds for capital investments to build transit. The Grand Paris Express project raised 80% of the project cost and New York 7 Line Extension raised 88% of its project cost through value capture. Crossrail in London is another example with 32% of project cost raised through value capture. (Salon, 2014). Housing is another capital-intensive project in cities worldwide. Expenditure required to meet London's infrastructure show that capital expenditure required on housing amounts to 32% of estimated budgetary requirement for London for the period 2016-2020 (ARUP, 2015). Housing when bundled with transit is an effective way of improving housing stock. The 'Rail + Property' (R+P) programme in Hong Kong SAR is a successful case of large-scale value capture that also built housing stock in the city. By 2016, the Mass Transit Railway (MTR) Corporation of Hong Kong had developed 39 MTR stations, providing some 1,00,000 housing units and more than 2 million square metres of commercial space (Mass Transit Railway Corporation, 2016). From 2000 to 2012 property development produced 38% and related business (such as commercial and property lease and management business) produced 28 % of the income of the transit company (Mass Transit Railway- MTR) in Hong Kong SAR (Suzuki, 2015). VCF in global cities such as New York, Hong Kong, Tokyo and London allowed these cities to generate funds for transit investment, operation and maintenance. Indian cities are also in need of large-scale investment in public infrastructure such as transport.

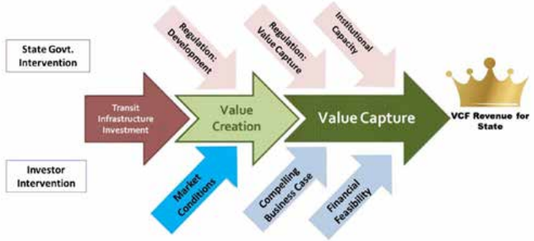
The general trend in Indian cities is to depend on government grants/ transfers, augmentation of revenue above operating expenses and long-term borrowings to develop large scale infrastructure. Since governments recover limited value from these investments, their capacity to make similar investments elsewhere is constrained. Cities have acknowledged that TOD investments can help in guiding urban growth. Unfortunately, financial constraints bind and severely limit such investments. Many governments in India and across the world have sought to address this problem by attempting to capture some share of the value increment in TOD using various innovative tools and policies. It is established by researches and practice in global cities that there is a clear positive impact on property values when accessibility is improved using public transport such as rail, BRT, and even conventional bus (Salon, 2014). Capture of this value increment has helped cities world- wide to reinvest and enable sustainable urban growth. If adapted well to local contexts, VCF can become an effective finance and planning apparatus for cities in India that are otherwise facing fiscal constraints in implementing TOD.

The VCF Policy Framework of Ministry of Housing and Urban Affairs also identifies the types of value capture, being area-based or project-based. Area-based value capture attempts to capture the basic appreciation of the value of the area as a result of infrastructure development, while project-based value captures the appreciation of land and building values in the area of influence of the project. The area of influence determines the geographic extent of immediate positive impact of project investments. Area-based application of Value Capture is best suited for urban areas. The area could be a locality, city or a larger planning area. On the other hand, project-based value capture can be used for projects being implemented by Ministries/Departments/Agencies of the Government of India, where mechanisms such as additional levy of charges can be enforced.

The success of Value Capture Finance in any Transit Oriented Development depends on enforcing the most feasible of VCF instruments at the right time along with the same being market friendly. Revenue from VCF shall accrue with favourable conditions of the real estate market and subsequent intensity of development. Hence, the following factors need to synchronize for maximum and steady accrual of VCF revenue:

1. Selection of appropriate VCF instrument(s),
2. Stage of enforcement and ease of implementation,
3. Amenable market conditions for development to happen, and
4. Appropriate institutional mechanism for VCF revenue collection and its appropriate utilization.

Figure 11: Regulatory process for implementation of VCF



Source: Guide to Value Capture Financing, American Public Transportation Association

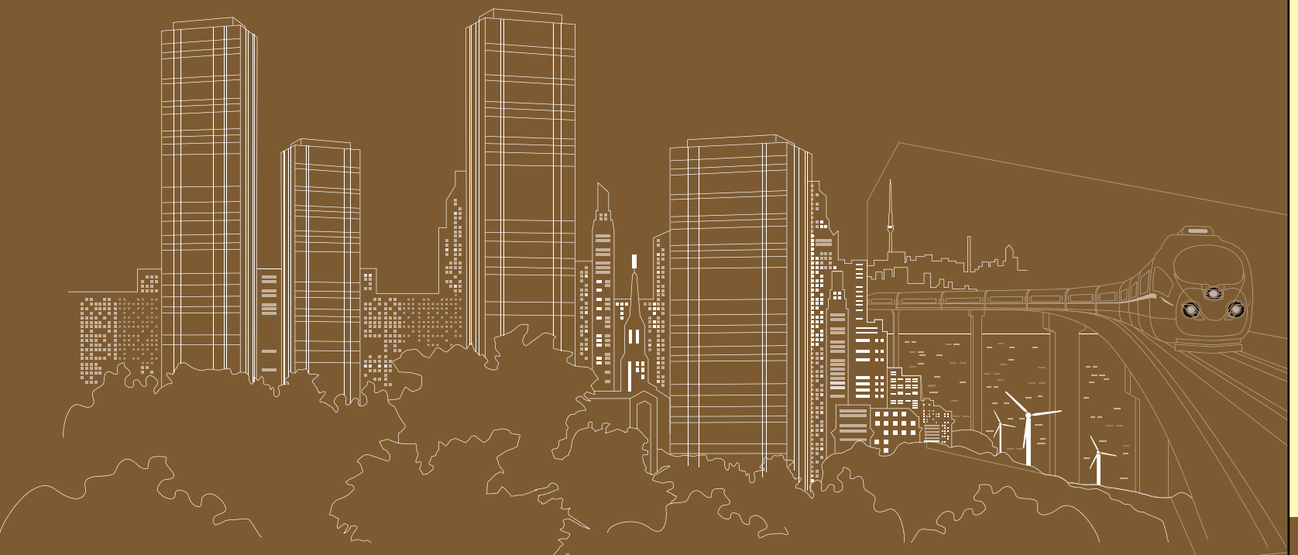
https://proponent.agency/unacast-vs-google/

APPLICABILITY OF VCF INSTRUMENTS

An overview is presented here of some of the instruments enforced in India with respect to the geographical area of applicability, at what stage of development it is enforced, who is it enforced upon, whether it is a one-time charge or a recurring one and finally, what is the purpose of enforcing such VCF instrument.

Table 3: Applicability of VCF instruments

	Change of Land use	Additional FAR	Additional Stamp duty/Cess	Development Fee/ External Development Charge	Infrastructure Development Charge	Betterment Levy	Vacant Land Tax	Transfer of Development Rights	TOD Cess/Metro Cess	Land Value Tax
Purpose	To enable mixed use high Density development. To put the land to more remunerative use	To enable high Density development	Additional cess/levy for infrastructure upgradation/ development	Additional cess/levy for infrastructure upgradation/ development	Development of major regional infrastructure projects	Additional cess/levy for infrastructure upgradation/ development	To discourage speculative investment and putting the land to productive use	To leverage development potential	Additional cess/levy for infrastructure upgradation/ development	To enable high density development and enhancement of land use efficiency
Geographical Area of Applicability	Development Authority jurisdiction or in the defined area	In zones defined by Development authority (such as Influence Zones & Special Development Areas)	Development Authority jurisdiction or in the defined area	Development Authority jurisdiction or in the defined area	Development Authority jurisdiction or in the defined area	In zones defined by Development authority (such as Influence Zones & Special Development Areas)	Vacant land parcels in the Development Authority jurisdiction or in the defined area	Sending and receiving areas in the Development Authority jurisdiction	In zones defined by Development authority (such as Influence Zones & Special Development Areas)	In zones defined by Development authority (such as Influence Zones & Special Development Areas)
Enforced at what stage of Development	At the time of applying for project permission	At the time of applying for project permission	At the time of every transaction of the asset	At the time of applying for project permission	At the time of applying for project permission	On announcement of transit infrastructure	Till the plot remains vacant	At the time of applying for project permission	At the time of applying for project permission	On announcement of transit infrastructure/ once the transit infrastructure is operational
Enforced on whom	Land owner / Developer	Developer/ Landowner	Purchaser	Developer (ultimately the end user)	Developer recovers it from the end user/ buyer(so it's a pass through cost)	Land owner/ Property owner	Land owner	Land owner/ Developer	Land owner/ Developer	Land owner
One time/ Periodic/ Recurring	One time	One time	Recurring-On every transaction	One time	One time	One time	Recurring	One time	One time	Annually



Case Studies

02

http://news.mit.edu/2017/transit-oriented-development-mexico-city-0202

The process of identifying and enforcing of a VCF instrument as followed by few cities and projects in India and abroad for Transit Oriented Development or augmenting the non-fare box revenue of the transit system are studied as cases for the project and the findings are presented in this section. While a summary of a few cases in India and abroad is presented below, detailed information on a selected few is in the subsequent pages. The cases of London Crossrail & Washington D.C. are studied for mechanisms of Business Rate Supplement and Special Assessment Charge respectively, whereas, the Mass Rapid Transit Systems of Pune, Jaipur, Nagpur, Bengaluru & Lucknow in India are studied for enforced or proposed instruments of purchasable additional FAR, levy of additional stamp duty or cess and Metro cess amongst others.

However, it should be noted that the cases are referred to only for the identified VCF instrument, respective regulatory provision for its enforcement and the revenue sharing mechanism (as available); these are not extensive research studies conducted regarding the transit system in question.

Table 4: VCF Instruments proposed in various Metro Projects in India

VCF Instrument	Bangalore Metro	Nagpur, Pune and Mumbai Metro	Lucknow Metro	Jaipur Metro	Indore and Bhopal Metro	Ghaziabad Metro	Gurgaon metro	Noida Metro
Additional Stamp Duty		✓	✓	✓	✓			
Increased/ Premium FAR	✓	✓	✓	✓	✓	✓		✓
Levy & collection of Cess from new development	✓		✓			✓	✓(IAC)	
Others (Green Tax)				✓				
TDR					✓			

Table 5: VCF Instruments enforced in other cities around the world

VCF Instrument	MTR, Hong Kong	London Crossrail	Paris Metro	New York City Subway	Sydney Metro	Copenhagen Metro
Business Rate Supplement		✓				
Joint Development	✓	✓				
Versement Tax			✓			
Congestion Charge		✓				
TDR				✓		
Land Value Tax					✓	✓
Tax Increment Financing				✓		

Each of the Indian and international case study covers general overview of the transit project supported with a map showing its spatial network and the VCF instrument identified by the governing transit or development authority for financial sustainability or augmentation of revenues. A snapshot of the regulatory and revenue sharing mechanism forms a part of every case study.

London Crossrail

Crossrail is an under-construction railway line that will run in London from Maidenhead and Heathrow in the west to Shenfield and Abbey Wood in the east. The line is expected to bring an additional 1.5 million people from outer London and beyond within the reach of central London and its major employment centers in 45 minutes or less.

In the 10 years since the project was announced, all 40 stations along the 73-mile line have seen a surge in the house prices by more than 41%, compared with a 25% rise in England overall during the same period. To internalize the windfall surpluses of land value due to proximity to the project, an innovative value capture instrument called the Business Rate Supplement (BRS) is enforced, thus helping repay the project borrowings and partly fund the on-going construction costs. Powers were granted to the GLA (Greater London Authority) to levy this under the Business Rate Supplements Act 2009 (the 'BRS Act'). The GLA will exercise these powers under the direction of the Mayor of London.

Since April 2017, the Crossrail BRS is applied only to assessments (business and other non domestic premises) with a rateable value of over £70,000 on the local rating lists of the 32 London boroughs and City of London Corporation. The revenue collected through BRS will be used to repay the loan for Crossrail and it will be effective until loan is completely repaid, ultimately funding around 1/3rd of project costs for a period of about 24 to 30 years at a rate of 2 pence per £1 across London on ratable values of more than £50,000 for business properties only.

(Greater London Authority (GLA) – Initial prospectus for levy of BRS; https://moneywise.co.uk)

BUSINESS RATE SUPPLEMENT

Regulatory Framework	Sharing Mechanism
Business Rate Supplements Act 2009 (the 'BRS Act') grants power to the Mayor of Greater London Authority (GLA) to levy the charge on business and commercial establishments	GLA to raise loans, BRS will be used to repay loans

Figure 12: London Underground & Suburban Railways

Source: www.urbanrail.net

Source: crossrail.co.uk

Washington D.C.

The New York Avenue-Florida Avenue Galludet University Metro Station was proposed to become an important part of the district's strategic economic development plan, which was built with funds from private land owners, the District of Columbia and the federal government. The land owners were the key beneficiaries of the project, who were educated about the impact of the project on land value by the District of Columbia's Department of Housing and Community Development. The landowners agreed to a pay 'a special assessment' over the period of 30 years to raise the funds.

This special assessment was proposed to be an additional charge that the assessment district would collect along with the regular property taxes. The assessment district was defined as commercially zoned parcels that were within an approximate distance of 800m from the transit station. Council of the District of Columbia passed the New York Avenue Metro Special Assessment Authorization Emergency Act of 2001 to create the special assessment district and allow the district to collect the assessment.

The district administration began collecting the assessment from 2002. Further, the District of Columbia also issued bonds to bring in the capital and proposed to repay the bonds using the funds collected through the special assessment.

(www.transportation-finance.org)

SPECIAL ASSESSMENT CHARGE

Regulatory Framework	Sharing Mechanism
New York Avenue Metro Special Assessment uthorization Emergency Act of 2001	The District of Columbia issued bonds to contribute funds Repay bonds using the funds collected through the special assessment

Figure 13: Washington DC Metro Rail Network

Source: www.urbanrail.net

Source: www.longandfoster.com

Maha Metro-Pune Metro

Additional Stamp Duty has been implemented vide amendment in Maharashtra Municipal Corporation Act, 1949 in 2015 (Section 149B)*.

The revenue collected through the levy of additional stamp duty shall be deposited with the State Government by the Department of Stamp & Registration, whereby the State Government shall release the funds on a regular basis to metro authority

Figure 14: Map showing Pune Metro rail network

Source: www.urbanrail.net

ADDITIONAL STAMP DUTY

Existing & Additional Rate	Regulatory Framework	Sharing Mechanism
5% of the value of the transaction + Additional 1% of the value as a SURCHARGE on stamp duty	Amendment to the Maharashtra Municipal Corporations Act to Levy Additional Surcharge on stamp duty 1% in notified cities. Levied in entire city area.	100% of the Revenue collected in city vide Surcharge to be granted by GoM to Metro Authority.*

Source: Pune Metro

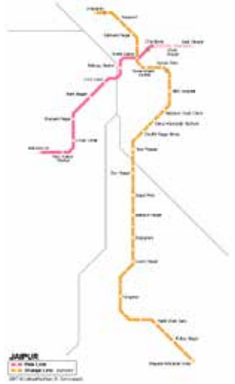
*Maharashtra Government Gazette dated 21st August, 2015

Jaipur Metro

Unlike most other MRTS systems, the Jaipur Metro is financed using proceeds from a State level fund known as the Rajasthan Transport Infrastructure Development Fund(RTIDF).

The RTIDF, however is financed largely by a State Wide Tax known as the Green Cess. This Green Cess is a nominal tax that is imposed for all motor vehicles during the time of registration. There are fixed rates and they are a function of the type of the vehicle and its age. Apart from Green Cess, Additional Stamp Duty and Additional FAR are also proposed.

Figure 15: Map showing Jaipur Metro rail network



Source: www.urbanrail.net

GREEN CESS

Existing & Additional Rate	Regulatory Framework	Sharing Mechanism
Fixed slabs / Nominal rates on registration and Resale of Motor Vehicles	Amendment to the Indian Motor Vehicles Act – Rajasthan Amendment	Grants Transferred by GoR towards Jaipur Metro towards Viability Gap Funding.
Rates depend on the age of the vehicles.	Applicable throughout the state of Rajasthan : Revenue Generated transferred to Rajasthan Transport Infrastructure Development Fund (RTIDF). Further Transferred as Grant by GoR towards Jaipur Metro (Varies in every annual budget)	100% retained with JMRCL as GoR Grant under RTIDF.

Source: Jaipur Metro

Maha Metro-Nagpur Metro

Two instruments namely, Additional Stamp Duty and Additional FAR, are under implementation in Nagpur to generate revenues for the Nagpur Metro Rail Project. Additional Stamp Duty has been implemented vide amendment in Maharashtra Municipal Corporation Act, 1949 in 2015 (Section 149B)*.

The revenue collected through the levy of additional stamp duty shall be deposited with the State Government by the Department of Stamp & Registration, whereby the State Government shall release the funds on a regular basis to metro authority

Figure 16: Map showing Nagpur Metro rail network

Source: www.urbanrail.net

Source: https://nagpuroranges.com

	Existing & Additional Rate	Regulatory Framework	Sharing Mechanism
ADDITIONAL STAMP DUTY	5% of the value of the transaction + Additional 1% of the value as a surcharge on stamp duty	Amendment to the Maharashtra Municipal Corporations Act to Levy Addl. Surcharge on stamp duty 1% in notified cities.	100% of the Revenue collected in city wide Surcharge to be granted by GoM to Metro Authority.*
ADDITIONAL PURCHASABLE FAR	**Max Permissible FAR**	**Rate of the Premium**	**Sharing Mechanism**
	Upto 4 depending on road width 500m on either side of alignment	1.25 times the ready reckoner rates	50% - Metro Authority 50% - Nagpur Municipal Corporation

Further, grant of additional FAR up to 4.06 within 500m on either side of the metro alignment was notified by the Urban Development Department, Government of Maharashtra. The premium is proposed to be charged at the rate of 60% of ready reckoner rates for residential and 90% for commercial establishments. This has been enforced through an amendment to DCR by Urban Development Department vide a notification dated June 9, 2017. The revenue from the purchase of additional FAR is proposed to be collected by the Urban Local Body (Nagpur Municipal Corporation) and further share 50% of it with Nagpur Metro Rail Project.

*Maharashtra Government Gazette dated 21st August, 2015

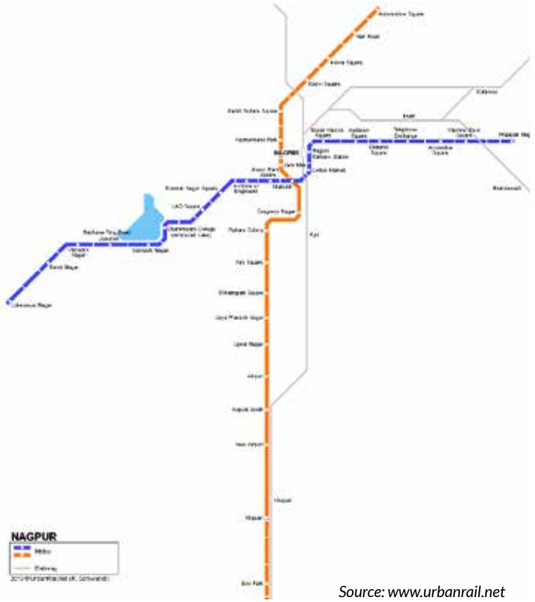
Namma Metro-Bengaluru

Two instruments have been proposed under the 'Metro Infrastructure Fund', namely Metro Cess and Additional FAR. A Metro Cess of 5% of the market value of land/building was proposed to be levied and the FAR was proposed to be increased to 4 in the Influence Zone (*150m radius from metro station). Bangalore Development Authority (BDA) was appointed responsible for revenue collections from these two sources through the Metro Infrastructure Fund as well as for transfer of respective funds to recipients other than itself; the recipients being Bangalore Metro Rail Corporation Limited (BMRL), Bruhat Bangalore Mahanagar Palike (BBMP) and Bangalore Water Supply and Sewerage Board (BWSSB).

	Existing & Additional Rate	Regulatory Framework	Sharing Mechanism
METRO CESS	5% of the market value of land/building One time during Grant of Permission for Development.	Imposed as a Betterment Levy under the Sec. 18 of KTCP Act 1961- Agency Responsible - BDA Applicable in the entire Jurisdiction of the Bangalore Development Authority	BMRCL 60% , BBMP 20%, BWSSB 20% and BDA 10%
ADDITIONAL FAR	**Max Permissible FAR**	**Rate of the Premium**	**Sharing Mechanism**
	Up to 4 depending on road width 150m radius from station	10% of Market Value on residential buildings and 20% of the Market Value on commercial buildings.	60% - Metro Authority 20% - Development Authority 10% - Municipal Corporation 10% - BWSSB

Source: Proceedings of the Government of Karnataka, for Bangalore Metro Rail Project Phase 2- Approval

Figure 17: Map showing Bengaluru Metro rail network



Source: www.urbanrail.net

Source: www.thenewsminute.com

Noida Metro

Noida Metro is an under-construction transit system connecting the settlements of Noida and Greater Noida in Uttar Pradesh, India. Currently, the network consists of a single line, with a total length of around 30km, serving 22 stations and is implemented by Noida Metro Rail Corporation (NMRCL).

To augment fare-box revenues, the project intends to capture development in the influence area of the corridor by granting 'Additional FAR' for future development. In 2013, Noida Development Authority & Greater Noida Development Authority approved a proposal for the grant of additional FAR of 0.5 on all plots within the influence zone of 500m on either side of the metro corridor. The proceeds from such additional FAR were proposed to be deposited in a dedicated Urban Transport Fund. It was estimated that the expected earnings by additional FAR shall be approximately INR 5,000 Cr. The Government of Uttar Pradesh through gazette notification approved the proposal under "The New Okhla Industrial Development Area Building (Third Amendment) Regulations 2015".

However, in 2016, the Greater Noida Industrial Development Authority (GNIDA) proposed to revise its building byelaws to enhance the base FAR and proposed a new base FAR to be applicable within a 500m influence zone on either side of the Metro rail corridor. Noida Development Authority is already accruing the revenues on the current date from the sale of additional FAR.

Figure 18: Map showing Delhi NCR Metro rail network

Source: www.urbanrail.net

Source: https://www.dnaindia.com/

Lucknow Metro

Lucknow Metro Rail Project is a mass rapid transit system serving a stretch of 8.5km, implemented by the Lucknow Metro Rail Corporation Ltd. that began its commercial operations in September 2017. Additional FAR was one of the instruments identified to capture the value generated due to the implementation of the metro project. The DPR states that approximately 60ha. of land is proposed to be made available for property development with FAR of 5.

Since urban bodies such as Uttar Pradesh Awas Vikas Nigam (UPAVN), Lucknow Development Authority (LDA) and Uttar Pradesh State Industrial Development Corporation (UPSIDC) were expected to contribute to the construction of the metro infrastructure, they were expected to use innovative sources of financing.

Apart from Additional FAR, Additional Stamp Duty and Cess on new development are also proposed.

Figure 19: Map showing Lucknow Metro rail network

Source: www.urbanrail.net

Source: Lucknow Metro

Mumbai Metro

The state of Maharashtra has been one of the earlier states to have experimented with land based fiscal tools, where one of the pioneer cities to have enforced these has been Mumbai. Several projects such as development of Bandra-Kurla Complex, Kalyan Growth Centre, public parking (CR2) at Nariman Point and several skywalks in the city have used value capture for their implementation.

In a more recent example, development of Mumbai Metro corridors and the monorail stretch from Chembur to Wadala have also incorporated value capture mechanisms to generate more financial resources. Government of Maharashtra has also approved enforcement of value capture mechanisms for the new metro lines that include

- Additional FSI on payment of premium upto 500m from rail line; 50% premium to MMRDA
- 100% increase of Dev. Charges; 100% share to MMRDA
- 1% cess on Stamp Duty on all transactions, 100% share to MMRDA

(Source: Mumbai Metropolitan Region Development Authority)

Apart from these, the proceeds from the commercial development of the car depots and the fee from advertisements and parking will be transferred entirely to the Development Authority (MMRDA). For this very purpose the Government has also approved setting up of an Urban Transport Fund in MMRDA for the collection of the revenue from VCF. The development models used for the metro lines differs as the first metro line was executed and operated on the PPP model with Reliance, whereas the rest of the metro lines are planned and in process of being executed by an SPV: the Mumbai Metro Rail Corporation Limited (MMRCL). In addition to the metro, the Trans Harbour link and the Multi-modal corridor are few of the major upcoming projects to be undertaken by the Development Authority.

Figure 20: Map showing Mumbai Metro rail network

Source: www.urbanrail.net

Case of Madhya Pradesh:

For the financial sustainability of transit projects of Bhopal Metro & Indore Metro implemented by the Madhya Pradesh Metro Rail Corporation (MPMRCL), the Government of Madhya Pradesh has used Value Capture Instruments namely - Additional Stamp Duty; and Transferable Development Rights in conjunction with the Transit Oriented Development Policy for urban areas of the state. The Government of Madhya Pradesh on 16th August 2018, notified the Madhya Pradesh Transferable Development Rights Rules 2018.

The rules allow for project implementing agencies to issue "Development Rights Certificate" in exchange for land that is acquired for the project. The "Development Rights Certificates" can further be traded to other entities thus allowing for "Transferable Development Rights". The local body / planning authority is responsible for the delineation, demarcation and notification of the "Generating" and the "Receiving" areas. The Policy is unique in the definition of TDR "Generating & Receiving Areas" – in that a generating area must be in the identified project area and a receiving area must be within a "Influence Zone" of the project under consideration.

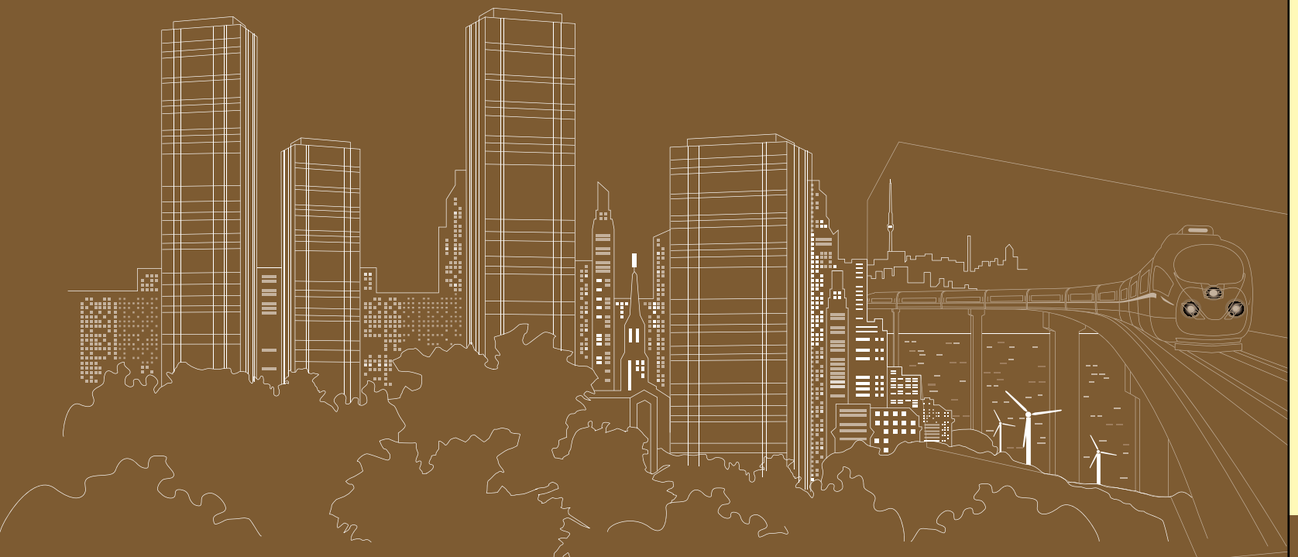
This read in conjunction with the "Transit Oriented Development Policy 2018 of the State Government – enables Transit and Planning authorities to exchange TDRs for project land requirement – which can be used in the TOD Influence Zone of the Project itself – helping in increasing densities in the Influence Zone as well.

Section 4 of the Rules, state that where the receiver entity wishes to avail of the Additional / maximum permissible FAR as is available to him in the project Influence Zone / Receiving Zone – it is mandatory that the receiver shall purchase the first 50% of such additional FAR from the project authority and only then utilize the provisions of TDRs.

This in effect ensures the availability of revenues to the Project Authority vide "Additional Purchasable FAR".

Madhya Pradesh also notified the Madhya Pradesh Nagarpalik Vidhi (Sanshodhan) Adhyadesh, 2018 in January 2018, which introduced an additional stamp duty of 1% for instruments of sale, gift and usufructuary mortgage, respectively, of immovable property within the limits of the concerned Municipal Corporations and Municipalities.

It is evident from the cases that value capture finance and the related instruments are at a very nascent stage in India where only limited instruments are used in 7 metro projects, studied here. Whereas, on the other hand, other countries and cities have explored other innovative mechanisms to capture the value generated by new transit & trunk infrastructure.



Implementation Project

Delhi-Ghaziabad-Meerut RRTS corridor

03

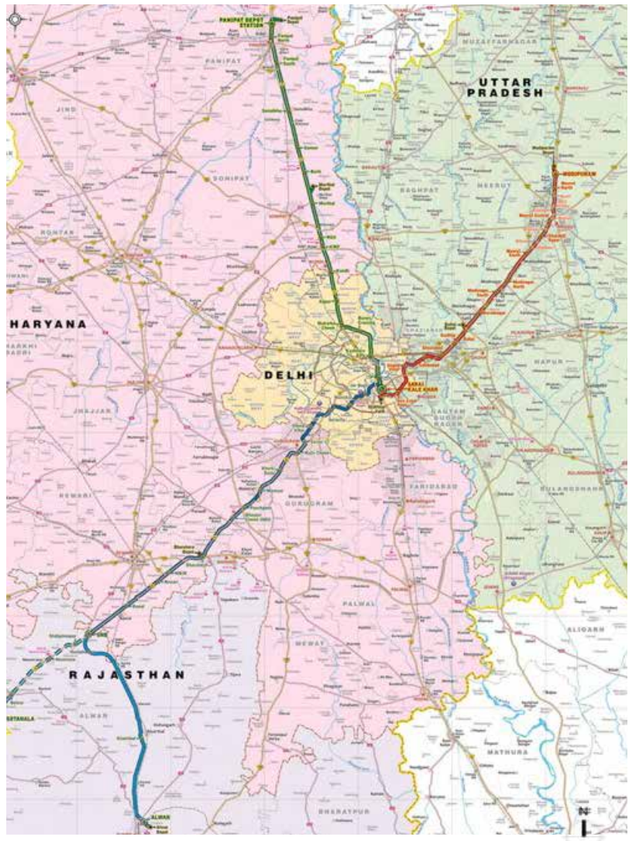
CONTEXT

The Regional Rapid Transit System (RRTS) was proposed to be developed in the National Capital Region (NCR) as a part of the Integrated Transport Plan of the Regional Plan 2021, prepared by the National Capital Region Planning Board (NCRPB) in 2005. It is proposed as a rail based sub-urban transport system to connect Delhi to the nearby urban centres of Alwar, Meerut, Panipat and other sub-regional centres. A total of 8 corridors were proposed initially, out of which 3 are prioritised to be implemented by the National Capital Region Transport Corporation in Phase-I.

The objective of the RRTS is to provide fast, reliable, safe and comfortable connectivity solution for National Capital Region (NCR). The RRTS is proposed to be the main commuter transport backbone significantly reducing the time for travel between key suburbs and towns around Delhi. High speed, significant reduction in travel time and wider reach of RRTS offer a very different proposition as compared to Metro rail systems. Some of the key value additions are:

- Increase in land value along the RRTS corridor
- Wider catchment area not limited to station proximity
- Time saving for long distance transit compared to existing modes of transportation
- A multimodal and sustainable transport system leading to decongestion in NCR and reduction in pollution by shifting commuters from private vehicles to a more sustainable mode.

Figure 21: Proposed NCR Regional Rapid Transit corridors



Source: NCRTC

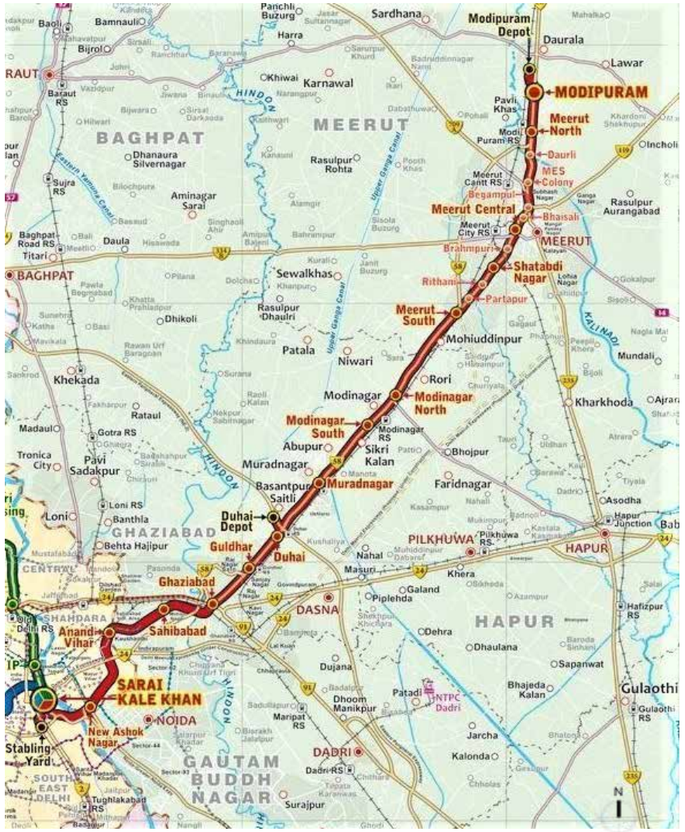
The first corridor to be implemented is the Delhi-Ghaziabad-Meerut corridor that will run for 90 km from a terminus in Sarai Kale Khan in Delhi to Modipuram in Meerut. The alignment of the corridor is planned with 22 stations and will pass through suburban regions of Ghaziabad, Muradnagar and Modinagar. Within Meerut city, it is proposed that NCRTC will run the Metro services of the Meerut North- South corridor utilising the RRTS infrastructure for the same.

It shall be a multimodal and sustainable transport system leading to decongestion in NCR and reduction in pollution by shifting commuters from private vehicles to a more sustainable mode. The proposed RRTS corridor shall expand & integrate new areas and trigger economic development while increasing the employment & livelihood opportunities in the catchment. There will be enhanced Real Estate development activity with an increase in the catchment area, increase in real estate valuations due to increase in accessibility, infrastructure and economic development and finally increase in the number of real estate transactions resulting to higher revenues to the state.

This is one of the first few projects where development concepts such as Transit Oriented Development and financial mechanisms such as Value Capture Finance have been acknowledged and included in the project at the DPR stage. In addition to implementation of TOD, VCF instruments were identified to generate revenue that shall address the debt servicing of the transit infrastucture.

A step-wise methodology for assessment of the feasibility of several VCF instruments and estimating the revenue thereof is elaborated in the next section taking examples from the implementation project itself.

Figure 22: Delhi-Ghaziabad-Meerut RRTS corridor



Source: NCRTC

0

Assessment of the present scenario of development & respective provisions in policy

- Study the existing VCF instruments being applied and how much revenue is being collected presently and what is the mechanism of its collections and utilization.
- Study the present institutional framework and the roles and responsibilities of the various govt agencies and role of private sector if any. Identify areas for streamlining.
- Study the present scenario of the level of development along the corridor and also study the existing plans (regional plans, city masterplans, zonal plans, etc.).
- Study the present development norms and guidelines and its suitability for TOD implementation

Details on page 42-45

1

Determine potential land for development in the Transit Oriented Development Influence zones

- Plot and analyze the present level of spatial development in the demarcated Influence Zones & Special development Areas in terms of:

A. Vacant & Plotted vacant land

B. Land with up to 10% ground coverage

C. Land having 10% to 30% ground coverage

Land with more than 30% built up area is excluded from the analysis.

- Further, analysis was based on the intensity of development. The conversion factor considered for each category is as follows:

Table 6: Conversion factor considered for prescribed land categories

Land category	Conversion (%)
Vacant plots/agricultural plots	75
Layout Plotted vacant	75
Plots with 0-10% ground	60
Plots with 10-30% ground coverage	50

Details on page 46-54

2

Visioning; Assign land use mix in the identified land parcels

- Determine appropriate land use for the IZ & SDA based on the vision developed for the transit corridor. The mix would be within the following range provided as guideline.

Table 7: Land use category distribution as UP TOD-Mixed use policy

Land use	Percentage
Residential	40-60
Commercial	5-10
Roads & Greens	15-30
Public & Semi-public	5-10
Industries	0-15

- Typically, 65% of the total land in mixed use category is considered saleable assuming that the rest 35% shall be required for Roads & Greens and Public & Semi-public use.
- Acquisition cost for the land under public & semi-public, roads & greens in mixed use land category is calculated and taken into consideration

3

Estimate revenue from the VCF instruments & generate scenarios for making informed decision

Identify the current VCF revenue and develop projections to arrive at base case scenario without RRTS.

Several factors are taken into consideration for estimating the potential revenue from each of the identified VCF instruments, which include:

- Geographical area of application (whether to be applied only in TOD zones or in entire Development Authority area)
- Amount of saleable land or built-up area
- Estimation factor as per the state policies

Derive scenarios as below for VCF revenue projections (after the RRTS is operational) and compare with the base scenario:

i. Conservative scenario
ii. Realistic scenario
iii. Optimistic scenario

Details on page 55-67

4

Determine VCF revenue sharing mechanism

- Determine the revenue flow for the collections from each of the instruments.
- Further, the sharing mechanism needs to be formulated where in the share of each of the stakeholder needs to be established and notified by the relevant authority.
- Create a separate fund account for the share of revenue meant for debt servicing of the transit infrastructure.

Consistent and extensive stakeholder consultations to attain consensus

Extensive consultations on a regular basis with the Development Authorities/Urban Local Bodies/other governing institutions for critical inputs are a critical component of the whole process: steps 0-5

5

Formulate an institutional framework for VCF enforcement & TOD implementation

An institutional framework to be designed where the roles & responsibilities of each of the stakeholder needs to be defined.

Details on page 70

Note: This methodology was followed for assessing the feasibility of the VCF instruments and estimating the potential revenue from the same. This is in no way claimed to be the only method to be followed by other cities & states for estimating potential revenue through Value Capture Finance. The assumptions and factors considered here are completely contextual and are likely to change in other cities and states.

STEP 0

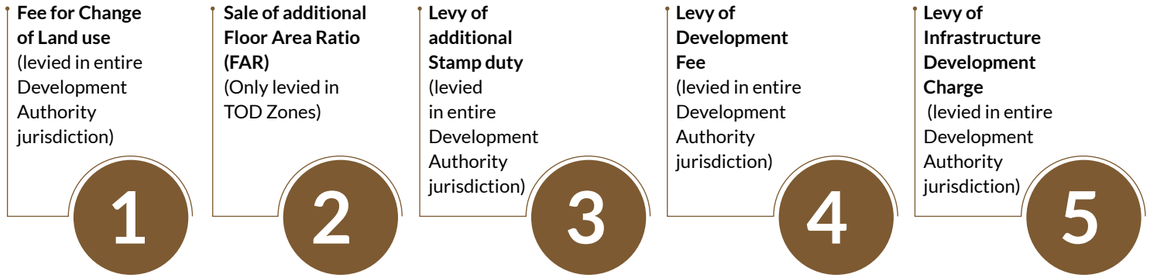
Assessment of The Present Scenario of Development & Respective Provisions In Policy

Prior to finalizing the instruments to be enforced along the Delhi-Ghaziabad-Meerut RRTS corridor, several instruments were identified and their feasibility was gauged with respect to the potential revenue profile, time frame for revenue realization, ease of implementation, precedence to the instrument in India and area of applicability. A collation of this exercise is presented below.

Table 8: Comparative Assessment of VCF Instruments

	Tool	Potential revenue profile	Time frame for revenue realization	Ease of regulatory implementation	Precedence of the instrument	Correlation with regional rail project	Remarks
1	Stamp Duty	High- based on historic profile of collection	Initial Year – High Later Years – High	Medium - Regulatory mechanism exists; Need for approval by state legislature	MRTS projects in Nagpur, Pune, Jaipur	Medium	City wide applicability possible
2	Sale of Purchasable FAR	High- based on historic profile of collection	Initial Year – Low Later Years – High	High- Regulatory mechanism exists; Authority with VC	MRTS projects in Bangalore, Nagpur, Noida, Lucknow, Jaipur	High	Possible applicability only in identified TOD zones (IZs & SDAs)
3	Infrastructure Development Charges	High - in line with Development Fee	Initial Year – Medium Later Years – High	Medium - Regulatory mechanism to be introduced as substitute for additional EDC	Haryana	Medium	City wide applicability possible
4	Fee for Change of Land Use	High – based on need for conversion of agricultural land	Initial Year – High Later Years – Low	High - Regulatory mechanism exists	--	Medium	City wide applicability possible
5	Development Fee / External Development Charge (EDC)	High- based on historic profile of collection;	Initial Year – Medium Later Years – High	High - Regulatory mechanism exists	MRTS in Pune	Medium	City wide applicability possible on new developments and re-developments
6	TOD Cess	High	Initial Year – Medium Later Years – High	Low- The tool has to be defined	--	High	To develop additional supportive infrastructure or feeder network
7	Betterment Charge	Low- Not utilized by Development Authority	Contextual Initial Year – Low Later Years – High	High- Regulatory mechanism exists; Authority with VC	--	High	Difficulty in enforcement as tax not linked to transaction

Since RRTS is a capital-intensive project like any other mass transit corridor, a part of the project is proposed to be financed through funds from a multi-lateral funding agency and the remainder through contributions from the Central and State Governments. To repay the debt incurred in the construction of this infrastructure, NCRTC and the State Government would need to devise innovative mechanisms to capture the value generated by the infrastructure. The detailed report on Value Capture Financing for Delhi-Ghaziabad-Meerut RRTS corridor, as submitted to Government of Uttar Pradesh in July 2019, identified 5 instruments for value capture financing, based on the assumption that the value of the land and built-up area in the TOD zones (4 greenfield zones + influence zones around the stations) would see a substantial increase when the RRTS is operational and additional funds could be mobilised to improve project viability on a sustained basis. The identified instruments were:



The selection of these instruments primarily depended on factors listed in table 3 on page 18 and table 8 on the adjoining page, viz. geographical area of applicability, nature of the charge (one-time or recurring), stage of implementation for the enforcement, tax/charge payee, potential revenue profile, time for realisation of the revenue, ease of implementation and lastly, precedence of the selected instrument in the country. An instrument wise account is elaborated below:

Change of Land Use: As a large extent of development activities are expected as a result of the upcoming rapid transit corridor, the lands that fall under the TOD zone are likely to undergo land use change for increased remuneration. The instrument will be able to capture this very increase of value in the said area. Many states in India already have the provision to levy a charge on the change of land use as it generates substantial revenue for Development Authorities. The provision for in Uttar Pradesh Development Act is as below:

'Where in any development area, the land use of a particular land is changed as a result of amendment of Master Plan or Zonal Development Plan under Section 13, the Authority (being the Development Authority constituted for a particular development area) is entitled to levy land use conversion charge on the owner of such land, in the manner and rates as prescribed. Such land use conversion charges are recovered from the landowner by the Authority prior to final notification of the amendment under Section 13 of the UPD Act.'

However, this was not enforced due to misinterpretation of the regulatory provisions, where the Development Authorities of Ghaziabad & Meerut inferred the provision in a way that since the Master Plan is enforcing the change of land use (from agricultural to non-agricultural or nonagricultural 1 to non-agricultural 2), the land owner will not be charged for the same. However, if the land owner applies for a further change of land use, then he shall be liable to pay the conversion fee. With the introduction of this instrument for value capture financing, such charges for land use conversion would be applicable for any change of land use as a result of amendment of Master Plan or by choice of the land owner.

Sale of additional FAR: Several other states such as Karnataka, Maharashtra, Haryana and Rajasthan are already successfully using it. It has also been enforced in Uttar Pradesh, in Noida and Lucknow in their respective mass rapid transit projects.

Additional Stamp Duty/Cess: States of Maharashtra and Rajasthan have enforced a 1% surcharge on the existing stamp duty rates applicable in the state. Revenue from the additional 1% charge is collected separately, to be re-invested in infrastructure provisions. Though there have been discussions for reforms in levy of stamp duty for decreasing the base rate so that it is easily enforceable, such surcharge will always be levied on the base rate and hence, will always be a source of revenue for the transit/development authorities.

Development Fee: The Development Fee in Uttar Pradesh is currently assessed based on the total land parcel area and it is linked to the density of development which allows for a maximum of 1.5 times increase of FAR for residential & commercial developments. Since this is an area-based charge and is within the existing provisions of the state, its implementation is relatively easier.

Other states that levy similar charge for undertaking supporting infrastructure development such as water supply, power, drainage, roads etc in the surrounding area are Maharashtra and Karnataka, where in Maharashtra, Pune metro enforces it and it is still in its approval stage in Karnataka for Namma Metro in Bengaluru.A distinguishing feature is the subject on which the Development Fee is charged. In Uttar Pradesh it is charged on plot area basis, while other states that have seen a higher intensity of development, have been charging the same on FAR basis.

Infrastructure Development Charge: The existing norms in Uttar Pradesh have a provision to levy additional 25% Development fee. This increase over and above the existing Development Fee may be levied as Infrastructure Development Charge. Thus, levy of such charges will depend on the regulatory provisions of the state and the extent of enforcement allowed therein.

Table 9 below and table 10 on the adjacent page identify and elaborate on the variables and factors that should be considered while estimating the revenue from each of these VCF instrument. While table 9 gives a generic idea of the variables and factors for each instrument, table 10 presents a more contextual scenario of state of Uttar Pradesh.

Table 9: Factors & variables for each shortlisted VCF instrument for Delhi-Ghaziabad-Meerut RRTS

VCF Instrument	Variables & Factors under consideration
Fee/Charge for change of land use	Saleable land *(as per context)* Circle rate *(as per context)* Multiplication factor for conversion of land use *(as per state norms and policies)* Land use change factor *(as per state norms and policies)*
Purchase of additional FAR	Purchasable built-up area *(as per context)* Purchasable FAR charge *(as per context & state norms and policies)*
Additional Stamp Duty/Cess	Saleable land *(as per context)* Number of transactions *(assumed as per context)* Circle rate *(as per context)* Stamp duty rate *(as per state norms and policies)*
Development Fee	Saleable land *(as per context)* Development fee rate *(as per state norms and policies)*
Infrastructure Development Charge	Development fee rate *(as per state norms and policies)*

Table 10: Shortlisted VCF Instruments for Delhi Ghaziabad RRTS corridor

VCF Instrument	Applicability (IZ/ SDA/Development Authority are of jurisdiction)	Saleable land area/built up area for calculation	Multiplication factor[1]	Formula for calculating revenue collection
Fee for Change of Land use	Development Authority jurisdiction area	65% of the total area of mixed land use (only total saleable area)	0.6[2] (applicable to parcels with area more than 10 ha: Refer Table 11 below)	CLU Charge = Total saleable land area X Multiplication factor for conversion of land use X Land Use Change Factor X Circle rate
Purchase of Additional FAR	Influence Zones & Special Development Areas	Mixed use areas in IZs & SDAs[3]	0.18[4]	Purchasable FAR Charge = Purchasable Built up area for mixed use development X Purchasable FAR Charge
Levy of cess on Stamp Duty	Development Authority jurisdiction area	• Mixed use areas in IZs & SDAs with FAR 2.5 (FAR 4 for areas in Sahibabad & Ghaziabad) • Non-mixed use areas in IZs & SDAs with FAR 2.0 • For extrapolation towards the Development Authority area: 15% area of GDA; 35% area of MDA	Additional 1% over the existing stamp duty rate of 7%	Additional Stamp Duty = Total saleable land area X Average number of transaction in a stipulated time period X Circle rate X Stamp duty rate
Levy of Development Fee/ External Development Charge	Development Authority jurisdiction area	On saleable land area for first 10 years & saleable built up area for next 25 years	0.755 (pls refer to page 63 for details)	Development fee = Total Saleable land area for development X Development Fee rates
Levy of Infrastructure Development Charge	Development Authority jurisdiction area	Charged at 25% of the Development Fee	-	Infrastructure Development Charge = Development Fee X Percentage share of Additional Development fee (allowed to be levied as IDC)

Table 11: Multiplication Factor for Land Use Conversion Charges as per size of land parcel

Area of land parcels (in hectares)	Multiplication factor
Up to 0.25	1.0
More than 0.25 up to 1.0	0.9
More than 1.10 up to 5.0	0.8
More than 5.0 up to 10.0	0.7
More than 10.0	0.6

Source: Integrated Township Policy, 2014, Uttar Pradesh

Table 12: Land use conversion factor for Uttar Pradesh

Change Category	Land use conversion factor
Agriculture to Mixed use	1.25
Agriculture to Residential	0.5
Agriculture to Commercial	1.5
Agriculture to Industrial	0.35
Agriculture to Public & Semi-public	0.20

Source: Sec. 4(1) and Sec 3 of The Uttar Pradesh Planning and Development Assessment, Levy and Collection of Land Use Conversion Charge) Rules, 2014

[1] As per the state policies & regulations

[2] As per the Mixed use & TOD policy of Uttar Pradesh, the factor for CLU is 0.5 in the TOD zones, however, for this study an average factor of 0.6 is considered as the area of consideration is beyond the demarcated TOD zones

[3] As per the provisions of Mixed use & TOD policy of Uttar Pradesh

[4] As per inputs from the Ghaziabad & Meerut Development Authorities, so highly contextual

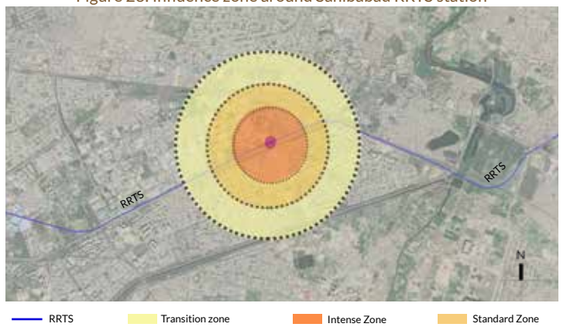
STEP 1

Determine Potential Land for Development in the Transit Oriented Development Influence Zones

Influence Zones for Delhi-Ghaziabad-Meerut RRTS Corridor

The Detailed Project Report of the Delhi-Ghaziabad-Meerut RRTS corridor identified TOD zones of 3000 m radius around each of the stations, consisting of an 'intense zone' up to first 300m (5 minute walk), a 'standard zone' up to 800m (10 minute walk), further a 'transition zone' up to 2000m (bicycle radius) and lastly a buffer zone of 1000 m that shall include green and open spaces to counter the higher densities in the inner zones. This recommended radius of 3000m for the Influence zone for TOD around every station was later revised to 1500m collectively by NCRTC, Ghaziabad Development Authority and Meerut Development Authority. This revision was in line with the provisions in the 'Planning norms, zoning regulations and Building Byelaws for mixed use and TOD–2015' of Government of Uttar Pradesh. Thus, influence zones of 1500m radius are proposed around each RRTS station that shall have high-density mixed-use development to bring as many people closer to the mass transit.

Figure 23: Influence zone around Sahibabad RRTS station



In keeping with the objective to promote higher densities along the RRTS transit corridors, it is proposed to introduce the concept of Transit Oriented Development around the RRTS stations. As part of TOD, besides high density, the principle of walkability, non-motorized transport (NMT), public transport connectivity and multi- modal integration is critical. Up to 500-1000m distance is considered to be walkable within 7-10 minutes while a distance of 1500 m is seen to be convenient for walking, bicycling or using localized feeder services.

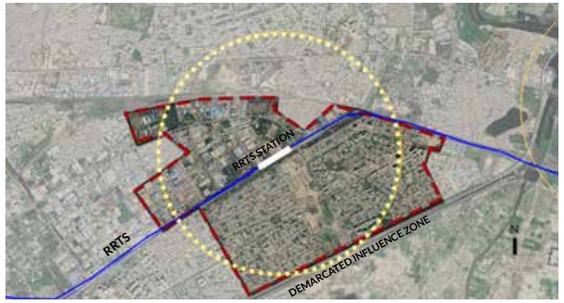
It is recommended to delineate TOD Zones up to a radius of 1,500m from the stations. The station influence areas of all the RRTS stations shall be earmarked as TOD Zones in accordance with the UP-TOD Policy.

Source: Detailed report on Value Capture Financing for Delhi-Ghaziabad-Meerut corridor, submitted to Govt. of Uttar Pradesh in July 2019

The delineation of the influence zone is governed by multiple factors, such as natural or geological features (if any), existing transit corridors such as major roads, highways and railway lines which act as physical barriers to the contiguity. Existing settlements, plot boundaries & other developed areas also play a role in defining these boundaries. Entirety of blocks or neighbourhoods should be taken into account while delineating an influence zone.

An example shown here is of the influence zone around the RRTS station of Sahibabad. The circle denotes the influence zone of radius 1500m marked as per the existing state policies. Further, a more definite boundary of the influence zone is demarcated based on the factors listed above. The area on the north of the existing railway line is excluded considering the physical barrier for walkability and accessibility by NMT. However, continuous access to such areas might be planned by the competent authority while formulating detailed plans for individual transit nodes.

Figure 24: Definite boundary of the Influence zone at Sahibabad



Special Development Areas along Delhi-Ghaziabad-Meerut RRTS Corridor

Vacant developable land available in a brownfield area (Refer Figure 32 on page 52) is limited to a few land parcels, whereas availability of such land in a greenfield area (Refer Figure 36 on page 52) is much higher. This is a realistic scenario relevant for any city and its suburbs where new development is envisaged around the transit station following the TOD principles. Development following the TOD principles on the developed land parcels can only happen with land pooling or with the development of a Town Planning Scheme. Thus, to realise a Transit Oriented Development in a city, it is essential to identify greenfield areas where new development can be proposed. These areas have been called as Special Development Areas (SDAs).

In case of Delhi-Meerut RRTS, there were four SDAs identified along the corridor in the Detailed Project Report (DPR) where contiguous greenfield land parcels are available for high-density development following TOD principles. These were located at Guldhar (250ha.), Duhai (400 ha.), Meerut South (400ha.) and Modipuram (400 ha.) (Refer figures 25-28). Further, each of the land bank is assessed with respect to the location and neighbourhood, current and proposed infrastructure for connectivity to the nearest urban or regional centre. Later, the Special Development Area is demarcated as overseen by factors such as natural or geological features (if any), existing roads, highways, railway lines and other trunk infrastructure and existing settlements. (Refer page 9 for detailed steps)

Figure 25: Identification of 4 potential Special Development Areas along the RRTS corridor

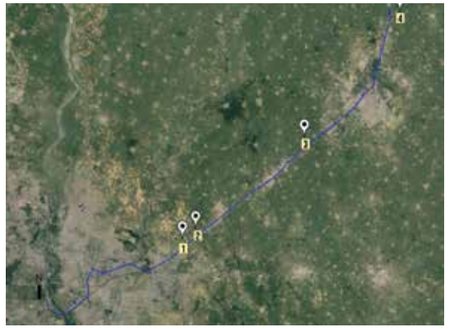


Figure 26: Demarcated SDA (Guldhar and Duhai) along the RRTS corridor

Figure 27: Demarcated SDA-Meerut South

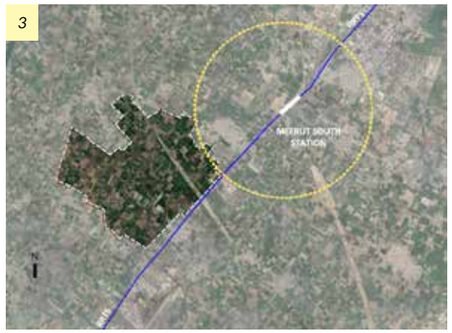


Figure 28: Demarcated SDA-Modipuram

After demarcation of such SDAs at favourable locations along the RRTS corridor, an exercise of land valuation was undertaken to ascertain acquisition costs and explore possible development models before undertaking the detailed planning of the demarcated SDA. The objective of land valuation is to derive a comparative between buying the land at market price and acquiring it through Land Acquisition Act. The outcome of the exercise will help in decision making for development models. This was conducted by an International Property Consultant where details were recorded about the land transactions in the subject area for comparable parcels. Since, the subject parcel size was large and no comparable parcels were identified, belting method was used to estimate the value of land. Hence, land parcels which are close to the arterial roads or have direct access, have higher valuation as compared to the ones in the interior. Further to land valuation, a detailed assessment was also carried out to establish the development potential for the demarcated SDAs. The purpose of undertaking the land development potential exercise is to arrive at the following:

- What is the vision for the subject area?
- What kind of economic activities (industries, trade & commerce, logistics, etc.) are expected to come up & where?
- What kind of support activities (housing, education, healthcare, community facilities, public open spaces, etc.) are expected to come up and where?
- How much physical and social infrastructure needs to be provided?
- What are the achievable prices as rentals?
- How would the development be phased?
- What would be the financial viability of the project/ upcoming development?
- What would be the optimal development model for each asset class?
- What would be the land assembly strategy?
- What would be the institutional framework for implementation?

COMPONENTS OF DETERMINING DEVELOPMENT POTENTIAL OF LAND

- Conduct a detailed demand survey to arrive at an appropriate vision and land use mix for the SDA, identifying the key economy drivers & the kind of core and support activities required along with their respective zoning.
- Study of the real estate trends in the region with regard to various uses like office, retail, leisure and entertainment, hospitality, healthcare, institutional, etc. uses, covering the demand supply dynamics across these sectors.
- Study of the prevailing pricing for rentals and capital values and the likely future based on reasonable assumptions on development of RRTS corridor.
- Comparison of different assumption for rentals, leasing and any other relevant modes for capturing maximum value of it before and after the transit corridor.
- Benchmarking of competing projects across sectors.
- Deriving the most appropriate product-mix with phasing in consultation with the Transit & Development authority.
- Developing of financial viability, risk and sensitivity scenarios
- Further, individual Local Area Plans would cover:
  - Land use plan
  - Traffic and transportation plan
  - Physical and Social Infrastructure Planning
  - Environmental management plan and sustainability issues
  - EIA & SIA
  - Energy and sustainability planning
  - Urban forestry and agriculture aspects
  - Resource mobilization plan/strategy
  - Plan Implementation strategy

https://www.cnu.org/publicsquare/2017/03/15/great-idea-transit-oriented-development

Estimation of Develop-able Land in a TOD Zone

Mass transit corridors within a city or a region may pass through already developed areas and hence, there is a need to establish the extent of areas available for further densification & development following the principles of TOD. A methodology of estimating the land area available for TOD in brownfield & greenfield areas is elaborated here.

The process primarily rests on two tools: the satellite imagery available for the identified site and the Master Plan in effect for the respective region. This is demonstrated on the adjacent page following examples of Influence Zones around two stations on Delhi-Ghaziabad-Meerut RRTS corridor, namely Sahibabad and Meerut North.(Refer Figure 29-36)

The Sahibabad IZ assessment was done after a detailed field survey and analysing the details of plot wise parameters like:

- Ownership
- Level of development on it
- Land use
- Access road within

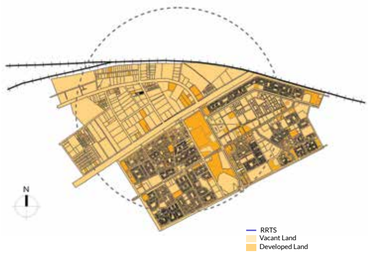
Whereas a rapid assessment of all the other IZs (demonstrated here for Meerut North) was done on the basis of satellite imagery & available Master Plan (without field verification) due to time limitations.

The process of approximate area estimation in the influence zones along the Delhi-Ghaziabad-Meerut RRTS corridor was a continuous consultative process with consultation meetings held with relevant stakeholders on a regular basis. Several meetings were conducted over a period of one year, the significant ones being with the Principal Secretary, Housing & Urban Planning Department, Government of Uttar Pradesh, Commissionerate, Meerut Division & the Development Authorities of Ghaziabad & Meerut.

Stakeholders for the project

- Housing & Urban Planning Department, Government of Uttar Pradesh
- Commissionerate, Meerut Division
- Ghaziabad Development Authority (GDA)
- Meerut Development Authority (MDA)
- National Capital Region Planning Board-Ghaziabad
- Revenue departments of the respective districts
- Uttar Pradesh State Industrial Development Corporation (UPSIDC)
- Uttar Pradesh State Road Transport Corporation (UPSRTC)
- Uttar Pradesh Awas Vikas Nigam (UPAVN)

Figure 29: Identification of vacant and developed parcels in Sahibabad influence zone



Step 1: Using the satellite imagery, identify existing land parcels in the influence zone in two categories: vacant & developed

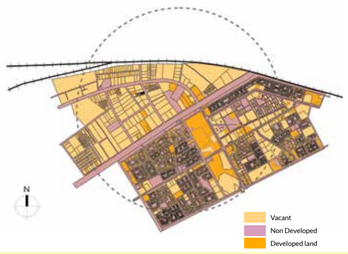
Figure 30: Superimposition of Master Plan on the demarcated influence zone for Sahibabad

Step 2: Overlay the Master plan on the demarcated Influence zone, that gives an idea of the proposed land use of the land parcels in the zone.

Figure 33: Identification of vacant and developed parcels in Meerut North influence zone

Figure 34: Superimposition of Master Plan on the demarcated influence zone for Meerut North

Figure 31: Deducting Non-Developable uses from derived Influence zone area of Sahibabad



Step 3: From the overlay of the master plan, identify the prohibited and non-developable uses on vacant land such as green belt, proposed transport hubs & plotted schemes of the Development Authority, etc. to be excluded from further considerations

Figure 32: Final developable land for VCF calculation for Sahibabad

Step 4: Post step 1,2 & 3, the remainder land is the actual vacant land available for any development.

Figure 35 Deducting Non-Developable uses from derived Influence zone area of Meerut North

Figure 36: Final developable land for VCF calculation for Meerut North

Assessment of Available Land

This particular step is a successor for estimating the developable land available in any Influence Zone or SDA.Further to that, more realistic scenarios can be developed based on the potential for development.

Below is the process followed for such assessment in case of the implementation project.

Step 1: Available developable land is divided in 3 categories,
Category 1: Plotting the vacant & plotted vacant land parcels
Category 2: Land in Category 1 + land with up to 10% ground coverage
Category 3: Land in Category 1 & 2 + land with 10-30% ground coverage
(Refer to maps below for an example of Modipuram: one of the IZs along the Delhi-Ghaziabad-Meerut RRTS)

Step 2: Additional conditions are considered for each of the categories
Category 1: Only 75% of the identified land gets developed
Category 2: Only 60% of the identified land gets developed
Category 3: Only 50% of the identified land gets developed

Step 3: Out of the available land, land for amenities is deleted. In the IZs where land is considered for mixed use development, it is assumed that 35% of the total area shall be utilised for Roads, Greens and Public and Semi-Public uses and rest 65% would be saleable.
It is further assumed that area under Roads, Green and Public and Semi-Public space will be acquired and developed by the Government in order to trigger development in respective IZs/ SDA.

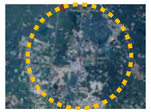
Step 4: After the land categorization & deriving the actual available land for potential development, the provisions of the state TOD policy (UP Mixed Use & Transit Oriented Development Policy for Zoning Regulations & Planning Norms, 2014) are applied.

Step 5: Three scenarios are developed for further VCF revenue estimation for the entire project period of 35 years:
Scenario 1: Only the vacant & plotted vacant land parcels get transacted (Conservative case)
Scenario 2: Land from Scenario 1 + land parcels with up to 10% ground coverage get transacted (Realistic case)
Scenario 3: Land from Scenario 1 & 2 + land parcels with 10-30% ground coverage get transacted (Optimistic case)

Scenario 2 is the recommended scenario and further revenue calculations for each of the VCF instruments is detailed in step 3.

Figure 37: Scenario 1: Vacant+ Plotted Vacant for transaction

Google Earth Imagery of IZ



Developable Vs Non Developable

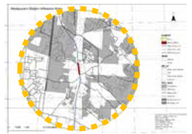
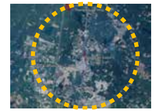


Figure 38: Scenario 2: Scenario 1 + Plots with up to 10 % ground coverage

Google Earth Imagery of IZ



Developable Vs Non Developable

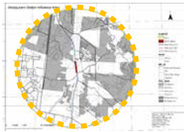
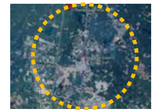
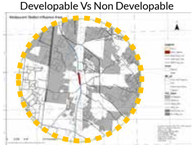


Figure 39: Scenario 3: Scenario 2 + Plots with 10-30 % ground coverage

Google Earth Imagery of IZ



Developable Vs Non Developable



STEP 2

Visioning; Assign land use mix in the identified land parcels

Steps for formulating vision for the corridor

a. Take a holistic view of the entire corridor with a role defined for each IZ and SDA in the regional context. The IZs and SDAs should complement each other and not compete and hence focus sectors need to be finalized accordingly.
b. Study the regional opportunity to identify the right kind of economy drivers and other related activities in line of the above.
c. Derive the core sectoral focus areas for each of the IZs and SDAs, check which ones are most suitable for any/ either of the following:
    i. Industrial development (SMES)
    ii. Large format manufacturing industries
    iii. Logistics and related
    iv. Affordable housing led development
    v. Educational institutes
    vi. Healthcare
    vii. CBD/Retail
d. Derive the land requirements for the support activities like residential, retail, public and semi-public etc for each of the IZ/SDA
e. Quantify the space left for roads and transportation for public and semi-public spaces and for masterplan green spaces.
f. Align the residential population and the corresponding space for public and semi-public amenities as per permitted norms.
g. Finalize the land use breakup for each IZ and SDA through a quick assessment. The purpose of the whole visioning exercise is to derive how much of total land is available for development.
h. For the purpose of implementation subsequently a detailed Zonal plan for each of the IZ and SDA should be prepared by the competent authority.
i. The competent authority can then prioritize which IZs & SDAs it wants to take up first and how it wants to initiate development.

A strategic vision has been prepared for each of the SDAs leveraging their locational advantages and the needs of the region based on available secondary data and interactions with key stakeholders including Government departments, private agencies and other industry associations. In the absence of primary surveys and detailed mapping, this exercise has currently been done on a conceptual basis and needs to be firmed up with detailed studies that may be undertaken subsequently.

Vision for each SDA shall assist in determining the total amount of land required for each land-use category, including roads, public, semi-public and green areas. The development shall begin with the land for the above mentioned categories being acquired by the Governing Authority.

Proposed Vision for Special Development Areas (SDAs)

Guldhar (250Ha)

Under the Mixed-Use policy, it has been considered that 20% of the SDA area would avail the FAR of 4.0 and the rest of the zone would avail the maximum FAR of 2.5.

Guldhar area has a considerable number of completed & ongoing projects catering to the affordable housing segment. This region is within the close proximity of the dense Raj Nagar Extension residential developments. Taking this into account, for Guldhar SDA, provision for more areas under Public & Semi-Public Land Use and other support infrastructure including schools, colleges, fire stations, police station & hospitals is proposed. A higher commercial component is also proposed as retail destinations can be created here for the benefit of the entire region. No industrial components have been proposed.

Duhai (400Ha)

Under the Mixed-Use policy, it has been considered that 20% of the SDA area would avail the FAR of 4.0 while the rest of the zone would avail a maximum FAR of 2.5

Location of Duhai affords an excellent opportunity for attracting logistics and allied activities due to its proximity to the Eastern Peripheral Expressway, Railways & Eastern Dedicated Freight Corridor. This makes it an ideal location for Warehousing, Distribution Centers, Freight Villages, Transport Nagars etc. Industries related to logistics can also be attracted here. Support, residential affordable housing is proposed.

Meerut South (400Ha)

Under the Mixed-Use policy, it has been considered that 20% of the SDA area would avail the FAR of 4.0 while the rest of the zone would avail the maximum FAR of 2.5

Meerut South SDA has been envisioned as an Industrial node majorly comprising of small Industrial Agglomerations with supporting Residential, Commercial and Social Infrastructure functions.

There are already scattered industrial clusters which can be further developed and the proposed DFC (Dedicated Freight Corridor) also passes close by to this SDA. Hence the industrial usage targeting SMEs and MSMEs has been proposed.

Modipuram (400Ha)

Under the Mixed-use policy, it has been considered that 20% of the SDA area would avail the FAR aof 4.0 while the rest of the zone would avail the maximum FAR of 2.5

Modipuram SDA has also been envisioned as an Industrial node for Medium and Heavy industries. The land values in this SDA are amongst the lowest in comparison to other SDAs. Hence private Industrial Estate developers as well as UPSIDC may find it viable to acquire and develop industrial estates. Also, the Dedicated Freight Corridor is passing close to this node which gives the node distinct locational advantage. Supporting Residential and Social infrastructure is being proposed including affordable housing and industrial worker housing

STEP 3

Estimate revenue from the identified VCF instruments

VCF Instrument 1: Fee for Change of Land use

Objective

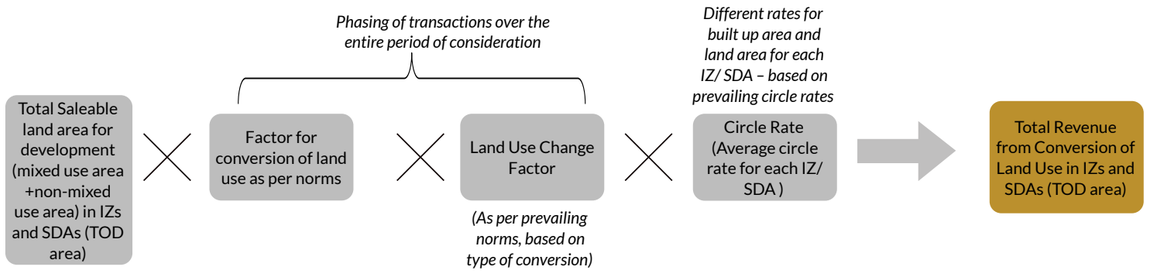
A levy of charge on conversion of land use from agricultural to non-agricultural and/or residential/commercial to mixed use. Provision for levy of Conversion of Land Use (CLU) charges is available under the current norms for change from one usage to the other. Uttar Pradesh Development Act states:

'Where in any development area, the land use of a particular land is changed as a result of amendment of Master Plan or Zonal Development Plan under Section 13, the Authority (being the Development Authority constituted for a particular development area) is entitled to levy land use conversion charge on the owner of such land, in the manner and rates as prescribed. Such land use conversion charges are recovered from the landowner by the Authority prior to final notification of the amendment under Section 13 of the UPD Act.'

Assumptions

The Multiplication Factor (Land Area) has been considered as 0.6 (Refer page 45 for details). Average circle rate for respective IZ/ SDA has been considered. The time period for estimation of revenue from levy of CLU charges has been considered as 2019-2054. Accordingly, phasing of realization of cumulative potential revenue for the IZs/ SDAs from CLU charges has been assumed. In order to calculate the cumulative potential revenue from levy of Change of Land Use charge on the entire jurisdiction area of the respective Authorities, extrapolation of the base revenue of year 2017 as received in the balance sheet by Ghaziabad Development Authority was escalated at the escalation rate of 3% per annum over the project period (2019-2054).

Methodology for Revenue Calculation



Recommendations

The Development Authorities in Uttar Pradesh currently do not charge any levy for conversion of land from agricultural to other categories of use, those prescribed in the Master Plan. An agricultural land can be used for residential development, if prescribed in the Master Plan, without paying any land use conversion charge. However, it is assumed that as a consequence of implementation of the RRTS project, substantial conversion of land use from agricultural to non-agricultural and/or from residential/ commercial to mixed use shall take place in the IZs and SDAs and thus, levy of such charges shall generate substantial revenue.

Levy	Regulatory Framework	Sharing Mechanism
Fee for Change of Land Use	Amendment to: 1. Uttar Pradesh Urban Planning & Development Act 1973 2. Conversion Charge Rules 2014	50% revenue: Development Authority 50% revenue: RRTS debt servicing

Source: www.voyagedubai.fr

VCF Instrument 2: Sale of Additional FAR

Objective

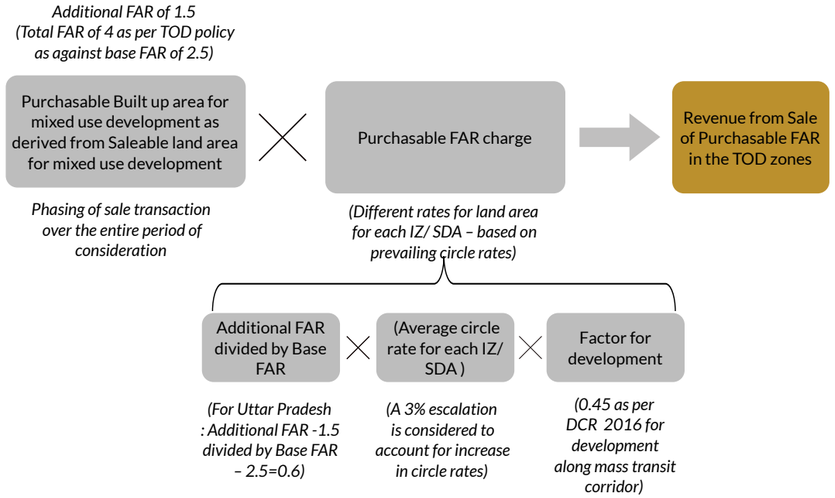
Since the instrument allows for additional development rights beyond the permissible limits, it is proposed to be used for generating additional revenue for the Development Authority through the high density development envisaged along the transit corridor.

Assumptions

For estimation of revenue potential from sale of additional FAR from special mixed-use development areas, an annual increment of 3% has been considered on the charge. The time period for estimation of revenue from sale of purchasable FAR has been considered as 2019-2054. Accordingly, phasing of realization of revenue potential from sale of FAR has been assumed.

Charges for purchasable FAR has been calculated for each of the IZs and SDAs based on multiplication of the prevalent circle rate with a factor of 0.18 as advised by the Development Authority in the Stakeholder Consultation held on 11th January 2019 at GDA, Ghaziabad. Earlier, a factor of 0.27 was considered.

Methodology for Revenue Calculation



Recommendations

The land area considered in the IZs and SDAs have been segregated for mixed use and non-mixed-use development in line with the methodology. The mixed-use areas are recommended to be developed as “Special Mixed-Use Development” areas in accordance with the Planning norms, zoning regulations and building bye-laws for Mixed Use and TOD, 2015.

It is recommended to permit additional purchasable FAR on the gross area within these special mixed-use development areas earmarked, in accordance with the Planning norms, zoning regulations and building bye-laws for Mixed Use and TOD- 2015.

Levy	Regulatory Framework	Sharing Mechanism
Charge for purchasing additional FAR	Amendment to: 1 Uttar Pradesh Urban Planning & Development Act 1973 2. Planning norms, zoning regulations and building bye laws for Mixed Use & Transit Oriented Development 2014 (UP TOD Policy) 3. Development plans and building bye-laws for Ghaziabad & Meerut	50% revenue: Development Authority 50% revenue: RRTS debt servicing

source: www.ukabc.org.uk copy

VCF Instrument 3: Additional Stamp Duty

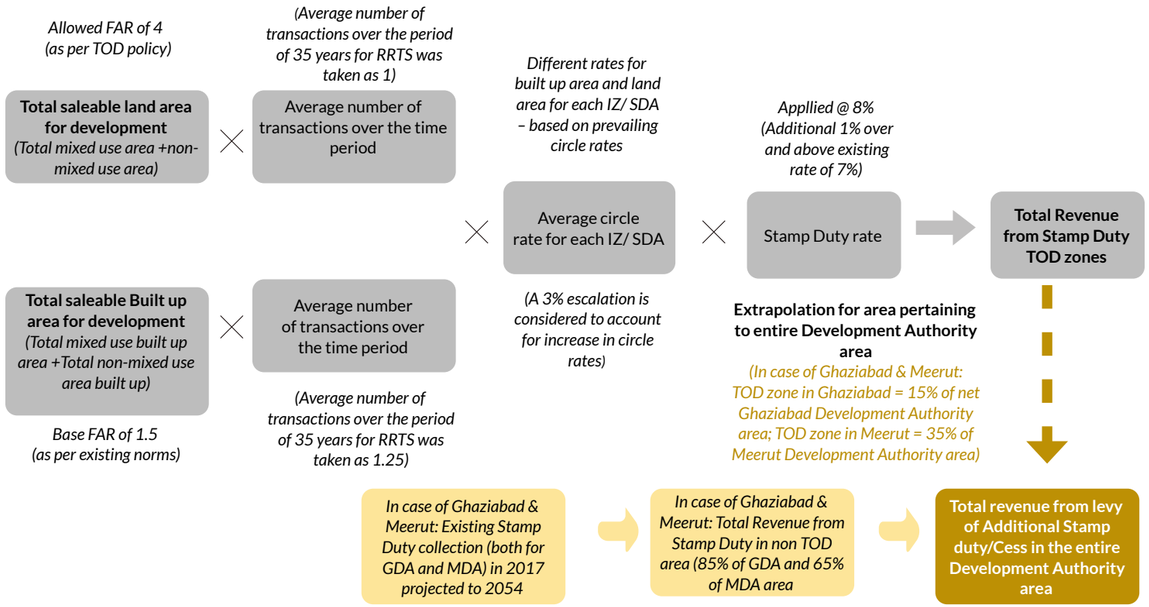
Objective

As the transaction velocity increases post the introduction of the rapid rail, levy of additional stamp duty shall generate additional revenue for the State Government. However, it was envisaged that the additional revenue shall be used for debt-servicing of the transit infrastructure.

Assumptions

It is assumed that on an average, sale/transaction of land would happen only once during the project period from 2019 to 2054, while built up area has been assumed to be transacted only 1.25 times. The value of land transaction has been estimated based on average circle rates for each of the IZs/ SDAs as of date. The value of transaction of built up area was estimated assuming a capital value of INR 25,000/sq. m. The time period for estimation of revenue from levy of additional Stamp Duty has been considered as 2019-2054. Accordingly, phasing of realization of cumulative potential revenue from Stamp Duty for entire jurisdiction areas of the respective authorities has been assumed.

Methodology for Revenue Calculation



Recommendations

As per precedence, an additional levy of one percent (1%) Stamp Duty on the entire jurisdiction area of the respective Development Authority was proposed.

The cumulative revenue potential Stamp Duty for the land area considered in Influence Zones (IZs) and four Special Development Areas (SDAs) has been estimated first, assuming that only an FAR of 2.5 for Mixed Use would be consumed in the TOD Zone (except in Sahibabad and Ghaziabad IZs, where up to a FAR of 4 will be consumed because they are highly urbanized areas). It has further been assumed that in Non-Mixed-Use areas in TOD Zones, one will be able to consume a FAR of 2.0 only.

Levy	Regulatory Framework	Sharing Mechanism
Existing rate: 7% Additional rate: 1%	Amendment to 1. Uttar Pradesh Urban Planning & Development Act 1973 2. UttarPradesh Stamp Valuation Rules 1997	Existing 7% share: State Revenue Department Additional 1%: RRTS debt servicing

https://pixabay.com/photos/sao-paulo-brazil-city-street-82693/

VCF Instrument 4: Development Fee

Objective

Development Fee is levied for maintenance of trunk infrastructure such as roads, sewerage, water and electricity supply in the jurisdiction of the Development Authority that is empowered to levy such fees on new development. The Development Fee in Uttar Pradesh is currently assessed based on the total land parcel area and it is linked to the density of development which allows for a maximum of 1.5 times increase of FAR for residential & commercial developments.

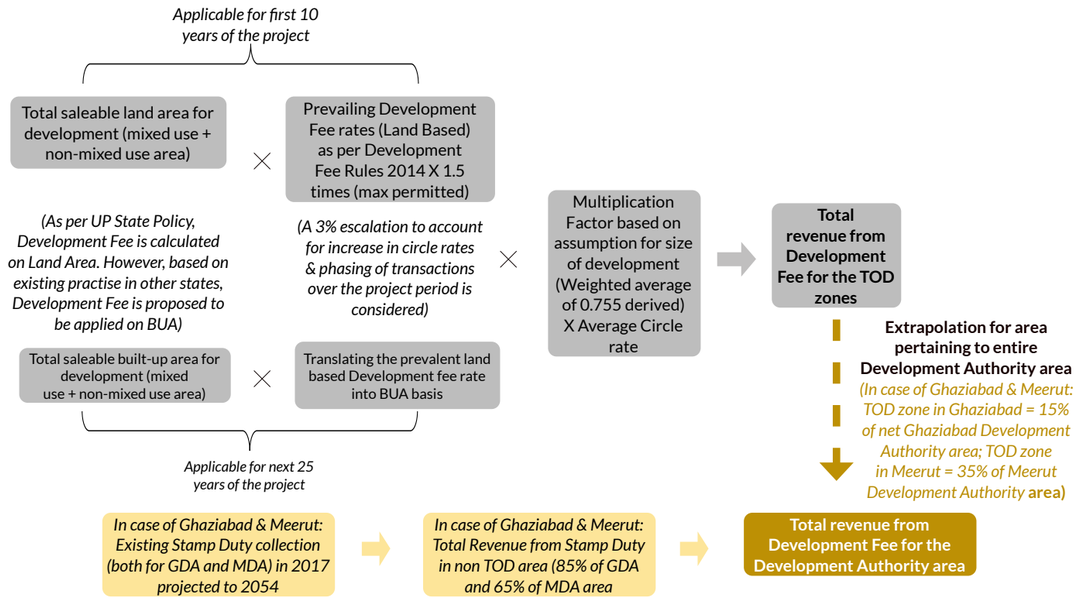
Assumptions

In case of Uttar Pradesh, the applicable multiplication factor (in case of up to 0.2 hectare the factor is 1 and gradually reduces to 0.4 where the gross land parcel area is more than 10 hectare) has been considered as 0.755 (for weighted average, refer table below) based on assumed proportion for the different land area categories.

Table 13: Assumed proportion for different land area categories in UP

Size of Development	Factor	Assumed % Area	Weighted average
Upto 0.2 ha.	1	10%	0.1
0.2-1 ha.	0.9	15%	0.135
1-5 ha.	0.8	45%	0.36
5-10 ha.	0.6	20%	0.12
Above 10 ha.	0.4	10%	0.04
		100%	0.755

Methodology for Revenue Calculation



Recommendations

The Development Fee in Uttar Pradesh is currently assessed based on the total land parcel area and it is linked to the density of development which allows for a maximum of 1.5 times increase of FAR for residential & commercial developments.

Further the Development fee would be applicable only on the Base FAR and not on the additional FAR, because one is already paying separate additional FAR charges for the same, hence there is no duplication of charges.

A Development Fee is recommended to be levied on land area for the first 10 years and then can be subsequently levied on the built-up area for next 25 years; the total time period considered for phasing of realisation of cumulative potential revenue being 35 years.

Levy	Regulatory Framework	Sharing Mechanism
Development fee	Amendment to: 1. Uttar Pradesh Urban Planning & Development Act 1973 2. Uttar Pradesh Urban Planning & Development (Assessment, levy & collection of Development Fee) Rules 2014	100% revenue: Development Authority

https://news.wjct.org/post/jta-pitching-land-around-5-transit-hubs-transit-oriented-development

VCF Instrument 5: Infrastructure Development Charge

Objective

Infrastructure Development Charges (IDC) are charges utilized for the overall growth and the development of the major infrastructure projects including National/ State Highways, transportation projects, major water supply schemes and power supply projects.

Assumptions

Total revenue from levy of IDC on the entire jurisdiction areas of the respective authorities has been considered as 25% of the Development Fee revenue

Methodology for Revenue Calculation

Development Fee for the entire Development Authority area × Percentage share of Development fee to be allowed as IDC as per state policy → **Total Revenue from IDC for the entire Development Authority area**

As per policy, levy of IDC @25% of Development Fee is allowed over and above Development Fee.

Recommendations

Since revenue from such charges could be utilised for the development of transit infrastructure, it is proposed to levy additional Development Fee up to 25% in case of special amenity/ impact oriented/ zone based development projects, called as the Infrastructure Development Charge (IDC). This IDC would be applicable on the whole FAR (ie. Base FAR plus Additional FAR).

Since entire revenue from Development Fee has been alloted to the authorities it is proposed 50% of the revenue to be realized from IDC shall be allocated for transit debt-servicing.

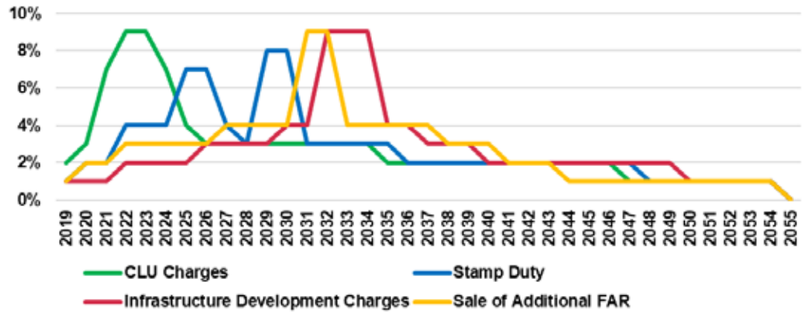
Levy	Regulatory Framework	Sharing Mechanism
Infrastructure Development Charges (IDC)	No amendments required as Rule 5 of the Development Fee rules gives a provision of levy of additional development fee of 25% in case of special amenity or impact oriented /zone based development	50% revenue: Development Authority 50% revenue: RRTS debt servicing

https://www.cnu.org/publicsquare/2017/03/15/great-idea-transit-oriented-development

Development Phasing

The VCF revenue through various proposed instruments is expected to be phased in the sequence as given in Figure 48. Land Use Conversion Charge is expected to reach the peak of revenue generation during the initial years as there are high probability of huge quantum of land getting converted to urban and mixed usages due to increased demand. It will be followed up by accelerated revenue generations from the Stamp Duty due to increased transactions of land. Stamp Duty is proposed to have a second peak too when there will be velocity in the transaction of Built up/ property/flats which will come up later during the project life cycle. Along with additional Stamp Duty, the generation of revenues from Development Fee and Infrastructure Development Charges are also expected to gain momentum as it is paid at the time of plan sanction. The Development Fee would be fully retained by the Government agency and not used for RRTS Debt Servicing. Lastly, there will be revenue coming from Sale of Additional FAR when developers will approach the Development Authority to buy additional FAR when the market demand picks up. Lastly, revenue from additional Stamp Duty shall see another peak once sale of flats begin, which shall be paid by multiple buyers.

Figure 40: Phasing of VCF Revenue Generation



STEP 4 Determine the Revenue Sharing Mechanism for all Instruments

Table 14: VCF Instruments for Delhi-Ghaziabad-Meerut RRTS and their revenue sharing mechanism

VCF Instrument	Sharing Mechanism
Additional Stamp Duty	Existing 7% share: State Revenue Department Additional 1%: RRTS debt servicing
Fee for Change of Land use	50% revenue: Development Authority 50% revenue: RRTS debt servicing
Additional FAR	50% revenue: Development Authority 50% revenue: RRTS debt servicing
Development Fee	100% revenue: Development Authority
Infrastructure Development Charges	50% revenue: Development Authority 50% revenue: RRTS debt servicing

https://www.coopercarry.com/projects/lindbergh-city-center/

STEP 5 Formulate an Institutional Framework for enforcement of VCF and implementation of TOD

Existing challenges & policy provisions for implementation

In the present context, proposals for Transit Oriented Development are treated as individual proposals, whereas they need to be dove-tailed with the larger regional & urban planning of the cities. An integrated planning approach is desired to meet the objective of respective TOD Policy that shall encourage planned sustainable urban growth centers, with walkable and liveable neighbourhoods with high density mixed land-use. The current institutional framework in urban areas involves multiplicity of institutions & organizations undertaking the planning and development. Hence, there are challenges for coordinated approach between various planning and implementing agencies.

Recommendations

In line with the existing policy provisions, it is recommended that a TOD cell be constituted, involving the concerned Development Authorities, Urban Local Bodies & all related & relevant departments/ organizations. The cell shall have a Management Board, headed by Development Commissioner for TOD to oversee the implementation of the TOD policy in all the IZs and SDAs. The Management Board to comprise of executives from the Development Authority, ULB & other key departments and agencies.

Role of the TOD cell:

- Coordination for purpose of planning and implementation of the proposed TOD development.
- To coordinate the formulation of the Master Plans and Zonal Plans for the Influence Zones/SDAs.
- To coordinate the augmentation of the physical and social infrastructure.
- Empowered to monitor and coordinate the land acquisitions for creating infrastructure and explore the possibilities of development/redevelopment by facilitating land-pooling.
- To ensure that the share from all revenues pertaining to the RRTS project from the various State Government entities/ Development Authorities, Urban Local Bodies is identified and credited to the RRTS debt-servicing fund account.

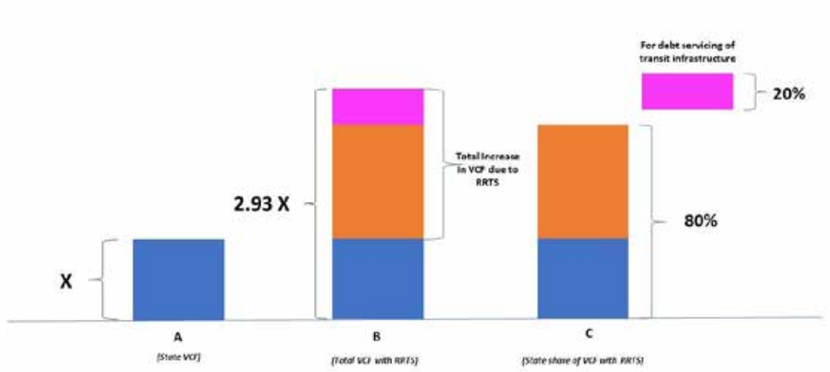
RECOMMENDATIONS & LEARNINGS

Any transit infrastructure needs an upfront high capital investment. The necessary policy interventions and detailed planning exercises need to be conducted as a primary step so as to direct or guide the prospective development activities. The Government can encash on Value Capture Financing only if it brings in the required notifications on time (preferably before the announcement of the project) so as to reap the windfall due to speculation. VCF revenues will accrue over a period of time, while most of the instruments are enforced once (at the time of granting permissions for the project) and few such as additional stamp duty are recurring and are enforced every time a built asset is transacted.

The possible quantum of VCF revenues for the realistic scenario of Delhi- Ghaziabad-Meerut RRTS, over a period of 35 years is compared to the VCF revenue of the state of Uttar Pradesh* without any transit project. It is observed that the VCF revenues of the state increase with a transit project like RRTS. This is demonstrated in the chart (refer fig. 49). The projection of existing VCF revenue of Ghaziabad and Meerut was done with a 3% annual increment till the entire project lifecycle of 35 years. This was the base case scenario without the RRTS (see bar A in fig 49). The VCF revenue projections for the realistic scenario were worked out considering a post-RRTS scenario and this increased the baseline case(x) to 2.93x. (see bar B in fig. 49). All this revenue shall accrue to the state from which a 20% share is dedicated for debt servicing of the transit infrastructure.

The share of the State Government/Development Authorities from these VCF instruments and the subsequent share of the transit authority for debt servicing is elucidated in Table 11 and Figure 50, where stamp duty emerges as the largest contributor and accounts for more than 50% of the total VCF revenue. Also Stamp Duty is transaction linked, so whenever any transaction happens it gets charged to the buyer. Hence, more the number of transactions more would be the Stamp Duty collections.

Figure 41: Comparison of VCF revenues pre and post RRTS for period 2019-2054 (recommended cenario)



** In this context, state of Uttar Pradesh implies area under the jurisdiction of Ghaziabad & Meerut Development Authorities*

Table 15: Share of VCF revenue to the Government & transit debt-servicing

VCF Instruments	Time Period for revenue estimation	VCF Revenues from recommended scenario	
		Share of Total VCF revenue (%)	Development Authority's share of the total revenue (%)
Levy on Change of Land Use	2019-2054	15.1	50
Sale of Additional FAR	2019-2054	5.9	50
Additional Stamp Duty	2019-2054	52.8	87.5
Development Fee	2019-2054	19.6	100
Infrastructure Development Charges	2019-2054	6.6	50
Total		100	

Figure 42: Share of VCF revenue to State/Development Authority

https://allevents.in/manchester/manchesters-transit-oriented-development-plan-charrette/1000080067605363

Value Capture Finance is a small share of the total value increase which the Government can potentially capture through relevant instruments. Hence, timing of interventions by the State agencies is key in maximizing the value created. In an ideal scenario, necessary notifications should be approved by the Government before the announcement of the project so that the maximum value appreciation can be captured through imposition of VCF instruments. In the case the RRTS project, where the project has already been announced, the necessary notifications need to be approved at the earliest, in order to maximize the VCF collections.

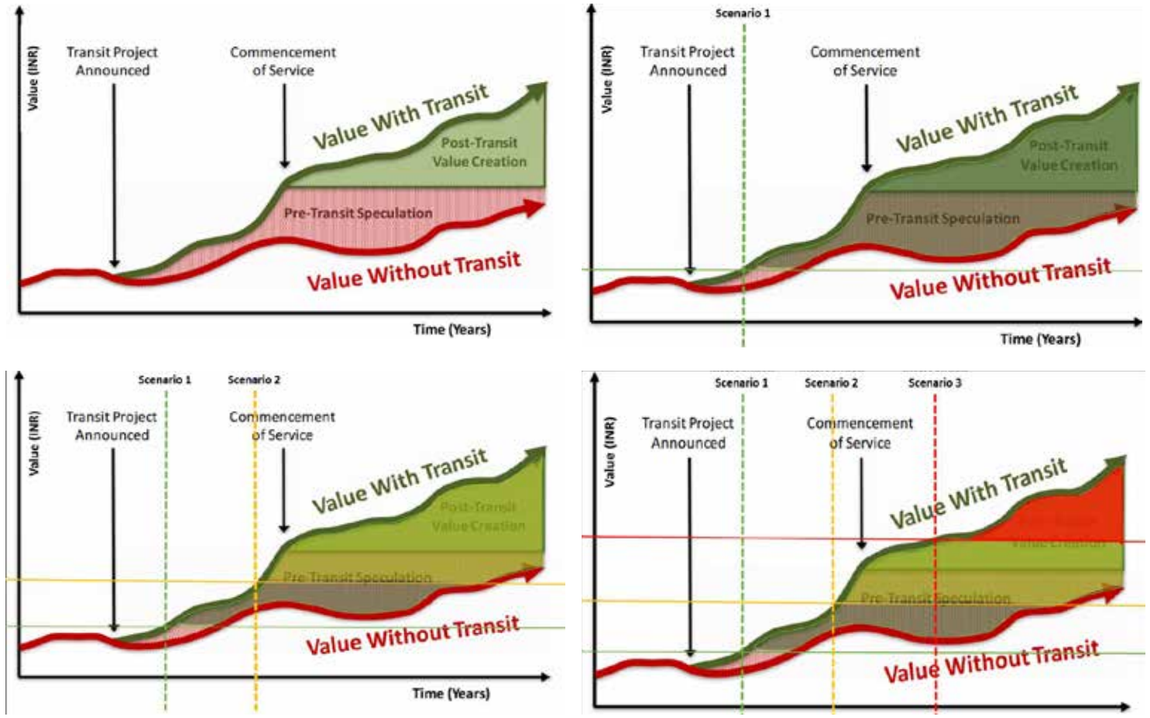
This is further explained in Figure 51, which graphically represents three scenarios and demonstrates that a delay in statutory interventions shall only lead to substantial reduction in VCF collections by the State. Scenario 1 is the most preferred option where VCF interventions have been applied at the earliest

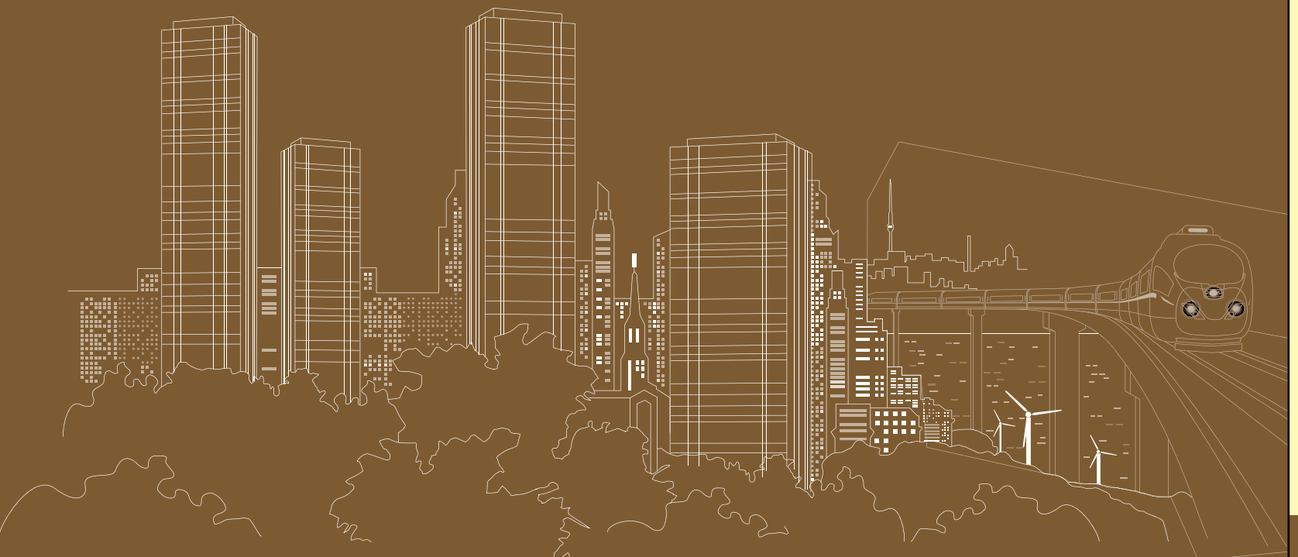
With the announcement of any transit project, there is an increase in real estate values in the region. Figure 51 also explains the relationship of the projected value without transit (in red curve) and with transit (in green curve). Generally, there is an upsurge in real estate prices when a transit project is announced and there is a rapid increase in the value from the time it is announced till the time the project is commissioned. Post commissioning, the value increase is lower and the real estate value prices start decreasing. The difference between the 'Value with Transit Curve' and 'Value without Transit Curve' is the 'Value Appreciation'. All the value appreciation till the commencement of the transit service is pre-transit speculation (shaded in red). The value after commencement of transit service is the post-transit value creation (shaded in green).

Scenario 1 is when the notifications of VCF instruments are approved at an early stage along with the announcement of the project. This ensures that State Government is able to capture substantial VCF revenues. This is considering the fact that sooner the announcement of the project, sooner the speculative forces get into action and the land market sees an increased amount of transactions. If the necessary statutory interventions are approved by then, the collections from VCF can increase. Scenario 2 is an example when the necessary statutory interventions are approved just before the commencement of the project. In this case the revenue collections are lesser as several transactions have been completed. Scenario 3 is when the statutory interventions are delayed and approved after the commencement of the project. In such cases most of the speculation takes place earlier and hence the collections reduce substantially. Hence, in order to maximise the revenue collections to the State Government and Development Agencies, it is recommended that the notifications and other statutory interventions are approved along with the announcement of the project, if not earlier.

https://commons.wikimedia.org/wiki/File:Arlington_County_-_Virginia.jpg

Figure 43: Relationship of projected value without transit (Red curve) and with transit (Green curve)





Appendix

ANALYSIS OF TOD POLICIES IN INDIA

A comparative analysis is carried out of the 4 TOD policies relevant to the implementation project, viz., National TOD Policy of Ministry of Housing & Urban Affairs, 2016, Planning Norms, Zoning regulations & Building Byelaws for Mixed use & TOD of Government of Uttar Pradesh, 2015, Delhi TOD Policy 2019 and Transit Oriented Development Policy (Draft) of Government of Madhya Pradesh, 2018.

	PLANNING & DESIGN				PLANNING & DESIGN				IMPLEMENTATION				
	Vision	Demarcation	Tool For Implementation	Prescribed FAR & Densities	Mixed Use	EWS Housing	Multimodal Integration	Parking	Financial Mechanism	TOD Fund	Land Assembly	Institutional Framework	Participation
National TOD Policy Ministry of Housing & Urban Affairs (2016)	Enabling Urban Transformation Making Public Transport accessible Developing Compact Walkable Communities	Influence zone: Radius of 500-800m around the transit station Influence zone: 500 m on either side of the transit corridor for MRTS	Master Plan/ Development Plan	Minimum FAR: 300-500% Governing factors: infrastructure, land use zoning, transit capacity	Contextual; governed by local conditions & real estate trends	10-15% built-up area of influence zone for housing of Economically Weaker Section	Mandatory inclusion of Intermediate Public Transport (IPT), Non-Motorized Transport (NMT) and feeder buses	Only bicycle park & ride facility within influence zone On-street parking prohibited	Use of mechanisms such as Land Value Capture, Additional Land Value Tax, One-time Betterment Levy, Development Charges/Impact Fee, Transfer of Development Rights (TDR)	Create a TOD fund (escrow account)	No mention of any mechanism	A joint entity with the ULB and the Development Authority for seamless inter-agency coordination	Encourage involvement of public and private sector City-wide awareness programs on the components of TOD & their benefits
Planning norms, Zoning regulations and Building Bye-laws for mixed use and TOD Government of Uttar Pradesh (2015)	Create dense, compact and mixed use development at walkable distance from transit station Promote public transport	Influence zone: 500m corridor along both sides of the MRTS/ Transit corridors	Master Plan/ Development Plan	Minimum FAR: 2 (brownfield), 2.5 (greenfield) Maximum FAR: 4 (brownfield), 4.5 (greenfield) (+5% additional FAR for services)	Permissible for: Notified Development nodes along Expressways and Major Highways TOD zones along MRTS New Township/Integrated Township schemes Urban Re-Development Schemes Notified Potential TOD locations in Master Plan/Zonal Development Plan	No provision	No provision	1.5 ECS for 100 sq m. For vertical mixed use, 1 cycling parking space of 2 sq.m for 1 residential unit	No mention of financial mechanisms	No provision	Provision for land pooling of smaller land parcels	A joint entity with the ULB and the Development Authority for seamless inter-agency coordination	No provision
TOD policy of Delhi Development Authority(2019)	Discourage private vehicle dependency and induce public transport use Densification and enhanced connectivity within walkable distance from the transit station	The Influence Zone of each TOD Node will have two components. TOD Planning Area –an area mostly falling within 800m radius around the transit station. Actual boundaries of the TOD Planning Area will be delineated and notified by DDA/UTTIPEC through a realignment of the 800m notional circle with closest roads, natural and topographical features, railway lines, etc. as applicable. Intense Development Area – an area mostly falling within 500m radius around the transit station. All TOD Schemes will be limited to this 500m Intense Development Area	Influence Zone Plan to be prepared at Local Area level followed by the surrounding TOD scheme .in conjunction with ADC's (Additional Development Control regulations	The FAR shall be 1.5 times the existing permissible FAR on the plot or 300,whichever is more. Larger TOD Schemes with an area of 4 Ha and direct access from roads of 30m RoW, will be eligible for FAR of 500 on all constituent plots, if feasible. Maximum FAR: 500%	Minimum criteria: 30% (residential), 10% (commercial) & 10% (community facilities) of FAR	The city-state to have a dedicated TOD fund.	Within 50 m: Feeder bus stops, Non-Motorised Transport (NMT), cycle renting/docking stations Within 100 m: Feeder bus stops Within 150 m: Non-Motorised Transport (NMT), Intermediate Public Transport (IPT), feeder bus stops Within 300 m: Intermediate Public Transport (IPT), feeder bus stops, private car parking Beyond 300 m: Car park facility (park & ride) Within 500 m: Interchange between two rapid transit modes	TOD Schemes shall provide 1.33 Equivalent Car Space (ECS) per100 sq.m. of covered area, with mandatory 10% of the parking area earmarked for bicycles.	No mention	The city-state to have a dedicated TOD fund	Amalgamation and reconstitution of plots (including Housing Area and Neighbourhood PSPs) will be permitted for all TOD Schemes	A Committee shall be set up under the chairpersonship of the Lieutenant Governor of Delhi comprising of representatives from DDA, various service providing agencies and all local bodies.	No provision
Transit Oriented Development Policy (Draft) of Government of Madhya Pradesh, 2018	Smart and liveable growth in urban areas by making public transport a preferred mode of transport through high density, mixed-use development. To ensure pedestrian safety, comfort and convenience	Influence zone (TOD area):Area within the 500m wide belt (5-10 Minute Walk) on both sides of centre line of Metro Rail/Light Rail/Mono Rail, Mass Transit Corridor; Area within a 300m wide belt on both sides of centre line of High capacity Public Transport, Mass Transit Corridor or centre line of it's Right of Way (ROW) Transition area: Area within the1000 meter wide belt on both sides of centre line of Metro Rail/Light Rail/ Mono Rail Corridor/ Network and Bus Rapid Transit (BRT) or High capacity Public Transport* Corridor/ Routes/Network	TOD Area Zonal Plans to be prepared under the provisions of the Development Plans, for any specific Transit Station/Corridor Area (TOD Area)	No minimum FAR or density specified for the TOD areas	Transit-supportive land/building uses to encourage transit use and increased transportation network efficiency. Guidelines prescribed for characterising the pattern of land/building use around transit stations an d corridors: • Higher Employment Densities and/or Residential Densities • Promoting Travel Time other than Peak Periods • Attracting reverse-flow travel on Roads and Transit Stations • Encouraging extended hours of Activity, throughout the day and week • Attracting Pedestrian Users and Generates Pedestrian Traffic	Planning,Development and Regulatory Agencies to earmark a certain portion of land at affordable rates for housing for EWS/LIG based on the TOD Rules and Regulations	Mandatory to ensure multi-modal integration in any public transport operations planning with key considerations listed. Development proposals/Layout Plan/TD Scheme etc. in the TOD Area to prioritise pedestrians, public transport, NMV modes over private motorized modes in design, management and planning of public spaces. Integrated public systems are encouraged that include primary and secondary pedestrian routes, road ROWs, pedestrian/cycle overpasses and underpasses, public open spaces, public toilets, transit stations and bus stops.	Parking management strategy to be developed for the TOD area considering: Restrictive parking for private vehicles in the TOD areas with prioritisation for transit buses, IPT modes and NMV; Mandatory share of parking for NMV, transit buses, IPT modes and 2-wheelers shall be part of ECS requirements for any development; Shared parking spaces to be developed by the public agencies or private developers/land owners/traders associations etc.; Higher and Differential parking prices in TOD Area to discourage private motorized vehicle use; Park and ride facilities for NMV to be encouraged in Terminal Stations and Multi-modal Transit Hubs and restricted for private vehicles in transit station premise.	Landvalue capture finance are encouraged including, mechanisms but not limited to FAR benefits, land value tax, fees for changing land use, Betterment levy, Development charges (Impact fees), Transfer of Development Rights (TDRs), Vacant Land Tax, Tax Increment Financing, Land Acquisition and Development , System. Land Pooling	Dedicated Urban Transport Fund to be formed (DUTF) to accrue the income generated from financing mechanism.	Planning, Development and Regulatory toassembly Agencies devise efficient land models for provision of housing, employment and other urban services in Areas; TOD Areas to be notified as TDR TOD Receiving Areas and Influence Areas in the purview of TDR Rules and Regulations for the same. Separate TDR regulations to be formulated by competent authorities and TDR policy to have relevant provisions. Provisions for penalizing under utilization and incentivising optimum utilisation within a specific time period.	Roles outlined for Department of Urban Development and Housing, Directorate of Town and Country Planning, Development Authorities, Housing and Infrastructure Development Board, MPMRCL, Mass Transit Agency and other Para statal Agencies, Municipal Corporation/ Municipality/Municipal Council, Madhya Pradesh Metro Rail Co Limited & Mass transit agencies.	Participation by local communities through consultations during the planning process is encouraged to capture the local knowledge on services and amenities needed by the community, housing forms, key pedestrian destinations, current pedestrian habits, parkingmanagement, etc.

DEMONSTRATION OF VCF REVENUE ESTIMATION FOR SAHIBABAD

The VCF revenue estimation for all the IZs was done based on satellite imagery and further developing scenarios for land undergoing development/redevelopment based on the existing scenario. In this section the detailed estimation of VCF instruments for Sahibabad IZ is demonstrated, where a detailed field survey was undertaken and a plot by plot mapping was done. this led to a more accurate generation of scenarios and projection of vcf revenue estimation.

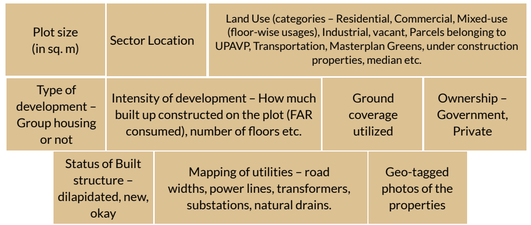
Influence Zone Delineation:

The RRTS Station Influence Zone (IZ) has been defined here as an area of 1.5 kms radius from the center of the station. This IZ is then rationalized by limiting it within specific bounded areas / physical boundaries like railway line, canal or large drain, major roads etc. In places where blocks have been bifurcated by the IZ, such entire blocks have been included or excluded to bring in some kind of rationality in delineating the IZ.

GIS Based Analysis:

After this an extensive GIS based survey of all the properties falling in the Sahibabad IZ was undertaken by studying Google images, A field survey was simultaneously carried out. The GIS and field survey outputs were vetted to formulate a refined well drawn base data which then was analyzed on various parameters to generate scenarios. The parameters of study included:

Figure 44: Parameters considered for Sahibabad study



Subsequently an analysis was done based on several of the parameters as detailed below for each of the 3 parcels.

First, all parcels belonging to Residential, Commercial, Mixed-use, Industrial, Vacant and Slums were segregated from the rest of the parcels. Other parcels were omitted because they are not likely to undergo changes even after the implementation of the TOD policy in the IZ.

Secondly, a filter was applied to the size of plots – all plots equal and less than 5000 sqm were segregated from those more than 5000 sqm (the Mixed-use TOD policy states that for cases of Redevelopment the minimum plot size needs to be 0.5ha or 5000 sqm). The plots which were pertaining to Residential, Vacant Residential and Slums were separated from the above pool and analyzed separately from the Commercial, Industrial and Mixed-use category plots. The Mixed-use TOD policy in cases of Redevelopment allows a threshold of 18m road-width as a minimum to avail the higher FAR. All plots falling on road-width of below 18m can't avail the higher FAR as per the present norms.

Thus, the total available land that is likely to go in for redevelopment after applying all the filters of plot size, access road-width and present FAR used (intensity of development) has been estimated.

Table 16: Considerations from the Uttar Pradesh TOD policy

Parameter	Redevelopment case	Greenfield case
Minimum area	0.5ha	4.0ha
Access road width	18.0m	30.0m
Base FAR	2	2.5
Max. with purchasable FAR	4	5
Ground Cover	50%	40%
Parking norms	100sqm to provide for 1.5 ECUs	

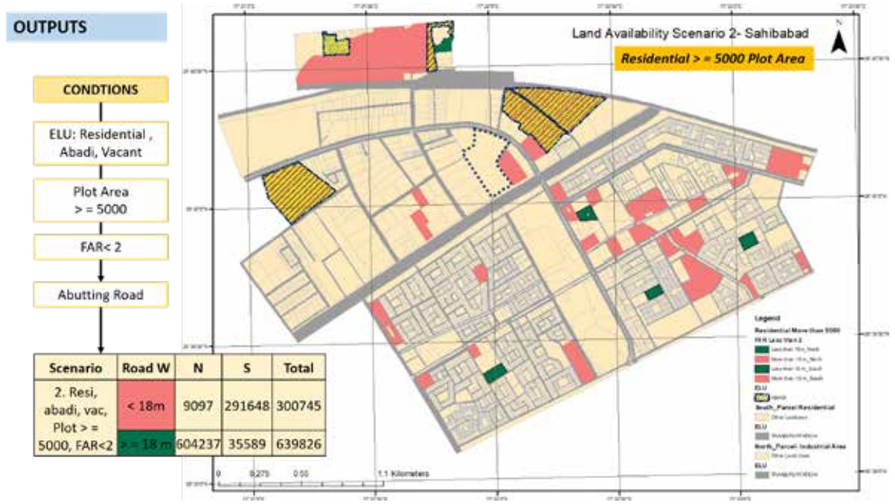
Table 17: Assumptions for Residential Land Use

Plot size	Road width Access	Current FAR utilization	Remarks/Decision	FAR permitted
Less than 5000sqm	On less than 12m	More than 1.5	Not likely to redevelop	
		Less than 1.5	Likely to redevelop	Base FAR of 2.0
	On equal to or more than 12m	More than 1.5	Not likely to redevelop	
		Less than 1.5	Likely to redevelop	FAR of 3.0
More than 5000sqm	On less than 18m	More than 2.0	Not likely to redevelop	
		Less than 2.0	Likely to redevelop	Base FAR of 3.0
	On equal to or more than 18m	More than 2.0	Not likely to redevelop	
		Less than 2.0	Likely to redevelop	FAR of 4.0

Table 18: Assumptions for OtherLand Uses (Commercial, Industrial, Insitituional etc.)

Plot size	Road width Access	Current FAR utilization	Remarks/Decision	FAR permitted
Less than 5000sqm	On less than 18m	More than 1.5	Not likely to redevelop	
		Less than 1.5	Likely to redevelop	Base FAR of 2.0
	On equal to or more than 18m	More than 1.5	Not likely to redevelop	
		Less than 1.5	Likely to redevelop	FAR of 3.0
More than 5000sqm	On less than 18m	More than 2.0	Not likely to redevelop	
		Less than 2.0	Likely to redevelop	Base FAR of 3.0
	On equal to or more than 18m	More than 2.0	Not likely to redevelop	
		Less than 2.0	Likely to redevelop	FAR of 4.0

Figure 45: Conservative case, Sahibabad

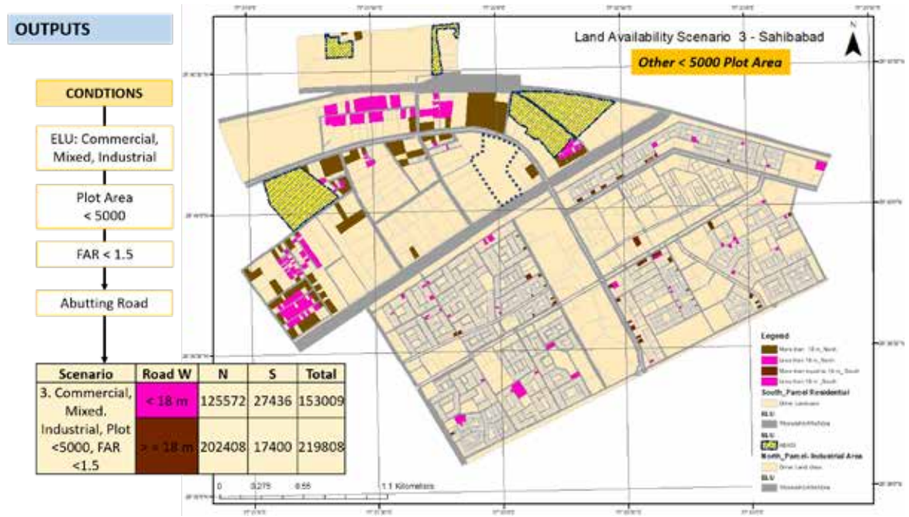


Scenario	Road W	N	S	Total
2. Resi, abadi, vac, Plot > = 5000, FAR<2	< 18m	9097	291648	300745
	> = 18 m	604237	35589	639826

Figure 46: Realistic case, Sahibabad

Scenario	Road W	N	S	Total
1. Resi, abadi, vac, Plot <5000, FAR<1.5	< 12 m	3807	244365	248172
	> = 12 m	51209	210819	262028

Figure 47: Optimistic case, Sahibabad



Scenario	Road W	N	S	Total
3. Commercial, Mixed, Industrial, Plot <5000, FAR <1.5	< 18 m	125572	27436	153009
	> = 18 m	202408	17400	219808

Further to this, the probability of redevelopment based on the 3 scenarios has been worked out as given below:

- Conservative case: That only 50% of the plots (filtered out) would go in for redevelopment.
- Realistic case: That only 75% of the plots (filtered out) would go in for redevelopment.
- Optimistic case: That all 90% of the plots (filtered out) would go in for redevelopment.

In all the cases, the amount of land that will go in for development/ redevelopment has been estimated. Based on this, the VCF revenue estimations for the Sahibabad IZ has been detailed out for all the three scenarios

Another assumption taken into consideration is with regard to the transaction velocity. It has been assumed that the land would get transacted only once (1x) during the entire project cycle of 35 years, whereas the built-up asset would be transacted 1.25 times (1.25x) in the same duration. This is a conservative scenario which has been considered. Further, fee for change of land use, development fee, infrastructure development charge and additional FAR would be charged only once during the project cycle.

Learnings and Next steps:

A better estimation of develop-able land and VCF revenue estimation thereof can be achieved more accurately by conducting a plot wise mapping exercise. Further, this shall provide a template for future detailed planning of the Influence Zone.

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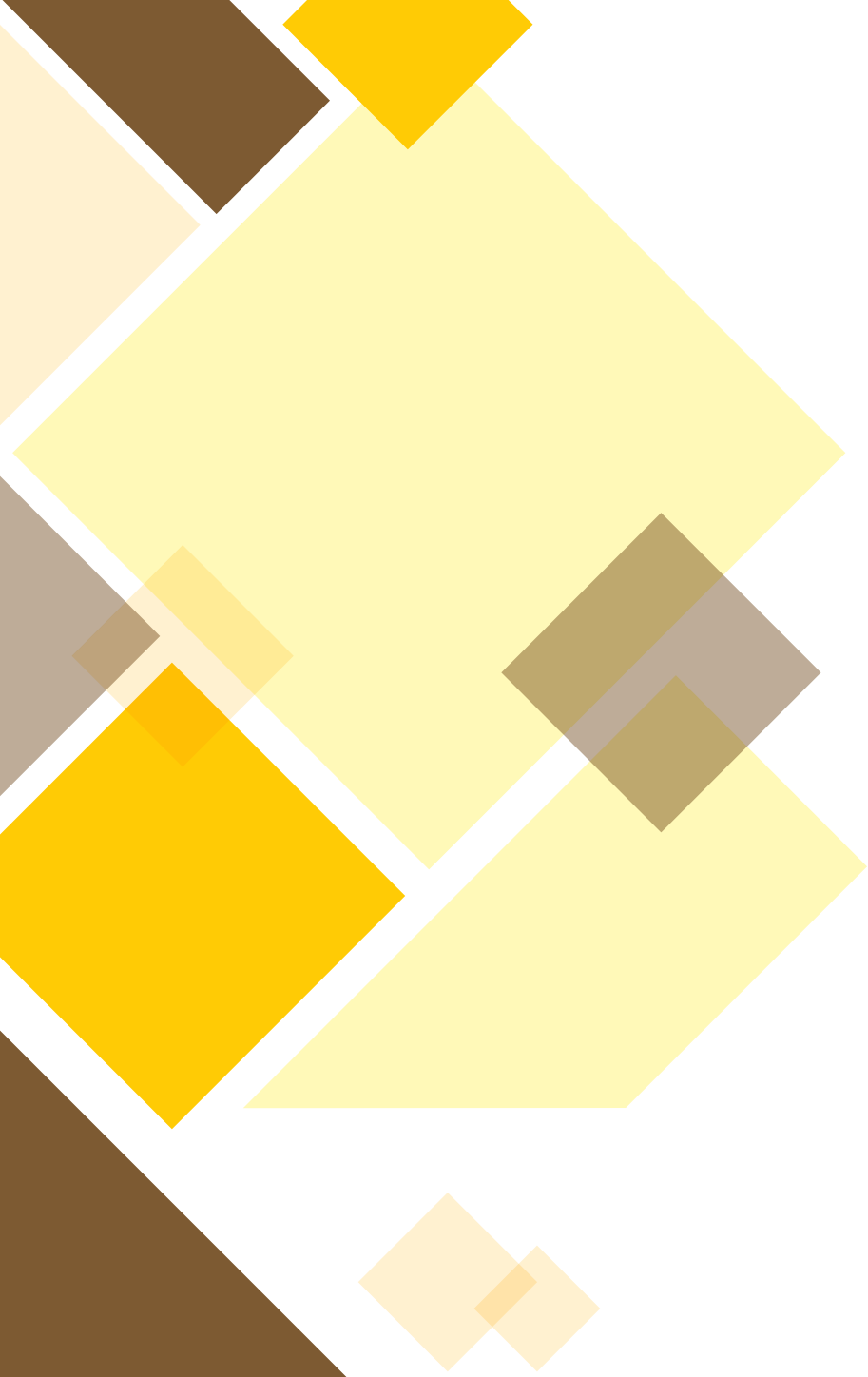

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