

Land use Assessment of Faridabad for Transit Supportiveness around Metro Stations Area

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Abstract - Urban development patterns in India are influenced by the Town and Country Planning Act of United Kingdom. Urban structure is the basis for a transit supportive environment. Urban areas are characterized by single land use with low density development and these land uses are located at a considerable distance from each other. This land use patterns encourage the need of personal vehicles than public transit. Cities all over the world are realizing more flexible ways to accommodate changes in land use and density patterns over time. Master Plan approach is an instrument for controlling, directing, promoting sound, rational development and redevelopment of an urban area. An important challenge for urban planning is to prepare a city development plan based on the principle of mix land use and pedestrian walkability. Transit supportive land use is a state of land uses (mixed used and density) that support mass rapid transit (MRT) socially and economically. This study assesses the land use compositions of the Faridabad city MRT areas for transit supportiveness. The study area is limited to four metro stations areas namely Old Faridabad, Neelam Ajronda Chowk, Bata Chowk and Escort Mujesar with a radius of 800m around these stations. The transit supportiveness of land use as per site condition and land use assigned in Faridabad development plan 2011 are evaluated.

Keywords: *Transit oriented development, Transit Supportive land use, Land use Planning, Development plan, TOD Zone.*

I. INTRODUCTION

Transit supportive land use comprises of land uses that support compact development forms, walkability and multi-model transit usage (New Jersey Institute of Technology 2014). It helps to maximize interchange and activity within station areas and mass rapid transit (MRT) corridors. The planning of transit supportive land use around the MRT stations offer residents and workforce a choice of mobility, commercial services, access to daily needs, and recreational opportunities, as well as access to key destinations, like work, office and school, within a short distance from home (VIA 2014).

The city of Faridabad is the District Headquarters of Faridabad district. Faridabad city is one of the fastest growing cities and part of the NCR, so massive growth, migration is taking place because of adequate infrastructure facilities and proper connectivity to nearby growth centers like Delhi, Gurgaon, and Noida. Faridabad has strong linkages with Delhi (Nirmala 2017). National Highway no. 2 from Delhi-Mathura passes through the length of the city and is the central axis of the city of Faridabad (Town and Country Planning Department 2016). The development has become intensive particularly among the major transport corridors, which has led to a form of ribbon development all along transport routes, deficiency in infrastructure facilities and also shelter. Major connectivity and transport corridor

forms the growth mixing developments leading to the growth of the city at higher frequency and unmanaged land development (Goel 2011). While being part of NCR gives a high priority status to the city, the ground situation with respect to infrastructure reflects poorly upon this emerging metropolis of the capital region (CRISIL, 2006).

One of the most valuable assets in Faridabad City is the MRTS. Metro line connects skilled labour to good-paying city centre jobs. Municipal Corporation Faridabad and Town and Country Planning, Haryana have long recognized the potential of the Metro station to be a catalyst for revitalization in Faridabad. Haryana Government, Town and Country Planning Department notified Transit Oriented Development (TOD) planning parameters to help to give a tangible vision to a future that realizes this potential (Town and Country Planning Department 2014). In 2015, Metro began operating in Faridabad City, the region's first light rail system. The metro route is running parallel to National Highway in Faridabad City and has the potential to capitalize the momentum to foster new development as TOD with change in development plan.

II. URBAN PLANNING INITIATIVES IN INDIA

The current urban planning scenario in India mainly focuses on detailed land use zoning that has its root from the Town

and Country Planning Act 1947 of the United Kingdom (Ahluwalia 2015). The earlier approaches considering urban transit as the significance of land use planning are being given up in favour of simultaneous determination of policy, recognizing the relationship between transit and land use planning. Typically, planning for transit happens at various scales and at different times in the development process of a city.

A Master Plan in India typically covers a time horizon of about 20 years, presenting a road map from the present state of the city to its ideal end-state with spatial details in the terminal year (Ahluwalia 2015). These plans are prepared by different agencies (private, public, or collaborative venture) and often enabled through different legislations. In India, most of the states prepared a Perspective Plan (20-25 years) for the cities based on the relevant Town and Country Planning act of the state. Such a plan offers the first opportunity for integrating the growth plans of the city with the vision of a new / expanded transit network. National Capital Region (NCR) Planning Board at the regional scale integrates the regional goals (such as decreasing traffic congestion, decreasing pollution levels and improving public health) with regional contexts (such as the consideration of population growth and the location of major employment centers) (Wilbur Smith Associates 2010).

The Faridabad city was covered under Government Urban Renewal scheme, i.e. JnNURM scheme, also prepared a Comprehensive Mobility Plan (CMP) so as to integrate mobility needs of the city with the existing future growth trends. However, in reality the ideas for introduction of new transit are often separated from the regional / metropolitan planning process. Regardless, planning for transit (new or enhancement of existing) happens at a regional scale when

the vision for improved connectivity in a growing city emerges. While the vision establishes a preliminary need for the transit, a detailed feasibility study is not usually included with this vision. A regional development authority or equivalent is responsible for translating this vision into a clearly delineated Development Plan / Master Plan for the urban area. The regional authority will also update and adjust the plan over time as the vision shifts. In order to understand and plan for Transit Oriented Development, it is important to first understand the overall process of planning for transit and where TOD planning fits into the city's or metropolitan area's overall planning processes (Chirayu Bhatt 2012).

III. METHODOLOGY

Transit Oriented Development is a type of urban development that includes residential, commercial, office & other amenities integrated into a walkable neighborhood and located within a half-mile of mass rapid transit system.

This Transit Supportive Land Use assessment has been prepared based on an analysis of existing conditions of four selected station locations within the transit corridor. For the purpose of this analysis, station area is defined as the area encompassing 800 meters radius around the selected stations. This 800m radius, which represents a comfortable ten minute walking distance, is generally the walk-access ridership base for a station. The data were collected through site survey and literature study for transit supportiveness of different land uses as mentioned in Faridabad development Plan.

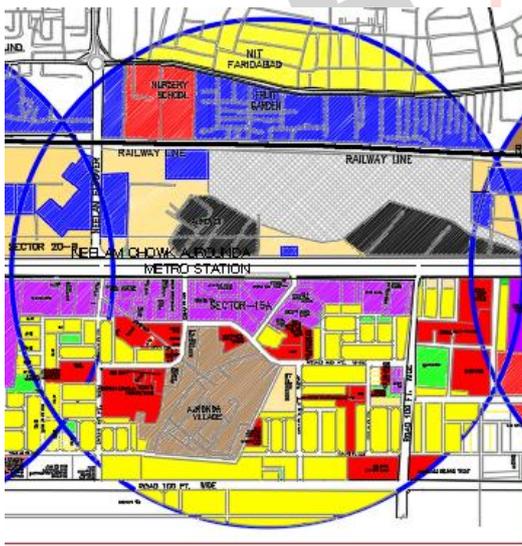


Figure 1: Land use map Neelam Ajronda Chowk

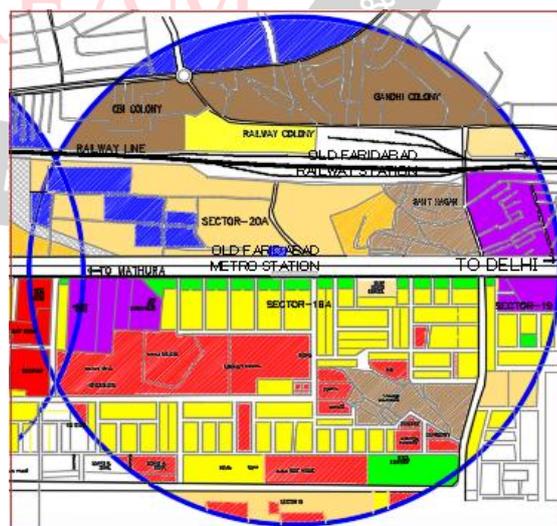


Figure 2: Land use map Old Faridabad

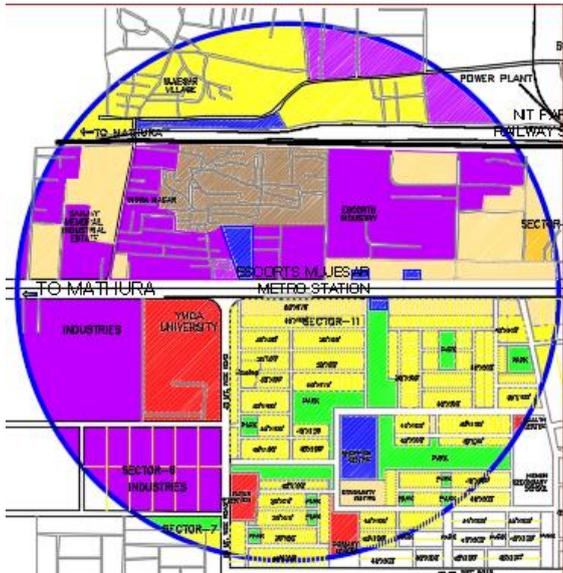


Figure 3: Land use map Escort Mujesar

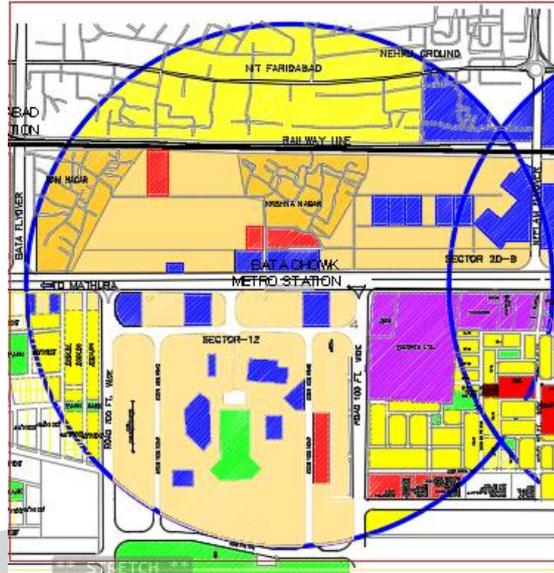


Figure 4: Land use map Bata Chowk

IV. LAND USE ALONG STUDY AREA

The Metro corridor of the Faridabad city has large industrial and commercial areas along National Highway. These industrial and commercial areas are planned and developed in strip-style with deep setbacks and large up-front parking lots. Residential development contrasts significantly in character, with a mix of urban villages, multi-family apartments, HUDA residential plotted development on eastern side and unauthorised development

on western side. These residential areas are rather divided from each other by National Highway. Railway line is also passing along the National Highway and Metro route in Faridabad. This railway line is acting as a barrier for the pedestrian to access that area. Most of the land between National Highway and Railway line is lying vacant and being encroached by the slum dwellers. The vacant plots and close industrial units in the study area offer an opportunity for the Faridabad to plan affordable housing and mix use development.

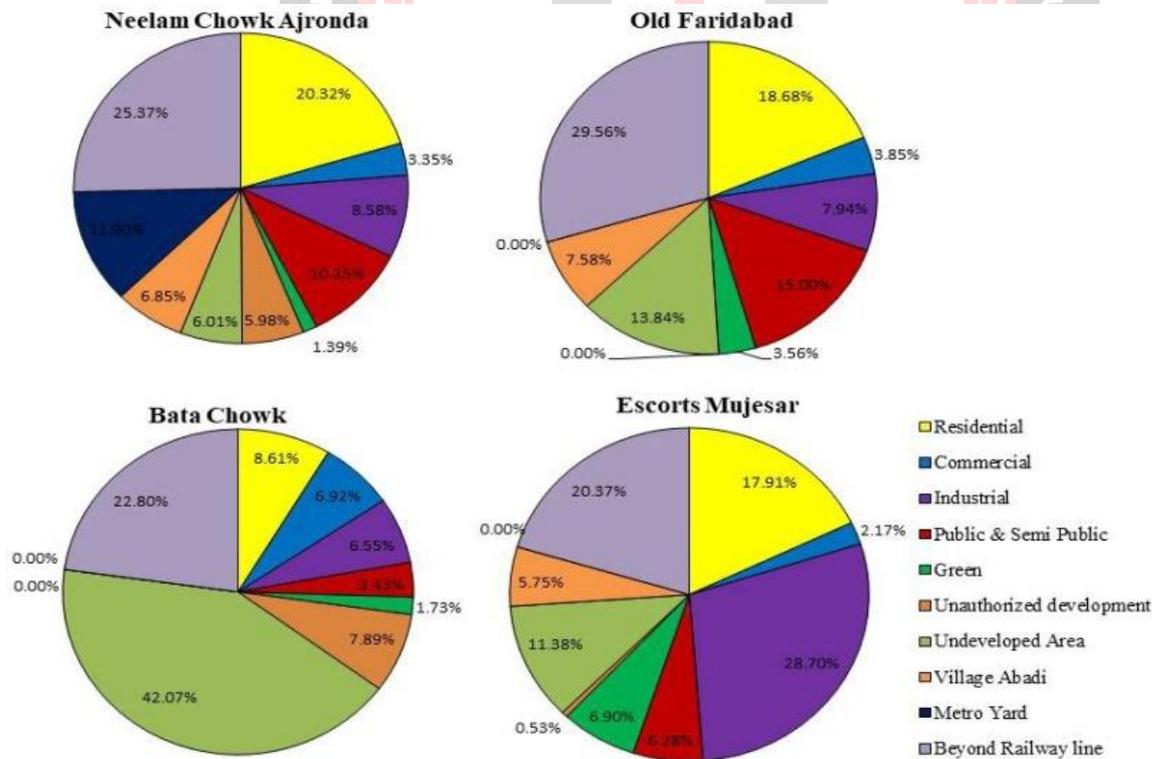


Figure 5: Existing Land Use along MRT station Area

V. LEGAL FRAMEWORKS FOR PHYSICAL PLANNING

Legislation is a source as well as instrument of public policy. The state seeks to achieve many of its policy objectives through enactment of laws. A major difficulty in articulation of Urban Land Policy is the plethora of existing legislation and regulation which govern the land market. The Constitution of India provides the power to Centre and State Government to enact laws relating to land. The master planning and zoning regulations of Indian cities have neglected the need of low-income segments of population

for space. Large scale unauthorized development in peri-urban areas indicate that the master plans were unable to anticipate demand. These plans mostly neglected the requirements of low income households consequently unplanned settlements are developing in the city (Ahluwalia 2015). The various laws governing the land market applicable to Faridabad are given below:

Table 1: Urban Planning Legislation in Haryana (Source: Mention department’s websites)

Law	Purpose
“The Punjab Schedule Roads and Controlled Areas Restriction of Unregulated Development Act, 1963”	“To prevent haphazard and sub-standard development along scheduled roads and in controlled areas in the state of Haryana”
“The Haryana Urban Development Authority Act, 1977”	“To undertake urban development and local area development in the State of Haryana and for the matters ancillary thereto”
“The Haryana Housing Board Act, 1971”	“To provide for measures to be taken to deal with and satisfy the need of housing accommodation”
“The Right To Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act, 2013”	“To ensure, a humane, participative, informed and transparent process for land acquisition for industrialisation, development of essential infrastructural facilities and urbanisation” “To provide fair compensation and make adequate provisions for their rehabilitation and resettlement”
“The Haryana Development and Regulation of Urban Areas (Amendment) Act, 2013”	“To regulate the use of land in order to prevent ill- planned and haphazard urbanization in or around towns and for development of infrastructure sector and infrastructure projects”
“The Haryana Apartment Ownership Act, 1983”	“To provide for the ownership of an Individual apartment in a building and to make such apartment heritable and transfer-able property”
“The Haryana Municipal Corporation Act, 1994”	“To provide for the establishment of Municipal Corporations for certain municipal areas in the State of Haryana”
“The Real Estate (Regulation and Development) Bill, 2016”	“To regulate and promote the real estate sector and to ensure sale of plot, apartment of building, or sale of real estate project, in an efficient and transparent manner and to protect the interest of consumers in the real estate sector and to establish an adjudicating mechanism for speedy dispute redressal”
“The National Highways Authority of India Act, 1988”	“To provide for the constitution of an Authority for the development, maintenance and management of NH”
“The Control of National Highways (Land And Traffic) Act, 2002”	“To provide for control of land within the National Highways, right of way and traffic moving on the NH and also for removal of unauthorised occupation thereon”
“The Urban Land (Ceiling and Regulation) Act, 1976”	“To provide for the imposition of a ceiling on vacant land in urban agglomerations in excess of the ceiling limit and to regulate the construction of buildings on such land to prevent the concentration of urban land in the hands of a few persons”

“National Capital Region Planning Board Act, 1985”

“To provide for the constitution of a Planning Board for the preparation of a plan for the development of the NCR and for co-coordinating and monitoring the implementation of such plan and for evolving harmonized policies for the control of land-uses and development of infrastructure in the NCR so as to avoid any haphazard development of that region”

All these laws contain elements which control or regulate the use of land. Hence, they are also aimed at facilitating the operation of land use policy.

1.1 Town Planning Schemes in Faridabad

In Haryana before its creation from Punjab in 1966, The Punjab Municipal Act of 1911 was applicable in all the Municipalities of joint Punjab. Section 193 of the Act was the enabling provision for the preparation of town planning schemes. After constitution of state of Haryana, a similar provision was introduced in section 203 of the Haryana Municipal Act, 1973 (Faridabad 2016).

Faridabad Complex was constituted in 1972 under the Faridabad Complex Act of 1971. According to section 5 of this act, Chief Administrator was empowered to extend any of the provision of Haryana Municipal Act, 1973 with prior approval of the Government. However, following 74th Constitutional Amendment, the Municipal Corporation was

constituted in 1995 under the Municipal Corporation Act, 1994. Section-267 of this Act provides for the preparation of “Building and Town Planning Schemes” (Faridabad 2016).

1.2 Institutional Mechanism in Faridabad

Municipal Corporation Faridabad (MCF) and Haryana Urban Development Authority (HUDA) are the major institutions to do work of physical development and services in Faridabad (HUDA 2016). All the main Municipal services (sewer, water supply and drainage), their scheme and execution are within the purview of Municipal Corporation Faridabad (MCF). HUDA mainly deals in the land acquisition and development. Town & Country Planning Department, Govt. of Haryana also has mandate to prepare Development Plan (DP) and notifying the DP for the MCF as well as FCA areas. However, Execution work of the DP is not in the purview of Town & Country Planning Department.

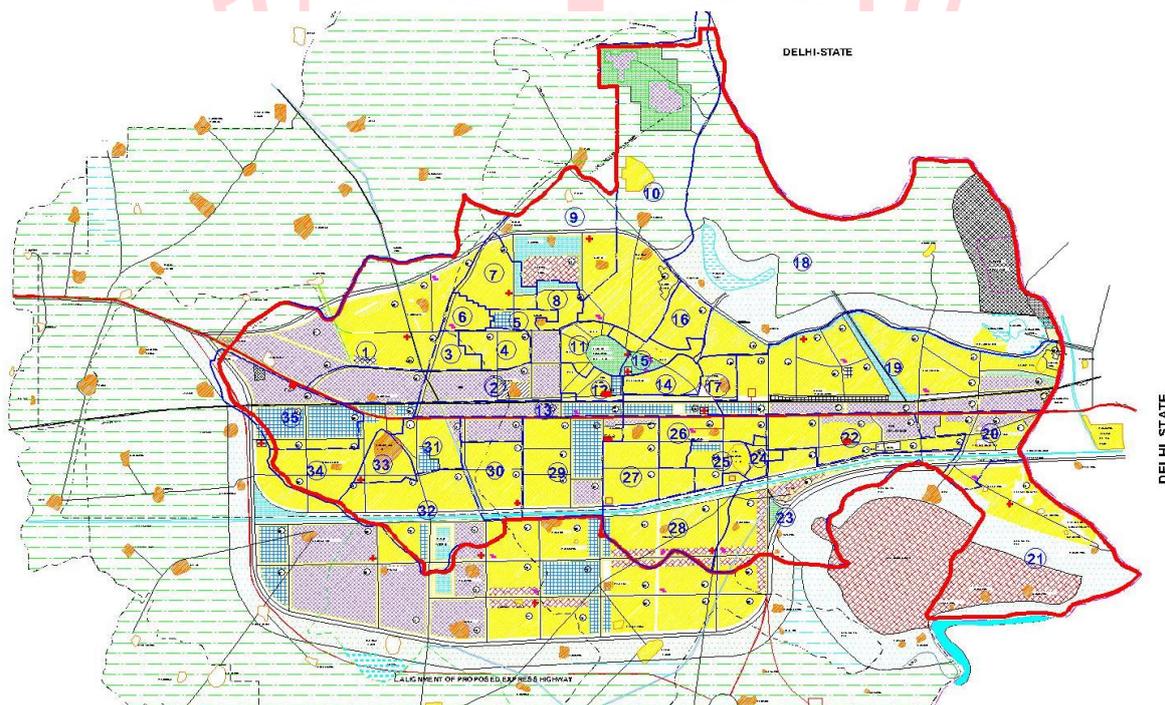


Figure 6: Faridabad Development Plan-2031, Source: (Department 2014)

Table 2: Agencies responsible for development related works.

Service/ Sector	Planning, Design and Execution
“Town Planning”	“Town & Country Planning Department, MCF, HUDA”
“Urban poor & Slums”	“MCF”
“Water Supply, Sewerage, Storm Water Drainage & Solid Waste Management”	“MCF”
“Roads, Bridges, Drains and Street lights”	MCF, HUDA

Source: (Faridabad 2016)

The main goal of TSD is to develop land use features and environments that are transit-supportive. Strong coordination between transit investments and development plans has been a key to success for a number of cities throughout the world. In order to support the mixed land use with walkability, there must be a resilient relation between transit and its supportive land use development. Coordinated land use and transportation planning, while still new, is gaining momentum (Deepti Muley 2008). In current scenario, land-use approaches such as infill development, higher density, compact development, mixing of land use, and resilient walkable planning are generally considered to develop a more sustainable transport system (Stefaan Vande Walle 2004). The development of mixed-use commercial

area along with high density residential area is the main land use planning in building a transit-supportive environment.

7.1 Assessment of Faridabad Development Plan

The Faridabad City is developing as a main industrial hub of Haryana State as well as of the National Capital Region. Keeping in view the above, land use proposals have been framed with respect to the industrial activities and trade and commerce, which will continue to be the main commercial activity of the city (Town and Country Planning Department 2016). The classification of land uses as per Final Development Plan 2031 of Faridabad city along with sub group is mentioned in table below.

Table 3: Evaluation of Transit supportiveness of land use for Faridabad Development Plan

Land use Code	Land use	Transit Supportive	“May be /may not be supportive	Not supportive
100	“Residential”	X		
200	“Commercial”	X		
210	“Retail Trade”	X		
220	“Wholesale Trade”		X	
230	“Warehousing and Storage”			X
240	“Office and Banks including Government Office”	X		
250	“Restaurants, Hotels and Transient Boarding Houses including public assistance institutions providing residential accommodation like Dharamshala, Tourist House etc.”	X		
260	“Cinema and other places of public assembly on a commercial basis”.	X		
270	“Professional Establishments”	X		
300	“Industrial”			
310	“Service Industry”	X		
320	“Light Industry”		X	
330	“Extensive Industry”			X
340	“Heavy Industry”			X
400	“Transport and Communication”			
410	“Railway Yards, Railway Station and Sidings”.			X
420	“Roads, Road Transport Depots and Parking Areas”		X	
430	“Dockyards, Jetties”			X
440	“Airport/Air Stations”		X	
450	“Telephone Exchanges etc.”		X	
460	“Broadcasting Station”		X	
470	“Television Station”		X	
480	“Logistic Parks/Dry Ports including Inland Container Depots and Warehouses”			X
500	“Public Utilities”			
510	“Water Supply installation including treatment plants”			X
520	“Drainage and Sanitary installation including Sewage Treatment Plant and disposal works”			X
530	“Electric power plants, substation etc.”			X
600	“Public and Semi Public”			
610	“Government Administrative Central Secretariat, District Offices, Law Courts, Jails, Police Stations, Governors and	X		

	President’s Residence”.			
620	“Education, Cultural and Religious Institutions”	X		
630	“Medical and Health Institutions”	X		
640	“Cultural institution like Theatres, Opera Houses etc. of a predominantly non-commercial nature”	X		
650	“Land belonging to defense”			X
700	“Open Spaces”		X	
710	“Sports Grounds, Stadium and Play Grounds”		X	
720	“Parks”		X	
730	“Green Belts, Garden/Golf Courses and other Recreational Uses”.		X	
740	“Cemeteries, crematories etc”.			X
750	“Fuel filling stations and Bus Queue shelters”		X	
760	“Water bodies/lakes/water recharge zones”		X	
770	“Mela Ground, multipurpose ground”		X	
800	“Agricultural land”			
810	“Market Garden, Orchards and Nurseries”			X
820	“Land under agriculture operation, where no change of land use/license shall be granted”.			X
830	“Land Under staple crops”			X
900	“Special Zone”		X	
1000	“Natural Conservation Zone”			X
1100	“Mixed Land use”	X		

Source: (Town and Country Planning Department 2014).

The most Transit-Supportive Land Uses are residential, commercial, retail trade, Office and Banks including Government Office, Restaurants, Hotels, Cinema, Professional Establishments, Service Industry, Government Administrative Central Secretariat, District Offices, Education, Cultural and Religious Institutions, Medical and Health Institutions and Mixed Land use (Lutin 2013). The land use is calculated by measuring the area around each metro station at the radius of 800M. The land use percentage of each metro station is represented in table 4. Internal

weights were given to each aspect with values ranging from 0 to 2 under typical field weight. The range of values for transit supportiveness shall be 2, if the land use does not support transit the value equal 0. The contributory rule as defined by (Chrisman 1999) can be applied to spatial data. A contributory rule uses all the values, giving each an opportunity to contribute to the composite result (Margaret H. Carr 2007). The contributory rule is applied for smart land-use analysis.

Table 4: Land use percentage of the Faridabad Metro Station Areas

Land Use	Escorts Mujesar		Bata Chowk		Neelam Chowk Ajronda		Old Faridabad	
	Land use (%)	Transit supportiveness Value	Land use (%)	Transit supportiveness Value	Land use (%)	Transit supportiveness Value	Land use (%)	Transit supportiveness Value
Residential	17.91%	35.82	8.61%	17.22	20.32%	40.64	18.68%	37.36
Commercial	2.17%	4.34	6.92%	13.84	3.35%	6.7	3.85%	7.7
Industrial	28.70%	28.7	6.55%	6.55	8.58%	8.58	7.94%	7.94
Public & Semi Green	6.28%	12.56	3.43%	6.86	10.25%	20.5	15.00%	30
Unauthorized	6.90%	13.8	1.73%	3.46	1.39%	2.78	3.56%	7.12
Unauthorized	0.53%	0	7.89%	0	5.98%	0	0.00%	0
Undeveloped Area	11.38%	0	42.07%	0	6.01%	0	13.84%	0
Village	5.75%	5.75	0.00%	0	6.85%	6.85	7.58%	7.58
Metro	0.00%	0	0.00%	0	11.90%	0	0.00%	0

Beyond Railway	20.37%	0	22.80%	0	25.37%	0	29.56%	0
Total	100.00%	100.97	100.00%	47.93	100.00%	86.05	100.00%	97.7

Source: Analysis

The analysis of transit supportive land use of the selected Faridabad metro station is done by assigning value to the land use on each station as 0 for “Not supportive”, 1 for “Maybe / maybe not supportive with development standards and 2 for “Transit Supportive” land use. The land use of residential, commercial and public & semi-public are considered transit-supportive with value of 2, while industrial land use, especially light industry may be

considered for transit-supportive with value of 1. The land areas which are either lying vacant or are being encroached by the slum dwellers and the areas beyond railway line, which is not connected with the MRT are considered ‘not supportive’ to TOD development. Scale has some limitations. Although, there must be some subjective aspects, which this scale might not have been able to report.

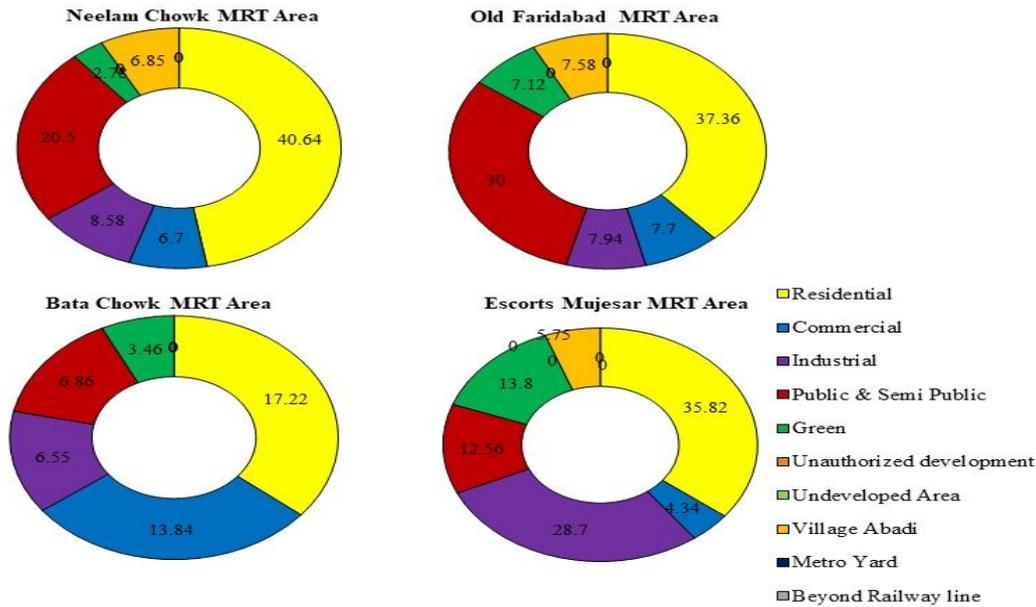


Figure 8: Transit supportive land use analysis

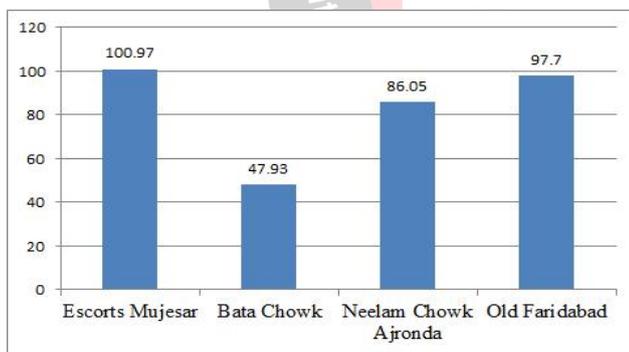


Figure 9: Transit supportive land use analysis

The analysis of transit supportive land use indicate that land use around old Faridabad metro station is most transit supportive and the land use on Bata Chowk metro station is least transit supportive. Coordinated land use and transportation planning, while still new, is gaining momentum in Faridabad. This land use analysis helps in identifying the TODness of the area. Land use diversity is one of the main components of TOD to be considered for evaluation of transit supportiveness of the MRT areas.

VIII. CONCLUSION

The area along Old Faridabad Metro station to Yamaha Mujesar Metro Station, currently surrounded by vacant and underutilized land, represents one of the city’s relatively few opportunities to envision and create a transit-supportive development from scratch. The result of the analysis shows that about 50 percent of the land at Bata Chowk MRT area is either vacant or unauthorised development. Escort Mujesar MRT area is highly transit supportive, followed by Old Faridabad and Bata Chowk area is less transit supportiveness.

The lack of properties available for redevelopment is an impediment to transit-oriented development. Developers may need to assemble multiple parcels to construct a development. This factor also takes topography into consideration when evaluating land availability. Property availability considers the amount of observed underutilized or vacant buildings in the vicinity of the station.

Many of the barriers to TOD in Faridabad can be overcome by changes to policy in master plan and public infrastructure targeted to incentivize positive market conditions. Due to increased activity at Metro Corridor, and its location on the

National Highway Corridor, significant development demand exists in Faridabad. Through restructuring of Faridabad Development Plan and policies and carefully optimizing the land use, Faridabad can leverage opportunities through existing market demand to better connect the station area and revitalize city center.

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