

5. Traffic and Transportation

5.1 INTRODUCTION

In the context of rapid growth of the city, increasing mobility, high travel demand, increasing congestion, delays, accidents, environmental pollution and associated energy costs an appropriate transport system for city's growth and sustainable development is imperative to ensure that the city becomes productive and competitive. The present exercise on traffic and transportation attempts to establish rationale transport system development policies and strategies for the study area based on extensive studies and scientifically evolved methodology.

5.2 STUDY AREA AND TRAFFIC ZONES

In this effort the Ranchi study area is divided into 24-Traffic Zones with 17-internal zones and 7-external zones for transport planning and system development in the city. Refer **Figure No. 5.1**.

5.3 TRANSPORT SURVEYS AND STUDIES

A number of traffic surveys and studies have been carried out to appreciate the traffic and travel characteristics, for identifying issues, constraints and potentials and to work out the most appropriate transport system for the city.

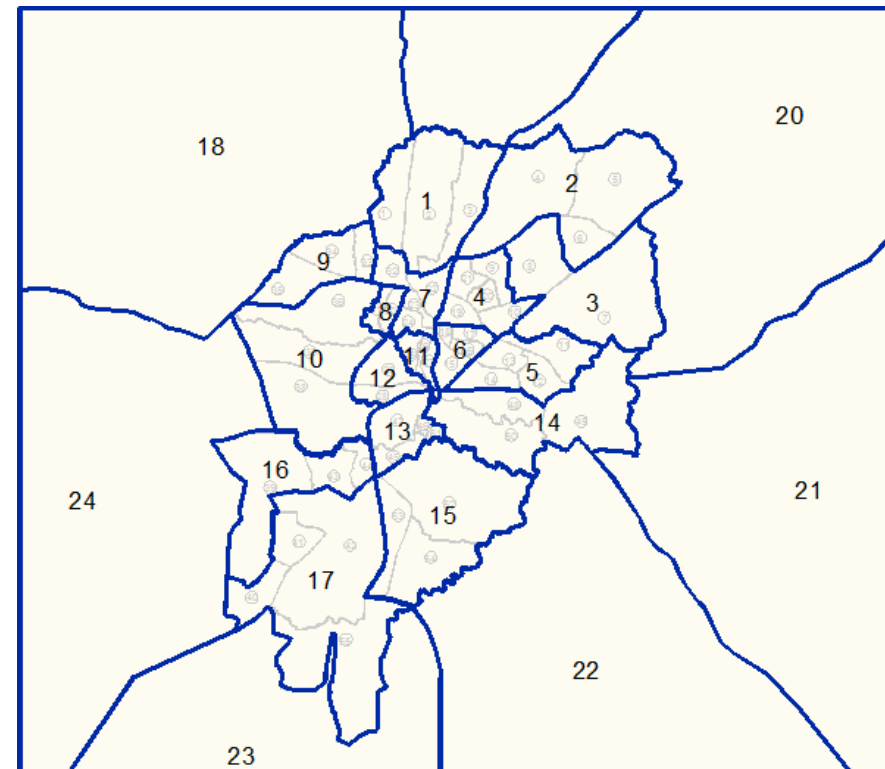


Figure No. 5-1: Traffic Zones System

5.4 TRANSPORT SYSTEM

5.4.1 Road Network Characteristics

For the present study a detailed inventory of 621 kms of road network was carried out by the consultants. Nearly, 45% of the road length has a right of way below 10 m while 38 % is between 10 to 20 m rights of ways.

Refer **Map No. 5.1** for Distribution of Existing Road Network by Lane Configuration.

Only 22 % of the road length has a carriageway width of 10.5 m (3 lanes) and above while only 13 % of the road length has median. It was observed that about 79 % of the road length did not have footpaths along it while 33 % of the road length did not have street lighting facility.

5.4.2 Traffic Characteristics

On the mid - block locations the estimated 16 hourly traffic volume ranges from a minimum of 19,103 vehicles at Tagore Hill road to a maximum of 1,29,988 vehicles near Bishop school. The temporal analysis of average daily traffic between 2007 and 2012 on comparable locations revealed that on average there has been 13 % increase in study area over time. In terms of traffic composition cars and two wheelers have predominant share ranging from 44 % to 73 %. Some of the major roads carrying significant goods traffic include Project Bhawan road, Lowadhi road and Jagannathpur road. The peak hour share varies from 7.5 % to 19.6 % across various locations with an overall 11.1 %.

5.4.3 Household Socio Economic and Trip Characteristics

5.4.1.1 Socio-Economic Characteristics

A sample survey of 2656 households was carried out to assess household socio economic and travel characteristics. Nearly 33 % of the households have four members followed by 24 % and 22 % of households with three members and five

members respectively. About 53 % of the households own one vehicle while 37% own two vehicles. About 37% of households own two wheelers only and another 30 % own cycles only. Temporal analysis reveal a declining trend in cycle ownership levels and an increasing trend towards two wheeler ownership levels in the city between 2007 and 2012. Further about 31% of the households have income up to Rs. 5000 pm, 21% have between Rs. 5,001-10,000 pm and 19% have between 15,001-20,000 pm respectively. Also about 31% of the persons are engaged in economically active population and of which about 68% are engaged in private jobs.

5.4.1.2 Trip Characteristics

A total of 12.88 lakh trips were generated in the city daily. The per capita trip rates (PCTR) observed were 1.20 including 'walk' trips and 0.94 excluding 'walk' trips. The shares of work, education and others purposes trips observed are 39.4 %, 36.6 % and 25 % respectively. The modal split by various modes was two wheelers (26%), cars (3.5%) and cycles (8.6%) respectively. The average trip length observed was 3.4 km while the average trip time observed was 22.4 minutes.

5.5 BASE YEAR TRAVEL DEMAND

It is estimated that in the base year 14.06 lakh trips are performed daily in the study area of which 11.60 lakhs are vehicular trips. The overall per capita trip rate is 1.33 while vehicular per capita trip rate is 1.10 respectively. The share of public transport in the vehicular trips comprising of buses and autos is 15% while the balance share of 85% is of private transport. In overall trips the share of walk trips is 21 %. A four stage travel demand modelling approach was adopted to assess the base year traffic assignment on the existing road network, enable assessment of horizon year travel demand and enable development of transport system policies to meet the projected travel demand.

5.6 PLANNING FORECAST

5.6.1 Population

The population of Ranchi city has increased from 8.46 lakhs in 2001 to 10.73 lakhs in 2011 at a decadal growth rate of 26.72%. Based on the past population growth trends it is estimated that the population of RPA (combination of urban and rural population) may vary from low of 21.12 lakhs to a high of 36.94 lakhs in 2037. A medium projection of 31.58 lakh for RPA for the perspective year 2037 is adopted and the same is used for the planned development of Ranchi Planning Area in the horizon year.

5.6.2 Workers

In view of the past trend of workforce a WFPR of 33% has been adopted for preparing the Ranchi Master Plan 2037. The workforce in Ranchi in 2037 works out as 9,29,374; considering additional 10% floating workforce, the total workforce in Ranchi is estimated to be 9,56,917 workers.

5.7 TRAVEL DEMAND FORECAST

The transport demand forecast for horizon year was based on Four Stage Transport Demand Modelling Approach taking to account the transport models developed for the base year along with and the planning forecast in the year 2037.

5.7.1 Persons trips

5.7.1.1 Intra-City

Based on the projected development scenario if the city it is estimated that in the horizon year an estimated 32.86 lakh intra –city trips would be performed daily in the study area. Assuming a modal split of 40% by the year 2037 based on previous studies it is estimated that about 13.15 lakhs public transport trips would be generated in the study area.

5.7.1.2 Inter-city

Also based on previous studies it is estimated that about 4 lakh inter-city passenger trips daily would use the intra- city transport system of which about 2 lakh would be share of bus trips. In addition is estimated that about 90,000 tonnes of inter-city freight would also be generated daily.

Refer **Map No. 5.2** for Peak Hours Public Passenger Trips Assignment for 2037.

It can be observed from the assignment of trips that the corridor from Lodhma Road to Hazaribagh Road has the desired passenger demand to warrant a medium capacity rail transit system such as LRT.

Figure **Map No. 5.3** for Overall Assignment of daily total traffic (PCU) including passenger and freight traffic for 2037.

5.8 TRANSPORT DEVELOPMENT STRATEGIES

The vision of the transport development strategies for the study area is to plan, develop, operate and manage an integrated coordinated multi modal transport system which offers high capacity, good connectivity, excellent quality, high productivity and reliability. As part of this effort the major medium and long term measures include road system, Public transport system development, terminals (passenger and goods), parking facilities, financing and organisational policies.

5.8.1 Road System

5.8.1.1 Proposed Road Network Form and Hierarchy

The proposed road network form in the city is envisaged as a ring and radial network form. The radial/axial roads are inter-connected by a Ring Road (80.8

km) on the periphery of the city and a Circular Road (47.7 km) circumscribing the developed area of the city. While the Ring Road is proposed to predominantly cater to long distance through traffic (passenger and freight) and serving the land uses such as inter-city bus terminals, industrial areas and institutional areas abutting it the Circular Road is largely meant to cater to movement of non – core area destined traffic in various parts of the city and thereby help in diverting traffic away from central area besides also relieving radially oriented traffic movement. With the proposed Circular Road in place the city would have a well defined radial-cum-orbital road network system. The main functional roads recommended can be categorised into following:

- Ring Road
- Circular Road
- City Radials/Axial
- All purpose roads

It is proposed to develop a hierarchy based road system in the city comprising of arterial, sub arterial, collector and local road. While the primary arterial roads have a ROW varying between 45 m to 60 m the other city level roads comprise of sub-arterial roads (24-45 m R/W) and collector roads (18-24 m R/W) respectively. For roads within the Central area it is proposed that these will be all purpose roads where the traffic volumes will be high. On these roads speed is not important as access needs predominate and providing parking space is important. As pedestrian movement will be high on these roads wide footpaths, safe crossing with exclusive phase period where signalized, refuge islands, clear markings, good lighting, guard rails, good signage are important components of the roads.

The circular road being proposed is a major orbital corridor of the city which starts from Nagri rail crossing, NH-23 crossing, Bangla Toli, Shalimar Apartments, Lalit Narayan Mishra Colony, Dipri village, Krishi Bazar, NH-75 crossing and Kamta Basti in the west; Hashmi colony, PHED colony, Pithuria Road crossing, Chowsi Basti, south of Gautam green city, Hazaribagh road

crossing in the north; west of Sainik colony, south of B.M. Central jail, east of New Toli, Murd rail line crossing, NH-33 crossing and Mathual Toli in the east; and finally Kocha Toli, Swarnarekha river crossing, Hethu Basti, Lotma Toli, Prem Nagar, Vikas Nagar, Kalandar Basti, NH -75 crossing towards Jaintgarh, Lodhma Rail line crossing, Lodhma highway crossing, Moshi Basti, Sai City in the southern part of the city.

Overall the total primary road network in year 2037 would constitute of 522 km of road length comprising of 224 km of existing road network and 298 km of additional proposed road network. The additional proposed roads have been developed in a hierarchy fashion under ten different classification of road system ranging in R/W from 60 m at the highest level to 10 m at the lowest level.

Refer **Map No. 5.4** for overall proposed road network for the horizon year-2037

Refer **Map No. 5.5** for the typical road cross – sections for proposed roads with R/W ranging from 60 m to 18 m.

5.8.1.2 Existing Roads System

Radial Corridors

Based on the available R/W and the assigned traffic in year 2037 various up gradation measures of important radial corridors have been identified. These measures include providing for minimum additional lanes feasible within the R/W besides providing of footpaths and utility zones wherever possibilities exists. Refer **Table No. 5.1**.

Table No. 5-1: Road Improvement Proposals along important Radial Roads

S. No.	Road Name	Section	Existing Lanes	Proposed Additional Lanes	Footpath (m)	Utility zone (m)
1	Ratu (NH-75) Road	New Friends colony- College More	2	2	1.5	
		Ratu More - Ratu Road Chowk	5	-	1.5	1.5
2	Kanke Road	Pahad Colony - Reliance market	3	1	1.5	
		Reliance Market- Krishna Bhavan	3	-	2	
		Krishna Bhavan- Ratu Road Chowk	4		2	
3	Pathiyatola Road	Beda Chowk-Karamtoli	1.5	1	1.5	
		Karamtoli- Jail More	3	1	2	
4	Hazaribagh Road (NH-33)	Kabristan – Basunder road/Main road Jn.	2	2	1.5	1.5
5	Muri Road	Namkum – Railway Crossing	2	2	2	3
		Railway Crossing- Kantatoli	3	-	1.5	3
		Kantatoli – Near Jail More	5	-	1.5	1.5
6	Baharagora Road (NH-33)	Bridge over river- Bhau Baazar	1.5	1	1.5	
		Bhau Baazar - Kutchary Chhowk	4	-	2	
7	Jaintgarh Road (NH-75)	Khunti Road-Birsa Chowk	4	-	2	3
8	Lodhma Road	J.M. chowk- Shalimar Market	3	3	2	3
		Shalimar Market- Hinno Chowk	3	1	2	3
		Hinno Chowk- Dorando	3	1	1.5	

S. No.	Road Name	Section	Existing Lanes	Proposed Additional Lanes	Footpath (m)	Utility zone (m)
		Chowk				
		Dorando Chowk- Daily Market	4	-	2	3
9	Nagri Road (NH-23)	Lalghutua – Kathal Mor	2	1	1.5	
		Kathal More - Piska More	3	1	2	
10	Harmu Road	Harmu Road- Shahajahan Chowk	2	1	2	
		Shahajahan Chowk- Hanu Chowk	4	1	1.5	1.5
11	Kutchary Chowk Road	Kutchary Chowk – Shahid Chowk	4	-	3	2

Central Area Roads

Within the central area the roads will lose their characteristics and are to be developed as all-purpose roads. Hence for roads within the central area it is proposed that these will be all purpose roads where the traffic volumes will be high. On these roads speed is not important as access needs predominate and providing parking space is important. As pedestrian movement will be high on these roads wide footpaths, safe crossing with exclusive phase period where signalized, refuge islands, clear markings, good lighting, guard rails, good signage are important components of the roads.

5.8.1.3 Grade Separators

Keeping in view the projected traffic at major intersections by the year 2037 and the criteria that major travel corridors of the city, namely the Ring Road, Circular Road and the radial roads provide seamless traffic movement along it is proposed to develop 11-grade separators at different locations in the city as per details below:

- Ratu Road – Ring Road crossing (GS1)
- Pithauria Road- Ring Road Crossing (GS2)
- Hazraibagh Road – Circular Road Crossing (GS3)
- Haziabagh Road- Ring Road Crossing (GS4)
- Muri Road- Ring Road crossing (GS5)
- Baharagora Road- Circular Road crossing (GS6)
- Baharagora Road- Ring Road Crossing (GS7)
- Near Airport on Lodhma Road (GS8)
- Jaintgarh Road- Circular Road crossing (GS9)
- Jaintgarh Road- Ring Road crossing (GS10)
- Bypass Road- Nagri Road Crossing, near Argora Chowk (GS11)

5.8.1.4 Railway Bridges

It is also proposed to develop 11-railway bridges at railway crossings with major roads of the city. The details of various rail bridges proposed are as under:

- Ring Road – Railway line to Pathiyatola Road (RB1)
- On Hazaribagh Road (RB2)
- On Muri Road (RB3)
- On Ring Road- Railway line to Muri (RB4)
- Ring Road – Railway Line to Muri (RB5)
- Circular Road- Railway Line to Muri (RB6)
- Circular Road- Railway Line to Muri (RB7)
- Ring Road-Railway Line to Lodhma (RB8)
- Circular Road- Railway Line to Nagri (RB9)
- Ring Road- Railway Line to Nagri (RB10)
- Circular Road near Hatia Railway Station (RB11)

Refer **Map 5.5 A** for locations of proposed grade separators and rail bridges

5.9 PUBLIC TRANSPORT SYSTEM

It is estimated that by the year 2037 about of 13.15 lakh trips would be catered in the city by the public transport assuming a modal share of 40%. To cater the above demand an integrated multi-modal transport system has been conceptualized. The component modes include the bus system catering the study area, supported by a medium capacity rail based system along three identified corridors and supplemented by the IPT modes. The sub modal share of public transport is estimated to be 80% by bus and LRT while balance 20% is by IPT. Within the combined modal share of bus and LRT based on previous experiences of road based and rail transit operations it is estimated that bus would account for predominant share of 70 % while LRT would account for 30% share catering to an estimated demand share of 7.36 lakhs and 3.16 lakhs respectively.

5.9.1 Light Rail Transit System (LRTS)

The proposed LRT corridor spanning over a length of 16.8 km runs between Lodhma Road near HEC and Proposed Railway Station on Hazaribagh Road. It has 17-stations proposed along it. Refer **Map No. 5.6** The system has a carrying capacity of 15,000 phpd to 25,000 phpd. It is estimated to cater to a daily demand of about 3.16 lakhs passenger trips. The proposed stations are at Dhurwa Reservoir, Golchakkar, Mausai Bari, HEC Gate, Hinoo, Doranda, A.G. Colony, Rajendra Prasad Chowk, Bahu Baazar, Kantatoli, Kokar, Surendranath School, Khelgaon, Booti More, Ranchi War Memorial, Gautam Green City and BITS.

Refer **Map No. 5.7** for proposed Network of Public Transport System

A segregated right of way is proposed for the LRT System and wherever the same is not available there an elevated way may be provided. The typical LRT alignment options under different contextual conditions are shown in **Figure No. 5.2**.

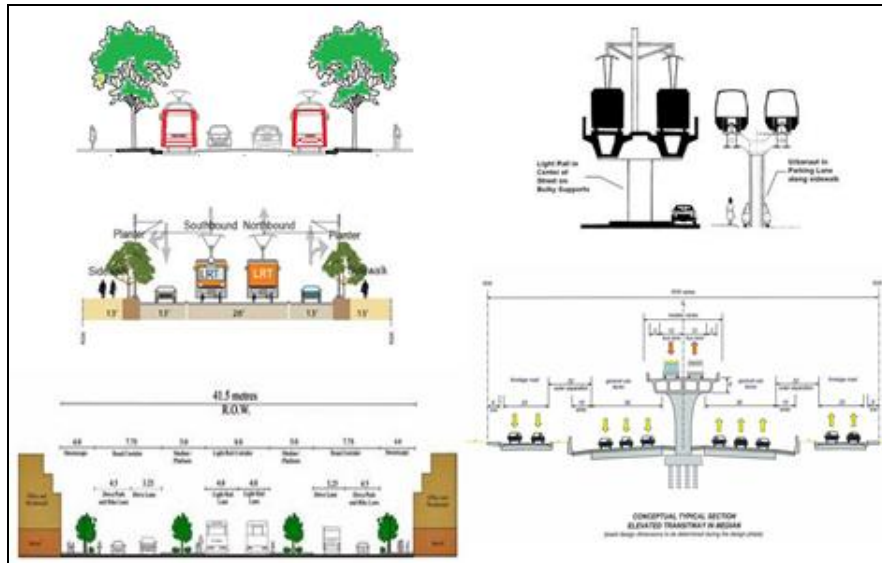


Figure No. 5-2: Typical LRTS Alignment Options

It is proposed that a detailed techno economic feasibility study may be carried out for the proposed LRT alignment.

5.9.2 Bus System

5.9.1.1 Bus Route Network and Fleet

The existing bus route network spans over a length of 185 km. In order to improve the accessibility of the population in the proposed development area it is necessary to expand the city's bus route network. Accordingly 61 km additional public transport route length has been proposed along the proposed Circular Road and along roads catering to newly proposed residential and activity areas of the city in order to ensure that there is a sizeable potential demand along its corridor for the operational efficiency of bus system. Refer **Map No. 5.8**. In order to cater to an estimated overall daily demand of 8.36 lakhs bus passenger trips

comprising of 7.36 lakhs intra city bus passengers and about a lakh inter-city bus passengers using the intra city bus system an estimated 650 buses are estimated to be required in the public transport fleet by year 2037.

It is recommended that the entire intra-city bus services route network system is reorganized by developing a hierarchy of bus terminals. At the highest level are the nodal terminals, followed by sub- nodal terminals and at the lowest level are the area terminals. It is proposed that the concept of direction oriented services need to be adopted. In this context 'Hub and spoke' form of network system provides good scope for organizing the bus services. As part of this concept direct, fast and frequent bus services are to be operated amongst the nodal bus terminals. Groups of sub-nodal bus terminals need to be integrated with identified nodal terminal with bus services. Local area terminals at the lowest hierarchy need to be connected to sub-nodal bus terminals. A study on City Bus System Planning and Route Rationalisation is initiated to enable reorganisation of bus route service pattern and development of bus related infrastructure.

5.9.1.2 Bus Depots and Workshop

To service the bus system 5 depots, each of 2.5 hectare in extent are required to be located in close vicinity to the terminals. In this context it is proposed that four depots may be located as part of four inter-city bus terminals complexes proposed at Lodhma Road , Delhi Road (NH -75), Patratu Road and Baharagora Road (NH-33) respectively. Another depot is proposed to be located within the proposed Transport Nagar complex being proposed towards the west part on the Ring Road closer to Kanke Road. Also one workshop, of extent 5 hectare, is also proposed to be developed within the proposed Transport Nagar Complex.

5.9.1.3 Bus Stops

In order to provide maximum accessibility to the users it is proposed that the bus stops must be easily accessible at a walking distance of not more than 500 meters. The spacing of bus stops should be ideally in the range of 500 to 600 meters. Bus shelters need to be well designed to provide shelter to the

passengers and add aesthetics to streetscape. Bus shelters are proposed to be developed as revenue generating measures with provision of spaces for commercial advertisement. Real time passenger information system through adoption of Intelligent Transport System (ITS) practices need to be provided at the each stop for the benefit of the users.

5.9.1.4 Bus Management System

The bus system in the city needs to be provided good infrastructure support in terms of depots, terminals, stops etc. Efforts need to be made to identify and franchise private sector operators, with adequate capacity, to operate and manage the city bus system. It is further proposed that these buses are regulated under an organizational framework such as Ranchi Transport Corporation (RTC). A phase wise implementation of the public transport development programme is proposed wherein initially tempos plying on existing bus routes would be relocated to areas presently un-served by buses and later on tempos will be further relocated on the peri-urban areas to act as a feeder system to fully developed bus system for Ranchi and also to the proposed LRT system along Lodhma Road- Hazaribagh Road. In addition cycle rickshaws can also be planned to operate as an access and dispersal system to the proposed LRT system.

5.9.3 Terminals

Terminals are very important component in the integrated transport network as they enable integration between the different modes of the system. The objective of terminal development policy is to organise the terminals in a hierarchy and locate them appropriately.

5.9.1.5 Passenger Terminals

Inter – City Bus Terminal

The study has indicated that, by the horizon year 2037, on an average day, 2.0 lakh passenger trips by inter- city buses are estimated to move into and out of Ranchi. It is proposed to develop four inter- city bus terminals as integrated entities providing for inter-state, inter-city and intra city bus services at the following locations:

- Lodhma Road
- Ratu Road (NH -75)
- Jamshedpur Road (NH-33)
- On Ring Road towards Northern side of Planning Area (Village Chandwe)

These terminals will have facilities for parking of private and IPT modes and other passenger amenities. It is also proposed that the new terminals be developed as a bankable project under Public Private Partnership (PPP) route. Refer **Map No. 5.8** that shows the locations of proposed inter-city bus terminals.

Intra – City Bus Terminals

It is further proposed that the existing bus terminals at Ratu Road (near Zakhir Hussain park), Khadgada Bus terminal near Kantatoli and government bus stand on station road will function as intra- city bus terminals and also act as the nodal terminals to facilitate **“Hub and Spoke”** concept of bus movement between various sub- nodal terminals which need to be developed near major traffic generators such as activity centres, railway stations, airports, etc.

Railway Stations

Keeping in view the future development scenario and the likely increase in inter-city travel by rail it is proposed to develop a new Railway Station near the junction of Hazaribagh Road and Railway line to Patratu. Refer **Map No. 5.8**. This station will act like an interchange station providing inter change facilities between the proposed LRT system and inter – regional rail system. The proposed station also needs to be connected through dedicated bus services to enable quick access and dispersal of passengers at the station. In addition it is proposed to augment the facilities at the existing railway stations at Ranchi and Hatia

including their handling facilities, parking facilities and access/dispersal transport services.

Airport

The existing Birsa Munda Airport of Ranchi is a public domestic airport serving the city of Ranchi, Jharkhand, India and is managed by the Airports Authority of India. It is located in Hinoo locality, approximately 7 km from the centre of the city. The airport is spread over an area of 223 hectare and is presently handling about 8 lakhs passengers per annum. It is also considered as one of the fastest growing small airports in the country. The airport has an international terminal with a capacity of handle 700 passengers per day comprising 200 international and 500 domestic passengers. Keeping in view the potential of traffic growth in the horizon year it is proposed to augment the land area of the airport to 794 hectare around the existing airport site by 2037. Refer **Map No. 5.8**. Further it is also proposed to improve the land side connectivity of the airport with different parts of the city through an improved public transport system facilitated as part of the overall bus services operationalization plan. In addition feeder services need to be operated between the airport and the proposed LRT system.

5.9.1.6 Freight Terminals

It is estimated that by the year 2037 nearly 90,000 tonnes of goods movement will flow into and out of the city every day. Some of the major corridors of goods traffic vehicles are Kanke Road (27.7%), Hazaribagh Road (21.1%), Ratu Road (12.3%), Purulia Road (11.3%), Khunti Road (10.8%) and Nagri Road (9.4%). Keeping in view the goods traffic movement a number of facilities for handling freight traffic have been proposed as under:

Transport Nagar

A Transport Nagar of 219 hectare size has been proposed towards the west part on the Ring Road closer to Kanke Road largely to handle goods flow entering the city from Lodhma Road, Nagri Road, Ratu Road and Kanke Road respectively. Refer **Map No. 5.8**. The proposed Transport Nagar area will have provisions for

various activities such as transport operator's – 30% (offices, Godown, Loading/Unloading), Service Industry – 6% (Petrol Pump, Service Area, Weigh Bridge), Public & semi- public – 3% (Police Post, Post Office, Telephone, first aid etc), Commercial – 3%, Parking – 18% (Idle, Transit, Other Vehicles), Open Space – 10%, Circulation – 28% and Others – 2 %.

Truck Terminal

A truck terminal of 81 hectare size has been proposed in the eastern side along the Ring Road - Mori Railway Line junction to support the logistical activities of the proposed Logistics Park adjacent to the truck terminal site. Refer **Map No. 5.8**. In addition it would also cater to the goods flow entering the city from Hazaribagh Road, Purulia Road and NH-33 respectively. It would have largely its area under parking, circulation, storage facilities besides few transport operators offices etc.

Integrated Freight Complex

For an efficient freight trading, handling and distribution environment in the city within one integrated complex and also to enable relocation of existing trade and other functions from the central area to this complex planning of an Integrated Freight Complex (IFC) becomes inevitable. It is proposed to develop an Integrated Freight Complex (IFC) in the eastern side along the Ring Road-Mori railway line junction. The proposed IFC is spreading over an area of 181 hectare. The proposed IFC would provide facilities for regional and intra-urban freight movement, warehousing and storage facilities and inter-link these sites with specialized markets, provide servicing, lodging and boarding, idle parking, restaurants and other related functions within the complex. It would include all the commodities markets and facilitate trading needs of any retailer. In terms of transport component the complex would include a rail goods terminal while the truck terminal is just adjacent to the site. The proposed IFC is strategically located such that it is connected to other parts of the city, including the central areas, as well as the city region with the appropriate transport system. The site

will have adequate parking facilities for both inter-regional and intra-urban freight transport system.

In terms of its management it is proposed to set up a Special Purpose Vehicle (SPV) such as 'Ranchi Integrated Freight Complex Company' (RIFCC) with equity contribution by Ranchi Development Authority (RDA) and the stakeholders. The RIFCC shall be responsible for planning and promoting the development of the IFC. It shall also mobilize resources for IFC development. The RIFCC would also advocate for implementation of incentives and disincentives for relocation of trade and other functions from central area to the IFC which is one of main objectives of development of IFC.

It is recommended that a pre-feasibility study of the IFC may be conducted and an integrated plan and program of implementation prepared

Logistics Park

In order to facilitate mechanised handling, inter-modal transfers, sorting / grading, cold chain, aggregation / disaggregation, etc, to handle freight in the city it is proposed to develop a multi-modal logistics park within proposed IFC. This facility would be a rail-based inter-modal traffic-handling facility complex, comprising container terminals, bulk / break-bulk cargo terminals, warehouses, banking, office space and facilities. It would be equipped with state-of-the-art integrated logistic facilities with mechanised handling and intelligent inventory management which is likely to result in minimisation of multiple handling, provisions of various logistics related services close to a rail transport hub and better integration with logistics and supply chains. A number of industrial establishments which are likely to be set up in the proposed industrial areas along the Ring Road are likely to immensely benefit from this facility.

The facility would be developed through Public Private Partnership (PPP) between the government and stakeholders in logistics business such as logistics service providers, real estate developers, third party logistics players,

warehousing investors, container operators, financial institutions, industrial houses etc. In this context it is recommended that a pre-feasibility study of the Logistic Park may be conducted and an integrated plan and program of implementation prepared.

Management of Goods Movement

The movement of goods modes on the road network in the study area needs to be rationalized to ensure environment sustainability. The goods modes can be grouped into three types as under:

- Small sized vehicles (pick up/delivery purposes)
- Medium sized vehicles like LCVs and
- Large size vehicles like 2/3 Axle Trucks, Truck Trailer & MAVs

Small size vehicles perform an essential distribution function in the city serving various retail commercial, small industrial establishments and particularly located in congested parts of the city. These can be in the form of auto rickshaws/goods carrier/ which can negotiate small congested networks. It is proposed that their movement on all road sections, at all times of day may be permitted. As part of traffic management plans, separate parking areas for these vehicles may be identified such that they do not impede smooth movement of other traffic particularly along arterial and sub arterial roads. The medium size vehicles like LCVs are important to move goods to and from industries, warehouses and other major activities. The large sized goods vehicles consume high proportion of road capacity, impede traffic flows, causes accidents, adversely affect environment and consume large extent of land for parking. These vehicles need to be received at the urban periphery and facilitated in terms of planned freight terminals such as Transport Nagar and Truck terminals as has been proposed. Overall for an efficient movement of freight vehicles within the city use of ITS practices could be adopted. Various stakeholders such as transport operators, warehouses owners, industrial and commercial establishment owners, traffic police, policy planners etc. need to evolve a coordinated policy for effective urban freight distribution in the city.

5.9.4 Parking

Keeping in view increased travel demand particularly by personalized vehicles and also the fact that there is severe shortage of off street parking facilities it is proposed to develop a Multi-level parking facility at Sainik Complex. It is also proposed that adequate parking facilities will be provided in all the newly proposed development areas as part of their area development plans adopting appropriate planning guidelines and development control norms for parking.

It is also imperative to evolve policies and strategies for effective parking facilities development and management in the study area. In this context following strategies are proposed:

- While providing on-street parking the needs of the functional hierarchy of the roads need to be respected. As a general rule no on-street parking on the carriageway is permitted on roads identified for high speed movement. On arterial and sub arterial road links, on-street parking to be provided only if the road is 6-lanes or more wide. On collector streets on-street parking to be provided if the road is of 4-lanes without median. Parking on footpaths on all road links to be strictly prohibited. Parking on front off-set space of a building, considered as private parking, to be strictly regulated. Access to these parking through footpaths to be strictly prohibited. Along cross streets in central areas where traffic flow is low and carriageway is 4-lanes or more, parking on both sides may be organized.
- The parking supply needs to be supplemented by provision of off-street public parking facilities. The investment on, and development and management of these off-street facilities may be by public agencies or by private sector by promoting off-street parking facilities as a business venture by provision of land at concessional lease rates, permitting the facility to be a multi-use complex with commercial uses and prescribing charges for parking based on vehicle type and duration of parking.
- Pricing use of parking space is an important component of the Parking Policy. The objectives of pricing are to (i) generate revenues, (ii) provide employment, especially poor, (iii) restrain demand, (iv) promote PMT, (v) encourage private sector investment, and (vi) rationalize parking duration. It is important to design and implement a differential parking price policy with low fees at the periphery of the city and increasing fees as one move towards the centre and high or penal fees within the central areas. As a policy long term parking, on-street, needs to be discouraged and short term parking encouraged to maximize turn over.
- It is often observed that provision of off-street private parking facilities through zoning regulations and building byelaws normally leads to abuse and misappropriation to other uses and resulting in parking demand spills over to on-street. To prevent misuse, the concerned public agencies need to exercise strict monitoring and control. In this context it is recommended that the policy of charging 'Compounding Fee' or 'In-lieu Fee' may be adopted wherein the property developer needs to pay a compounding fee per unit parking space, fixed from time to time by the Municipal Authorities, for the total parking space he needs to provide as per regulation/byelaw. The Municipal authority would need to pool these 'compounding fees' and use them to promote development of off-street parking facilities in association with private sector. There is a need to prescribe 'compounding fees' rate from time to time, by location. This strategy may be applied in central areas where demand for space is high, availability is low and opportunity costs are high.

It is also proposed that a comprehensive parking study in the city may be undertaken to identify potential solutions to the existing parking problems.

5.9.5 Improvement of Existing Intersections

It is proposed that following intersections need to be taken up for improvement in terms of channelization, widening of approaches, ensuring minimum turning radii as per standards, pedestrian crossing facilities, signage's, markings etc. The overall objective of such improvements is to improve the traffic handling capacities of the intersections, minimise delays, avoid conflict situations, improving safety and facilitate smooth traffic dispersal. Also there is a need to examine the adequacy of roundabouts. In this regard following intersections have been identified for undertaking improvement measures:

- Piska More (Ratu Road)
- Kutchary Chowk
- Dangratoli Chowk
- Ram Mandir Chowk (Kanke Road)
- A. G. More , near Mecon
- DPS School crossing, Doranda
- Harmu Bypass and HEC Road Junction
- Karamtoli Chowk
- Chandini Chowk (Kanke Road)
- Nepal House
- NH-33 and Lalpur Kokar Road crossing
- Lalpur Chowk
- Argora Chowk
- Kathal More Chowk
- Harmu Chowk

In addition it is also proposed that area wide /corridor wide traffic improvement plans for critical locations, particularly in the central area may be prepared. Some of these include:

- Over Bridge to Kutchary Chowk (Main Road)
- Kutchary Chowk to New Market Junction (Ratu Road)

- Over Bridge influence area
- Circular Road
- Piska More area

5.10 PLAN IMPLEMENTATION STRATEGY

5.10.1 Financing

The existing practice of financing urban transport infrastructure projects including its maintenance is responsibility of various departments of Central, State and concerned ULBs. Keeping in view the envisaged budgetary requirements in the horizon year it is proposed that besides government budgetary support it is necessary to evolve and adopt innovative finance tools to generate finances for creating necessary transport infrastructure. Some of these are:

5.10.1.1 Real Estate Development

It is one of the most widely used avenues for raising funds particularly for transport projects like LRT, grade separators etc. In this the property developers are invited to develop the land along the transport corridors and share profit with the transport organisations arising sale of such property.

5.10.1.2 Dedicated Road Fund (Infrastructure Initiative Fund)

Various states in the country have created such funds for development of roads by charging cess on turnover, betterment levy, Shops and establishment levy, tax on employment, surcharge on octroi and other levies. A brief description of some of these methods is described below:

a) Cess on Turnover

- A substantial amount of revenue could be generated through cess on turnover particularly in cities based on industry, trade and commerce activities

- Betterment levy through value capture mechanism
- It is fiscal instrument to generate funds by recouping the land value increment. It aims to recover the project cost from the beneficiaries of the project. Some of such value capture resources include contribution from employees, transport development levy, development cess on daily rail and inter-city bus tickets, surcharge on seasonal tickets, property development levy etc.

b) Shops and Establishment Levy

- This method has the potential to be one of the large revenue gathering measures particularly where the city has predominant economic base of trade and commerce.

c) Tax on Employment

- An additional source of revenue can be generated by an additional levy on the employer

d) Surcharge Levy on Octroi Rates

- This method involves laying a surcharge on Octroi. In areas where there is a proposal for abolishment of octroi, a substitute in the form of Entry Tax has been enforced which has the potential to generate sizeable source of revenue.

e) Other levies

- There are certain other levies which have a potential to generate revenue. These include:
 - Levies related to use of private passenger transport such as surcharge on petrol/diesel, surcharge on Motor vehicle tax, vehicle ownership charge on first time registration etc.
 - Levies on direct use of transport facilities such as levy of terminal tax for passengers, cess on permit fees, goods

vehicle tax, surcharge on parking fees and passenger fares etc.

- Other levies such as surcharge on property tax, surcharge on conversion charge for allowing commercial use of land, cess on liquor, levy on wage bill of commercial and industrial establishments etc.

f) Municipal Bonds

- These are important instrument for mobilizing resources for funding urban infrastructure projects.

g) Sale of Govt. Land and Property

- It is convenient source of raising resources by the ULB's.

h) Advertisement Revenues

- These could be generated through bill boards at terminals and other important locations.

In addition to all the above there is also a need to adopt private sector participation in development and provision of infrastructure to contribute to growth in city's economy. Some of the widely used forms of PPP are service contracts, management contracts, leasing, concession and BOT/BOOT, DBFO etc.

5.11 INSTITUTIONAL FRAMEWORK

Keeping in view the deficiencies in the capacity of existing government organizations to implement the urban transport infrastructure schemes it is proposed that the city must have an Unified Metropolitan Transport Authority (UMPTA) by the horizon year keeping in view the proposed policy objectives on National Urban Transport Policy proposed by the Government of India in 2006. In the interim period it is proposed that there is a need to set up and Transport Planning and Traffic Management (TPTM) cell to be headed by a Senior Transport

Planner/Transportation Engineer and assisted by adequate technical staff of transport planners, traffic engineers, architects, economists etc. at junior level. This cell should coordinate with all the stakeholders' government institutions such as PWD, Traffic Police, RTO, Ranchi Transport Corporation (RTC) besides RMC, RRDA etc. for all matters relating to planning, development, operations and management of urban transport system of Ranchi.