



Pre-feasibility study for sustainable transport interventions in Ranchi

August 2012

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The Institute for Transportation and Development Policy (ITDP) works with cities worldwide to bring about transport solutions that cut greenhouse gas emissions, reduce poverty, and improve the quality of urban life.

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Abbreviations

BRT	bus rapid transit
BSRTC	Bihar State Road Transport Corporation
CDP	City Development Plan
JNNURM	Jawaharlal Nehru National Urban Renewal Mission
JTDC	Jharkhand Tourism Development Corporation
RMC	Ranchi Municipal Corporation
ROW	right-of-way
RRDA	Ranchi Regional Development Authority
RTA	Regional Transport Authority

About this study

The Oak Foundation, an international philanthropy seeking to address issues of social and environmental concern, has short-listed the Indian states of Jharkhand and West Bengal for intensive engagement across multiple issues that are of importance to the Foundation. The environment and housing divisions of the Oak Foundation have identified integrated transport and urban planning as a focus area in the state of Jharkhand. Key activities include supporting Jharkhand in developing progressive transport policies and implementing demonstration projects in Ranchi, its capital city. The demonstration projects are expected to promote environmental sustainability and provide greater access to opportunities, especially for the urban poor.

Institute for Transportation and Development Policy (ITDP) is an international nonprofit organization whose mission is to promote environmentally sustainable and equitable transportation worldwide. It is regarded internationally as centre of knowledge and expertise in the field of sustainable urban transport planning. ITDP engages cities across the developing world to influence policy and implement gold standard projects. ITDP has been working with the Union Government of India as well as government agencies in various states and cities for well over a decade. It has a good understanding of the local context and needs of various stakeholders.

On the invitation of the Oak Foundation, ITDP conducted a study to assess the opportunities to develop sustainable transport systems in the city of Ranchi. In the first phase of engagement, called the pre-feasibility phase, ITDP studied present conditions in the city and assessed the feasibility of implementing various sustainable transport initiatives including, but not restricted to:

- Improvement of bus services in the city
- Creation of a high-quality bus rapid transit (BRT) system
- Improvement of paratransit services and integration with formal public transport
- A network for non-motorised transport (walking, cycling, cycle rickshaws) and complete street design that enhances access and ensures safety of all road users.
- Parking policy and management

This phase included consultation with various government stakeholders, researchers, and community representatives to start the process of building consensus on the need for planned urban development and implementation of sustainable transport systems.

This report is a product of research conducted by ITDP from January to April 2012 and a stakeholder consultation workshop organized in May 2012 to discuss the findings of the study.

The city of Ranchi

Ranchi is an important regional hub in eastern India. It has a population of 1.1 million and is the capital city of Jharkhand, a new Indian state formed in 2000 out of southern Bihar. Jharkhand is endowed with some of the largest deposits of coal, iron ore, and other minerals in India. The demand for a separate state was premised on Jharkhand's predominantly tribal identity and the poor socioeconomic conditions of the tribal population despite the rich mineral wealth in the region.

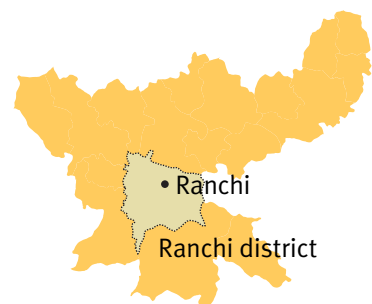
Since its founding the state has made visible progress, showing a decline in poverty rates and a consistently positive per capita growth rate of 2.4 per cent per year.¹ Yet Jharkhand remains one of the poorest states in India. There is a sharp contrast between rural and urban poverty. In Ranchi district, the incidence of rural poverty is 89 percent, whereas the incidence of urban poverty is similar to that of the advanced states in India.² Ranchi's relative prosperity is driving rural residents to migrate to the city for employment and economic opportunities. As the city grows, there is a pressing need for improved infrastructure and policy reforms to allow for sustained development in a planned, equitable fashion.

Economy

Ranchi has a strong industrial base and has seen some of the fastest employment growth among cities of its size.³ There are 540 industrial units in and around Ranchi.⁴ Major industries include steel plants, foundries, and refractory units. Several leading industrial and mining companies such as Heavy Engineering Corporation (HEC) Ltd, the Steel Authority of India, and MECON Ltd have their head quarters in Ranchi. Ranchi is also an important commercial, administrative, and educational centre of the region, with leading schools, colleges and higher education institutions.

Demographics

The population of the Ranchi metropolitan region grew 30 percent from 2001 to 2011 and is one of the fastest growing urban areas in India. With a population of 2.9 million, Ranchi district is the second most populous district in Jharkhand after Dhanbad. Much of the workforce is engaged in wholesale and retail trade (22 per cent), followed by manufacturing



Ranch is the capital of the state of Jharkhand in eastern India

Source: Wikipedia.org

1 World Bank, 2007. Jharkhand: Addressing the Challenges of Inclusive Development.

2 Ibid.

3 http://articles.timesofindia.indiatimes.com/2010-10-13/ranchi/28223453_1_top-five-sectors-employment-provider-cities

4 Meinhardt, 2007, Ranchi Comprehensive Development Plan

and repairs (19 percent), and other sectors including administration, defence, education and health.⁵

The urban poor in Ranchi constitute 30 percent of the population and largely consist of tribals engaged in activities such as cycle rickshaw operations and daily wage labour. The portion of the total population living in slums—35 to 40 percent—indicates a severe shortfall of affordable housing options and lack of basic infrastructure for the urban poor.⁶

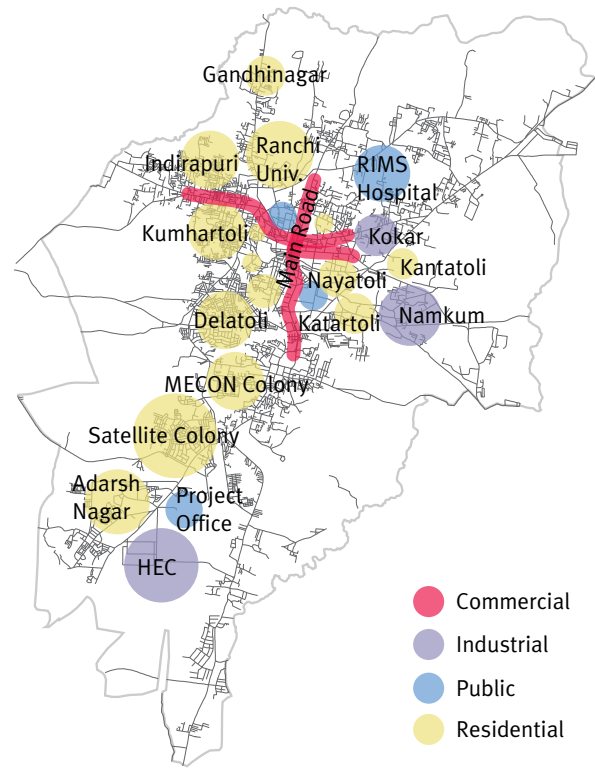
Spatial structure

The city of Ranchi comprises an area of 173 square kilometres. Close to 70 percent of the land (about 120 sq km) within Ranchi Municipal Corporation (RMC) limits has been developed.⁷ The densest part of the city is along Main Road, the commercial core of Ranchi. Larger commercial and retail land uses along Main Road step down to mid-rise shops and residential uses in the inner lanes.

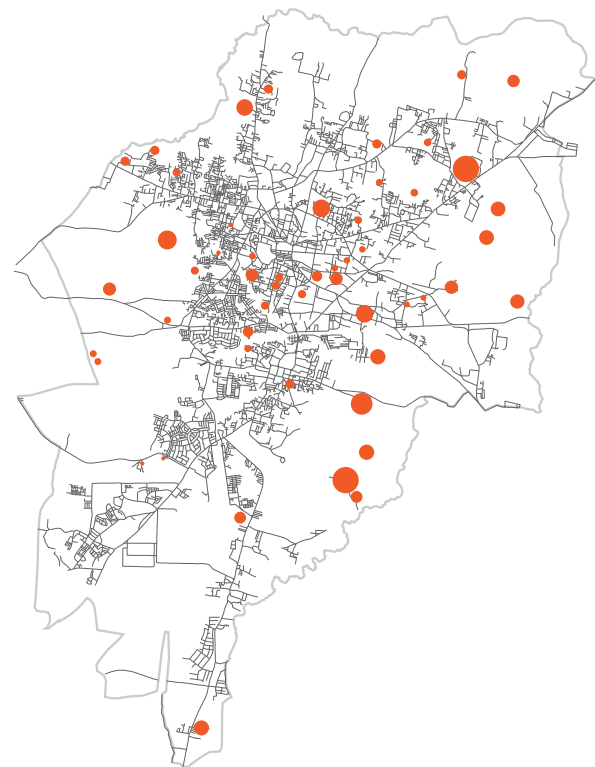
Educational institutions and administrative offices including RMC, the Ranchi Regional Development Authority (RRDA), the Regional Transport Authority (RTA), Ranchi University, and Birsra Munda Stadium are concentrated in the north and north east around Radium Road, Kutchery, and Tagore Hill road. There are three notified industrial areas within the municipal limits. HEC is the largest industrial area, situated south of the airport. State government offices are also located on HEC lands. Other industrial areas include Kokar and Namkum.

The growth of Ranchi city accelerated in the 1970s, primarily around industrial development. The surrounding district is one of the most urbanized districts in Jharkhand state, with a population of 2.9 million.⁸ Since then the city has grown significantly mostly spreading outward along radial corridors such as Kanke Road (NH 23), Ratu Road (NH 75) and the Dhurwa-HEC Road. Newer residential colonies south of the railway line are single use-low rise with private amenities and infrastructure such as roads, parks and recreational centres. Between these main corridors, the lack of a complete road network has prevented growth.

Slums are interspersed all across the city, comprising close to 12 percent of developed land. They have little or no access to basic amenities like water, sewers, and drainage. A number of these slums were originally tribal villages which are now surrounded by development. Close to 42 percent of slum dwellers own their land.⁹ The remaining 58 percent of slums



Major land uses in Ranchi.



Locations of informal settlements in Ranchi.

5 Ibid.

6 Ibid.

7 Jharkhand Space Applications Centre, 2009. Ranchi Utility Information System Project Report

8 Census 2011

9 Ibid.

are unauthorised, located on government land or other vacant land in the city.

Any tribal land in Jharkhand state is nontransferable from a tribal community to any non-tribal entity as per the Chota Nagpur Tenancy Act. The amount of tribal land within RMC limits is estimated at 30 to 60 percent.¹⁰ A lot of tribal land is also scattered in smaller parcels all across the city. All this tribal land is inaccessible for any planned growth.

Governance

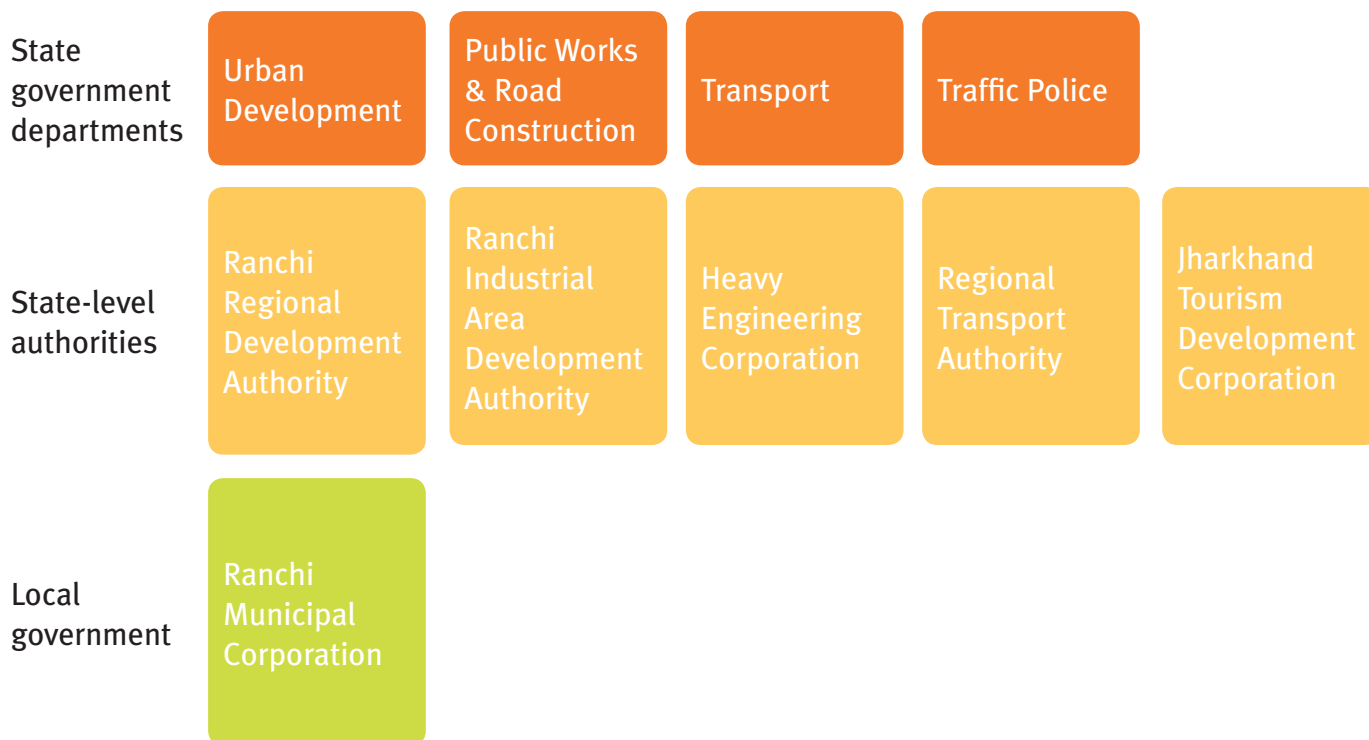
Jharkhand is struggling to establish political stability and a sustained leadership. When the state government was formed, the first assembly was comprised of legislators elected in the Bihar elections of 2000. Jharkhand's first independent elections, in February 2005, were closely contested and resulted in a Bhartiya Janta Party (BJP) coalition coming to power. All the governments formed since have been coalitions and Chief Ministers have changed every few years. Indian Administrative Service (IAS) officers, who wield considerable power over state and city affairs in most other states, have not remained in their positions for long due to political changes at the top.

The municipal government, the Ranchi Municipal Corporation (RMC), has limited authority and financial capacity and is slowly finding its grounds as an independent and autonomous urban local body. RMC was first formed in 1979 through a merger of the erstwhile municipalities of Ranchi, Doranda, and their Joint Water Board.¹¹ The city has 55 administrative wards, each represented by an elected councillor. RMC is notionally led by an elected mayor, but the de facto head is the chief executive officer, an IAS officer appointed by the state government.

The 74th Amendment to the Constitution of India, which aimed at devolving power to

¹⁰ Personal interviews with government officials and faculty of BIT Mesra.

¹¹ Ranchi Municipal Corporation, 2012. About us. Retrieved from <http://www.ranchimunicipal.com/aboutus.aspx>.



Many municipal services in Ranchi are carried out by state government departments and authorities. The local government has limited power.

urban local bodies, has only been partially implemented in Ranchi. The present functions of RMC are defined in the Ranchi Municipal Corporation Act of 2001. As per the act, RMC's role is limited to construction of roads; provision of parks, markets, and bus stands; and provision of sanitation facilities. RMC is also responsible for administering state and Central poverty alleviation schemes. However, the Act does not mention the planning, provision, and management of public transport services, and the regulation of transport. These activities are currently handled by state government authorities. The state government also plays a substantive roles in city planning activities, including urban planning, regulation of land use, and granting of building permissions.

Public finance

RMC has limited financial capacity to fulfill its fundamental responsibilities of providing basic services to its citizens. The corporation has limited sources of revenue and is heavily reliant on state and central assistance. In 2011, RMC had a total budget of Rs 550 million, out of which one-third was raised from internal resources and the remainder came from the state government. Property tax is the single largest source of revenue for RMC. Other sources include user charges and income from municipal properties such as parking lots and commercial buildings.

In addition to the funds assigned in the municipal budget RMC also receives earmarked funding for specific projects including slum up-gradation, road construction and public transport through national and state level programs such as Jawaharlal Nehru National Urban Renewal Mission (JNNURM) and Rajiv Awas Yojna. Under the JNNURM financing pattern, Ranchi was eligible for a 50 percent grant from the central government and another 20 percent grant from the state government for approved projects. Ranchi received JNNURM funding to procure city buses and provide basic services for the urban poor, including housing.

Given RMC's weak revenue base, the City Development Plan (CDP) suggests accounting reforms and improving recovery mechanisms in the short term, as well as tax free bonds, land pooling, and public private partnerships in the long run to become financially sustainable.¹²

Planning processes

There is currently no mechanism to foster planned growth of the city. RMC and RRDA have limited funds and have no incentive to develop basic infrastructure like roads, sewage networks, and parks. In the absence of civic infrastructure, the new developments are low density, haphazard, and primarily concentrated around regional arterials.

RMC recently commissioned a new master plan to replace the 1983 plan for Ranchi. The commissioning of the master plan is the first important step towards managing future growth of the region. The aim of the master plan is to consolidate different transport and development initiatives in the region and set the future direction for growth of the city. Among the city's most critical challenges is developing an integrated, sustainable transport system to guide urban growth over the coming decades.

12 Meinhardt, 2007, Ranchi Comprehensive Development Plan

Transport system and challenges

Historically, Ranchi depended on walking, cycling and cycle rickshaws. The old city of Ranchi has a dense fabric of narrow, interconnected streets where non-motorised modes are prevalent. The outward expansion of the city has led to an increase in travel distances and higher demand for motorised mobility. The use of personal motor vehicles, especially cars, is expanding rapidly, leading to congestion in central areas and safety challenges.

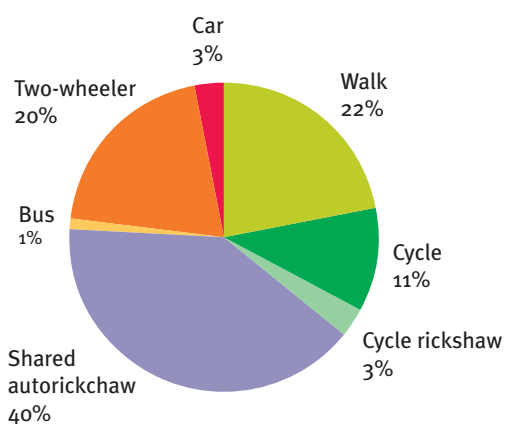
Public transport demand is largely met by paratransit systems. Seven-seater autorickshaws carry two-thirds of daily motorised trips in the city. These rickshaws operate as shuttle services on fixed routes, offering frequent and flexible service. The city has recently initiated bus services with funding assistance from JNNURM, but it has received limited state and local government support and suffers from poor image and quality.

The majority of new transport initiatives in the city are limited to road widening and flyovers. No concrete effort has been made so far to develop sustainable transport solutions.

Travel patterns and demographics

According to Ranchi's City Development Plan (2007), work and education trips account for 73 per cent of total daily trips in Ranchi. The per capita trip rate including walking trips is 2.25. The CDP presents estimated mode shares for Ranchi. However, these figures are not consistent with the primary data collected as part of this study. Trips by mode have been estimated using primary data and assumptions derived from travel patterns in other Indian cities. Actual mode shares may vary plus or minus 10 percent.

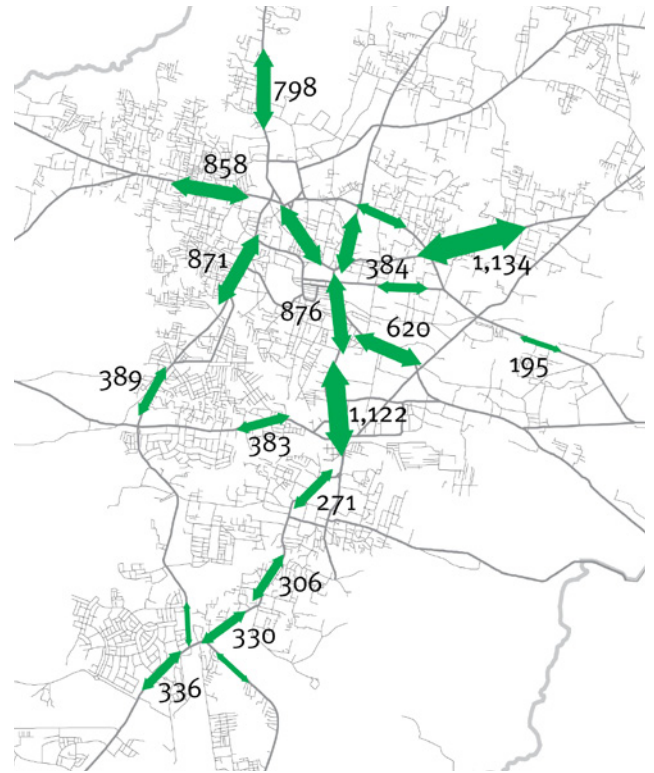
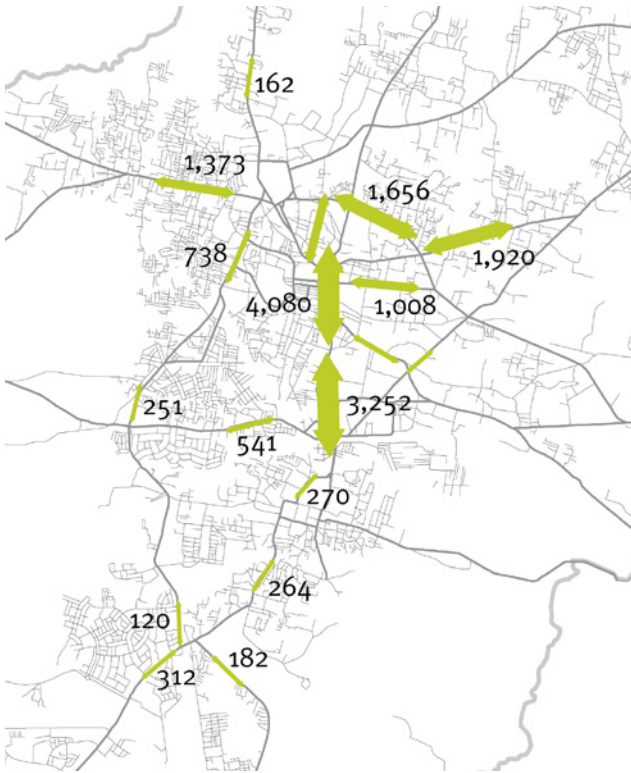
Walking and cycling account for one-third of the trips in Ranchi. A significant share of these trips fall in the inner city area around Main Road, which is the commercial hub of Ranchi. The highest pedestrian volumes (4,000 people per hour) are observed on Main road from



Paratransit and non-motorised modes account for the majority of trips in Ranchi. For more details see Table 2.1.



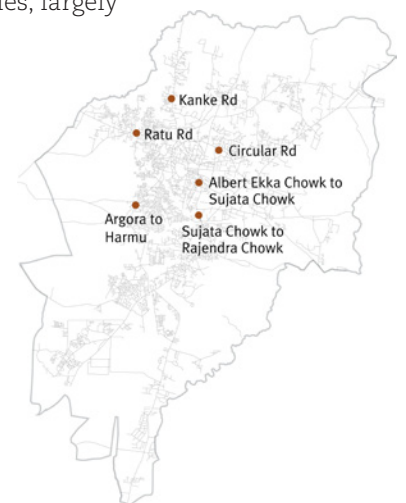
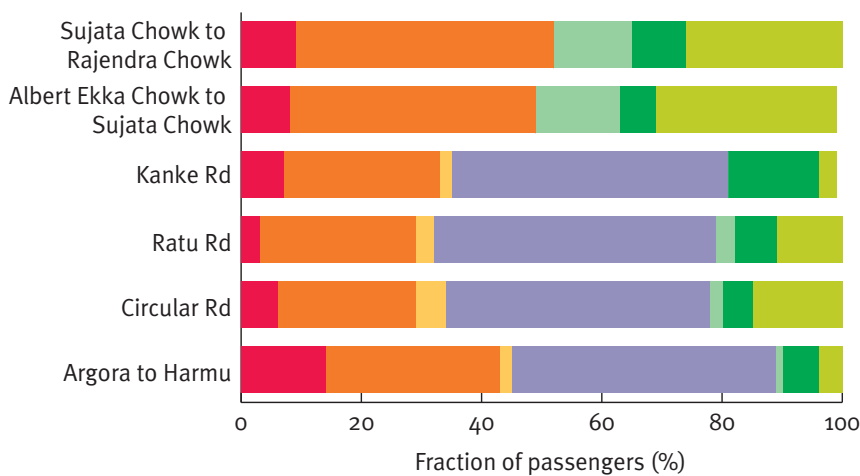
Non-motorised modes are predominant modes in Ranchi, particularly in central locations such as Main Road



Walking and cycling are dominant modes in Ranchi. These charts show the peak hour volumes of pedestrians (left) and cyclists (right) on major corridors in the city. Main Road between Albert Ekka Chowk and Sujata has the maximum pedestrian traffic, while cyclist volumes are highest on Main road and Hazaribag Road.

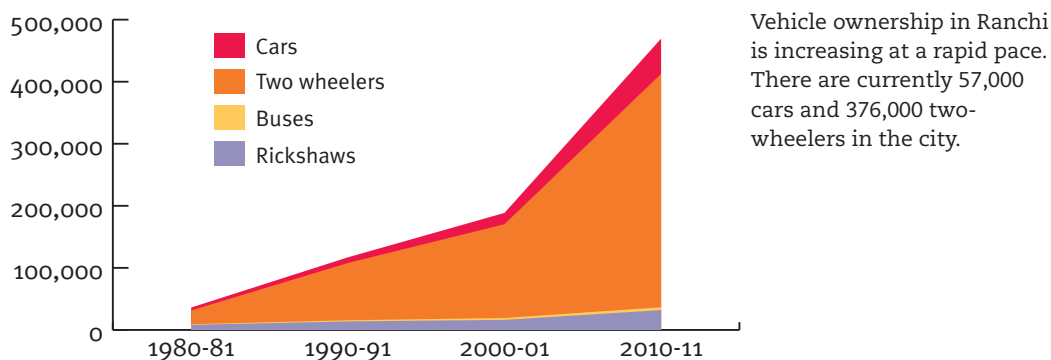
Rajendra Chowk to Albert Ekka Chowk and further toward Gandhi Chowk, primarily due to the presence of commercial markets, the railway station, and a number of institutions. High pedestrian volumes comprising school and college students are observed on Purulia Road, Circular Road, and its extension to Kantatoli Chowk. This area has a concentration of educational institutions. Labourers living in the slums within and around the city walk large distances to work.

Large cyclist volumes (more than 1,000 cycles per hour) are observed on Main Road and Hazaribag Road, which has several industrial units. Most adult cyclists are males, largely



Car Two-wheeler Bus Shared autorickshaw Cycle rickshaw Cycle Walk

In central locations such as Sujata Chowk and Albert Ekka Chowk, about half of trips are accomplished by non-motorised modes. On larger arterials away from the city center, shared autorickshaws predominate. Autorickshaws are not permitted on Main Road. All figures refer to the morning peak period.



industrial workers or working small jobs in offices. Cycles also are used by school children, both male and female. Peak cycle movements tend to occur earlier than the peak hour for motor vehicle traffic. The pedestrian and cycle mode shares appear to have decreased in the past decade—the 2007 CDP registered a combined share of 40 per cent for these modes.

Ten per cent of trips are carried out on cycle rickshaws. Cycle rickshaws are largely used by middle class individuals as well as families to travel short to medium distances especially around Main Road.

Of motorised trips, nearly two-thirds are performed on shared auto rickshaws. Around two-thirds of bus and auto rickshaw users in Ranchi are male—largely labourers, workers, and those holding lower-level administrative and government jobs. Shared rickshaws are quite popular with school and college students as they offer a frequent service at relatively affordable rates. However, autorickshaws present difficulties for some user groups. As documented in recent press reports, women face particular challenges when travelling by paratransit modes.¹³

Buses account for only 1 per cent of all vehicle trips. Bus trips in the city are largely work related. Household trips primarily made by women in and around the neighbourhood are mostly on foot.

Personal motorized modes account for nearly a quarter of all trips. Peak flows upwards of 1,000 passenger car units (PCUs) per hour are observed on major traffic corridors. Current vehicular ownership estimated to be around 22 cars and 144 two wheelers per 1,000 persons in Ranchi.¹⁴

Table 2.1 Trips per day by mode in the Ranchi metropolitan region

	Number of trips	Fraction (%)
Walk	625,000	22
Cycle	306,000	11
Cycle rickshaw	96,000	3
Autorickshaw	1,131,000	40
Bus	22,000	1
Two-wheeler	569,000	20
Car	85,000	3
Total	2,812,000	

13 Kislaya, Kelly (22 August 2012). Women question safety of auto rides. *The Times of India*. Retrieved from <http://timesofindia.indiatimes.com/city/ranchi/Women-question-safety-of-auto-rides/article-show/15607020.cms>.

14 Assuming that 90 per cent of the vehicles registered in Ranchi District are owned by residents of the city of Ranchi.



Though pedestrians account for a quarter of all trips in Ranchi, most streets lack usable footpaths and pedestrians are forced to walk in the carriageway.

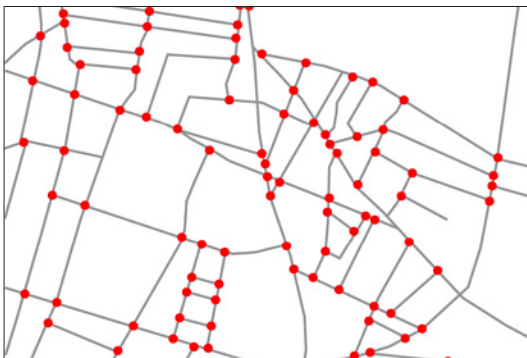
There is a significant population of labourers and factory workers from adjacent villages and urbanized areas such as Ratu, Khunti, Ormanjhi, Kalamati, and Rampur, who commute into the city everyday or stay and work in the city for extended periods of time. There are large commuter movements toward industrial areas such as Tatisilwai.

Road infrastructure

Although pedestrians and cyclists account for one-third of all trips in Ranchi, there are few dedicated pedestrian and cycle facilities in the city. Most roads in the city have no defined footpaths. Where footpaths are present, they are poorly maintained or encroached by parked vehicles. In the absence of any dedicated pedestrian facilities, people are forced to walk on the road next to motorized vehicles or on unpaved edges. Cycles and cycle rickshaws share the limited road space with fast moving vehicles. The large number of pedestrians walking on the road limits continuous cycling movements.

The total road network of Ranchi is nearly 559 km. Approximately 90 km of the roads are maintained by the state road construction department. The remaining 470 km of roads are largely sub-arterial and local roads built and maintained by the RMC.

Most roads in Ranchi have a right of way (ROW) of 20 m or less. Main road, NH-75, Purulia road, Ratu road, Kanke road and Hazaribag road are some of the major corridors in the city. Most roads in Ranchi are poorly maintained. The roads are all laid from the centre line out and the edges are all kept as dirt. The drainage infrastructure is obsolete with common open sewage and storm water drains on the edge of the road. Essential drainage infrastructure is



Near Albert Ekka Chowk
98 intersections per sq km



Kanke Road near J. P. Marg
20 intersections per sq km

A dense street network decreases walking times, disperses traffic, and reduces vehicle speeds. A street network with 50 or more intersections per square kilometre is considered ideal. While central Ranchi (left) scores well above this standard, intersections are relatively sparse in outer areas (right).

How is road space used in Ranchi?

Road space utilization in the city differs based on the type of activity along the streets. Regional arterials primarily act as thoroughfares for vehicular traffic with most of the ROW used for traffic movement.

In inner city areas such as Main Road, pedestrian movements, cycles, cyler rickshaws, vending, and social gathering are more significant, occupying around 40 percent of the ROW. Another 30 percent of the ROW is used by mixed traffic—primarily personal motorized vehicles. Finally, haphazard on-street parking occupies 30 percent of the ROW.

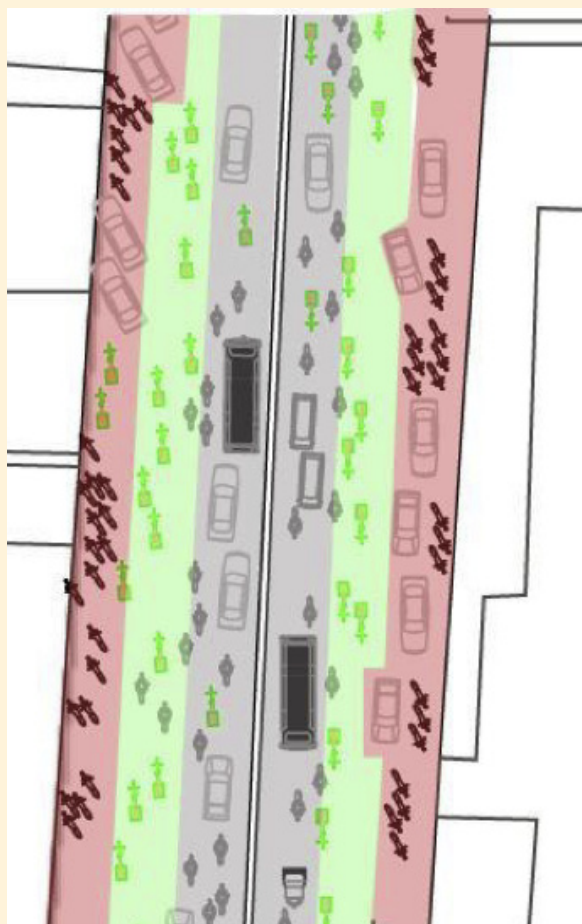
Although the usage patterns differ significantly between these two types of streets, the design varies little—in both cases the dominant element is the mixed traffic carriageway, which covers nearly the entire ROW.



On NH 75 near HEC, traffic mostly consists of motor vehicles.



On Main Road, there are large volumes of pedestrians, cyclists, and cycle rickshaws.



The distribution of space on Main Road among different uses.

lacking on most roads. Buses and paratransit vehicles ply in mixed traffic and compete with personal vehicles for limited road space.

Central Ranchi has a dense fabric of interconnected narrow streets. The narrow widths of these streets keep speeds low and facilitate walking and cycling. The road network becomes more disjointed and more widely placed away from the core, making pedestrian travel more difficult. South of the railway line, a significant amount of residential development is in the form of industrial townships or colonies with private road infrastructure, inaccessible to nonresidents.



Cycle rickshaws (left) and 7-seater autorickshaws (right) are key paratransit modes in Ranchi, carrying over half of all daily trips.

Paratransit

There are two primary paratransit services in Ranchi: cycle rickshaws and autorickshaws. Cycle rickshaws mainly operate in central areas such as Main Road. Autorickshaws provide long- and short-distance commuter service on major corridors, except on Main Road, where they are not permitted.

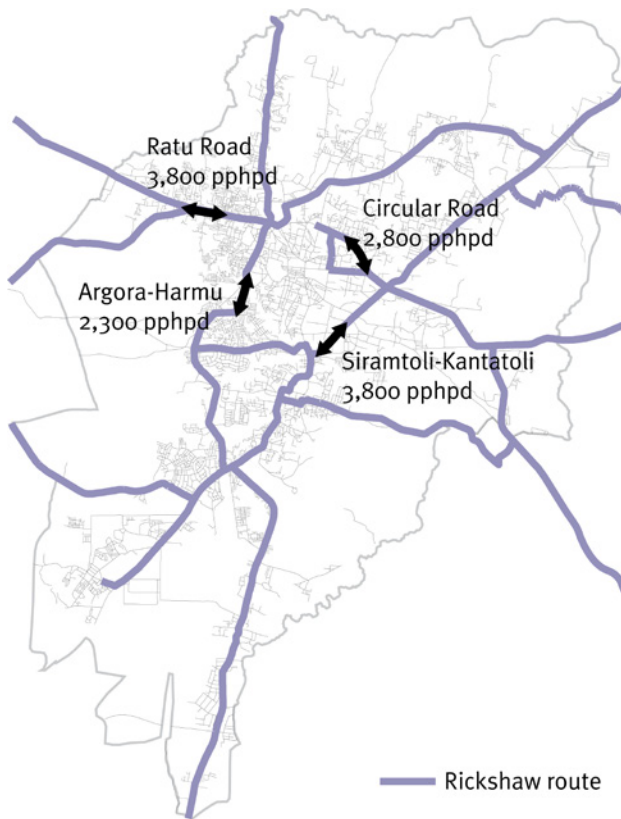
Autorickshaws

Auto rickshaws account for nearly 1.1 million daily trips, the highest number on any mode in Ranchi. The number of three wheelers in the city comprising of three seater and seven seater auto rickshaws has also seen a near 100 per cent growth in the last decade. There are three primary types of auto rickshaws in Ranchi: two types of 7-seater diesel rickshaws (Minidor and Piaggio) and smaller three-seater rickshaws that run on petrol. Regular taxi services provided by three-seater autorickshaws are relatively insignificant. The paratransit also fleet includes a small but growing fleet of vans (e.g. Tata Magic) as well as some Jeeps. Most of the autorickshaws are highly polluting models. There are several shared rickshaw pick up points in the city but no dedicated rickshaw stands or facilities. While the official capacity of the larger autorickshaws is 7, they commonly carry 10 to 12 passengers.

In contrast to the situation in most Indian cities, there is some regulation of autorickshaws in Ranchi. The Ranchi Regional Transport Authority (RTA) designates routes within and surrounding the city where shared autorickshaws may operate. As of 2011, the RTA had issued permits to 1,026 rickshaws. Another 1,034 permit applications are pending. Based on ground surveys and interviews with the Rickshaw Union, 7,500 autorickshaws are operational in and around Ranchi. Routes have been allocated on all major roads in Ranchi, except on a part of the Main Road where autorickshaws are banned. The routes connect several major destinations in and around the city including the University, Kutchery, Project Office, and Railway Station. The routes also extend outside RMC to villages of Rampur, Ratu, Ormanjhi, Tatisilwai and Bhero.

Table 2.2 Autorickshaws by the numbers

Fleet size	7,500
Trips per day per vehicle	10
Average route length (km, one-way)	14
Average occupancy	7
Fare (Rs per km)	1
Passenger trips per day	1,130,000



Modern vehicle such as the Tata Magic are gaining popularity as paratransit vehicles in Ranchi (above).

The Ranchi Regional Transport Authority issues route licenses to shared autorickshaw operators (left). Peak hour passenger volumes are shown in key locations (in pphpd, or passengers per hour per direction).

Cycle rickshaws

Ranchi's cycle rickshaw fleet carries approximately 96,000 passengers every day. The total number of registered cycle rickshaws in Ranchi is 5,479.¹⁵ However, as per ground surveys and interviews, close to 8,000 cycle rickshaws currently ply on a given day. Most cycle rickshaw drivers are poor, unskilled migrants from nearby villages who rent their rickshaws for Rs 35 per day. Only 20 per cent drivers own their rickshaws. The average income of a cycle rickshaw driver is around Rs 200 per day.

There is an established cycle rickshaw union, the Ranchi Jila Rickshaw–Thela Majdoor Sangh, that engages with the rickshaw pullers and works to better their social and economic well being. The union also functions as a communication link between the government and rickshaw pullers.

Table 2.3 Cycle rickshaws by the numbers

Fleet size	8,000
Trips per day per vehicle	8
Average trip length (km, one-way)	2
Average occupancy	1.5
Fare (Rs per km)	10–15
Passenger trips per day	96,000

City bus service

City buses have been operating in Ranchi since 2010 and now carry approximately 22,000 passengers per day. However, in the absence of any state or city support and little clarity on long term operations, the bus service is struggling with problems of overcrowding, strikes, and unreliable service. Out of the existing bus fleet of 100 buses, only half are operational on any given day. Buses are thus able to cater to only about 1 percent of total public transport

¹⁵ Ranchi Municipal Corporation.

demand. Shared auto rickshaws ply parallel to buses on a number of routes and satisfy most of the most public transport demand.

There are 144 bus stops in the city, few of which have formal shelters. Buses stop anywhere, anytime as requested by passengers, causing delays. There is no prescribed time schedule for bus operations and no dedicated fleet assigned to a particular route.

There are currently eight designated bus routes in Ranchi. The bus network connects important commercial, educational centres and destinations in Ranchi. The buses also operate outside RMC area to nearby villages and industrial areas. The longest Bus Route is close to 40 km which goes from Khunti Village to Ratu Village via Main Road and Ratu Road. The bus and shared rickshaw routes overlap significantly indicating a strong demand for public transport that the current bus fleet is unable to meet.

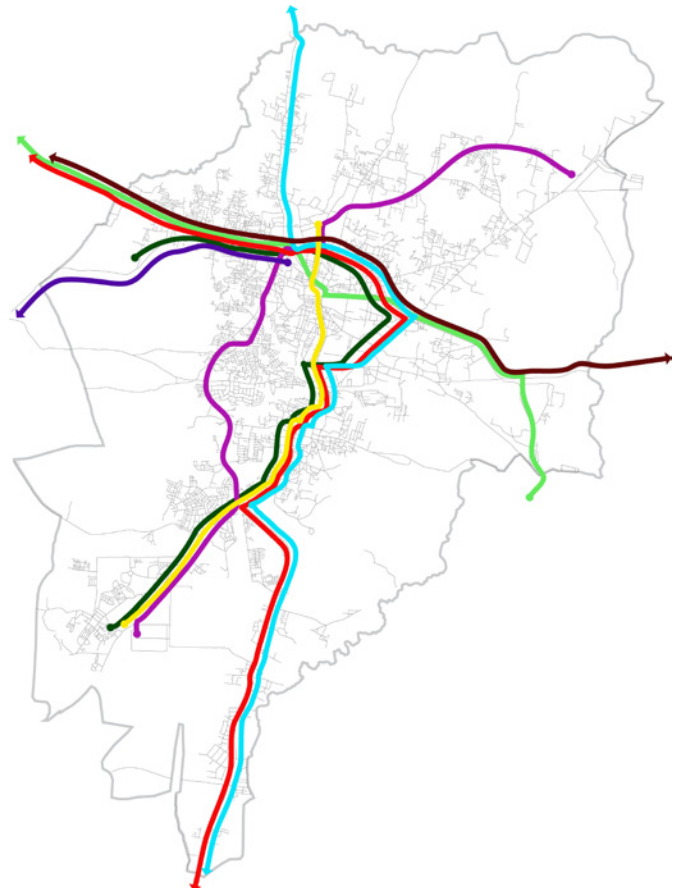
Ranchi's bus fleet was procured by Jharkhand state under JNNURM. The Jharkhand Tourism Development Corporation (JTDC) was given the responsibility of operating buses in Ranchi and two other cities, Jamshedpur and Dhanbad. The bus operations are sub-contracted. JTDC supervises overall bus operations, while a service provider supplies manpower—bus drivers, conductors, and attendants—on a fixed daily wage basis. JTDC generally collects a fixed amount from the driver and conductor each day, and the remaining ticket revenue stays with the operator.



The buses procured under JNNURM are Swaraj Mazda minibuses with a seating capacity of 29 passengers. All buses are equipped with LED boards to display route information inside and outside the bus.

Table 2.4 Bus routes in Ranchi

No	From	To	Length (km)	Fleet size
1	Dus Mile	Kanke	26	10
2	Booti More	Dhurwa	17	20
3	Ratu Chatti	Namkum	22	2
4	Ratu Road	Bhero	35	6
5	Booti More	Project Office	20	3
6	Ratu Road	Khunti	40	4
7	Ratu Road	Angara	25	4
8	Dhurwa	Main Road	14	4



Bus routes operated by the Jharkhand Tourism Development Corporation.



Most bus shelters are in poor condition (left) and at many stops there is no shelter at all (right).

The city bus fare structure is based on approximate distance travelled and is charged based on known landmarks. Tickets are not issued to passengers unless requested. Since JTDC’s payments to the operator are based on documented ticket sales, revenue leakages are estimated to be around 40 per cent.

There are two depots in Ranchi. Ranchi Depot near the railway station area provides space for 40 minibuses and for Bihar State Road Transport Corporation (BSRTC). At the second location, the Dhurwa depot, city buses are parked on road as the limited space is mostly occupied by BSRTC buses. The depots lack proper facilities for washing and routine maintenance. The administrative office building is also in a dilapidated condition. RRDA is currently planning to construct a new bus terminus and depot on the ring road near Sukhurhuttu.

Table 2.5 City buses by the numbers

Fleet size	48
Trips per day per vehicle	6
Average trip length (km)	23
Fare (Rs per km)	1
Passenger trips per day	22,000

Public parking

RMC owns 18 off street paid parking lots in various parts of the city auctioned out to private contractors. Some of the larger lots are at Kantatoli Bus Stand, Ratu Road, New Market, and ITI bus stand. Each parking lot has close to 100 equivalent car spaces. The hourly rates set by RMC are Rs 7 per hour for cars and Rs 3 per hour for two wheelers. Operators sometimes charge more—Rs 10 per hour for cars and Rs 5 per hour for two wheelers—indicating that there is a gap between the official rates and the amount that vehicle users are willing to pay. RMC offers monthly passes at a discounted rate of Rs 500 per month for cars and jeeps. Many employees and shop owners who work on Main Road avail the monthly pass. RMC earned a total revenue of Rs 7.7 million in 2011 and expects to earn Rs 20 million in 2012. Besides the RMC parking facilities, some private paid parking facilities exist in the city.

RMC is investigating the possibility of building multi-level parking structures on city property along main road, which in effect will subsidise personal motor vehicle use. Multi-



While most on-street parking is free, RMC operates some paid lots where cars are charged a nominal fee of Rs 7 per hour.

level parking lots are expensive to build. Unless on street parking is managed and charged appropriately (equal to or more than parking fee in the parking structures), multi-level structures will fail to attract users.

Existing plans for transport improvements

The Ranchi CDP identifies a number of transport system improvements, including mass rapid transit, bus service improvement, traffic and parking management, road network improvement, and intelligent transport systems. The following table highlights some major transport initiatives in the CDP.

Table 2.6 Transport initiatives proposed in Ranchi’s City Development Plan

Initiative	Cost (billion Rs)	%
Construction, operation, and maintenance of ring road (85 kms)	8.5	35
Road improvements (480 km)	5.9	25
Construction, operation, and maintenance of monorail (13 km)	5.7	24
Flyovers (2 locations)	0.5	2
Rail overbridges (2 locations)	0.4	2
City bus services and infrastructure	0.4	2
Other infrastructure (railway station improvements, freight terminal, intercity bus terminal)	2.6	11
Total	24.0	

Misaligned priorities

The CDP’s transport proposals are not consistent with the needs of the city. Specifically, the proposals raise the following concerns:

- Although road-based public transport (primarily paratransit) presently accounts for two-thirds of all motorised trips in Ranchi, planned funding for city bus services represents only 2 percent of total expenditures. Ninety-five per cent of expenditures are for road improvements and fancy rail projects.
- Assuming that around two-thirds of existing paratransit passengers shift to high quality, formal bus services, the city needs a fleet of 1,300 buses—a huge increase over the 155 buses proposed in the CDP.
- Solutions such as flyovers and elevated structures are cost-intensive and benefit only the quarter of the population that commutes using personal motorized vehicles. Elevated structures provide at best short-term relief to traffic congestion. As the use of private vehicles continues to rise, these facilities quickly fill to capacity.
- Monorails are expensive to build and have limited passenger capacity as compared to metro and bus rapid transit (BRT) systems. They also face huge operational losses and never have been successful as the primary mode of mass transport in any city.

Unrealistic budget

The proposed projects entail a total cost of nearly Rs 24 billion rupees (USD 440 million). It should be noted that cost estimates presented in the CDP (2007) represent one quarter to a third of a likely cost of Rs 60 to 80 billion in 2012. For example, the CDP cites a cost of Rs 400 million per kilometre for construction of a monorail. By comparison, the Mumbai monorail cost Rs 1,390 million per km.¹⁶

The CDP proposes to source 60 percent of the funding from the Central government. Yet even if RMC succeeds at raising this portion from the central government, the remaining expenditure of Rs 25 to 30 billion would be very high compared to RMC’s total annual budget

16 Wikipedia, 2012. Mumbai Monorail. Retried from: http://en.wikipedia.org/wiki/Mumbai_Monorail.

of Rs 0.6 billion for all civic services. In fact, of all the identified projects, only the ring road is under implementation, and construction is proceeding at a very slow pace.

A more financially feasible transport sector expenditure plan would focus on lower cost but high-benefit alternatives. Phased implementation of a BRT network four times the size of the proposed monorail, complemented by improvements in city bus services and 250 km network of walking and cycling facilities, would cost Rs 2.2 billion per year. While these initiatives would still require support from the state government, they are more viable than the CDP's proposed expenditures of Rs 12 billion per year. If half of this funding is obtained from the national government, and a quarter from the state, then the city can obtain the remaining quarter through expanded recovery of personal motor vehicle parking fees. In terms of user benefits, these projects would result in tangible improvements for the three-quarters of the population who commute by walking, cycling, and public transport every day.

Conclusion

While Ranchi's transport system poses several challenges, well-planned investments and effective management can help the city chart a course toward a more sustainable transport system.

Table 3.2 Summary of opportunities and challenges

	What's working	What's not working	Next steps
Walking and cycling	Safety through numbers: widespread presence of pedestrians and cyclists on city streets.	Unsafe sharing of space with fast-moving motor vehicles. Limited street network connectivity in outer areas.	Citywide provision of high quality walking and cycling facilities, including on-street facilities and a greenway network.
Autorickshaws	Supportive regulatory environment.	Polluting vehicles. Personal safety concerns.	Recapitalisation of vehicle fleet. Provision of formal on-street stands.
Cycle rickshaws	Non-polluting, short-distance taxi service. Source of employment for urban poor.	Old vehicles. Poor working conditions for drivers.	Introduction of modern vehicles. Provision of formal on-street stands.
Public transport	Strong demand for starter bus service operated by JTDC.	Limited bus fleet. Lack of an effective institutional structure.	Major expansion of the bus fleet. Adoption of effective contracting and monitoring structures.
Private vehicle use	Parking fees levied at some off-street locations. RMC recognises the revenue potential.	Unorganised parking causes congestion and disrupts pedestrian movement.	Institute user charges on a widespread basis to generate revenue for sustainable transport systems.
Planning process and investment priorities	JNNURM funding used to purchase 100 minibuses.	Current and proposed projects in the CDP focus on infrastructure for personal motorised vehicles. Planned expenditures are not plausible.	Preparation of an operational plan for bus services. Study of pedestrian and cycle movements and identification of priority infrastructure improvements.

Transport initiatives

Ranchi district is one of the most urbanized districts in Jharkhand and has the potential to become a stronger commercial, educational and cultural centre and afford its citizens jobs, opportunities and improved quality of life. For this possibility to become reality, the city will have to develop adequate infrastructure that will facilitate development and improve the quality of life of all its citizens, both rich and poor. Transport plays a key role in shaping this vision. To achieve this vision of equitable and sustainable development, an integrated approach to transport is required that combines improvement of public transportation systems with changes to the urban environment around the streets.

The proposals in this section are guided by eight principles of sustainable and equitable transport:

- **Walk.** Walking is the most natural, affordable, healthy and clean form of transport, but it requires more than just feet. It requires walkable streets. When streets are designed to prioritise pedestrians, vitality, economic activity, equity, and safety all improve.
- **Cycle.** Bicycles and other means of people-powered transport, like cycle rickshaws, allow for the convenience of door-to-door travel, but use less space and fewer resources. They are the healthier and more sustainable alternative to cars, scooters and auto rickshaws for short trips. Cycling is also one of the cheapest forms of transport available to the urban poor.
- **Connect.** Cities that are pleasant to walk and bicycle have large numbers of narrow, short streets and many intersections. A dense network of streets with frequent intersections decreases walking time between destinations and provides multiple ways of reaching the same destination.
- **Public transport.** Some trips are too long to make walking or cycling a viable option in our growing cities. Comfortable, safe, high-speed public transport can move millions of people quickly and comfortably using a fraction of the fuel and space required by personal motor vehicles.
- **Mix.** Integrating residential, office, commercial and entertainment activities into one area



Most streets in Ranchi lack pedestrian footpaths (left). High quality pedestrian infrastructure (right) is an essential part of an equitable transport system.



To transport a given number of people, cars are the least efficient use of limited road space. Buses and cycles can carry more people in the same number of lanes, allowing the transport system to respond to growing travel demand without the requirement of expensive road expansions.

makes better cities and better places. If different uses are mixed together, commute times are reduced and many trips become short and walkable

- **Densify.** Dense communities use resources more efficiently and reduce car dependency. Reliable, frequent, high-quality mass rapid transport can be provided at a cheaper cost to Dense, Mixed Use Areas
- **Compact.** When cities start to sprawl, travel distances increase and efficiency of mobility drops dramatically. An efficient way of accommodating growth is to build on vacant and under utilized lot in inner city areas and around public transport before developing farmland on the urban fringe.
- **Shift.** More personal vehicles mean more congestion, pollution and time on the road unless their use is managed better. Using parking restrictions and congestion charging encourages people to leave their cars at home and shift to more sustainable modes of transport.

Given the findings about Ranchi's current transport conditions, ITDP has developed a set of informed recommendations about how the city can improve transport in ways that enhance mobility and equitably and reduce pollution. These recommendations are described in detail below and are organized into the following initiative areas:

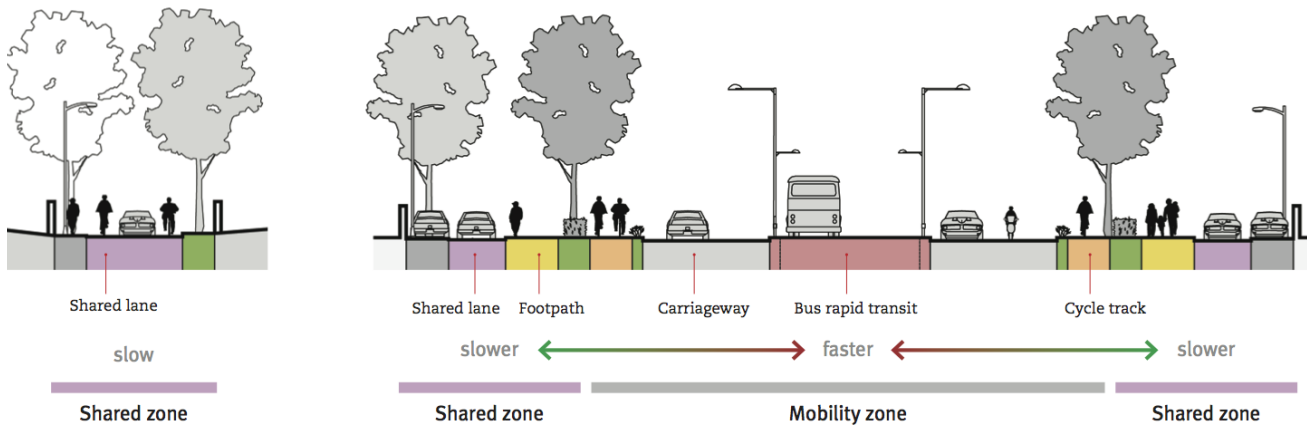
- Better infrastructure for cycling and walking
- Bus service improvements
- Bus rapid transit
- Reform of the paratransit industry
- Parking management

By focusing on the movement of people rather than vehicles, these initiatives are more likely to result in a sustainable Ranchi.

Improving walking and cycling facilities

In Ranchi, one third of trips in the city are performed on foot, yet footpaths are nonexistent in most parts of the city. Cyclists, vendors, rickshaw users, and others are equally inconvenienced by the lack of infrastructure. Streets of Ranchi should be designed to represent the actual needs of the commuting public. Wide, shaded footpaths on all major streets are needed to provide safe, comfortable places to walk. Similarly, dedicated non-motorised vehicle tracks are needed on larger arterials where motor vehicle speeds are high.

The provision of a well-designed slow zone makes it possible for the fast zone of a street to provide for safe, relatively uninterrupted mobility at moderate speeds. The result is a safer



All streets need slow zones where people can walk safely and comfortably. On smaller streets with traffic calming elements, the whole ROW can function as a slow zone. On larger streets, a separate slow zone should be provided away from fast-moving vehicle traffic.

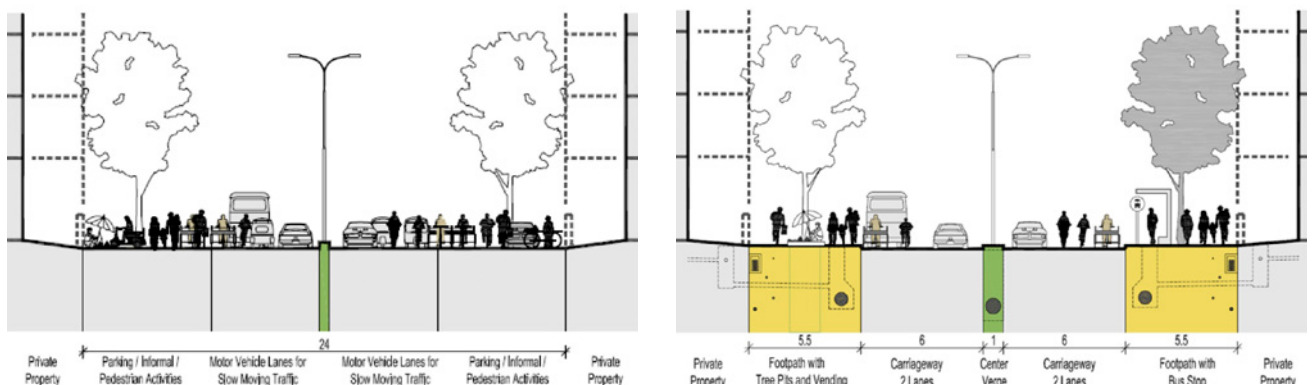
and more pleasant street environment for everyone, including personal vehicle users. If the streets are narrow, the entire street needs to be made safe for pedestrians. Smaller streets in the commercial zone around Main Rd can be considered for complete pedestrianisation.

Adoption of street design and management guidelines

In order to facilitate widespread implementation of better pedestrian and cycle facilities, design guidelines should be developed and adopted to guide street redevelopment projects throughout the city. The guidelines should include minimum standards for each street element to ensure usability and consistency across the city. They should also include standard templates that can guide consultants and contractors hired by RMC to carry out street redevelopment projects. Managing a well-designed space is equally important. Guidelines have to be developed for management, monitoring, and enforcement such that the new spaces are put to their intended uses.

Main Road redevelopment

Main Road is a bustling commercial street which attracts a large share of work and recreational trips in the city. Most of these trips are on foot, cycle, or cycle rickshaw. Given the density of informal economic activities and pedestrian flows of 2,500–4,000 in the peak hour, Main Road should be redeveloped to prioritise pedestrians. Wide footpaths should provide adequate space for pedestrian movement while also accommodating informal market activities. Street vending offers convenient access to goods and services for a wide range of economic groups, primarily the poor. Formalizing this sector will also serve as a poverty alleviation mechanism. Care should be taken that street vending does not take over



The existing section of Main Road (left) provides a wide carriageway, but only one lane is used for motor vehicle movement. The edge of the ROW is occupied by parked vehicles, forcing pedestrians to walk on the carriageway next to mixed traffic. An improved design (right) provides dedicated space for pedestrian movement and street vending.



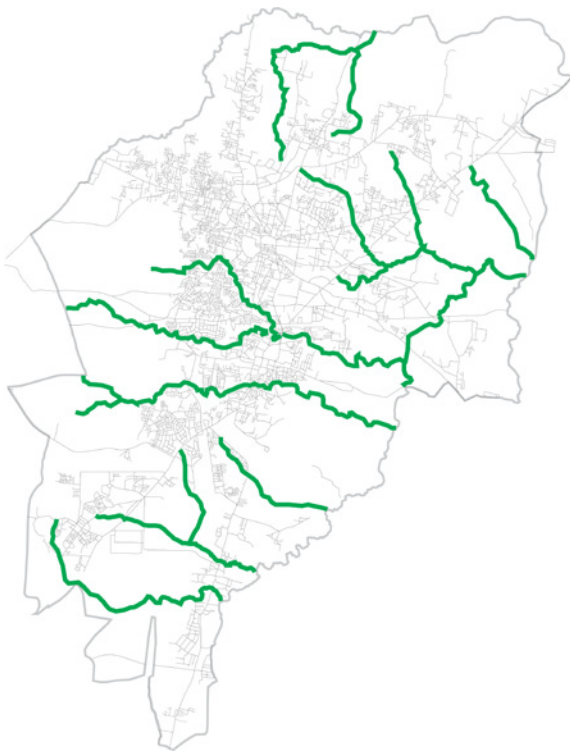
Central Ranchi already has some de facto pedestrian zones, such as the fruit market off Main Road (right). Full pedestrianisation of other core area streets (right) can strengthen their appeal as shopping destinations and improve the quality of life for local residents.

pedestrian space. Formalisation and active monitoring should help ensure that vending and pedestrian mobility remain compatible.

Frequent public transport should be introduced to serve Main Road. At present, the lack of public transport access compels many visitors to arrive by private vehicle, contributing to congestion and encroachments on pedestrian space. On street parking of personal motor vehicles should be restricted to certain stretches and should be appropriately charged. In addition, designated cycle rickshaw stands should be provided.

Traffic calming and pedestrianisation of streets

Central Ranchi has a dense network of streets, many with narrow ROWs ranging from 9 to 12 m. These streets can be designed as “shared spaces,” with slow speeds to allow vehicles, pedestrians, and cyclists to safely coexist. Some busier commercial streets can be completely



Ranchi has an extensive network of drainage canals and waterways (above). They can be transformed from neglected spaces (above right) to high quality public spaces and mobility corridors (below right).



Greenways in Seoul (left) and Guangzhou (right) improved connectivity and created new recreational spaces.

pedestrianised. On other streets, a safe and pleasant pedestrian environment can be ensured through traffic calming techniques such as speed tables, street furniture, landscaping, and bollards. Traffic cells can be employed to prevent motor vehicles from using smaller streets for through movement. Refuse collection, storm water drainage, and sewer systems should be upgraded to improve the overall cleanliness of these streets.

Greenways network

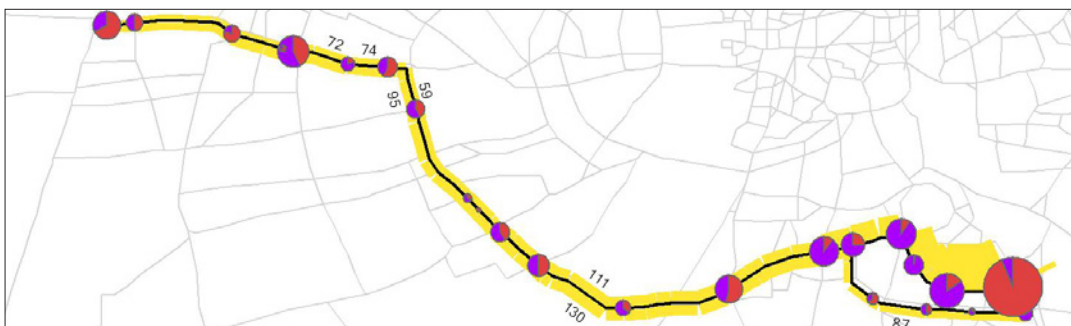
Ranchi has a comprehensive network of drainage canals. The network has a total length of around 140 km, with widths from 12 to 24 meters. Re-invisioned as greenways with pedestrian paths and cycle tracks, the canals offer immense potential for improving connectivity and supplementing the city's limited road network.

Many slums and low-income neighbourhoods are located close to the canals. Greenways can become an important asset for these neighbourhoods by providing improved access to job centres for pedestrians and cyclists. Greenway development can be integrated with in situ development of slum areas along the canals. Water and sewer lines laid along the waterways will improve basic infrastructure for the urban poor and will also help revive the canals as natural waterways. The canal network also offer opportunities to carve out much needed parks and public spaces for the city.

Public transport and paratransit improvements

Public transport forms the backbone of mobility in cities as it provides access to jobs, education, and recreation. Public transport is an essential service, especially the poor, children, women, and the elderly. Public transport uses road space efficiently, helping to prevent traffic jams and congestion.

Investments in public transport provide mobility at a much cheaper cost to the government than road infrastructure aimed at personal motor vehicle users. Government support is essential if Ranchi wishes to establish a high quality public transport system. In the absence of such support, demand for public transport is met by paratransit. However, the paratransit system has numerous shortcomings, such as personal safety concerns, high pollution levels,



Operational planning can help calibrate bus services to observed demand levels, helping to reduce wait times and overcrowding.



Ranchi's city bus system requires formal stops with shelters that provide protection from the elements (left). Depots should be expanded and formalised to provide sufficient space for the entire bus fleet (right).

and unavailability of off-peak services in low-demand areas. Paratransit services are run to generate profit, yet a public transport system should meet social goals as well. In particular, public transport services are needed to give the urban poor access to jobs, education, recreation, and other services.

Strengthening city bus services

Bus operations are complex and require meticulous planning and continuous monitoring. Bus services in Ranchi should be revamped by creating a single decision making authority to overlook operations. A focused Special Management Unit that plans, manages, and monitors services should be created. Rather than running public transport as a business, the government will need to invest financial resources to ensure that the system meets social goals. The Special Management Unit should take up the following initiatives:

- **Operations planning.** Planning and monitoring of operations and scheduling daily are a critical step to develop a service plan which responds to the customer needs. Service plans should be constantly monitored to evaluate their effectiveness. This requires data collection and data base management, which can be aided through vehicle tracking and electronic ticketing. Operations planning can be carried out in the following steps
- **Fleet expansion.** Ranchi will need a fleet of 1,300 minibuses if it wishes to serve two-thirds of the existing demand for public transport. The fleet will have to be augmented regularly to serve growing demand and ensure that a large percentage of trips in the city are by public transport modes. Minibuses can serve better on narrow internal streets. Larger buses should be used for efficient, high-capacity BRT service. The additional bus fleet can be a mix of standard 12 m buses as well as minibuses to service narrower internal roads. The new buses should adhere to the Urban Bus Specifications recommended by the Ministry of Urban Development, Government of India.
- **Introduction of IT systems.** Real-time vehicle tracking through a central control centre can make bus operations more effective and can generate vehicle arrival updates for passengers.
- **Electronic ticketing.** Use of smart cards for fare collection reduces the cost of ticketing, allows the authority to track passenger travel patterns, and reduces revenue leakage.
- **Investment in capital facilities.** The bus stops in Ranchi are old and in very poor condition. They should be replaced. Depots should be expanded to provide secure parking space and ensure that daily maintenance activities can be carried out.
- **Private sector participation.** Private sector investment can help maximize quality and minimize cost over the long term. However, a clear set of guidelines and contracting structure is necessary. Service standards for operator performance should be included in the bus operator's contract.

Bus rapid transit

While strengthening the city bus service is very important to improve the quality and reach of existing public transport in Ranchi, rapid growth of personal motor vehicle use can be contained only by introducing a new high-quality, high-capacity, and flexible form of public



BRT systems, such as the Janmarg system in Ahmedabad, feature dedicated bus lanes to ensure that buses are not slowed by traffic congestion.

transport such as bus rapid transit (BRT).

Key characteristics of BRT system include the following:


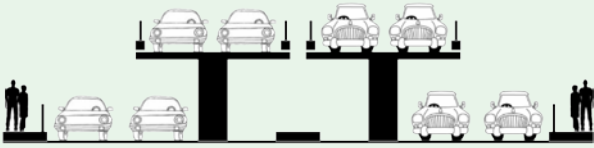

- Segregated median busways, physically separated from mixed traffic lanes. Dedicated lanes enable BRT systems to achieve high commercial speeds.
- Stepless boarding and alighting from stations located in the median. This reduces delays at stations and makes the system more accessible to disabled and elderly passengers. Stations provide a high quality waiting environment, with protection from sun and rain.
- Off-board fare collection. Passengers buy tickets before entering stations, helping to reduce delays and revenue leakage.
- System monitoring to ensure that buses arrive on time and to provide real-time arrival time information to passengers
- Unique and attractive branding to generate awareness about the system.

BRT systems have a carrying capacity of up to 45,000 passengers per hour per direction (pphpd). Present demand, in the range of 4,000 pphpd, could be served with a simple BRT system at a low capital cost of Rs 120 to 150 million per km as compared to Rs 2.0 to 2.5 billion per km for an elevated metro rail line or Rs 1.5 billion per km for a monorail. BRT is also more economically efficient in comparison to road widening and flyovers as it results in much higher increase in road capacity at a lower cost. Since BRT buses carry travel faster than regular buses, BRT can improve the efficiency of bus service. Each bus can carry more passengers each day, helping to reduce operating costs and fleet requirements.

Table 3.1 Comparison of BRT and city bus service in Ahmedabad, India

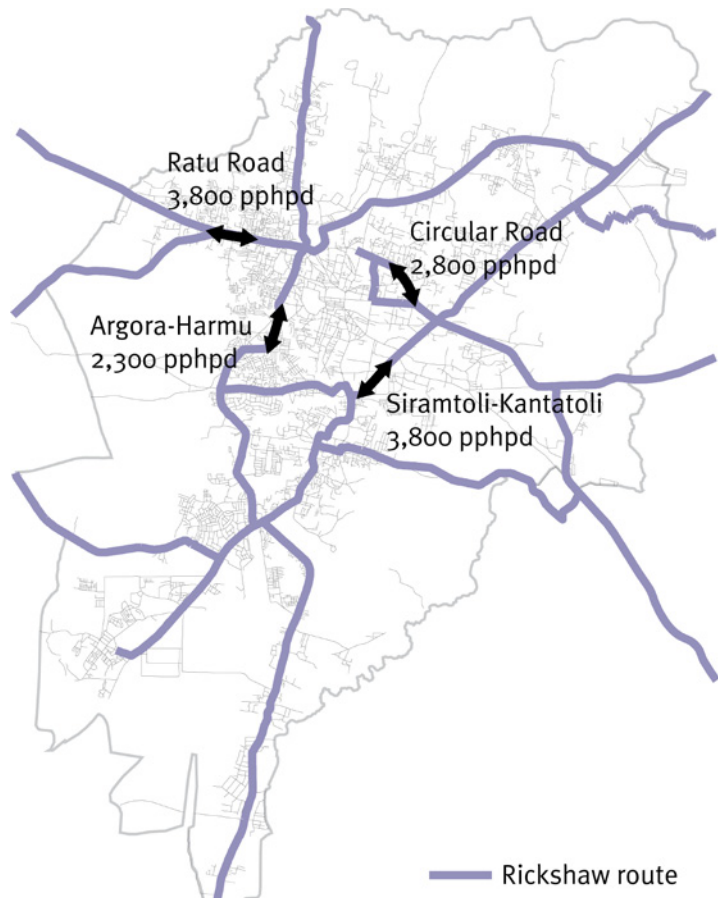
	Janmarg	AMTS	Increase (%)
Passenger trips/day/bus	850 passengers	1,800 passengers	110
Average Bus Speed	18.1 km/hr	24 km/hr	30
Kilometers/day/bus	190 km	240 km	25
Average Occupancy (load) per bus	24 passengers	42 passengers	75

Table 3.2 Comparison of transport investments

	Carrying capacity (passengers per hour per direction)	Cost per km (million Rs)	Remarks
3-lane carriageway in each direction 	3,000	150	-
2-lane carriageway in each direction plus elevated road 	1,800 (carriageway) + 2,880 (elevated road)	600	60% increase in capacity; 300% increase in cost
2-lane carriageway plus BRT 	1,800 (carriageway) + 4,000–30,000 (BRT)	200	200 to 1,000% increase in capacity; 30% additional cost



BRT passengers board from median stations at the same level as the floor of the bus.



Major corridors in Ranchi have existing public transport passenger demand ranging from 2,000 to 4,000 passengers per hour per direction, sufficient to implement a BRT system.



Formal rickshaw stands at on-street locations (left) and major destinations such as railway stations (right) can improve the image of paratransit services in Ranchi.

A BRT network in Ranchi can be developed on major radials connecting the city core with outlying areas. These corridors already have heavy paratransit ridership in the range of 2,000 to 4,000 passengers per hour direction. Demand can be expected to increase as focused, high intensity development occurs along BRT corridors and some private vehicle users shift to the BRT system.

Integrating the BRT system with other existing modes such as cycle rickshaws, auto rickshaws, regular bus services, and walking and cycling facilities will greatly enhance the public transport system reach in the city.

Shared autorickshaw industry restructuring

Ranchi's network of shared autorickshaw services arose spontaneously to fill in the gaps in the formal public transport system. This is a market which will continue to grow given its flexibility of operations. The RTA regulates shared autorickshaw operations to some extent by issuing route licenses. However, a more comprehensive approach to regulating paratransit modes is needed to improve safety and service quality.

The small entrepreneurs currently operating paratransit services can be made important stakeholders in the formalization of public transport system. Cities like Bogotá and Johannesburg, which faced similar issues with multiple paratransit operators, have successfully absorbed the majority of the workforce in formal public transport operations. Paratransit services can then be restructured to serve as feeder to an improved city bus system.

As part of restructuring, the vehicle fleet should be modernised to meet emission standards should be promoted as paratransit modes. Reforms in the registration of motor vehicles, licensing and vehicle scrapping policy adhering to Central Motor Vehicles Rules (CMVR) should be implemented.

Cycle rickshaw improvements

Cycle rickshaws serve as a dominant mode of transport in dense commercial areas such as Main Road and narrower, pedestrian priority streets. The cycle rickshaw is an efficient and low-cost vehicle that can serve as an excellent transport option for short-distance trips. Pedal powered vehicles are used extensively in Indonesia and other South Asian countries and are gaining popularity in Europe and America as modern, eco-friendly "pedicabs."

The rickshaws currently plying in Ranchi are old and rickety, uncomfortable for drivers as well as passengers. Fleet modernisation can make the cycle rickshaw lightweight, safer, and more comfortable. Cycle rickshaw services also can be strengthened through the provision of dedicated stopping bays at key destinations in core commercial areas. Formal networks, such as the Ecocab system in Fazilka, Punjab, can provide additional user services such as



Modern rickshaw designs (left) are light-weight and ergonomic. Close to 300,000 modern cycle rickshaws ply in several Indian cities including Agra, Delhi, Jaipur (right), Vrindavan, and Fazilka. Such vehicles can be introduced in Ranchi.

Fazilka's Ecocab system

The Ecocab system in Fazilka, Punjab serves as a useful case study in cycle rickshaw operational reform. Ecocabs is a dial-a-rickshaw service, the first of its kind in India. It was started by a nonprofit organization, the Graduates Welfare Associations, Fazilka (GWAF), in 2008. In many cities, rickshaws cluster around high intensity commercial areas and are harder to find in residential areas. To address this issue, Ecocabs established call centres that dispatch cycle rickshaws in various zones of the city. Each centre serves close to 1,500 households and an Ecocab reaches a given destination within 10-15 minutes.

Ecocabs has also been successful in improving the socioeconomic conditions of the rickshaw pullers by providing social and financial security to the rickshaw pullers in the form of an insurance policy, health checkups, medical aid, and support for children's schooling. The Fazilka Municipal Council has supported the Ecocabs initiative, and the Punjab Heritage and Tourism Promotion Board is exploring the possibility of replicating the model in Amritsar and Patiala.

on-demand dispatching of rickshaws via a call centre, and facilitate driver benefits such as healthcare plans and educational resources for family members (see box).

Parking management

Responding to parking demand by increasing the supply of parking rarely solves the problem. Like a magnet, more parking attracts more cars and further adds to the traffic congestion. Parking is a commodity that users should pay for. The more progressive parking policies approach parking as a powerful tool to manage personal motor vehicle use as well as generate revenue for the city. Cities around the world are finding that effective parking management can help encourage efficient use of road space and facilitate a shift toward walking, bicycling, and public transport.

Parking Management in Ranchi will help facilitate efficient traffic operations, generate revenue and will help ensure that Ranchi makes the most of its investments in public transport systems. Ranchi has approximately 51,000 cars and 330,000 two-wheelers. The city can generate Rs 500 million per year even if parking fees apply to only 10 per cent of the personal vehicles in Ranchi. Revenue from parking fee should be used to augment the city bus service and improve the quality and service of public transport.

Table 3.3 Estimate of potential parking revenue in Ranchi

Time of day	Parking slots	Occupancy rate (%)	Hours per day	Charge (Rs per hour)	Revenue per day (million Rs)	Revenue per year (million Rs)
Peak	12,000	70	8	15	1.01	340
Off-peak	12,000	35	8	10	0.34	110
Nigh	12,000	15	8	5	0.07	20
Total					1.42	480

Transit oriented development

Much of the land in central Ranchi is reserved, making planned development difficult. This has pushed new development to peripheral areas. In order to accommodate future growth of the city in a sustainable manner, Ranchi should optimise the use of its scarce land resources by encouraging transit-oriented development (TOD) along mass rapid transit corridors.

As part of TOD, a higher floor space index (FSI) can be permitted at strategic locations that have high land value and are easily accessible by high-quality public transport. Selective intensification of land use can reduce trip lengths by creating compact, mixed-use neighbourhoods that combine housing, offices, educational, centres, and public space. Government and institutional buildings should also be located in these mass rapid transit zones. Where government land is available along these corridors, it can be used to increase the supply of housing for low-income groups.

Successful TOD requires complementary restrictions on the supply of on- and off-street parking to limit the number of personal motor vehicle trips generated by new development. Walking and cycling facilities should be improved in TOD zones to allow residents to access nearby services without making use of personal vehicles.

Conclusion

Road space is a scarce public good that provides access to important locations for the rich and the poor alike. As made clear in India's National Urban Transport Policy, the goal of the transport system is to ensure safe, affordable, quick, comfortable, and reliable access to jobs, education, and recreation. The mobility of people should be prioritised over that of vehicles to ensure that Ranchi's transport system can handle growth in population and travel demand in a sustainable manner. Investments in walking, cycling, and public transport can reduce the long-term financial burden on citizens while improving the environment and social equity in the city.

Stakeholder consultation

A consultation was organized in May 2012 to discuss potential urban transport initiatives for Ranchi. The consultation was attended by bureaucrats, government officers, planners, and engineers from different city and state departments. Representatives from local institutes and non-governmental organisations were also present. The purpose of the consultation was to identify priority programs and projects and establish next steps to further the agenda of sustainable transport in Ranchi.

ITDP made a presentation on a sustainable vision for Ranchi and discussed specific recommendations under the following categories:

- Improving bus operations
- Integrated street design prioritising pedestrians and cyclists
- Greenway network
- On street parking management
- Potential for a high quality-high capacity BRT system
- Improving street connectivity

A list of workshop participants is presented in Appendix B.

Identified initiatives

At the end of the consultation, RMC expressed keen interest in the following studies and pilot projects.

Detailed feasibility study for BRT

The CEO of RMC and other participants agreed that a high quality, high capacity BRT is a possible long-term solution for Ranchi. It was suggested that a feasibility study for BRT be carried out.

Street improvements and a stronger NMT network

Ratu Road, Circular Road, and Main Road were identified as pilot corridors for street improvements prioritising pedestrians, cyclists, and public transport. Ratu Road and Circular Road are major bus and shared rickshaw corridors. Main Road is a bustling commercial street that attracts a major share of work and recreational trips, a large percentage of which are walking trips. Street improvements on these three roads should focus on efficient use of the ROW, providing safe and convenient walking and cycling infrastructure and improving accessibility from the rest of the city through high quality public transport.

In addition to improving the pilot corridors, a long-term strategy should be developed for strengthening the NMT network in the city. Development of greenways can be explored.

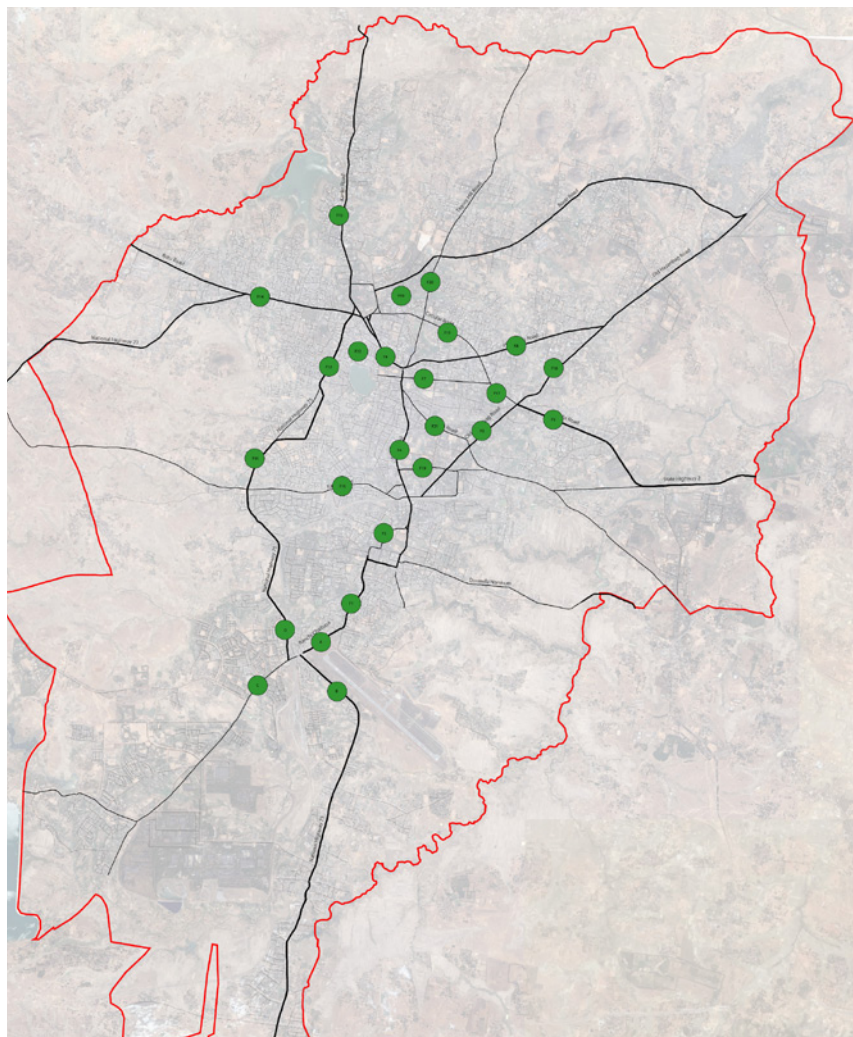
Parking management on Main Road

There was a consensus amongst stakeholders that parking charges should be expanded on Main Road. It was recommended that a detailed survey be conducted to determine parking demand in various areas of the city in addition to Main Road. A citywide parking management approach should be considered instead of charging on a street-by-street basis.

Appendix A: Data sources

The CDP is the primary source of transport-related data for the city, but the transport figures in the CDP were extrapolated from 1997 data. Since the urban transport situation in Ranchi has changed significantly over the past five years, it was necessary to conduct primary surveys to document current travel behaviour as well as the state of transport infrastructure.

Frequency-occupancy surveys were conducted at 25 locations to determine the number of passengers travelling on each mode. In addition, a visual survey was conducted to assess the gender, age, and economic profile of pedestrians, cyclists and passengers using public and paratransit in Ranchi. Finally, ITDP surveyed public parking lots and documented street widths and utilization. Total passenger trips per day on public transport and personal motorized vehicles were estimated based on demographic data, primary traffic surveys, and operational data collected from operating agencies and unions.



Frequency occupancy survey locations.

Appendix B: Participants in the stakeholder consultation

Mr. N N Sinha, Principal Secretary, Tourism

Mr. Arun Kumar Pandey, Planning and Investigation Secretary, Road Construction

Mr. Rajeev Lochan, Executive Engineer, National Highways

Mr. Umesh Prasad Sinha, Executive Engineer, Road Construction

Mr. M. S. Bhatia, Inspector General Ranchi

Mr. Ranjeet Kumar Prasad, superintendent of police, Traffic

Mr. Vinay Kumar Chaubey, Chief Executive Officer, RMC

RMC senior engineers

Dr. A.T. Jeyaseelan, Director, JSAC

Ms. Amanda Beswick, Director of Housing and Homelessness, Oak Foundation

Mr. Leonardo Larcea, Director of Environment, Oak Foundation

Ms. Paromita, Choudhury, India Coordinator, Oak Foundation

Ms. Ritu Sharma, Professor, BIT Mesra

Ms. Harshit Tete, Professor, BIT, Mesra

Ms. Smriti Mishra, Professor, BIT Mesra

Mr. Shashikant Pandey, Professor, BIT Mesra

Mr. Anuj Malhotra, Director of Transport Programs, ITDP

Mr. Chris Kost, Director of Research, ITDP

Ms. Vanishree Herlekar, Program Officer-Urban Design, ITDP

Mr. Pratik Dave, Technical Officer, ITDP

Mr. Rajendra Verma, Manager, Administration and Finance, ITDP

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