

## **7 COMPREHENSIVELY BALANCED URBAN TRANSPORTATION SYSTEM**

### **7.1 Role of Urban Transport**

Urban transport is an important component of urban system of the city, affecting its competitiveness, livability and environmental sustainability. The impacts of urban transport on urban development are so diversified and interactive as briefly explained as follows:

- (a) Transportation determines the spatial structure of a city which in turn affects the city's long-term sustainability;
- (b) Transportation affects land-use and urban development;
- (c) Transportation affects living conditions in terms of providing convenience, safety, and comfort;
- (d) Transportation affects the environment at city and global levels in relation to air quality, noise, and energy use;
- (e) Transportation requires large amounts of public investment which in turn greatly affects municipal finance; and
- (f) The way transportation is provided affects the poor and other marginalized sectors of society more critically than others.

In view of these extensive impacts, transportation planning must not be isolated from the total urban and environmental planning and development process. In fact, the results of this study's Household Interview Survey indicate that the people expect transportation and urban services to alleviate poverty, develop the economy, protect the environment, improve security and safety, and provide land and decent housing

A shared understanding of and agreement on transportation development objectives must therefore be established between the government and the public to ensure prioritization of needed policy interventions, projects, and actions. The five (5) main objectives of transportation development in Ulaanbaatar City are thus as follows:

- (i) Provide the foundation for sustainable urban growth through strategic infrastructure and coordinated operation;
- (ii) Promote competitive economic development and investment through integrated development;
- (iii) Ensure mobility, accessibility, and safety for all including the poor and the disabled through high-quality public transportation services, barrier-free infrastructure, and necessary safety nets;
- (iv) Reduce the negative impacts on the environment and promote efficient energy use through adequate physical measures and institutional arrangements; and
- (v) Enhance people's awareness of the significant role of transportation in urban development and promote the "beneficiaries pay" principle.

## 7.2 Basic Strategies for Urban Transport Development

While future development of the city is directed to realize compact, efficient and environmentally friendly urban areas by managing its growth and land use through improved planning and institutional framework and sector management capacity, leverage of transport on urban growth and formation must be exercised by interfacing planning and development between urban and transport sectors in much synergetic manner. For this seven (7) strategies are numerated as follows:

- (a) **Strategy 1 - Establish competitive public transportation system to promote public-transportation-based urban development:** Worldwide experiences clearly indicate that large urban areas, like the future Ulaanbaatar City with a population of more or less two million, can not be sustained without structuring them with a public transportation orientation, which is the only way to ensure adequate mobility and equitable accessibility to work and essential services for all in the future. Increasing requirements for better environment and energy saving also support the promotion of public-transportation-based urban areas.
- (b) **Strategy 2 - Manage car use effectively:** How to use cars in future Ulaanbaatar has to be discussed. While restraint on car use is a common trend in many cities in the world, Ulaanbaatar should establish its own way of managing car use. It is the Study Team's view that the city should provide opportunities for using cars and other private vehicles especially during weekends and off-peak hours to take advantage of the city's natural environment; its green and open spaces can provide rich recreational opportunities to residents and visitors alike. On the other hand, during peak hours and in the city center where demand concentrates, private cars should be strictly controlled and the people encouraged to use public transportation instead.
- (c) **Strategy 3 - Develop and maintain high-quality transportation infrastructure especially roads:** Roads provide the most fundamental space for urban transportation services both for vehicular and pedestrian traffic. Their quality directly affects the economy, safety, and comfort of the traveling public and the operation of service providers. Although Ulaanbaatar's extreme climate conditions prevent the government from spending on the construction and maintenance of high-quality infrastructure, it is this very same reason why the government should invest more in it in order to provide better transportation services and productive environment for a growing economy.
- (d) **Strategy 4 - Develop effective interface between regional and urban transportation, including road, rail, and air transportation:** As Ulaanbaatar is the capital and international gateway of the country, international and regional transportation is concentrated in the city. Since urban traffic by its very nature is vastly different from regional traffic, their interface in urban areas must be carefully designed to avoid highly damaging socio-economic and environmental impacts, chief among them is traffic congestion. It is thus advisable to, for example, carefully align the function of the Mongolian railway and the Asian Highway No. 3 with that of urban transportation in order to achieve smooth interface and synergy.
- (e) **Stage 5 - Enhance transportation environment and disaster preparedness:** The transportation sector is expected to become a major contributor to future air quality as vehicular traffic increases and the pollution from *ger* housing areas and that from

power plants are eliminated. The sector must also improve the transportation environment for pedestrians and the physically challenged while at the same time attending to various environmental issues such as flood protection and urban landscape enhancement.

- (f) **Strategy 6 - Provide adequate institutional arrangements to support improved urban transportation development and management:** Urban transportation development requires strong financial, social, and institutional backing. To support the funding requirements for capital and recurrent investments, a more active involvement of the private sector as well as the imposition of user charges need to be promoted. In addition, communities and stakeholders must participate in the process of planning and project development. Moreover, effective and efficient development and use of transportation infrastructure and system require a pool of qualified human resources and a capable organization, as well as modern planning and management tools.
- (g) **Strategy 7 - Promote social awareness of urban transportation problems and issues:** As it was clearly shown in preceding discussions the current traffic situation and problems can largely be attributed to low awareness and understanding among the people of traffic rules and regulations as well as the consequences of not following them. The society as a whole must thus be engaged in order to promote an efficient and pleasant transportation environment in the city.

The above strategies are further elaborated into a number of planning directions as shown in Table 7.2.1.

**Table 7.2.1 Basic Strategies for Urban Transportation Development**

| Strategy   | Planning Direction   |
|--|--|
| 1. Establish competitive public transportation system to promote public-transportation-based urban development     | <ul style="list-style-type: none"> <li>Establish a hierarchical public transportation system comprising LRT/BRT as the core system and where buses, minibuses, and taxis are effective integrated.</li> <li>Integrate mass-transit system (LRT/BRT) with urban development at and around terminals/stations as well as in its influence areas.</li> <li>Practice strategic implementation methods for improved cost recovery and in resettlement planning through phased development, land readjustment, urban renewal, among others.</li> </ul> |
| 2. Manage use of car effectively   | <ul style="list-style-type: none"> <li>Improve roadworthiness and emissions of vehicles through improved vehicle registration/inspection as well as pricing on vehicle ownership.</li> <li>Control use of cars to avoid congestion through pricing for parking and traffic control, especially in the city center and congested locations.</li> <li>Provide adequate space/facilities for cars and vehicles in strategic locations.</li> </ul>   |
| 3. Develop and maintain high-quality transportation infrastructure, especially roads                               | <ul style="list-style-type: none"> <li>Immediately improve road maintenance and rehabilitate existing network, including removal of bottlenecks and construction of missing links.</li> <li>Strengthen the hierarchy of road network comprising primary, secondary and tertiary roads.</li> <li>Develop/improve community roads.</li> </ul>  |
| 4. Develop effective interface between regional and urban transportation   | <ul style="list-style-type: none"> <li>Integrate inter-city and urban transportation network and services as well as intermodal functions among road, rail, and air transportation but segregate inter-city and urban traffic in urban areas.</li> <li>Develop/relocate inter-city goods distribution/logistics facilities in/to strategic locations of the above integrated transportation system.</li> </ul>   |
| 5. Enhance transportation environment and disaster preparedness  | <ul style="list-style-type: none"> <li>Improve road space and facilities to provide safe, pleasant, and barrier-free environment for pedestrians, including the physically challenged, and non-motorized transportation.</li> <li>Enhance traffic safety for all road users throughout the year by way of expanding education and campaign on traffic safety, strengthening enforcement, and improving safety facilities/equipment.</li> <li>Develop roads in integration with preventing disasters such as flood.</li> </ul>                    |
| 6. Provide adequate institutional arrangements to support improved urban transportation development and management | <ul style="list-style-type: none"> <li>Establish improved mechanism to better develop roads including land acquisition, while minimizing negative impacts such as involuntary resettlement and excessively high compensation costs.</li> <li>Develop sustainable funding mechanism for roads development and maintenance, including increase in road user charges, among others.</li> <li>Strengthen capacities in transportation planning and management through expanded trainings and improvement of related universities.</li> </ul>         |
| 7. Promote social awareness on urban transportation problems and issues  | <ul style="list-style-type: none"> <li>Develop practical rules and regulations.</li> <li>Expand traffic education and campaigns on transportation problems and issues.</li> <li>Develop indicators and monitoring system on urban transportation problems.</li> </ul>  |

Source: JICA Study Team.

## 7.3 Regional Transport Network

### 1) Overall Network

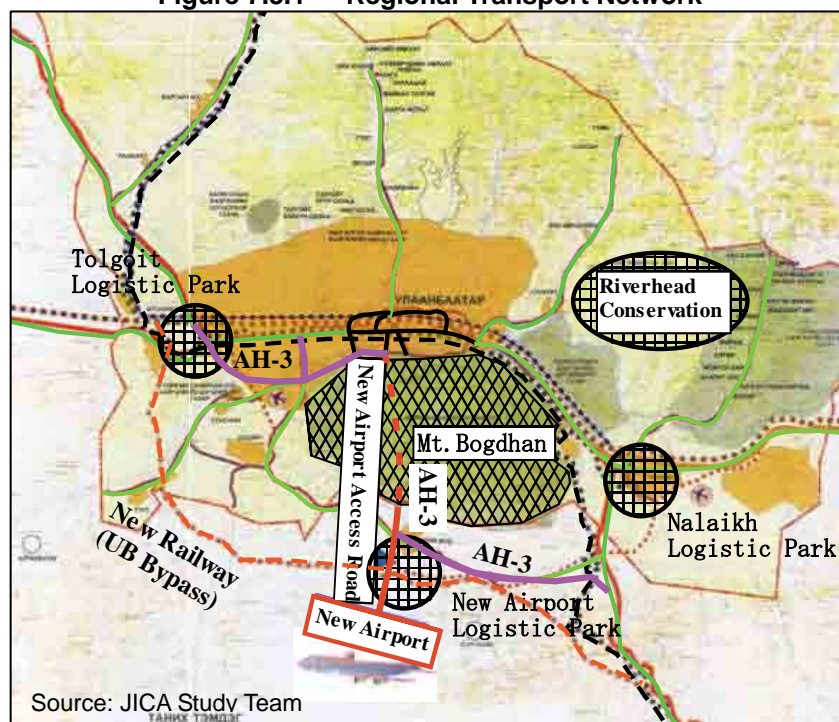
The connectivity of urban transportation network within Ulaanbaatar as well as to its satellite cities and the country's major regional growth centers is important at both international and national levels, because the city is the center of national economy and politics. Ulaanbaatar must be connected efficiently with the global market via air and cross-border transportation and via rail and road.

Regional transport in Mongolia is unique and much different from many other countries at both national and international levels. The national land with large areas with small population distributed widely suffers from adequate transport connectivity, while its land locked nature requires long cross-border transport access to ocean ports for trade across China.

At present, there are main modes of transport including railway, road and air<sup>1)</sup>. Railway has a total of 18.15 km comprising two main lines of the North-South line (Zamin Uud at Chinese border – Ulaanbaatar – Sukhbaatar at Russia border) and the Bayantumen Lirre (Choybalsan – Chuluunhoroot at Russia border). The railway is basically single track with gauge of 1.520 mm, the same as that of Russia but different from Chinese 1.435 mm, requiring transshipment of transit cargo between China and Mongolia at Zamin Uud. The road network extends 49,250 km, comprising 11,214 km of state roads and 38,031 km of local roads. They are mostly two (2) lanes with fair to poor surface condition due to severe climate and permafrost.

Air transport covers both international and national services. At present Ulaanbaatar is connected directly with four (4) countries including Japan, China, Korea and Russia. Existing international airport in Ulaanbaatar City is constrained for expansion and improvement and time to time suffer from cancelation of flights due to weather conditions.

Figure 7.3.1 Regional Transport Network



<sup>1</sup> In addition to railway, road and air, Mongolia has a shipping company.

## 2) Regional Transport Demand

Regional traffic demand has been increasing both in passenger and freight traffic of all modes, except rail freight traffic. Main characteristics are as follows:

- (a) In 2007, regional traffic demand was about nine (9) billion ton-kilometers and 3.3 billion passenger-kilometers. Railway is the main mode in regional transportation, carrying 93% of freight and 43% of passenger traffic. Since 2005, freight traffic volume has decreased, while that of passenger has increased at a considerable rate. Increasing road transportation demand is notable both in freight and passenger transportation (see Table 7.3.1).
- (b) Railway traffic is composed of local and international volumes which are further broken down to exit, entry, and transit. Of the total 14 million tons of carried freight, 53% is accounted for by domestic cargo, while 47% is by international cargo, 53% of which is transit cargo. Of the 8.4 billion ton-kilometers of carried freight, domestic cargo shares 29%, while international cargo shares 71%, 65% of which is transit cargo (see Table 7.3.2).
- (c) Transit cargo through Mongolia is almost entirely between China and Russia, particularly Russia to China where traffic volume has been increasing substantially (see Table 7.3.3).
- (d) Freight traffic by container increases significantly, accounting for 20% per annum. Domestic container freight share about half of the total volume in terms of twenty-foot equivalent units (TEUs), (see Table 7.3.4).

**Table 7.3.1 Regional Transportation Demand, 2004 - 2007**

| Freight<br>million ton-km |       |        |       |       | Passenger<br>million pass-km |       |       |       |       |
|---------------------------|-------|--------|-------|-------|------------------------------|-------|-------|-------|-------|
| Year                      | 2004  | 2005   | 2006  | 2007  | Year                         | 2004  | 2005  | 2006  | 2007  |
| Railway                   | 8,878 | 9,948  | 9,226 | 8,372 | Railway                      | 1,219 | 1,234 | 1,287 | 1,401 |
| Road                      | 282   | 311    | 458   | 662   | Road                         | 645   | 640   | 648   | 870   |
| Air                       | 9     | 9      | 9     | 8     | Air                          | 758   | 772   | 837   | 986   |
| Total                     | 9,170 | 10,268 | 9,593 | 9,042 | Total                        | 2,622 | 2,546 | 2,772 | 3,257 |

**Table 7.3.2 Railway Traffic Demand, 2004 - 2007**

| Freight<br>(000 tons) |        |        |        |        | Freight<br>(mil. ton-km) |       |       |       |       |
|-----------------------|--------|--------|--------|--------|--------------------------|-------|-------|-------|-------|
| Year                  | 2004   | 2005   | 2006   | 2007   | Year                     | 2004  | 2005  | 2006  | 2007  |
| Local                 | 6,857  | 7,558  | 7,336  | 7,494  | Local                    | 1,916 | 2,160 | 2,193 | 2,446 |
| International         | 7,174  | 8,027  | 7,443  | 6,582  | International            | 6,962 | 7,787 | 7,031 | 5,925 |
| Exit                  | 1,125  | 1,468  | 1,814  | 1,775  | Exit                     | 1,094 | 1,272 | 1,529 | 1,398 |
| Entry                 | 1,225  | 1,166  | 1,163  | 1,332  | Entry                    | 512   | 528   | 544   | 671   |
| Transit               | 4,824  | 5,393  | 4,466  | 3,473  | Transit                  | 5,354 | 5,986 | 4,957 | 3,856 |
| Total                 | 14,031 | 15,586 | 14,779 | 14,076 | Total                    | 8,878 | 9,947 | 9,225 | 8,372 |

**Table 7.3.3 Railway Transit Cargo Volume, 2000 - 2005**

(000 tons)

| Direction       | 2000  | 2001  | 2002  | 2003  | 2004  | 2005  |
|-----------------|-------|-------|-------|-------|-------|-------|
| Russia to China | 1,459 | 2,150 | 2,988 | 2,454 | 4,649 | 5,026 |
| China to Russia | 54    | 13    | 89    | 189   | 176   | 360   |
| Total           | 1,512 | 4,164 | 3,076 | 4,646 | 6,829 | 7,391 |

Source: Mongolian Statistical Yearbook 2007.

**Table 7.3.4 Container Freight Traffic, 2002 - 2006**

| Year          | 2002   | 2003   | 2004   | 2005   | 2006   |
|---------------|--------|--------|--------|--------|--------|
| International | 27,681 | 34,118 | 32,118 | 29,412 | 37,061 |
| Domestic      | 8,387  | 13,974 | 13,974 | 16,300 | 30,449 |
| Total (TEU)   | 36,068 | 43,878 | 46,092 | 47,712 | 67,510 |
| 000 (ton)     | 789    | 956    | 1,053  | 1,077  | 1,634  |

Source: Mongolian Railway.

### 3) Future Plan

To further meet the potential demand due to extensive mineral development, a number of plans and projects on air, rail, and road transportation are being promoted as briefly explained as follows:

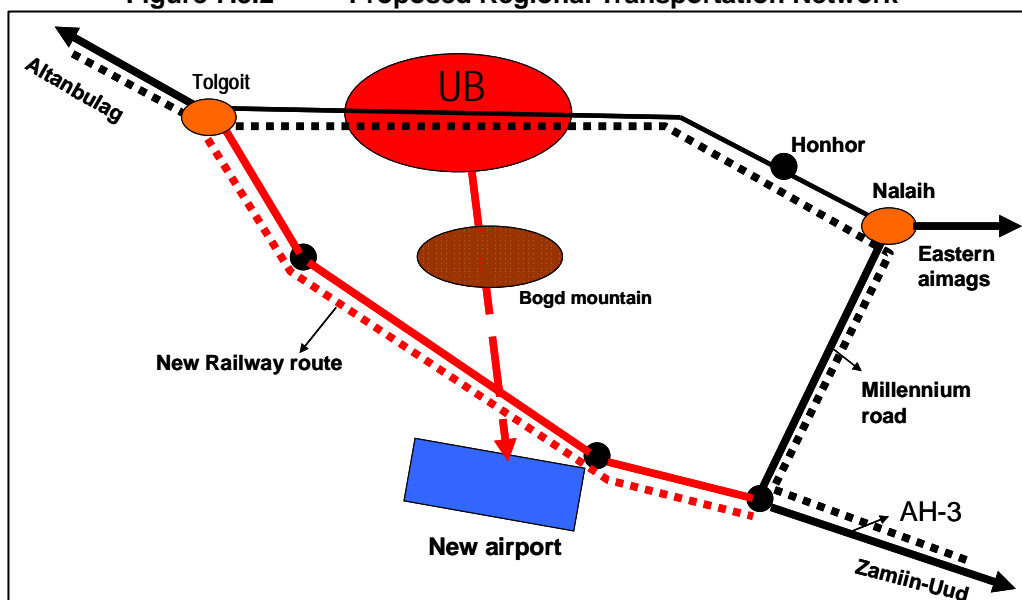
- (a) **New International Airport:** A new international airport is planned in the Khushigt valley with JBIC assistance. It will be located south of Bogd Khan Mountain and 45km from the center of Ulaanbaatar, aiming at encouraging tourism and rare metals export. This airport will be four (4) times bigger than the existing airport, having a 3,100-meter long runway and terminal facilities with a capacity for 1.7 million passengers. It is targeted to open by 2015. The proposed international airport requires a good access to the city because it is located a little far (about 50km along the existing road). As there is also a plan to develop an Airport City in the vicinity, the proposed new railway and Asia highway will be strengthen the airport's connectivity to the world and other growth centers in the country and contribute to widening the opportunities for the development of the airport city. In the long run, a shorter, more direct access through Bogd Khan Mountain situated between the city and the airport can be considered.
- (b) **Railway:** A 65-Kilometer long railway is planned to bypass Ulaanbaatar in the south of Bogd Khan Mountain and to provide access to a new airport. Railway depots/terminals are planned in Tolgoit and Nalaikh where a new railway will be divert from and then merge with the existing railway, respectively. Especially relocation of freight traffic which is expected to grow sustainability in the future is critical as transit cargo between China and the European Union (EU) / Russia is likewise expected to rise and may cause traffic conflicts and worsen safety in the densely inhabited urban areas. On the other hand, international and regional passenger services may remain on the existing lines.
- (c) **Asian Highway:** The national road from Altanbulag (Russian border) to Zamin-Uud (China border) is designated as Asian Highway No.3 (AH-3) with AH Design Standard Class III<sup>2</sup>. It is advisable to establish this road outside urban area, with good connectivity to urban primary roads. This road can also function as access road to the proposed

<sup>2</sup> Since 1995, the Government of Mongolia has implemented AH-3 development projects with ADB assistance, namely: Road Development Phase-1 (1995-2000): Ulaanbaatar-Altanbulag (312km); Road Development Phase-2 (2000-2005): Nalaikh-Choir (200km), and Road Development Phase-3 (2006-2009): Sainhand-Zamin-ud (282km)

international airport.

- (d) **Logistics Centers:** Although a detailed analysis has not been made in the study, it is likely that freight traffic to/from Ulaanbaatar City, as well as transit cargo passing through the country between China (including countries beyond China such as Korea and Japan) and EU/Russia will increase in the future.

**Figure 7.3.2 Proposed Regional Transportation Network**



Source: JICA Study Team



## 7.4 Urban Transport Situation Analysis

### 1) Urban Transport Demand

Overall transportation demand in Ulaanbaatar City is estimated to be 3.4 million trips a day including walking or 2.3 million trips a day excluding walking. This “trip rate” or number of trips made by a person per day is 3.9 including walking or 2.7 including walking. The trip rates of the city are relatively high compared to other cities in Asia<sup>3</sup>. Although the reasons for the high trip rates of Ulaanbaatar residents cannot be determined precisely, it may be attributed partly to social factors and partly to the fact that the land-use pattern and community structure require more trips to access necessary services.

Total transportation demand in the city is composed of walking (31.0%), car (23.7%), taxi (9.4%), bus (33.4%), and others (2.5%). When walking is excluded, the total demand is composed of 34.9% for car, 13.3% for taxi, 48.1% for bus, and 3.8% for other vehicles (see Table 7.4.1). Other main characteristics with regard to the choice of transport modes are as follows:

- (a) The choice of mode varies significantly among those not owning any vehicle, not owning a car, and owning one.
- (b) The share of walking is high among households that do not own a vehicle or a car (36% and 34%, respectively) and those with a car (20%).
- (c) Dependence on cars is high among households with a car (49%), while low among those without a vehicle (11%). However, those without a car still use it to travel (32%).
- (d) The use of public transportation is high among all households. Those without a vehicle show the highest (52%), while even those with a car have a relatively high share (27%).
- (e) The use of bicycles, motorcycles, and private buses, such as company or school buses, is not popular.
- (f) Taxis are commonly used by all households.
- (g) Use of transport modes varies by travel purpose. For “to work” purpose, bus (38.9%) and car (31.7%) are mainly used, while for “to school” trips, bus (42.9%) and walking (4.5%), for “business” purpose, car (41.1%), for “private” purpose, walking (36.0%), car (26.5%) and bus (26.2%) are mainly used (see Table 7.4.2).
- (h) There are peak travel periods such as 7-8 am, 12 noon-1pm, and 5-6 pm (See Figure 7.4.1)

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<sup>3</sup> The trip rates of Ho Chi Minh City (Vietnam), Manila (Philippines), and Chengdu (China) are 3.0, 2.2 and 2.6 including walking and 2.5, 1.8 and 1.8 excluding walking, respectively.

**Table 7.4.1 Travel Demand by Mode and Vehicle Ownership**

| Mode    |             |              | Vehicle Ownership (%) |        |          |       |
|---------|-------------|--------------|-----------------------|--------|----------|-------|
|         |             |              | No Vehicle            | No Car | With Car | Total |
| Walking |             |              | 36.1                  | 33.5   | 20.1     | 31.0  |
| Private | Bicycle     |              | 0.1                   | 0.6    | 0.0      | 0.1   |
|         | Motorcycle  |              | 0.0                   | 0.2    | 0.0      | 0.0   |
|         | Car         |              | 11.2                  | 31.5   | 48.7     | 23.7  |
|         | Truck       |              | 1.0                   | 0.0    | 4.1      | 1.9   |
|         | Others      |              | 0.1                   | 0.0    | 0.0      | 0.0   |
|         | Subtotal    |              | 12.4                  | 32.4   | 52.9     | 25.8  |
| Public  | Bus         | Minibus      | 25.8                  | 16.7   | 11.6     | 21.0  |
|         |             | Standard Bus | 14.9                  | 9.4    | 6.9      | 12.2  |
|         |             | Trolley Bus  | 0.3                   | 0.3    | 0.1      | 0.2   |
|         | Private Bus | Company Bus  | 0.4                   | 0.5    | 0.2      | 0.3   |
|         |             | School Bus   | 0.0                   | 0.1    | 0.1      | 0.0   |
|         |             | Tourist Bus  | 0.0                   | 0.0    | 0.0      | 0.0   |
|         | Taxi        |              | 10.1                  | 7.1    | 8.0      | 9.4   |
|         | Subtotal    |              | 51.5                  | 34.1   | 27.0     | 43.2  |
| Total   |             |              | 100.0                 | 100.0  | 100.0    | 100.0 |

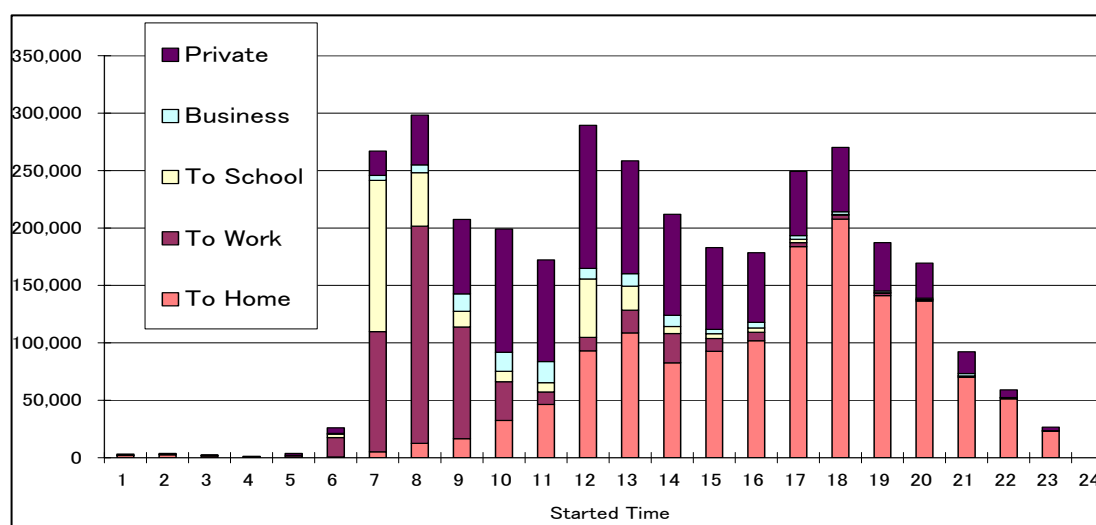
Source: JICA Study Team

**Table 7.4.2 Transportation Demand by Mode and Purpose**

| Mode    | To Work | To School | Business | Private | To Home | Total     |       |
|---------|---------|-----------|----------|---------|---------|-----------|-------|
|         | (%)     |           |          |         |         | (000/day) | (%)   |
| Walking | 15.7    | 41.9      | 14.3     | 36.0    | 31.3    | 1,031     | 30.6  |
| Car     | 31.7    | 9.6       | 41.1     | 26.5    | 21.5    | 816       | 24.2  |
| Taxi    | 10.1    | 5.0       | 10.7     | 9.0     | 9.8     | 311       | 9.2   |
| Bus     | 38.9    | 42.9      | 22.3     | 26.2    | 35.2    | 1,127     | 33.4  |
| Others  | 3.9     | 0.6       | 11.6     | 2.3     | 2.1     | 88        | 2.6   |
| Total   | 100.0   | 100.0     | 100.0    | 100.0   | 100.0   | 3,373     | 100.0 |

Source: Household Interview Survey, 2007, JICA Study Team

**Figure 7.4.1 Hourly Distribution of Travel Demand<sup>1)</sup>**



1) Number of trips by time started and purpose.

Source: Household Interview Survey, 2007, JICA Study Team

## 2) Main Urban Transport Problems and Issues

The transportation sector in Ulaanbaatar City has been confronted with various problems and concerns. Although overall mobility and accessibility are tolerable to most people in the city, the situation will quickly worsen if urban population further increases, urban areas expand, and transportation demand intensifies without a corresponding provision of infrastructure and services. The city's main problems and concerns on the current traffic/ transportation situation are as follows:

- (a) Increasing traffic congestion;
- (b) Decreasing level of safety and amenity of road transportation;
- (c) Unsatisfactory level of public transportation;
- (d) Low awareness of road users;
- (e) Lack of traffic management capacity; and
- (f) Deficient road transportation infrastructure/ facilities.

The causes of these problems are complex and interrelated, requiring both short-term and long-term attention, as well as an integrated approach covering infrastructure management and user awareness; transportation and land use; economic, social, and environmental aspects; and so on.

While traffic congestion is a common problem in most of the world's medium to large cities—although the situation and causes often differ—there are still no universal indicators to aid a common understanding by all of what constitutes traffic congestion. However, the Study Team's analysis of traffic congestion in Ulaanbaatar resulted in the following observations:

- (a) In general, the level of traffic congestion in the city is not so serious based on a number of indicators such as average travel speeds of vehicles on major roads (20 - 30 km/h), average travel time of "to work" trips (about 30 minutes) as well as the observation of the study team in comparison with other cities in Asia.
- (b) Traffic congestions are limited to certain sections during peak hours (morning, lunch time, and evening) and do not last long.
- (c) Traffic congestions are largely due to three (3) main factors, namely: (i) poor behavior of road users, including drivers and pedestrians, who often do not observe traffic rules, (ii) poor traffic control and management by enforcers, (iii) inefficient use of available engineering measures at intersections, to manage traffic lanes, etc.

While travel speed on roads, queue length at intersections, and volume-capacity ratio at road links are common indicators in urban transportation planning, the study also analyzed "average travel time of a trip" as an indicator of accessibility in the city regardless of the quantity and quality of infrastructure services. Results show that average distance of and time spent on a trip from an origin to a destination in the city are 29 minutes and 3.9km, respectively (see Table 4.7.2).<sup>4</sup>

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<sup>4</sup> For example, in Hanoi in Vietnam with three (3) million populations, average travel time of "to work" trip is about 20 minutes for 3.8km.

**Table 7.4.3 Accessibility of Urban Transportation in Ulaanbaatar City**

| Trip purpose | Time (min) | Distance (km) |  | Mode         | Time (min) | Distance (km) |
|--------------|------------|---------------|--|--------------|------------|---------------|
| To work      | 32         | 4.5           |  | Walking      | 14         | 1.3           |
| To school    | 27         | 3.3           |  | Car          | 28         | 4.9           |
| Business     | 32         | 4.3           |  | Minibus      | 39         | 5.4           |
| Private      | 26         | 3.6           |  | Standard bus | 43         | 5.4           |
| To home      | 30         | 4.0           |  | Taxi         | 27         | 3.4           |
| Total        | 29         | 3.9           |  | Total        | 29         | 3.9           |

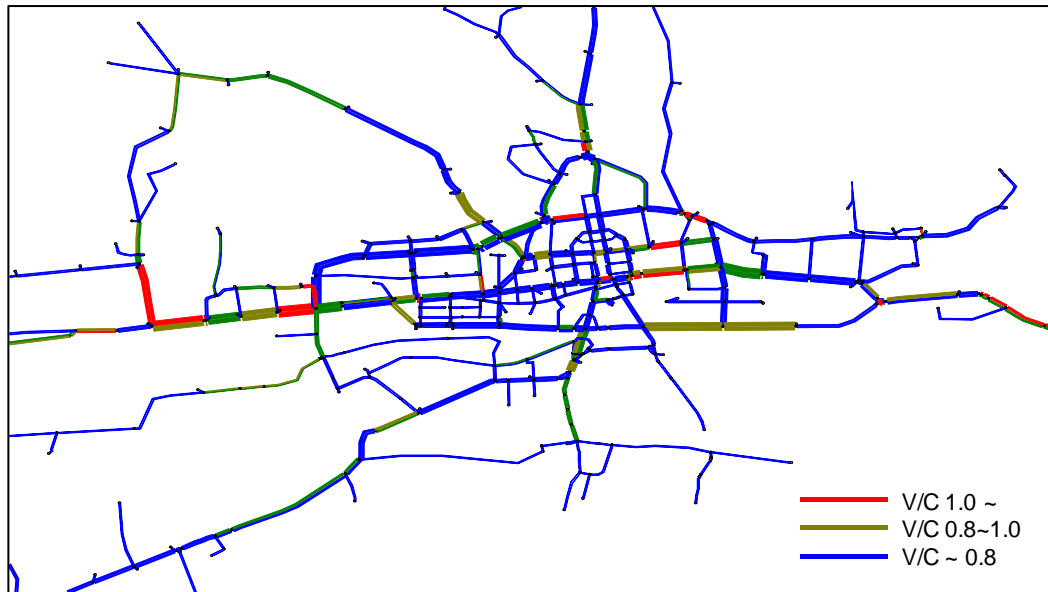
Source: Household Interview Survey, 2007, JICA Study Team

As causes of traffic congestion in Ulaanbaatar City are relatively identical and not so serious (the city has only 70,000 vehicles), it is not so difficult to improve the situation through combinations of the following:

- (a) **Behavior Improvement of Road Users:** Traffic behavior of all road users, i.e. drivers, passengers, and pedestrians, is poor. Particularly cars and other vehicles are to be blamed for congestion in the city center and at main intersections which result in decreased traffic capacity. Low pedestrian awareness of traffic rules is the main cause of traffic accidents in which they are often the victims.
- (b) **Traffic Enforcement and Management:** Traffic is not properly controlled by enforcers due to a lack of personnel, operation techniques, and equipment /facilities. Simple traffic rules and measures are not observed and practiced. Control of road-side parking in the city center by designating alternative parking areas more clearly and/or charging adequate parking fees can be effective measures to achieve immediate improvement.
- (c) **Minor Infrastructure Improvement:** While the primary road network in the city is relatively adequate, it lacks articulation due to the lack of secondary roads as well as some missing links. Poor surface condition of roads as a result of inadequate maintenance also hampers traffic flow and the safety of vehicles and pedestrians. Poor maintenance also contributes to economic and environmental costs of road traffic.

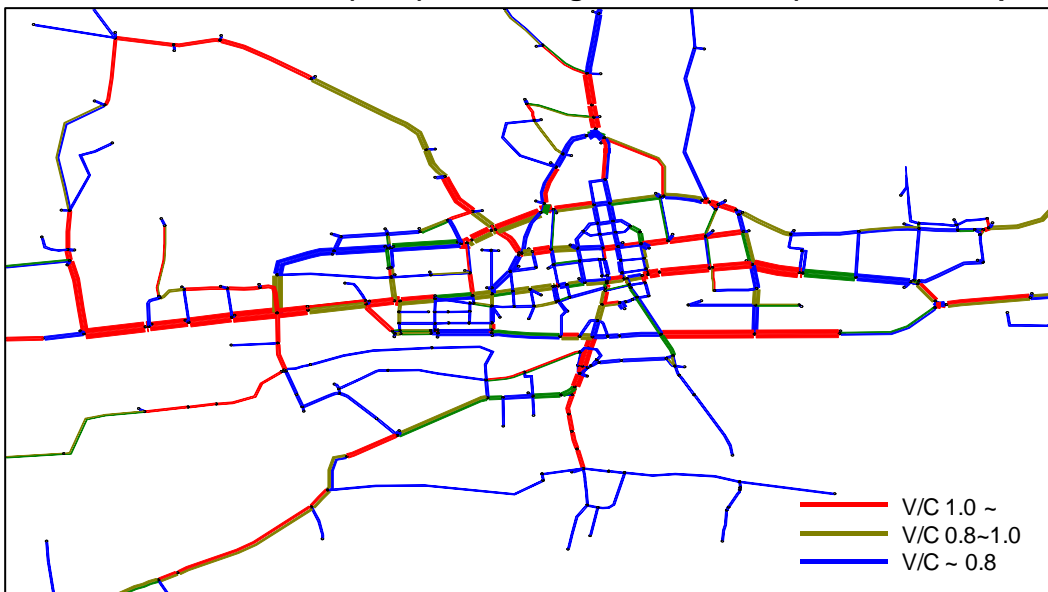
An analysis based on STRADA was conducted in the study indicates that the capacity of existing roads is underutilized and that it could be increased by as much as 20% by implementing the traffic management measures mentioned above and without putting in substantial funding. Therefore, if the city can formulate an effective mechanism based on this, costly infrastructure investments in the future can be avoided and higher economic returns can be generated (see Figures 7.4.2 and 7.4.3).

**Figure 7.4.2 Assumed Traffic (2007) on Existing Road Network (Full Link Capacity)**



Source: JICA Study Team

**Figure 7.4.3 Assumed Traffic (2007) on Existing Road Network (80% of Link Capacity)**



Source: JICA Study Team.

### 3) People's Assessment of Current Traffic Situation

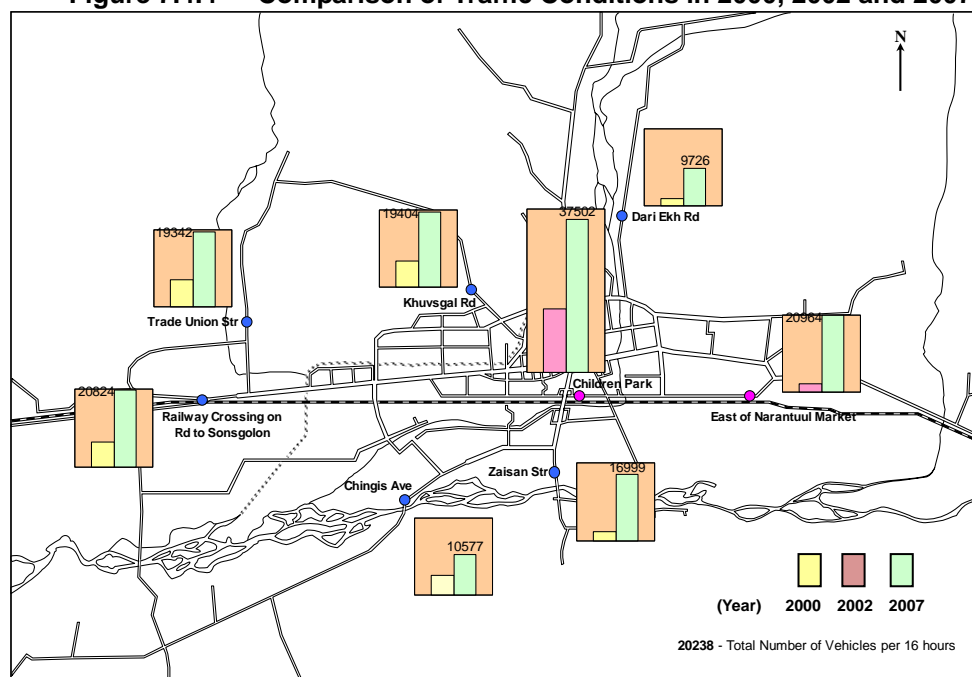
HIS results show the people's assessment of the current traffic situation in the city. They are briefly as follows:

- (i) More than 80% of the people, regardless of car ownership, gender and age, find "traffic congestion" and "exhaust gas" as bad or very bad. Almost all find the situation has worsened compared to that five (5) years ago (see Figure 7.4.4);

- (ii) About 60 - 70% of the people find “safety,” “convenience,” “walking environment,” and “parking” as bad or very bad; and
- (iii) On the other hand, dissatisfaction with public transportation is relatively low; 34% find it bad or very bad, while 45% so-so and 16% good.

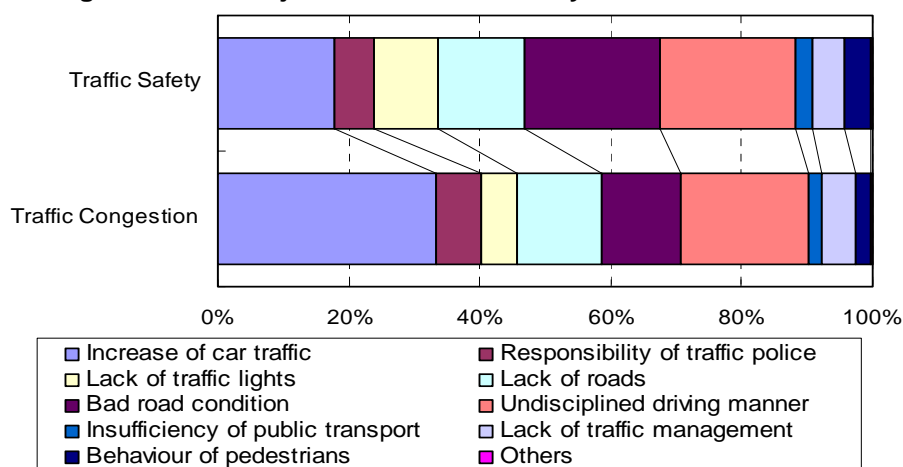
According to the respondents, the negative causes of traffic congestion include “increase in car traffic” (33%), followed by “undisciplined driving behavior of the people” (20%), “lack of roads” (15%), and “bad road conditions” (12%) (see Figure 7.4.5).

**Figure 7.4.4 Comparison of Traffic Conditions in 2000, 2002 and 2007**



Source: Household Interview Survey, 2007, JICA Study Team

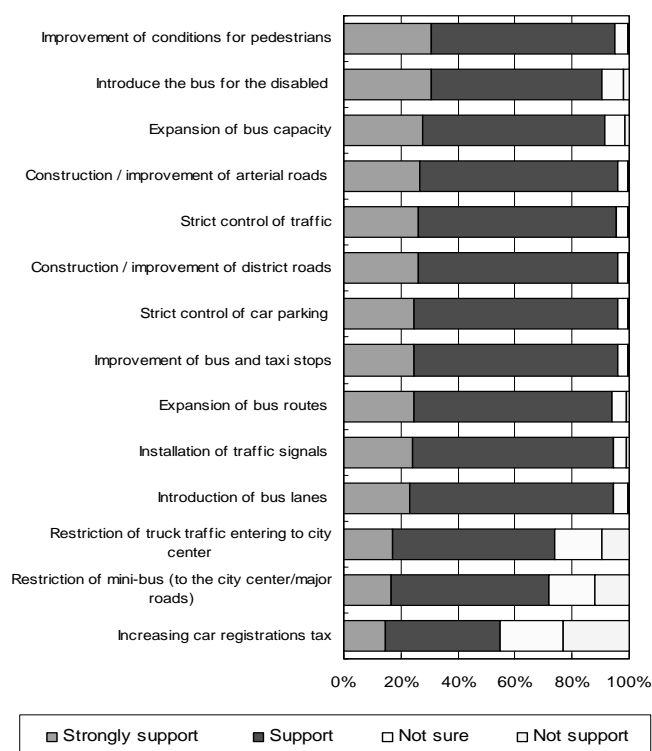
**Figure 7.4.5 Major Causes of “Bad/Very Bad” Traffic Conditions**



Source: Household Interview Survey, 2007, JICA Study Team

The people have high expectations that various transportation measures will significantly improve the situation in the future. These measures range from infrastructure development, management improvement, control measures, and enforcement strengthening (see Figure 7.4.6).

**Figure 7.4.6 Evaluation of Transportation Measures**



Source: Household Interview Survey, 2007, JICA Study Team.

It is a fact that traffic congestion at major intersections, except IS-12, is already reaching critical levels. Travel speed surveys conducted in 1998 by JICA and in the period from 8 May to 6 June 2007 by the JICA Study Team reveal that travel speeds have decreased significantly due to traffic congestion, as shown in Table 7.4.4.

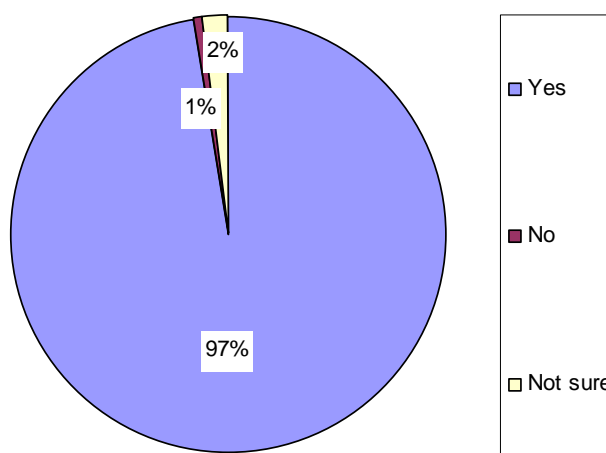
97% of the respondents request the improvement of public transportation in Ulaanbaatar City, as shown in Figure 7.4.7. Bus passengers want convenience and safety to improve, while other road users expect that appropriate bus operations will alleviate traffic congestion.

**Table 7.4.4 Travel Speeds, 1998 and 2007**

| Vehicle Type | Route                     | Direction | Travel Speed |      |
|--------------|---------------------------|-----------|--------------|------|
|              |                           |           | 1998         | 2007 |
| Car          | Peace Avenue              | East      | 41.4         | 25.4 |
|              |                           | West      | 42.4         | 25.7 |
|              | Khuvsgalchid - Ikh Toiruu | East      | 30.3         | 21.3 |
|              |                           | West      | 29.0         | 20.9 |
|              | Ikh Toiruu                | South     | 40.9         | 19.1 |
|              |                           | North     | 42.5         | 20.3 |
| Bus          | Nary Zam                  | East      | 42.3         | 31.7 |
|              |                           | West      | 41.2         | 19.7 |
|              | UBIS -Yarmag              | East      | 35.7         | 21.4 |
|              |                           | West      | 31.9         | 20.1 |
|              | UBIS -Chingeltei          | East      | 24.1         | 16.8 |
|              |                           | West      | 24.1         | 18.0 |

Sources: JICA Travel Speed Survey, 1998, and UBMPS Travel Speed Survey, 2007.

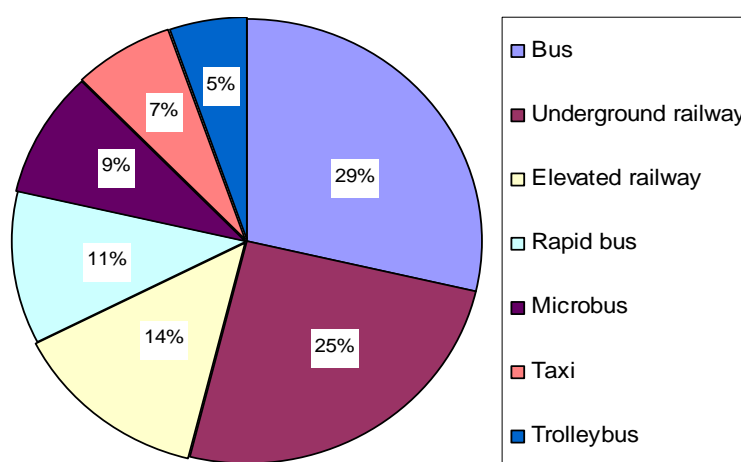
**Figure 7.4.7 Requests for Improvement in Public Transportation**



Source: Household Interview Survey, 2007, JICA Study Team.

Many respondents expect that urban mass transit systems, such as underground railway, elevated railway, and rapid bus, will be developed as public transportation modes, as shown in Figure 7.4.8.

**Figure 7.4.8 Preferences for Public Transportation Modes**



Source: Household Interview Survey, 2007, JICA Study Team.

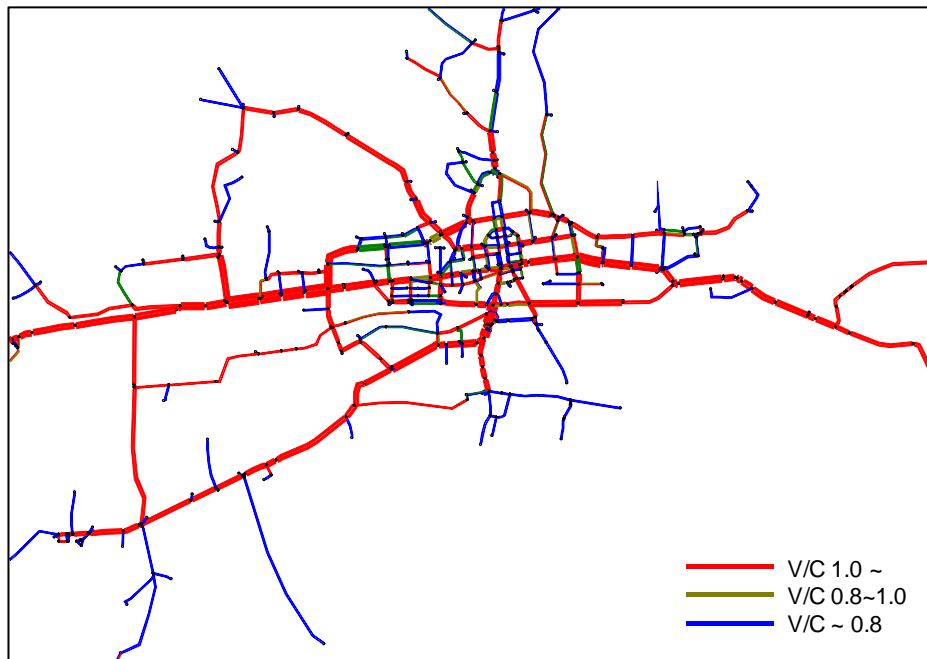
#### 4) Future Prospects on Traffic Congestions

The real threat of traffic congestion in the city will occur in the future and this may require fundamental policy interventions rather than short-term measures and symptomatic treatment. The combined impact of population growth, urban area expansion, and increased car ownership rates in the city is anticipated to be enormous. By 2030, the population is expected to have doubled, urban areas have expanded, and car ownership rates have increased from 20% of households to about 60%. The latter alone indicates that the number of cars will have increased six (6) times the current level. An analysis of a “do nothing” scenario based on the “STRADA”<sup>5</sup> model also clearly indicates that traffic conditions by 2030 will be a nightmare unless strategic measures are implemented before then.

<sup>5</sup> The Study Team simulated the future traffic situation on roads under different scenarios using the STRADA model. The “Do nothing” scenario, meaning no projects are implemented, shows the traffic situation when future demand is assigned onto the existing road network.



**Figure 7.4.9 Estimated Level of Traffic Congestion by 2030 under a “Do Nothing” Scenario**



Source: JICA Study Team.

Mitigating, if not removing, future traffic congestion in the city will be a big challenge and will require much more comprehensive and strategic interventions than relatively simple measures which are only effective in improving the current situation. The basic factors which affect traffic and congestion include the following:

- (i) Urban structure and land-use pattern, specifically the size of the urban area as well as the density of population and activities;
- (ii) Modal policy on public and private transportation, specifically the provision of mass transit system and management of car use; and
- (iii) Provision and management of transportation infrastructure, specifically road network development, traffic management measures, provision of parking and other transportation facilities.

Toward 2030, a critical planning issue will crop up and that is how to manage the city's growth vis-à-vis the role and impact of transportation. As explained in Section 6.3, the following two scenarios of growth pattern were tested:

- (i) Trend scenario assumes that the future urban area will grow more or less in accordance with the current trend; and
- (ii) Compact scenario assumes that the future expansion of urban areas will be controlled while the density of population and socio-economic activities will be guided.

The results of the analysis are the following (see Table 7.4.5):

- (i) Although the total number of trips/day will only double between 2007 and 2030, passenger-kilometers will increase by 3.3 times under the “trend scenario” and 2.7 times under the “compact scenario;”
- (ii) The average trip length of private transportation will increase between 2007 and 2030

from 5km to 7.2km under the “trend scenario” and 5.9km under the “compact scenario” due to prolonged trips as a result of urban area expansion.

- (iii) The reason the average trip length of public transportation will not increase is attributed to the assumption that mass transit routes have been developed thereby improving connectivity in the urban areas, especially under the “compact scenario” wherein future urban development is closely integrated with the development of mass transit lines.

An explicit conclusion from this simple analysis is that the development of compact urban areas with effective mass transit systems can contribute to the reduction in traffic congestion and savings in infrastructure provision.

**Table 7.4.5 Impact Analysis of Urban Growth on Transportation by Scenario**

|                          |                        | 2007 | 2030 Scenario |         |
|--------------------------|------------------------|------|---------------|---------|
|                          |                        |      | Trend         | Compact |
| No. of trips             |                        | 1.0  | 2.0           | 2.0     |
| Passenger-km             |                        | 1.0  | 3.3           | 2.7     |
| Average trip length (km) | Private transportation | 5.0  | 7.2           | 5.9     |
|                          | Public transportation  | 4.9  | 6.0           | 5.0     |

Source: JICA Study Team

## 7.5 Overall Urban Transportation Network

The future transportation network of the city must be planned in a way that it will not only enhance people's mobility and accessibility to work and other services but also provide a foundation for the sustainable growth of urban areas, promote economic development, and ensure environmental sustainability. The proposed transportation network is thus prepared based on the following concepts (see Figures 7.5.1, 7.5.2 and 7.5.3):

- (a) **East-West and North-Southwest Mass Transit Corridors:** To develop these corridors integrated with medium- to high-density mixed-use urban development. Candidate types of mass transit system include LRT and BRT depending on demand and further technical study;
- (b) **East-West Transportation Corridors:** To develop these corridors comprising an east-west mass transit corridor (Peace Avenue) and two major east-west roads running parallel in the north (Naraizam Street and its extensions) together with a number of north-south connectors to form a strong ladder-type core transportation system. As the two parallel roads are located at only about a kilometer from the mass transit corridor, those residing or working in the vicinity can reach a mass transit station within fifteen (15) minutes of walking; and
- (c) **Ring Road:** To develop a ring road covering the CBD and the strict implementation of traffic management measures such as area licensing scheme (congestion pricing) for the CBD. Together with the provision of modern mass transit services, the traffic situation in the CBD is expected to dramatically improve and with it additional revenue can be generated which can be used for other traffic improvement measures in the city.

Although the future Ulaanbaatar seeks to become primarily transit-oriented in its transportation system and urban development, this does not mean that car ownership and use will be severely restrained. The proposed network plan intends to encourage both public and private transportation use through proper sharing among modes of available space by area and time. During peak hours and in the CBD, car use will be restrained, but not during off-peak hours, weekends, and holidays. The underlying principle in the plan is the effective management of congestion in such a way that users shoulder the cost of congestion.

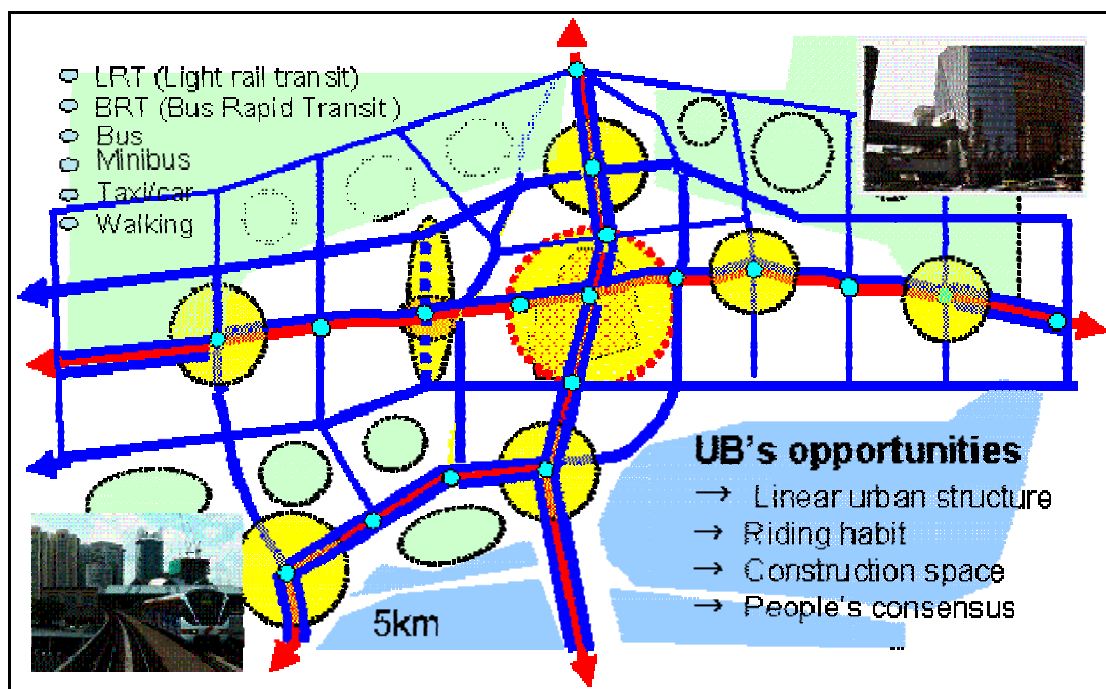
The proposed network plan also includes new types of urban road such as urban expressways and buffer roads. The urban expressway, which will be located along the existing Mongolian railway right of way<sup>6</sup> (see Figure 7.5.2), intends to further improve vehicular traffic in the city. It will be a toll road and a self-financing project. On the other hand, buffer roads will be constructed to protect main urban areas from flashfloods caused by the fragile natural conditions resulting from disorganized Ger area development. Such proposed buffer roads can serve as boundaries for urbanization promotion areas (see Figure 7.5.2).

Urban and regional transportation network interface is important to both city and region in order to avoid unnecessary conflicts due to vehicular traffic mix, facilitate smooth connectivity between the city and the region, as well as to strengthen competitiveness of logistics and goods distribution.

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<sup>6</sup> The right of way of the Mongolian Railway is so wide that it can accommodate an expressway.

**Figure 7.5.1 Concept of Future Transportation Network**



Source: JICA Study Team

**Figure 7.5.2 Proposed Types of Roads**

**Urban Expressway**



Source: JICA Study Team

**Buffer Roads (Disaster Prevention Road)**

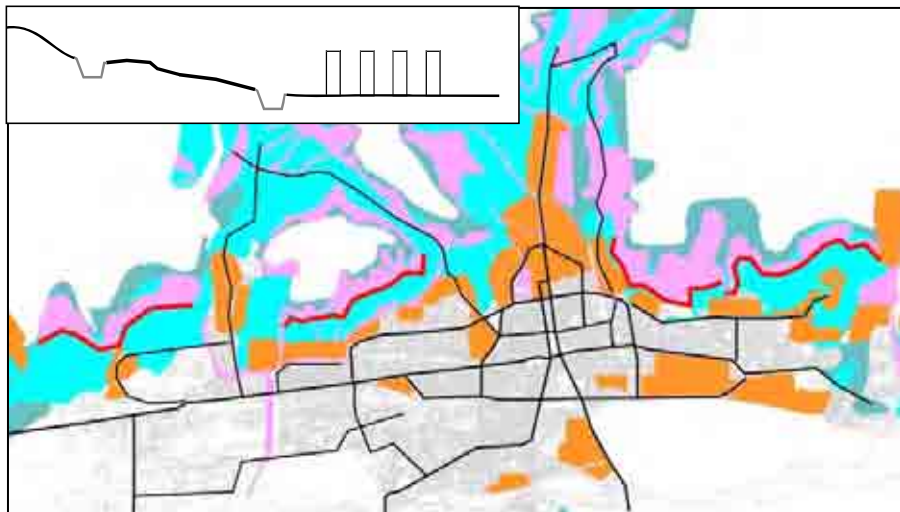
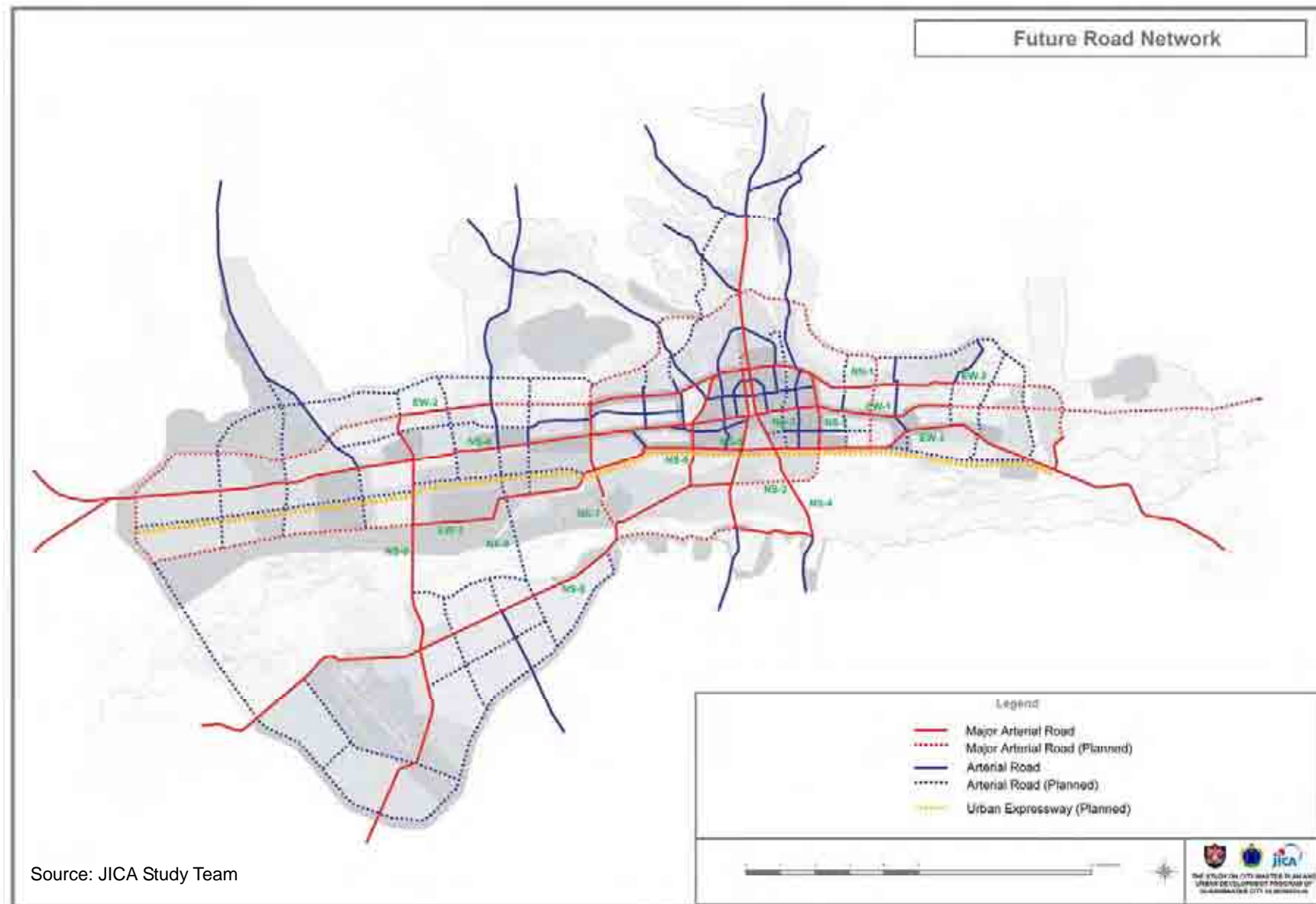


Figure 7.5.3 Proposed Urban Transportation Network Plan for 2030



## 7.6 Public Transportation System

### 1) Overview

The public transportation system in Ulaanbaatar City is composed of different types of bus including trolley bus, large bus, minibus, and taxi. While trolley, large, and medium buses operate on main roads, and minibuses ply secondary routes and those linking the sprawling fringe areas, their routes overlap in many road sections.

Public transportation demand in the city is large. At present, buses carry 156 million passengers a year or about 435,000 passengers a day on average, excluding free riding passengers such as the elderly, physically challenged, soldiers, and policemen who are exempted from paying the bus fare. Students who use season tickets are also excluded in the count. On the other hand, the estimated figure from the Household Interview Survey indicates about 1.1 million daily passengers use buses. The minibus, large bus, and trolley bus together account for 35% of the total demand including walking or 48% of the total demand excluding walking<sup>7</sup>.

Of the total bus demand, minibuses share about 62%, followed by large buses at 36%, while the remainder is shared by trolley buses and other buses such as company bus. Buses are used for different trip purposes, namely "private" (29.4%), "to work" (16.9%), "to school" (9.0%), "business" (3.3%), and "to home" (42.2%).

In addition to buses, taxis play an important role by narrowing the supply gap. It shares 9% (if walking is included) of the estimated total demand of about 311,000 trips a day or, if walking is excluded, 13% of the total demand. Together with buses, public transportation share accounts for 43% and 61% of total demand including and excluding walking trips, respectively.

Bus service is provided by three state-owned operators, nine (9) cooperatives, and 38 private operators which own a total of 1,725 units of which 623 are large buses and 1,102 are minibuses (see Table 6.4.3). However, only 937 units comprising 481 large buses and 456 minibuses are operating 81 routes (see Table 7.6.2). The characteristics of bus operation in the city are summarized as follows:

- (a) The route structure needs improvement together with a clearer functional split between large buses and minibuses. In principle, the former should operate on main roads with longer route lengths, while minibuses should supplement large bus routes with shorter route lengths.
- (b) Buses are mostly so old that roadworthiness is low. Only 77% of large buses and 41% of minibuses are in use.
- (c) The load factor of large buses is low compared to minibuses. Route structure and allocation of bus units need to be designed in a way that differences in load factor are narrowed.
- (d) The operation of large buses is highly subsidized under the current fare level of 200 Tg./trip, while minibus operation is almost free from subsidy (see Table 7.6.3). This sharp contrast suggests there are opportunities to improve bus transportation services in the city.

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<sup>7</sup> Total transportation demand in the city is 3.4 million a day including 1 million (31% of the total) walking trips.

**Table 7.6.1 Profile of Bus Operators**

| Ownership   | No. of Operators | No. of Routes | No. of Bus Units      |                         |       |
|-------------|------------------|---------------|-----------------------|-------------------------|-------|
|             |                  |               | Minibus <sup>1)</sup> | Large Bus <sup>2)</sup> | Total |
| State       | 3                | 14            | 34                    | 142                     | 176   |
| Cooperative | 9                | 13            | 330                   | -                       | 330   |
| Private     | 38               | 80            | 738                   | 481                     | 1,219 |
| Total       | 50               | 107           | 1,102                 | 623                     | 1,725 |

1) 12 seats without standees + driver

2) 31 seats with 63 standees + driver

Source: Transport Division of Ulaanbaatar City

**Table 7.6.2 Profile of Bus Operation**

| Type        | No. of Routes | Ave. Route Length (km) <sup>1)</sup> | Service Hours | No. of Fielded Buses |           |       |
|-------------|---------------|--------------------------------------|---------------|----------------------|-----------|-------|
|             |               |                                      |               | Minibus              | Large Bus | Total |
| Main CBD    | 17            | 25                                   | 7-22          | -                    | 188       | 188   |
| Main Others | 17            | 24                                   | 7-22          | -                    | 216       | 216   |
| Trolley Bus | 4             | 22                                   | 7-22          | -                    | 44        | 44    |
| Subroutes   | 43            | 34                                   | 7-22          | 456                  | 33        | 489   |
| Total       | 81            | 29                                   | 7-22          | 456                  | 481       | 937   |

1) Origin to origin

Source: Transport Division of Ulaanbaatar City

**Table 7.6.3 Bus Performance Indicators**

| Bus Type | No. of Routes | No. of Bus Units | Average/Bus/Day |         |                   | Revenue/Bus/Day (000 tug) |               |               |
|----------|---------------|------------------|-----------------|---------|-------------------|---------------------------|---------------|---------------|
|          |               |                  | No. of Trips    | Km. Run | No. of Passengers | Fare                      | Subsidy       | Total         |
| Large    | 47            | 483              | 15              | 192     | 357               | 68<br>(37.8)              | 112<br>(62.2) | 180<br>(100%) |
| Minibus  | 34            | 446              | 16              | 219     | 151               | 42<br>(94.2)              | 3<br>(5.8)    | 45<br>(100%)  |
| Total    | 81            | 929              | 15              | 203     | 258               | -                         | -             | -             |

Source: Transport Division of Ulaanbaatar City

## 2) People's Assessment of Public Transportation Services

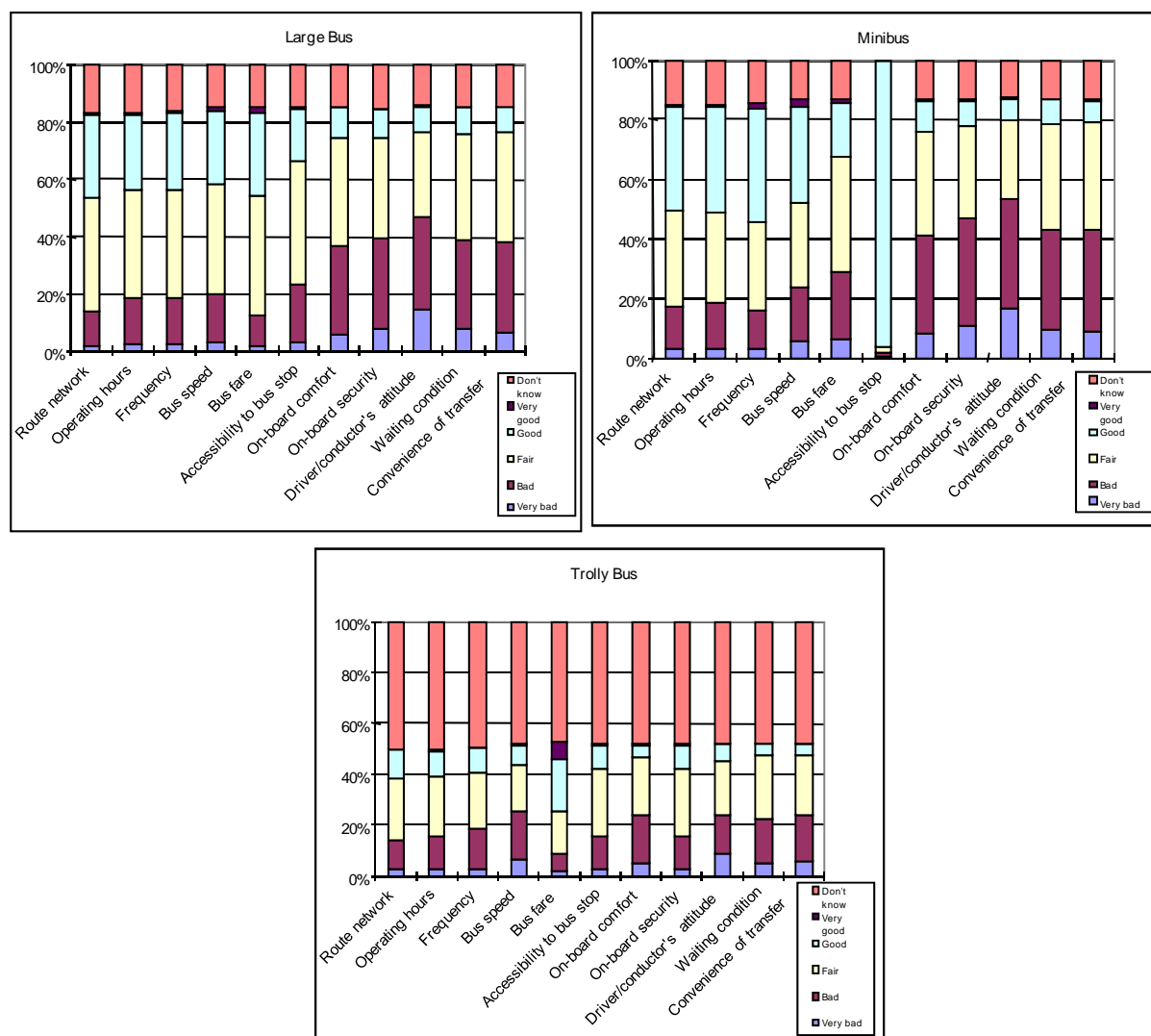
Results of the Household Interview Survey provide a window as to how the people assess existing public transportation services in the city. These are briefly as follows (see Figure 7.6.1):

- The reasons for choosing buses vary. In general, people do not have any other choice but to use public transportation (42%), followed by cost (20%) and convenience (19%). In addition, trolley buses and minibuses are chosen due to the low fares and faster travel time, respectively;
- In general, people are relatively satisfied with the route network, operating hours, frequency, bus speed, accessibility to bus stops, although they are dissatisfied with

driver/conductor behavior, on-board security and comfort, as well as with the waiting and transfer conditions; and

- (iii) The number one cause of dissatisfaction among customers of large buses and minibuses is “driver/conductor attitude” and that of trolley bus is “bus speed.” On the other hand, the number one cause of satisfaction is “bus fare,” “frequency,” and “bus speed”, respectively.

**Figure 7.6.1 People's Assessment of Bus Services**



Source: Household Interview Survey, 2007, JICA Study Team



The people's support for public transportation and their future expectation of improvement are high. 93% of people including those who own cars and other private transportation modes replied that public transportation services are necessary with majority of them supporting a wide range of measures. These measures are as follows:

- (a) Construction and improvement of roads, including primary and district roads and their network articulation;
- (b) Strengthening of traffic control and management, including car restraint, improved traffic signals installation and operation, car parking control and management, restriction of truck traffic entering the city center, etc.;
- (c) Improvement in bus operating conditions, including introduction of bus lanes, improvement of bus/taxi stops, and restructuring of bus routes;
- (d) Expansion of bus operation, including increase in bus fleet capacity and introduction of bus services for the physically challenged; and
- (e) Others including the improvement of bus waiting conditions and improvement of walking conditions for pedestrians.

Types of public transportation mode which people desire in the future include standard bus (29%), underground rail (24%), elevated rail (13%), rapid bus (12%), and others.

### 3) Opportunities for Mass Transit Development in Ulaanbaatar

Since the development of a modern mass transit system is much desired by the people and has been gaining political support, the Study Team made a preliminary study and the results are described below.

Since Ulaanbaatar is relatively small and the income level is low, it would be costly to develop a rail-based mass transit system, especially one with an underground arrangement, judging from the experiences of other Asian cities. At the same time, there are a number of factors favoring such a project for Ulaanbaatar City, as follows:

- (a) **Fitting Urban Structure:** The linear form of its main urban area, wherein business and commercial activities concentrate along Peace Avenue, enables it to become a catchment area for a mass transit line. With good feeder/ access transportation services, one line can cover most of the main urban area<sup>8</sup> which is sandwiched by Ard Ayush Avenue in the north and Naryn Zam in the south, both running parallel to Peace Avenue. This area can be within walking distances to a mass transit station, if ever it is developed.
- (b) **Good Public Transportation Ridership:** At present 48% of the total demand for motorized urban transportation is met by buses; the figure increases to 61% if taxis are included. The high rate of public transportation demand is the potential main market for a modern mass transit system. If the system is attractive enough, it can also encourage car users to shift.
- (c) **Availability of Construction Space:** In many cities, finding good construction space with minimal land acquisition and relocation of buildings/ facilities has always been a costly and problematic issue. However, in Ulaanbaatar City, the right of way for a mass transit system along Peace Avenue is already available due to its wide road space

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<sup>8</sup> The area has about 44% of the population.

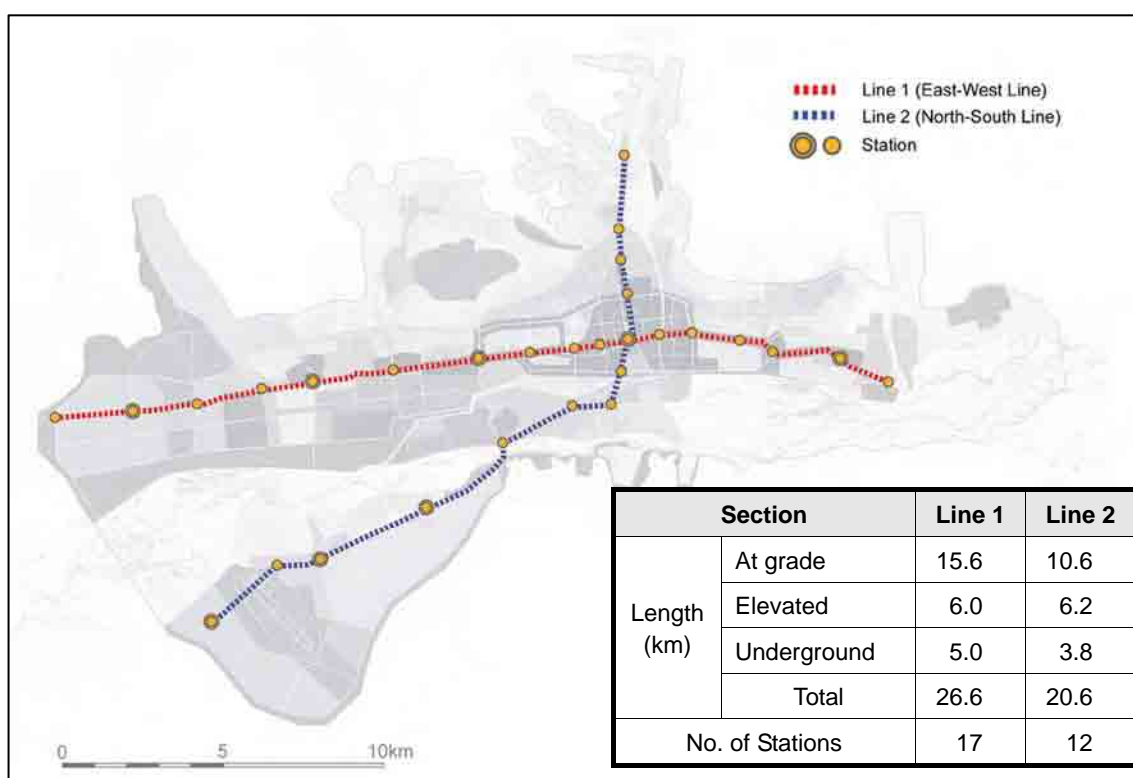
including the median and sidewalks.

- (d) **Consensus of the People:** As is explicitly seen from the results of the HIS, the people expect much improvement in public transportation services through the introduction of a mass rapid transit system, such as an LRT/ MRT.

A preliminary study was thus carried out on the possible location of the LRT/MRT, and two (2) lines are proposed (see Figure 7.6.2), as follows:

- (a) **Line 1:** Line 1 will be constructed in an east-west direction along Peace Avenue. It will have a total length of 21km including a 7-kilometer underground section in the CBD and the remaining length as at-grade or elevated sections.
- (b) **Line 2:** Line 2 will be constructed in a north-south direction in the urban area and farther to connect to the airport. It will have a total length of 15km including a 4-kilometer underground section intersecting Line 1.

**Figure 7.6.2 Preliminary Mass Transit Location Plan**



Source: JICA Study Team

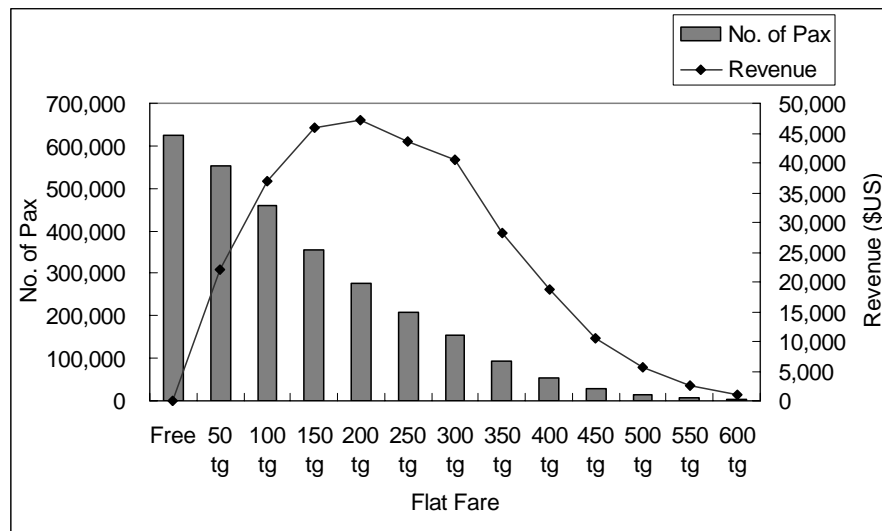
Although preliminary technical and developmental studies on the two (2) lines are ongoing, the initial findings are briefly as follows:

- (a) There are no serious technical constraints in construction, engineering, and operation of the system;
- (b) Future demand is affected by a number of factors including fare level, competition and complementation with bus services, as well as traffic congestion on mass transit corridors, among others. Fare is particularly crucial in terms of ridership and fare revenue. As is seen in Figure 7.6.3, if Line 1 is free, it is estimated that demand will reach 700,000 a day

by 2030, while it will shrink to less than 100,000 when the fare is 500 Tg. or higher<sup>9</sup>. The revenue-maximizing fare level is about 300 Tg. which will attract about 300,000 passengers a day.

- (c) Line 1 will attract more passengers than Line 2, even if all proposed urban development projects are realized by 2030. Line 2 is estimated to have a ridership of roughly 65% that of Line 1.

**Figure 7.6.3 Preliminary Estimate of Line 1 Ridership**



Source: JICA Study Team

In order to enhance the effects of the LRT services, there is a need to undertake associated improvements such as:

- (i) Restructure bus/ minibus routes to enhance the overall public transportation network;
- (ii) Improve connectivity between LRT and other modes including BRT, bus, minibus, taxi, car, and walking;
- (iii) Establish an equitable fare policy and efficient collection system (affordability, smart card, etc.); and
- (iv) Effectively control traffic and manage cars and other vehicles along the LRT corridor.

Considering the high investment needed for the mass transit system, the study will further carry out the following:

- (i) Survey of the areas along the proposed two (2) main LRT corridors (land use, main facilities, available space, related roads, etc.);
- (ii) Demand analysis and forecast;
- (iii) Selection of adequate systems;
- (iv) Determination of opportunities for integrated urban development;
- (v) Preliminary economic and financial evaluation;
- (vi) Environmental impact analysis; and
- (vii) Formulation of development strategies.

<sup>9</sup> This analysis is still tentative but can provide a basis for discussion on relationship between “fare” and “ridership”.

## 7.7 Road Development

### 1) Current Situation

In 2006, Ulaanbaatar City had a total of 439km of roads including 55km of state roads, 203km of city roads, 104km of district/special roads, and 78km of roads to satellite town/villages. In addition, there were about 100km of roads in residential areas and earth roads. Between 2000 and 2006, the road length increased by only 21km (see Table 7.7.1).

**Table 7.7.1 Road Length by Classification**

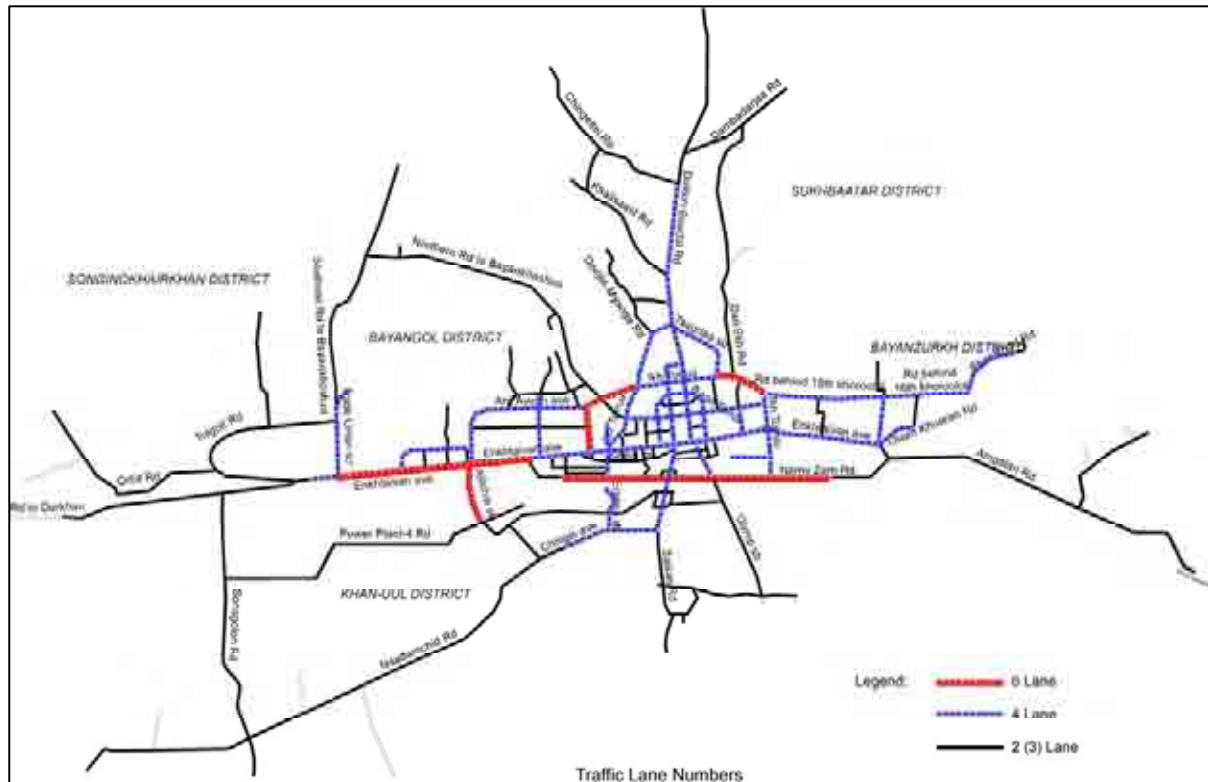
| Classification                          | (km)   |        |
|---|--------|--------|
|   | 2000   | 2006   |
| 1. State Road                           | 76.5   | 54.5   |
| 2. City Road                            | 168.8  | 202.7  |
| 3. District and Special Road            | 94.9   | 104.0  |
| 4. Road to Satellite Towns and Villages | 78.0   | 78.0   |
| 5. Residential Area Road                | (67.3) | (67.3) |
| 6. Earth Road                           | (35.5) | (35.5) |
| Total Length (excluding 5+6)            | 418.2  | 439.1  |

Note: JICA Study Team based on data from then MRTT and Ulaanbaatar City

Road development varies by area but faces a number of common problems which are briefly as follows:

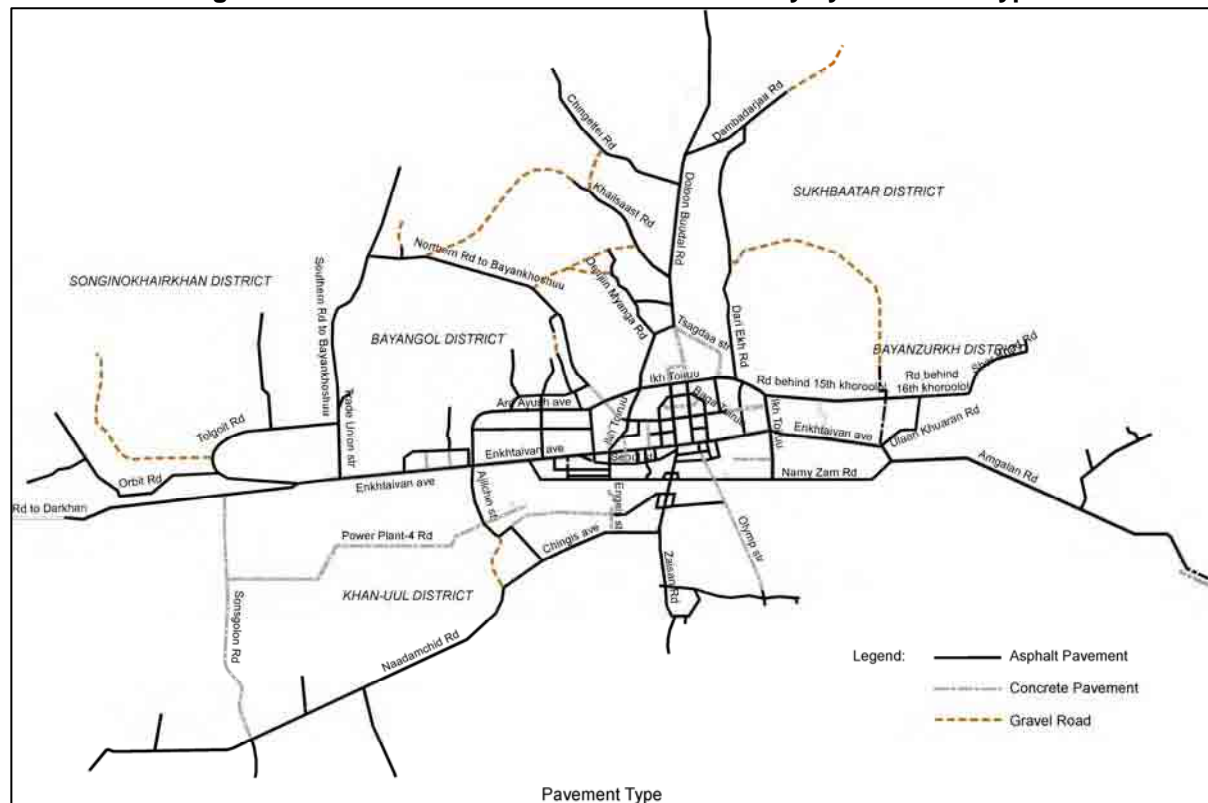
- (i) While the basic arterial structure exists, especially in the city center which is provided with a well-articulated network with wide space and basic facilities, the quality of pavements and facilities is substandard, and missing links/ bottlenecks exist.
- (ii) Roads in emerging fringe areas are poorly developed in terms of network connectivity, pavement quality, design standards, and facilities, including sidewalks and various traffic management facilities.
- (iii) Roads at the community level both in the city center and other areas are not satisfactory; vis-a-vis the main roads and within the areas/ blocks, they lack the appropriate configuration and proper facilities, such as smooth sidewalk, street lights, and parking space. Roads and facilities are also not adequately maintained.

**Figure 7.7.1 Road Network in Ulaanbaatar City by Number of Lanes**



Source: JICA Study Team

**Figure 7.7.2 Road Network in Ulaanbaatar City by Pavement Type**



Source: JICA Study Team

In Ulaanbaatar City, there are approximately 100 intersections, including seven rotary-type intersections (roundabouts) on state, city, district, and special roads as well as roads to satellite towns and villages. Of this number, 68 are designated as major intersections, 43 of which are signalized and 25 more are being planned for signalization.

A rotary-type intersection has the advantage of creating uninterrupted flow when traffic volume is modest and is much less than traffic capacity. As traffic volume increases, however, such an intersection becomes inadequate and has low traffic safety levels due to many conflict points and interlocking of traffic. It therefore becomes a major cause of traffic congestion. To resolve this, the construction of grade-separated structures (flyovers) can be done, since land in the vicinity of rotary-type intersections is usually available.

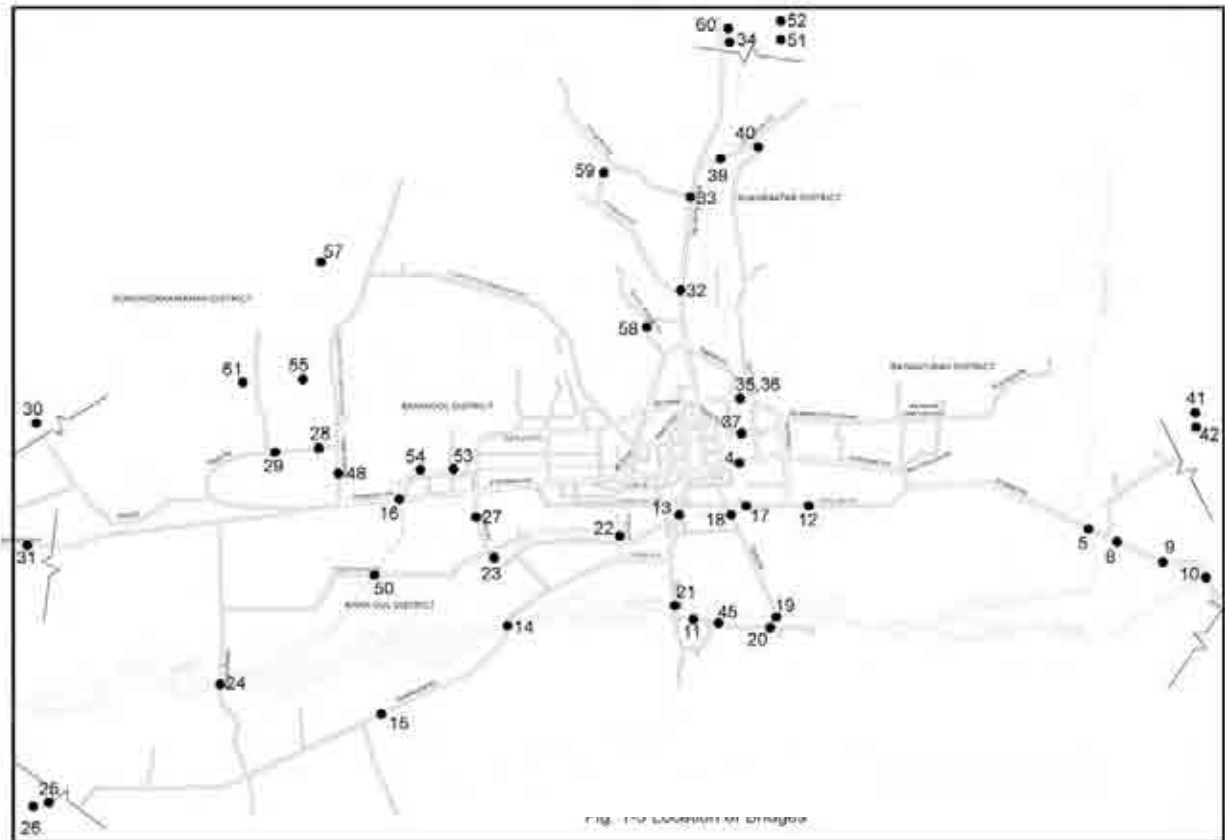
Of the 43 signalized intersections in Ulaanbaatar City, 20 have Russian-made traffic signals, while 23 use Korean-made ones purchased under Japanese official development assistance (ODA). The Ulaanbaatar city government has plans of installing new traffic signals at 45 intersections together with closed circuit television (CCTV) cameras at 26 intersections and to replace 20 Russian-made signals with a new type.

Besides traffic signals, the stopping line at intersections is very important in regulating traffic flow and securing traffic safety. However, no stopping line can be found at existing signalized intersections except those at West Cross, East Cross, in front of the Geser Temple, and on Naryn Zam Street. The absence of stopping lines at intersections has been observed as a major cause of traffic congestion. However, these could not be provided because of poor surface condition.

### **(1) Present Conditions of Road Bridges**

Based on an inventory survey of bridges in Ulaanbaatar, there are 48 bridges in the urban area which include two (2) pre-stressed concrete (PC) girder bridges, 38 reinforced concrete (RC) girder bridges, and one steel girder bridge (see Figure 7.7.3). The foundation of most bridges is of the spread type due to the hard ground. The construction of these bridges started in 1961, averaging at almost 10 bridges a decade, except in the 1990s. Maintenance work on the bridges commenced at the end of the 1990s. In 2007, about Tg. 3.5 billion were allocated for bridge and road maintenance.

**Figure 7.7.3 Location of Existing Bridges**



Note: JICA Study Team based on data obtained from the Ulaanbaatar Road Department.

## **(2) Importance of Road Development**

Roads are not simply meant for traffic; within their influence areas they also affect land use and socio-economic activities. In the long term, the strategy taken to develop roads and road transportation services also determines the urban form. In order therefore to develop and maintain high-quality road infrastructure and facilities, the following need to be duly taken into account:

- (i) Develop roads as an integrated/ coordinated network with clear hierarchy and connectivity as well as road space planning;
- (ii) Improve the quality of road construction and maintenance to ensure smooth and safe travel and to help reduce vehicle operating cost and traffic accidents; and
- (iii) Provide adequate traffic management facilities and measures, including traffic signals, flyovers, pedestrian and safety facilities, parking, public transportation facilities, street/ traffic lights, among others.

The road development strategy delineated in the 2030 plan aims to undertake short-term measures with a long-term perspective. They are more specifically as follows:

### **(a) Short-term measures include:**

- (i) Mitigate traffic congestion through improved traffic management;
- (ii) Eliminate traffic bottlenecks;

- (iii) Rehabilitate/ Restore deteriorated road sections/ facilities; and
  - (iv) Improve traffic safety through better enforcement, campaign, and education, as well as provision of safety facilities.
- (b) **Medium-term measures** include:
- (i) Strengthen road network through widening and new construction in compliance with the long-term network plan;
  - (ii) Improve traffic mobility in key corridors through comprehensive measures, including traffic management and facilities development;
  - (iii) Control roadside activities and land use; and
  - (iv) Provide adequate parking facilities and rules on parking, especially in the city center.



## 7.8 Road and Traffic Management

### 1) Increase in Road Traffic and Congestion

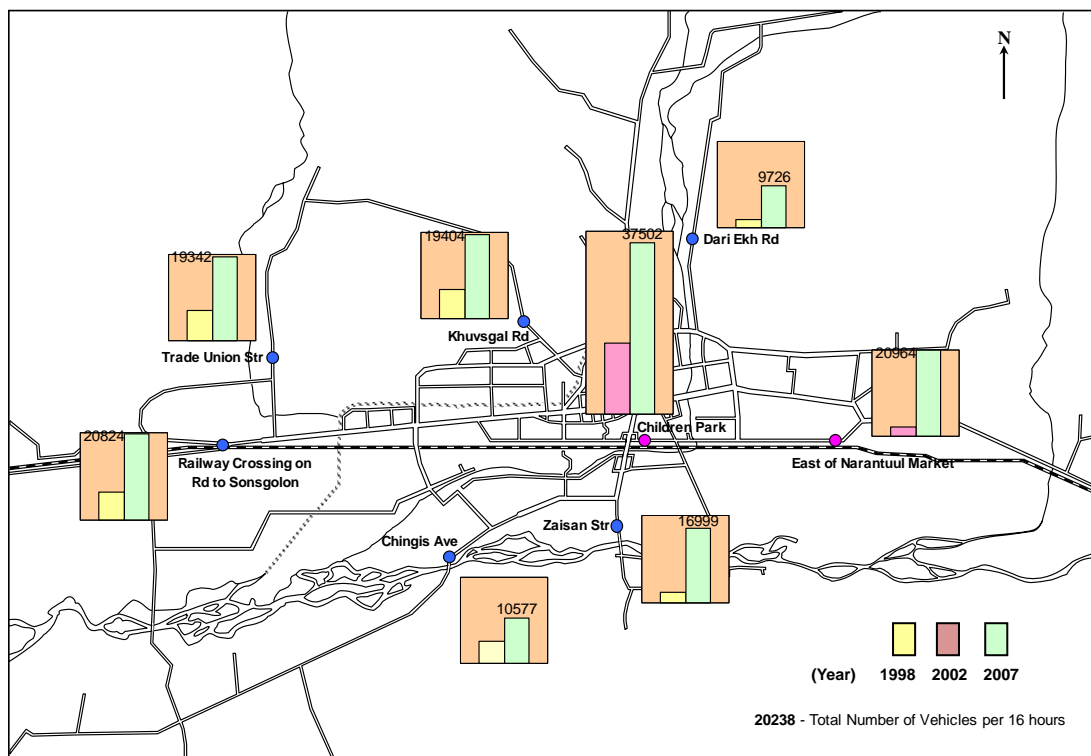
In the last several years, road traffic sharply increased, as clearly shown by a traffic comparison between 1998 and 2007 (see Figure 7.8.1). While the increase in the city center was more or less twice the 1998 figure, those in outer areas are so significant as a result of the expansion of urban areas and the stimulation of socio-economic activities in these areas.

A further assessment of the performance of the road network shows that many sections of main roads are nearing their capacities (see Table 7.8.1). Those with volume-capacity ratios higher than 0.8 are especially susceptible to congestion due to minor traffic accidents and roadwork, as well as inefficient traffic management which all reduce lane capacities. Many sections of main roads, including Peace Avenue, Ilk Toiruu Road, and Chinggis Avenue, fall under this category.

### 2) Travel Speeds

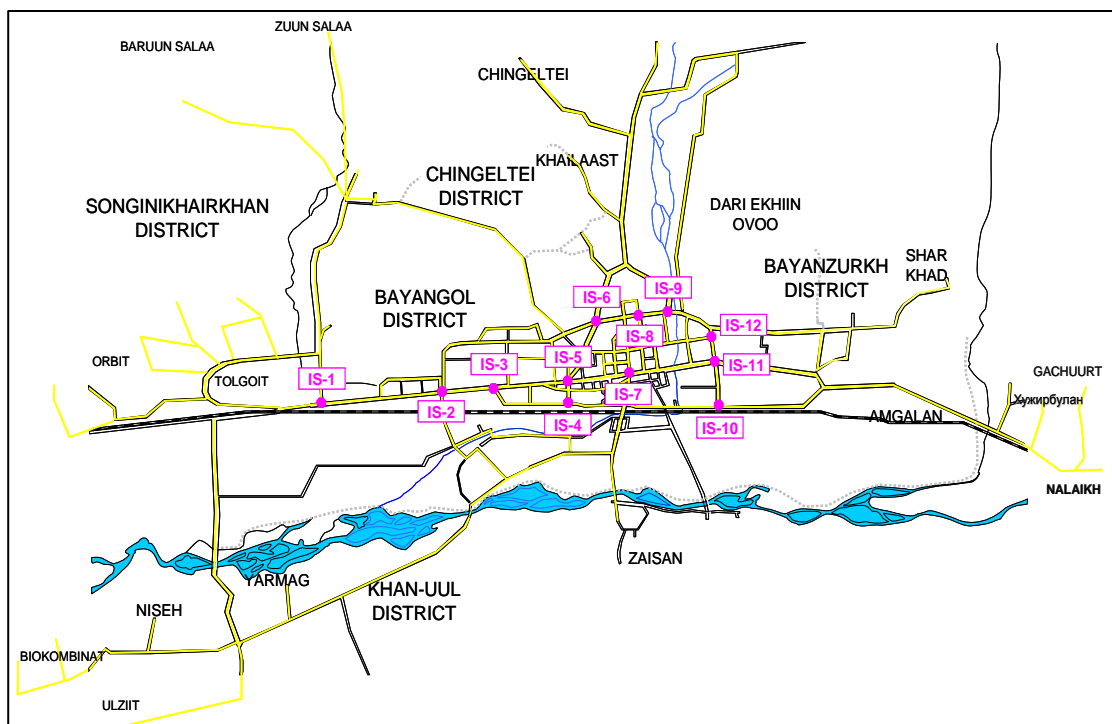
Due to increasing traffic volume and worsening traffic congestion, travel speeds have decreased (see Table 7.8.2). In 1998, the average travel speeds on most sections of the main roads were about 30 - 40 km/h, and in 2007 these decreased to 20 - 25 km/h.

**Figure 7.8.1 Comparison of Road Traffic in 1998, 2002 and 2007**



Source: JICA Study Team

**Figure 7.8.2 Location of Intersection Survey Points**



Source: JICA Study Team.

**Table 7.8.1 Assessment of Main Intersections**

| Intersection | No. of Legs | Total Traffic Volume (no. of veh.) | Saturation Degree | Queue (veh/min/lane) | Remark                         |
|--------------|-------------|------------------------------------|-------------------|----------------------|--------------------------------|
| 1. IS-1      | 3           | 58,289                             | 1.279             | 19.6                 |                                |
| 2. IS-2      | 4           | 95,946                             | 1.043             | N.A                  | Rotary                         |
| 3. IS-3      | 4           | 68,722                             | 1.122             | 13.2                 |                                |
| 4. IS-4      | 4           | 44,800                             | 0.890             | 36.8                 | 3 <sup>th</sup> leg to parking |
| 5. IS-5      | 4           | 72,609                             | 0.937             | 15.6                 |                                |
| 6. IS-6      | 4           | 84,690                             | 1.617             | N.A                  | irregular rotary               |
| 7. IS-7      | 4           | 90,912                             | 0.907             | 38.6                 |                                |
| 8. IS-8      | 4           | 58,208                             | 0.971             | 32.0                 |                                |
| 9. IS-9      | 3           | 54,081                             | 1.013             | 25.0                 |                                |
| 10. IS-10    | 3           | 63,637                             | 1.229             | 25.6                 |                                |
| 11. IS-11    | 4           | 79,689                             | 0.996             | 25.5                 |                                |
| 12. IS-12    | 3           | 39,875                             | 0.716             | 0.0                  |                                |

Source: JICA Study Team.

**Table 7.8.2 Travel Speeds in 1998 and 2007**

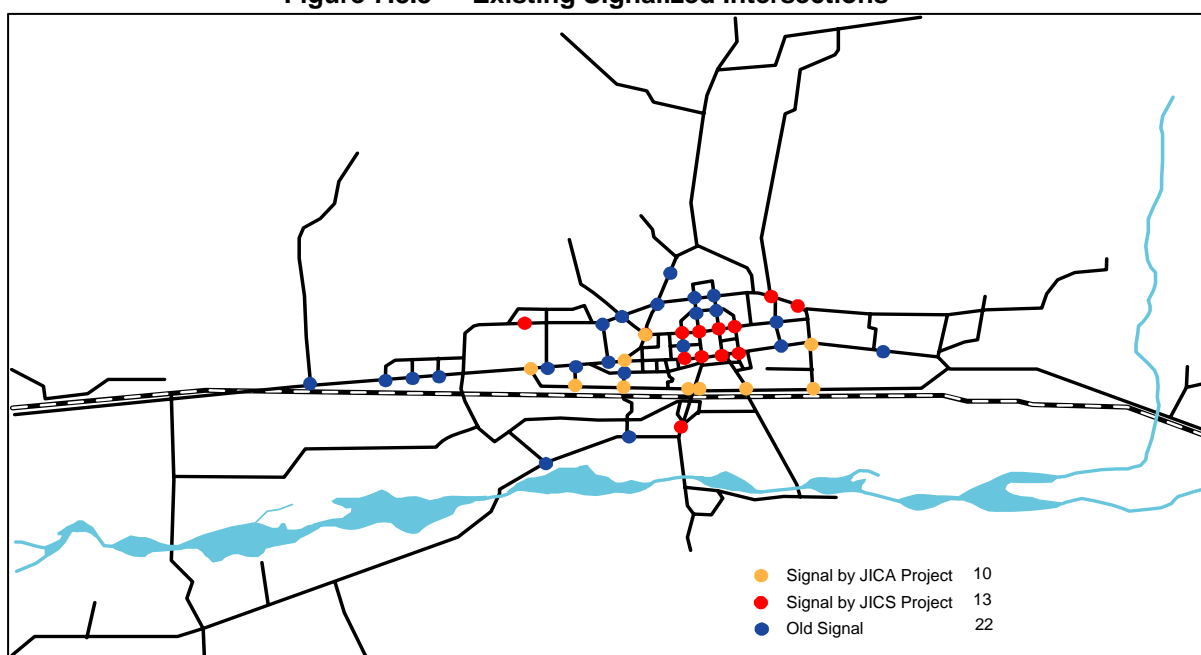
| Vehicle Type | Route                   | Direction | Travel Speed (km/h) |      |
|--------------|-------------------------|-----------|---------------------|------|
|              |                         |           | 1998                | 2007 |
| Car          | Peace Avenue            | East      | 41.1                | 25.4 |
|              |                         | West      | 42.4                | 25.7 |
|              | Khovagakchid-Ihk Toiruu | East      | 30.3                | 21.3 |
|              |                         | West      | 29.0                | 20.9 |
|              | IKH Toiruu              | South     | 40.9                | 19.1 |
|              |                         | North     | 24.5                | 20.3 |
| Bus          | Naray Zam               | East      | 42.3                | 31.7 |
|              |                         | West      | 41.2                | 19.7 |
|              | UBIS-Yarmag             | East      | 35.7                | 21.4 |
|              |                         | West      | 31.9                | 20.1 |
|              | IBIS-Chingehei          | East      | 24.1                | 16.8 |
|              |                         | West      | 24.1                | 18.0 |

Source: JICA Study Team.

### 3) Traffic Signals

Based on the Traffic Management Improvement Project Report, there are now about 210 intersections in Ulaanbaatar City including 48 signalized intersections, as shown in Figure 7.8.3. These signals can be divided into four groups: (i) Russian-made signals installed in the 1970s and 1980s (22 signals referred to as old signals in the figure), (ii) Korean-made signals installed in 2001 mainly in the city center as part of a Japan International Cooperation System (JICS) project (13 signals), (iii) Japan-made signals with Korea-made controllers installed several years ago mainly along Naray Zam Street as part of a JICA project (10 signals), and (iv) recently installed signals locally developed by the Mongolian Technical University using French controllers (three (3) signals). Although major intersections are signalized, it is not clear whether or not all intersections where signal is warranted are signalized.

**Figure 7.8.3 Existing Signalized Intersections**



Source: JICA Study Team.

A study of the existing signals shows that they are not efficient. All are isolated fixed-time signals and there is no coordination between neighboring signals. Moreover, signal phase design and signal timing are not optimized, causing unnecessary delays to vehicles. Although the green arrow signal is introduced to control different movements on the same approach, its usage is not properly designed. The fundamental reason for the inefficient signal operation is the lack of signal design standards including signal warrant, phase sequence design, and calculation of signal timing parameters.

The problem of inadequate intersection geometry is aggravated by the lack of pavement markings which are virtually nonexistent in Ulaanbaatar City, with few exceptions like Naryn Zam, where markings are still visible and function to some extent. It is understandable that severe winter conditions are detrimental to pavement markings. Nonetheless, the improvement of pavement markings is an urgent work as, with relatively small fund, it greatly helps regulate traffic flow particularly at intersections.

Reflective studs are installed along the center line of some streets to supplement the function of pavement markings. Most, however, are covered in dust so that they are not as prominent as expected.

Traffic signs are scarcely used in the city, making it difficult to know the regulation applied at particular locations or sections of streets. The types of sign sparsely installed are for no parking, no parking and stopping, pedestrian crossing, one-way traffic, and no entry of trucks. Reflective sheets are used for traffic signs and their visibility seems good at night.

#### 4) One-way Traffic, Turning Restrictions, and Other Regulations

A one-way traffic system is applied to several streets, as shown in Figure 7.8.4. The most effective is the one-way pair on the east and west sides of Sukhbaatar Square, wherein Sukhbaatar Street is one-way southbound from Juulchin to Peace Avenue, while Ikh Surguuli is one-way northbound from Peace Avenue to Zaluuchuud Street. This one-way pair has reduced congestion at the staggered intersection of Peace Avenue-Ikh Surguuli, although traffic jams are still found at the Peace Avenue-Sukhbaatar Street intersection.

**Figure 7.8.4 Existing One-way Systems in CBD**



Source: JICA Study Team

Turning restrictions, in particular, the left-turn ban, are not adopted at many intersections except for a few such as the Peace Avenue–Baruun Selbe Street intersection, where eastbound traffic on Peace Avenue cannot turn left into Baruun Selbe.

## **5) Traffic Information**

Currently, no real-time traffic information and congestion information are available to road users. However, the Traffic Police plans to have a regular radio program, through which both traffic congestion information and traffic safety rules will be aired.

The introduction of an area traffic control (ATC) system to Ulaanbaatar City is being planned. The system will have vehicle detectors at 22 locations to collect traffic information. In addition, 26 sets of CCTV camera will be installed to monitor traffic flow. The data and image from the detectors and cameras will be valuable traffic information. Once these devices are installed, real-time traffic surveillance can be done and the information can be fed to road users through two (2) variable message signs (VMSs) to be installed at East Cross and West Cross intersections.

## **6) Traffic Enforcement**

Under the existing enforcement system, when a violator is apprehended, the transaction is settled on the spot. A ticket is issued to the violator, and the penalty corresponding to the type of violation is collected by the policeman. The amount of penalty is stipulated in the Mongolian Administration Responsibility Law and ranges from Tg. 2,000 to 3,000. According to the Traffic Police, the amount is considered small and an increase is being planned.

In 2006, about Tg. 500 million were collected in Ulaanbaatar City as fines. As the enforcement procedure improved starting January 2007, the total collection during the first four months of 2007 alone reached Tg. 500 million already. The total collection for 2007 is expected to reach Tg. 1.5 billion. Penalties collected serve as revenue for the city.

For serious offenses, such as drunk driving, driver's licenses are suspended for two (2) - six (6) months.

In March 2007, a pilot project in which penalty was paid through banks was tried for 10 days. The collection rate was 60 - 70%, which is not bad, according to the Traffic Police. The full implementation of the new scheme is, however, suspended as there is no legal basis to collect penalty from those who do not pay.

Punching holes on the driver's license was once tried to record violations. Every time a driver is apprehended for a traffic violation, a hole is punched on the page attached to a violator's driver's license. If one gets three holes, his license is reexamined. The system was abandoned as it was found to also be ineffective in preventing drivers from violating traffic rules.

The city's driver licensing system is already computerized and driver profiles are stored in a database. Only records of heavy offenses are entered into the database. There is no renewal system of driver's licenses, so that if one gets a license, it is valid for life.

## **7) Traffic Discipline**

In Ulaanbaatar City, the level of traffic discipline is not high. Traffic regulation is sometimes not followed, in particular when the Traffic Police are not present. Common violations include

disregarding traffic signals and turning left at intersections where such is prohibited.

According to traffic rules, vehicles going straight have the right of way over left-turning vehicles coming from the opposite approach at intersections. This rule is often ignored; often, left-turning vehicles try to cross the path of those heading straight. Such behavior is not only against the rule but is also very dangerous. Another case found on multilane roads is that of left-turning vehicles occupying the second lane from the center which is assigned for through traffic. Left-turning vehicles blocking through traffic severely reduces intersection capacity.

No priority rule exists at unsignalized intersections and stop signs are not installed to indicate lower priority for crossing the road. Vehicles enter the intersection on a first-come, first-served basis, compromising both efficiency and safety. At roundabouts it is a common rule that vehicles already circulating inside have higher priority over vehicles entering them. The latter must give way to the former so that vehicles will not accumulate inside roundabouts and no congestion occurs. This rule is not observed at such locations as the Sapporo Roundabout.

Another high-priority problem is the lack of protection for pedestrians who are not given priority at intersections and pedestrian crossings. Vehicles do not stop at pedestrian crossings even when there pedestrians trying to cross them. At the same time, jaywalking is common among pedestrians.

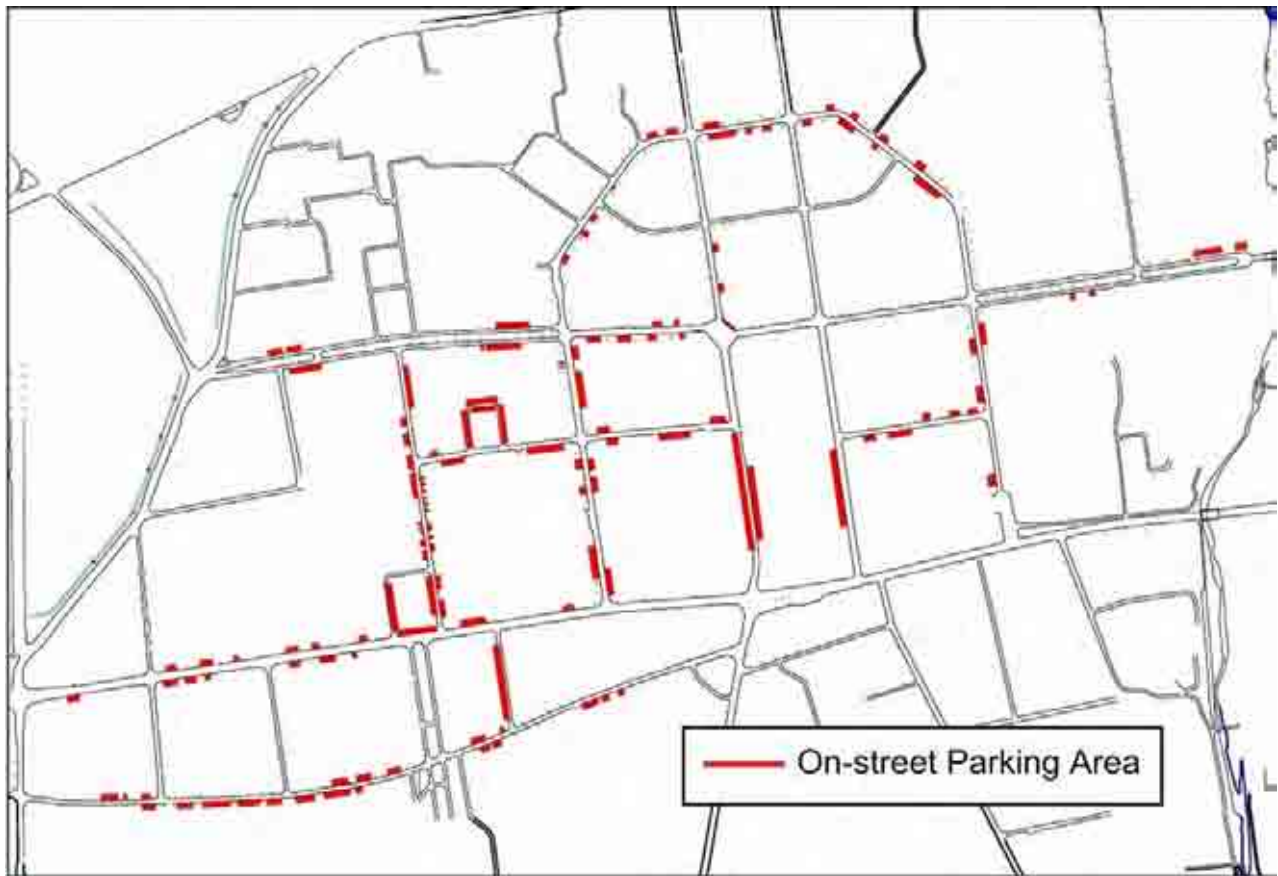
## **8) Parking Management**

One of the serious traffic management problems of Ulaanbaatar City is parking management. There is a big gap between demand and supply of parking space. The number of registered vehicles in the city increased 1.64 times from about 41,000 vehicles in 2000 to 67,000 vehicles in 2004. The annual growth rate is 13.2%. On the other hand, there is very limited number of off-street parking spaces, resulting in acute shortages. In order to alleviate the situation, sidewalks have been converted to roadside parking lots at many locations. They are, however, always full, indicating insufficient supply of parking space in the city center. Vehicles that are not accommodated by roadside parking park either on the sidewalk or roadside, creating serious obstacles to traffic flow.

The rapid increase in the number of vehicles is expected to continue in the next several years even though there are no parking management policies, strategies, and measures in the city at the moment. Such being the case, the parking problem will persist or worsen unless drastic measures are taken to address both parking demand and supply.

In many locations, the direction of roadside parking is either diagonal or perpendicular to traffic flow. Compared with parallel parking, such arrangement causes severe disturbance to the flow, especially when a vehicle tries to leave the parking lot. One of the streets that have parking problems is Sambuu Street which has two lanes in one direction. If both lanes are used as carriageway, traffic flow will be smooth. But the street is congested in the afternoon due to parked vehicles.

**Figure 7.8.5 Location of On-street Parking Areas**



Source: JICA Study Team

## **9) Traffic Management, Safety, and Amenity**

The importance of traffic management cannot be overemphasized, since without it, costly projects would not generate the expected benefits. And while it is likely that the provision of infrastructure will not meet the fast-growing demand, traffic management strategies such as the following can greatly improve the situation:

- (a) Strengthen traffic management and improve traffic flow by enforcing traffic rules/regulations on road parking and use of road space, installing traffic signals for vehicles and pedestrians, etc.;
- (b) Improve management of main transportation corridors by developing infrastructure/facilities, managing traffic, and improving public transportation services to ensure smooth traffic flow and safety along the corridors; and
- (c) Improve traffic management in the CBD by developing infrastructure, improving traffic circulation/ and parking control, improving pedestrian environment, etc.

In the medium- to long-term perspective, the city must introduce car demand management measures. Car ownership has been increasing and should not be discouraged because the people are also entitled to use cars during off-peak hours and weekends/ holidays. However, if the trend in car use continues as is seen today, it is certain that future congestion will

negative effects and to facilitate a shift to public transportation. Car restraint measures include the following:

- (a) Physical restrictions including on-road parking control, requirement for a garage certificate<sup>10</sup>, car use ban such as number coding and car-less days, and vehicle inspection; and
- (b) Economic restrictions, including increased prices for purchasing and registering cars, expansion of pay parking areas, introduction of congestion pricing such as road pricing, area licensing scheme<sup>11</sup>, etc.

The undisciplined behavior of drivers and pedestrians is another main cause of traffic accidents, although poor road surface and the lack of traffic management measures/ facilities are also major contributors. At the same time, accident reporting is not systematically done. Hence the first important steps to improve the situation include the following:

- (a) Strengthen the accident reporting system based on an improved accident database;
- (b) Establish an analysis system available to all interested stakeholders; and
- (c) Build capacities of related agencies for handling an accident data management system.

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<sup>10</sup> Ownership of cars will not be permitted unless the owners certify that they have parking spaces for them.

<sup>11</sup> Vehicle users who want to pass through congested road sections or designated areas, such as the CBD, have to pay for it.



## 7.9 Comprehensive Urban Transport Development

Transportation is one of the most important urban functions which sustain competitive and livable urban development by ensuring mobility and accessibility of the people to needed services as well as smooth movement of goods. Thus transportation affects level of socio-economic activities and quality of life in urban areas. Transportation is also strongly related to the growth and formation of urban areas through interactive impacts between transport and land use over years in the process of urbanization. The impacts of transportation on sustainable urban growth and development need to be attended both from short-term and long-term perspectives.

Quality of transportation is determined by the state of three (3) main components, (a) provision of infrastructure, (b) maintenance and management of infrastructure, and (c) users awareness in using the infrastructure. It is evidently seen in the city today that all these three factors are problematic as explained in previous sections, Resulting in the current transportation problems including among others traffic congestions, traffic accidents, air pollution, poor quality of public transport, poor walking environment, physical and non-physical barriers to transport poor groups, parking in CBD, they can hardly be solved or improved without attending the issues comprehensively.

Ulaanbaatar city has been growing rapidly. In the next two decades urban population is expected to double, income increases by four (4) times, car ownership increases from 20% to 40% of the households. Economic structure of the city and lifestyle of the people are expected to change significantly. Transportation sector needs to respond the process of dynamic change and contribute to the socio-economic improvement of the city. Managing the rapid urban development process is difficult and a big challenge to the Government and society, requiring strategic approach. A long-term goal must be clearly set and various projects/programs be designed and implemented synergistically in a way that they improve immediate problems and concurrent promote long-term objectives.

Key findings and conclusions of the transportation sector are as follows:

- (a) **Integrated Road Network and Land use / Urban Development:** While urban growth and land use management policy are not clearly defined, it is difficult to establish road network development strategy because roads are primary factor to determine the form of urban areas and affect land use. Nevertheless the city has a notable advantage to improve conventional urban areas through enhanced integrated development of urban and transportation. Existing spacious east-west primary roads and north-south connecting roads which cover main urban areas in grid pattern can provide a strong foundation to promote an ideal compact urban area with relatively low investment costs for additional transport infrastructure including roads, LRT, BRT, transport terminals and other facilities. While conventional urban areas, have a lot of opportunities for improvement, the city has following areas would generate more serious problems in the future unless drastic measures are introduced.
- (b) **Growing Ger Areas:** Thinly spreading Ger areas are problematic with necessary transport services efficiently. Cost to provide them is high but beneficiaries are much less compared to those in urban areas. This applies to other type of infrastructure services too. As the budget envelop of the city for transportation development is constrained,

development of transportation infrastructure in the Ger areas will be limited unless policy priority is made clear. From integrated transportation development perspective, it is not advisable to provide substantial public investment in these areas but establish a mechanism to encourage a shift of settlement to inner urban areas, through integrated development.

- (c) **Underutilized zones in existing urban areas:** There are many underutilized areas in the city including industrial zones, airport areas, markets, among others. With integrated transportation development, these areas can provide significant opportunities to improve both transport situation and socio-economic activities of the city.
- (d) **Roads development and management:** While roads are the most important component in transportation development, they are not properly attended. Network still has a lot of bottlenecks and lacks needed facilities for efficient circulation of vehicles and safety of pedestrians. Roads are so poorly maintained that driving is unsafe and high vehicle maintenance costs are required. Before constructing expensive new roads and flyovers, there is a need to maximize the capacity of roads as a network through constructing missing links, removing bottlenecks, and strengthening maintenance.
- (e) **Strengthening Comprehensive Traffic Maintenance:** Traffic management in the city is extremely weak. Poor traffic management is also a cause of traffic congestions, low safety level for vehicles and pedestrians, and chaotic parking. Unless traffic management capacity is improved, effects of any farther investment in infrastructure will be limited.
- (f) **Public Transport Development:** In spite of the current low quality of public transport services, patronage of the people is high. Access to bus stops is long and poor, waiting time is long, buses are old and on-board comfort is low. Unless public transport services are much improved, preference of the people to car use as their income level increases will be accelerated.

Future traffic demand for the city is large. Total demand in terms of no of trips increase by 2.4 times from 2.3 million to 5.5 million from 2007 to 2030, respectively. While the demand increase only by 2.4 times, the impact on road traffic is much larger. The traffic analysis using STRADA indicates that the future traffic in terms of PCU-km and PCU-hour increase by 5 times and more than 10 times, respectively. This makes average travel speed of 27 km/h to 12 km/h between 2007 and 2030, respectively. Similarly increase in transport cost and emissions of pollutant are also significant (see Table 7.9.1).

In order to meet the demand, an analysis was made on the impact of urban growth scenario on urban transport under “Trend” and “Compact” scenarios wherein the former represent, land-use pattern when current development trend continues up to 2030, while the latter represent compact land-use pattern proposed by the study team. The results indicate following (see Table 7.9.1):

- (a) “Compact” scenario shows improved values of mobility indicators by 15% in PCU-km and 22% in PCU-hours. With this average travel speed is faster by 10%.
- (b) With regard to economic indicators, “Compact” scenario shows about 20% reduction in transportation cost which comprise vehicle operating cost (VOC) and travel time cost (TTC).
- (c) Effects on environment of “Compact” scenario are better compared to “Trend” scenario. About 17 to 18% in terms NO<sub>x</sub> and CO<sub>2</sub> emissions, respectively.

Further analysis was made on the impact of transport network development particular regard to LRT/BRT and expressway. The results are briefly as follows (see Table 7.9.1):

- (a) Development of at grade roads alone will not be able to accommodate future traffic demand because there are not much room for developing new roads or widening existing roads in urban centers and build up areas where traffic demand concentrate.
- (b) Development of two grade separated mass-transit lines comprising LRT and BRT can contribute to improvement of traffic situation significantly in the most critical areas of the city. However, roads remain congested in many sections of primary roads. This implies that introduction of LRT and BRT improve mobility of public transport passengers significantly, it will not much contribute to improving traffic congestions on roads, requiring enforcement of car restraint measures.
- (c) Development of expressway provides an opportunity to improve traffic situation significantly. Under this scenario, both public transport and private transport users can enjoy high level of mobility and accessibility.

**Table 7.9.1 Traffic Impact Analysis**

| Indicators             |                           | 2007  | 2030 by scenario |           | Ratio of compact scenario to "Trend" |              |                           |
|------------------------|---------------------------|-------|------------------|-----------|--------------------------------------|--------------|---------------------------|
|                        |                           |       | "Trend"          | "Compact" | with roads only                      | with LRT/BRT | with LRT/BRT & expressway |
| No. of Trips/day (000) |                           | 2,288 | 5,486            | 5,454     | 0.99                                 | 0.99         | 0.99                      |
| Mobility               | PCU-km (000)              | 4,900 | 25,929           | 22,049    | 0.85                                 | 0.76         | 0.77                      |
|                        | PCU-hr (000)              | 184   | 2,189            | 1,700     | 0.78                                 | 0.65         | 0.54                      |
|                        | Ave. speed (km/h)         | 26.7  | 11.8             | 13        | 1.09                                 | 1.18         | 1.42                      |
| Economic               | VOC (\$000/day)           | 666   | 6,689            | 5,350     | 0.80                                 | 0.73         | 0.65                      |
|                        | TTC (\$000/day)           | 268   | 2,886            | 2,239     | 0.78                                 | 0.59         | 0.50                      |
|                        | Total costs               | 934   | 9,575            | 7,590     | 0.79                                 | 0.69         | 0.60                      |
| Environment            | NO <sub>x</sub> (ton/day) | 6     | 46               | 39        | 0.83                                 | 0.78         | 0.74                      |
|                        | CO <sub>2</sub> (ton/day) | 279   | 2,074            | 1,685     | 0.81                                 | 0.66         | 0.60                      |

Source: JICA Study Team

In view of the above, suggested strategies for competitive urban transport development for the city are as follows:

- (a) **Promotion of Public Transport Based City through Integrated Development:** This overall development goal involve following:
  - (i) To realize public-transport based compact urban areas through development of competitive public transport system and integrated urban developments. Public transport system is composed of highly competitive primary mass-transit corridors comprising LRT or BRT. Secondary bus network and other public transport services which will be developed in proper hierarchy, and connectivity with the primary network.
  - (ii) To promote resettlement of households residing in sprawling Ger areas to appropriate areas in and along the mass-transit corridors, through integrated development of underutilized public lands and space.
  - (iii) To develop urban transport network which meet both public and private transport needs effectively at the same time. While private transport use is restricted in and

along the public transport corridors, appropriate environment will be provided during off-peak hours weekends and peak business purposes.

- (b) **Development of Mass-transit Corridors:** Ulaanbaatar city is ideally structured for development of mass-transit corridors in effective manner with high cost-benefit performance, especially along the Peace Avenue. Urban areas with relatively high density developed in a east-west liner form can be effectively served by a mass-transit line. If the urban areas are further developed and redeveloped in integration with the mass-transit system, performance of the system can be farther enhanced. As to choice of a system between LRT and BRT, it depends on the level and features of demand. The study indicates that the demand along the corridor is sufficiently large to justify longer system, say LRT, particularly in the central and heavily developed areas, while the other areas need less capacity. It is concluded that a combination of LRT and BRT can best form the mass-transit function along the Peace Avenue. The second corridor is important in two ways: one to integrate central urban areas with the first corridor and two to integrate growing urban areas in the south-west and the north. Needless to say, urban development must be closely coordinated with the mass-transit development. The second corridor can also be a combination of LRT in the central area and BRT in other areas. As to type of structure, it is a view of the study team the system must be either elevated or underground in city centre and density developed urban areas due to following reasons:
- (i) Although space is available in Peace Avenue, future traffic demand along the Peace Avenue will be much longer including private transport. There are also a number of main roads which intersect with the Peace Avenue.
  - (ii) Segregated at-grade LRT/BRT will separate urban areas of both sides.
  - (iii) Grade-separated mass-transit system can increase overall transport capacities of the corridor significantly.
  - (iv) Grade-separated mass-transit system of either elevated or under ground can facilitate integrated urban development at and around the stations. Especially underground system in the central part of the city can provide attractive opportunities for underground space development.
  - (v) Grade separated system can enhance an image of the city.
- (c) **Immediate Undertaking of Short-term Programs:** Prior to any heavy investment on transport infrastructures, the city must attend unfinished work in many areas such as:
- (i) **Strengthening of Road Network Management:** This includes improved maintenance, rehabilitation of damaged infrastructures, removal of bottlenecks, construction of missing links to improve connectivity and performance of network.
  - (ii) **Strengthening of Traffic Management:** This includes improvement of traffic circulation, parking control and improvement of pedestrian environment to maximize the use of available traffic capacity and enhance road transport environment. Inspection of road vehicles must also be gradually strengthened to reduce emissions. Traffic safety must also be attended through comprehensive measures.
  - (iii) **Improvement of Public Transport Services:** Current public transport users must be provided with improved services through introduction of new buses, rationalization of bus routes, improvement of bus operation and bus facilities, and maintaining

affordable fares, especially for the poor.

- (iv) Enhancement of Public Awareness on Urban Transport Issues: Many existing transport problems facing the city can be attributed to low awareness of transport service providers and users. The city must take an initiative to enhance awareness of the society through formal education, constant campaigns, improved enforcement, among others.

## 8 STRATEGY OF HOUSING POLICIES

### 8.1 Current Housing Policies and Housing Development Issues

Current housing policies in Mongolia originated with the start of “Housing Finance Project” conducted by ADB in 2002 and construction of “40,000 Housing Units Program” supported by GTZ in 2006. Also, ADB’s Japan Fund for Poverty Reduction (JFPR) projects and “Community-led Infrastructure Development Project” supported by the World Bank-Netherlands Water Partnership influenced the direction of housing policies in Mongolia.

Commercial banks started housing loan services in 2002 for middle and upper-low income groups, with the loan resources of “Housing Finance Project” and their own resources; they also started housing loan services in 2007 for people with monthly income over 450,000 Tg, using national bond funds for “40,000 Housing Units Program.” The Mongolian Housing Finance Corporation (MHFC) was established in 2006, by the initiative of MCUD, MOF and UB City, as the public corporation for implementing the “40,000 Housing Units Program.”

However, the current housing policies don’t target vulnerable groups belonging to the low income and poor class; rather they focus more on the supply side (housing development) than the demand side (housing finance). Figure 12.1.1 shows the income groups covered by the current housing policies both on the supply side and the demand side. To classify household income groups from high to low, we adopted the results of the interview survey on the household expenditure in “Housing Finance Project” conducted by ADB.

ADB and NGOs are providing financial assistance for vulnerable groups from the housing development fund and micro-credit finance, but those activities are not in the mainstream of housing policies. The ADB’s “Housing Finance Project” finished in 2007 and is not sustainable. At present, private developers are the major players on the housing supply side, and commercial banks are the major players on the housing demand side.

The central government tries to help private developers to promote housing development by exempting their consumption tax and import tax for construction materials. However, these benefits don’t reach the vulnerable groups who are suffering from the steep rise in prices of houses. On the other hand, the central government tasks private developers to provide 20% of the constructed houses for war veterans without profit and further to donate 2% of the houses to them gratis. However, there are no housing policies for the low income group.

**Figure 8.1.1 Current Housing Policy Framework —Income Group Covered by Current Housing Policies in Mongolia**

| Household Income Group                             | Housing Development (Supply Side)                            |   | Housing Finance (Demand Side)                           |  |
|--|--|---|---|--|
| High Income Group<br>( > 700,000Tg./Month)         |  | Private Sector<br><br>Consumption tax and Import tax exemption / 20% of houses provided for war veterans without developer's profits / 2% of houses donated to them | Mongolian Housing Finance Corporation + Commercial Bank | Commercial Bank + Mongolian Mortgage Corporation (MIK) |
| Middle Income Group<br>(300,000—700,000 Tg./Month) | Mongolian Housing Finance Corporation + Construction Company |   |   | ADB<br>Housing Finance Project (HFP)                   |
| Low Income Group<br>(63,000—300,000 Tg./Month)     |  | Self-Help (Partially Supported by Donor, NGO and Community Based Organizations (CBO))   | NGO Fund  | Japan Fund for Poverty Reduction (JFPR)                |
| Poor People<br>( < 63,000 Tg./Month)               |  |   |   |  |

Source: JICA Study Team

MHFC is managed and operated as a limited liability company in spite of its being a public corporation. The president of MHFC resigned in November 2007 and MHFC was reorganized since it had suffered from financial problems. MHFC has supplied few houses yet, but can develop on national and city-owned land gratis and use national bond funds pooled in commercial banks as financial resources for both housing construction and housing loan. Therefore, they are obliged to provide lower priced houses than private developers, for people whose monthly income is around 450,000 Tg (middle income class). However, the recent steep rise in construction cost makes it difficult to supply low cost houses of US\$ 350/m<sup>2</sup> which is the regulated construction cost by MHFC. Since MHFC doesn't yet have much experience and know-how for housing development and can't cover the low income group, enhancement of their institutional capacity as a public corporation is required in order to realize increase in the housing supply for the low income group.

Mongolian Mortgage Corporation (MIK) was established in 2007 by Bank of Mongolia and ten (10) commercial banks to make a long term framework of housing loan resources, for developing the housing market and for stabilizing the long term financial resources. The desired effect of MIK has not be realized yet, but the legal enhancement of the mortgage system is, at present, regarded as a major topic of the current housing policies in Mongolia.

Most the low income class people living in Ger areas are forced to build their own houses and to improve the living environment by their own self-help system. There is no access to the housing loans for them. ADB and NGOs assist them in formulating community based organizations (CBOs) and saving groups, and provide the community with mortgage loans for community development. Seven (7) CBOs have been formed in UB City but they are not very strong yet. Therefore, it's vitally important to promote community-led living environmental improvement based on a dweller participatory system all over the Ger areas.



## 8.2 Comparison of Housing Policies with 4 Southeast Asian Countries

In this section, we compare the current housing policies of Mongolia with the housing policies executed in four (4) Southeast Asian countries: Indonesia, Thailand, the Philippines, and Malaysia. Table 8.2.1 shows the summary of housing policies, housing finance, housing development (sale and rental houses), and slum clearance in these countries. This comparison will be useful for judging how to introduce proper housing policies in Mongolia.

### 1) Government Intervention for Housing Finance

In Malaysia and Thailand, secondary mortgage corporations were established for realizing long term housing loans. The Malaysian mortgage system is referred to as a good model for the other Southeast Asian countries. The Mongolian government also adopted the Malaysian system for the establishment of MIK in 2007. USAID provides technical assistance for them to upgrade the investment environment to attract foreign and domestic investors, to clarify the security standards, and to pass the related laws ("The Law on Securitization and Asset Backed securities" and "The Law on Collateralized Mortgage Bonds") in the State Great Khural.

In the four (4) countries, the central governments provide preferential interest rates for funds together with the benefits of tax exemption so public institutions can develop the low cost housing. In Mongolia, MHFC also can use the housing fund financed by a 60 billion Tg national bond for both housing construction (60% of the total fund) and housing loans (40% of the total fund), and can develop on national and city-owned land gratis. However, the national bond is pooled in a commercial bank which is in charge of risk management for providing the funds. MHFC is not authorized to manage the housing finance by themselves because they lack financial capacity.

In Indonesia, the Philippines and Thailand, the public financial Institutions provide the low interest rate loans for low-income house purchasers. In Mongolia, MHFC provides housing loans indirectly for households whose monthly income is around 450,000 Tg (middle income class) through a commercial bank in which the national bond of 60 billion TG is pooled. The specification of the housing loan is as follows:

- Maximum amount of loan: 25 million Tg
- Downpayment: Over 25% of the purchasing price
- Interest rate: 11% per year
- Repayment period: 10 years
- Maximum amount of repayment: Within 40% of annual household income

This loan system in Mongolia is not accessible for low income class households and it's difficult even for the middle income class households to purchase the houses of 50 m<sup>2</sup> sold at US\$ 500/m<sup>2</sup>. The current steep rise in housing prices makes it even more difficult.

In Singapore, China, and Malaysia, the central provident fund (pension fund) is utilized for house purchasers. People in each of these countries enjoy the benefits from this fund when they purchase houses. In Singapore, 40% of monthly salary is paid for the fund by both employer and employee. In contrast, in Mongolia, the national government legally prohibits

the use of pension funds for another purpose, but this policy will be reviewed for new housing financial sources.

In the countries above, low income class people are usually subsidized directly by discounting the sale price by the national government. In Mongolia, a steep rise in construction cost hinders adopting this type of subsidy system, but USAID is now providing technical assistance for the Mongolian government in order that all the middle income class people with household income over 300,000 Tg./month can access the housing loans by subsidizing the purchasers down payment.

The national governments of the Southeast Asian countries searched for innovation of the financial policy and system so as to enable commercial banks to participate in the public finance field. However, the importance of public finance institutions has to be examined in Mongolia in order to raise cheap funding to assist low income class people to purchase houses.

**Table 8.2.1 Comparison of Housing Policies in Four (4) Southeast Asian Countries**

(1/2)

|                 |         | Indonesia  | Thailand   | Philippines  | Malaysia  | Mongolia  |
|-----------------|---------|--|--|--|---|---|
| Housing Policy  |         | <ul style="list-style-type: none"> <li>Specified Housing Policy in National Development Plan</li> <li>Changing to Make much of Market Mechanism</li> </ul>     | <ul style="list-style-type: none"> <li>Each Government Agency has a role in Housing Policy</li> <li>Housing Finance and Development relies on Market Mechanisms</li> </ul>                           | <ul style="list-style-type: none"> <li>Housing and Urban Development Coordinating Council, Office of the President in Charge of Medium Term Plan of Housing Development</li> </ul>   | <ul style="list-style-type: none"> <li>Specified Housing Supply Plan in National Development Plan</li> <li>Government's Promotion for Housing Ownership</li> </ul>                                      | <ul style="list-style-type: none"> <li>40000 Housing Units Program</li> </ul>   |
| Housing Finance | Public  | <ul style="list-style-type: none"> <li>National Saving Bank (BTN) Exclusively in charge of Low Interest Rate Financing for Low Cost House Purchaser</li> </ul> | <ul style="list-style-type: none"> <li>Over 50% of Housing Finance by Government Housing Bank (GHB)</li> <li>GHB's Promotion of Saving and Low Interest Rate Finance for Low Income Group</li> </ul> | <ul style="list-style-type: none"> <li>Low Interest Rate Finance by National Home Mortgage Finance Corporation (NHMFC)</li> <li>NHMFC's Breakdown in 1996 and Falling into Functional Disorder in Housing Finance</li> </ul> | <ul style="list-style-type: none"> <li>No Public Finance Organization for Housing</li> <li>Mortgage Corporation Established in 1987 as a Model for others in Southeast Asia</li> </ul>                  | <ul style="list-style-type: none"> <li>MHFC's Indirect Finance of Loan for Middle and Upper Income Groups Using the Pooled National Bond Fund in Commercial Bank</li> <li>Mongolian Mortgage Corporation Established in 2007</li> </ul> |
|                 | Private | <ul style="list-style-type: none"> <li>Commercial Bank Enlarging Housing Finance Business</li> </ul>   | <ul style="list-style-type: none"> <li>Commercial Bank Financing for High and Middle Income Group</li> <li>Commercial Bank's Share Taken away by GHB</li> </ul>                                      | <ul style="list-style-type: none"> <li>Commercial Bank Financing for Middle and High Cost House</li> <li>Pull-down of Minimum Loan Amount</li> <li>Affiliation with 3 Major Mutual and Pension Fund</li> </ul>               | <ul style="list-style-type: none"> <li>Commercial Bank Financing for All Income Group</li> <li>Lending Obligation for Low Cost House Purchasers, Allotted to Commercial Bank by Central Bank</li> </ul> | <ul style="list-style-type: none"> <li>Commercial Bank Financing for High and Middle Income Group</li> <li>Owing Substitutive Function for Public Institution such as ADB, MHFC</li> </ul>  |

(2/2)

|                        |         | Indonesia   | Thailand   | Philippines  | Malaysia  | Mongolia   |
|------------------------|---------|---|--|--|---|--|
| Sale House Development | Public  | <ul style="list-style-type: none"> <li>• Housing and Urban Development Corporation in Charge of Supplying Almost Half of Low Cost Houses</li> </ul>   | <ul style="list-style-type: none"> <li>• National Housing Authority(NHA) in Charge of Supplying Houses for Low and Middle Income Group and Promoting Slum Clearance</li> </ul>     | <ul style="list-style-type: none"> <li>• National Housing Agency(NHA) in Charge of Urban Redevelopment and Low Cost Housing Development</li> <li>• NHA Making much of Urban Redevelopment in terms of Demarcation with Private Sector</li> </ul> | <ul style="list-style-type: none"> <li>• State Economic Development Corporation(SEDG) in Charge of Housing Development as a part of Regional Development</li> </ul>   | <ul style="list-style-type: none"> <li>• MHFC in charge of Supplying Middle and Lower High Income Class Houses Making Use of Cheap Construction Materials and National and city-owned land Gratis</li> </ul> |
|                        | Private | <ul style="list-style-type: none"> <li>• Large Developers for Middle and High Cost Houses and Small and Medium Developers for Low Cost Housing Categorized</li> </ul>                                       | <ul style="list-style-type: none"> <li>• Over 80% of Houses Developed by Private Sector</li> <li>• Small Developers Facing Financial Issues due to Oversupply of Houses</li> </ul> | <ul style="list-style-type: none"> <li>• Low Cost Housing Developers Financially Distressed, due to no Financial Support</li> </ul>  | <ul style="list-style-type: none"> <li>• No. of Low Cost Houses and Bumi Households allotted to each Development Project</li> <li>• Internal Cross Subsidy</li> </ul> | <ul style="list-style-type: none"> <li>• Housing Development for Middle and High Income Group</li> <li>• Steep Rise in Construction Cost Limiting the Income Level of Purchasers</li> </ul>                  |
| Rent House Development |         | <ul style="list-style-type: none"> <li>• 1% of Total Housing Units Provided for Rental Houses by Housing and Urban Development Corporation</li> <li>• Public Financing for Private Rental Houses</li> </ul> | <ul style="list-style-type: none"> <li>• 10% of Housing Units Provided for Rental Houses by NHA</li> <li>• Rental House Projects with Purchase Right Conducted</li> </ul>          | <ul style="list-style-type: none"> <li>• NHA Supplying a few Rental Houses on the Public Land of Local Gov.</li> <li>• Not so Active due to the Rental Fee Regulation</li> </ul>   | <ul style="list-style-type: none"> <li>• SEDG Providing Rent Houses for Poor Immigrants for 5 Year Limited Period, Getting a Finance from Central Bank</li> </ul>     | <ul style="list-style-type: none"> <li>• No Rental House Development Plan by MHFC</li> </ul>   |
| Slum Clearance etc.    |         | <ul style="list-style-type: none"> <li>• Kampung Improvement Project</li> </ul>   | <ul style="list-style-type: none"> <li>• Improvement of Living Conditions by CODI</li> </ul>   | <ul style="list-style-type: none"> <li>• Community mortgage Program by NHA</li> </ul>  | <ul style="list-style-type: none"> <li>• Low Cost House Development for Squatter's Removal by SEDG</li> </ul>   | <ul style="list-style-type: none"> <li>• NGO's Community Development Activities in Ger Area</li> </ul>   |

Source: Journal of Research Institute for Development and Finance, No.8 Nov. 2001

## **2) Government Interventions for Housing Development**

Each of the four (4) Southeast Asian countries has a public housing corporation/developer established under the control of the national government that is obliged to supply housing for the low income class. In these countries, there is no public institution like MHFC which is a limited liability company and can't target low income class housing.

In the four (4) Southeast Asian countries, the national governments task the private developers to provide the low income class houses for at a certain portion of their development sites. For instance, 20% of houses constructed should be allocated for the low income class for large scale projects over a certain scale in the Philippines, 60% of houses for large scale projects over 200 ha in Indonesia, and different percentages of houses depending on project scales in Malaysia. However, this type of obligatory allotment of low income class houses is not going well in these countries. Thus, it is important to provide incentives for private developers such as deregulation of floor area ratio and tax exemption in exchange of the construction of low income class houses.

The percentage of low cost houses constructed by public institutions is different by country in the four (4) Southeast Asian countries, on average 10% to the total houses constructed. The Mongolian government can refer to this percentage as a target indicator.

The national governments of the four (4) countries allow the public institutions to develop middle income class houses in order to cross-subsidize development of low income class houses. In Mongolia, MHFC is also adopting this system, but cannot develop the low income class houses because of the steep rise in construction costs.

Each of the four (4) Southeast countries has separate public institutions for housing finance and for housing development while MHFC has both the functions in itself. However, the financial function of MHFC depends a lot upon the capacity of commercial banks, which are very weak. The merit of MHFC is that it can provide the low priced houses (about US\$500/m<sup>2</sup>), compared with those by private developers (US\$650/m<sup>2</sup> to US\$1,000/m<sup>2</sup>), as it can develop on national and city-owned land gratis and they have exclusive contracts with plants producing the cement and iron reinforcing rod. The commercial bank takes care of funding for housing construction and housing loans, but it takes so a lot of time to provide the funds and they face the problems, as the regulation for construction cost and the funding procedure is very severe and complicated.

## **3) Rental House Development**

Development of rental houses is not so popular in the Southeast Asian countries because the maintenance and operation is costly compared with the rent income. For example, 1% of the total houses are developed for rent in Indonesia, 10% in Thailand; and in Malaysia, rent houses are developed only for poor immigrants and seasonal workers only for five (5) years. In Mongolia, most of the houses are self-owned and MHFC has no plan to develop rental houses. Some immigrants to UB City seem to rent a part of the relative's houses in Ger areas. The rental house issue is expected to be examined in order to provide temporary accommodations for the increasing immigrants to UB City.

In Indonesia, the government examines the possibility of public financing for the private development of rental houses. As most of the immigrants into UB City are very poor, it may be difficult to introduce this type of housing policy in Mongolia; however it's worthy studying the possibilities in Ger areas.

#### **4) Slum Clearance**

New housing policies have been put into practice for the slum clearance in the four (4) Southeast Asian countries. The mainstream of these slum clearances is community-led environment improvement of living conditions. It is programmed through the participatory bottom-up approach by dwellers and NGOs, not the conventional top-down approach by the government. The following are such projects in the four (4) countries:

- Indonesia: Community mortgage projects named KIP-Plus executed for the land and housing development with Kampung Improvement Project (KIP)
- Thailand: Self-help housing construction, improvement of living conditions and job creation with micro-finance provided by "Community Organizations Development institute (CODI)"
- The Philippines: Urban redevelopment of slum districts with community mortgage program by National Housing Authority (NHA)
- Malaysia: Low cost house development for removing squatters by "State Economic Development Corporation (SEDC)"

In Mongolia, a community mortgage program is being executed by ADB and NGOs in a limited number of Ger areas; however it is very important to apply the community mortgage program in larger Ger areas more effectively by enhancing the community network.

In Mongolia, there are no community organizations like "Community Organizations Development Institute (CODI)" in Thailand which cope institutionally and sustainably with the issues of worsening living environment. It is desirable to establish such an organization to solve the present urban problems in Ger areas.

### 8.3 Targeted Housing Policy Framework

In this Section, the housing policy framework in Mongolia is discussed in reference to the housing policies of the four (4) South Asian countries. The current housing policies in Mongolia focus more on the housing supply side than the demand side. New organizations to enhance the current housing policies in housing finance (demand side) and development (supply side) system are also described. The housing policy framework should cover the following:

- Targeted Housing Policy Framework
- Housing Demand and Supply
- Construction Cost Policy
- Affordable Housing Model

Table 8.3.1 shows the targeted housing policy framework expected to be introduced in Mongolia. All income groups, especially the low income group and the poor, have to be covered by the targeted housing policy framework. MHFC's function of housing finance and housing development is expected to be reorganized into "Housing Development Financing Institution (HDFI)" and "Social Housing Corporation (SHC)" as national or municipal agencies in order to enhance the institutional capacity of MHFC. The details are explained below.

#### 1) Housing Finance System (Demand Side)

For the enhancement of the current housing finance system in Mongolia, the establishment of "Housing Development Financing Institution (HDFI)" and "Community Organizations Development Institute (CODI)" is very important for assistance to low income and poor people. The basic concepts of these two organizations are explained below.

##### (1) Housing Development Financing Institution (HDFI)

In the Housing Law of Mongolia, the article to enable the establishment of "Housing Development Fund (HDF)" had been incorporated for the purpose of the housing and infrastructure development, and thereby the financial resources and the disbursement procedure is precisely stipulated. However, the central government invalidated this article by the Law on Government Ad Hoc Fund approved on 29th June, 2006.

The loan agreement of ADB's "Housing Finance Project (HFP)" stipulates "the immediate establishment of ad hoc account for the housing financing fund at the Bank of Mongolia and by the finalization of the project, and the remaining account subsidy should be transferred into HDF and should be utilized as the subsidy for further crediting actions". The implementation manual of this project stipulates "the operation of the project administrative unit will be finalized as of 30 June 2007, and according to the loan agreement by 15th May 2033 or for 32 years, the loan must be repaid completely."

Since the start of the project implementation, HDF has distributed the housing finance loans totaling 24.5 trillion Tg. for 2,199 borrowers via the commercial bank. At the end of the loan recovery process, it currently has collected 6.6 trillion Tg., from which 3.8 trillion Tg. was paid out for the main loan debt and 2.8 trillion Tg. was given for loan interest payment. According to

the project documentation, the housing loan interest given to the commercial banks and the expenditure difference of MOF or 40% of the total interest is allocated in the HDF's account of the State Treasury and currently amounts to 1.1 trillion Tg..

The project document which was approved by Board of Directors of ADB on 15th May, 2002 stipulates "After the finalization of the project implementation, the entire subsidy from the loan recovery should be centralized at HDF and will be utilized as a sub-fund for the housing development for low income residents of Ger area and as of today, the amount of this fund is equal to over 200 million Tg."

Paragraph 2 of Article 2 of "The International Agreement Law of Mongolia" stipulates that "the article of the international agreements would be effective and matter to follow". Also in Article 19 of this law stipulates "Other organization within the framework of the related issues under the agreements, the special agencies and Ministries of Mongolia will execute the obligations of the Mongolian side." Based on this International Agreement Law, MCUD submitted a proposal to revise "The Law on Government Ad Hoc Fund" to the State Great Khural, to provide the legal basis for the utilization of HDF, with which the national government promotes the housing and infrastructure development for the low and middle income groups.

ADB had a plan at the initial stage to establish "the Housing Development Financing Institution (HDFI)" as an institution to provide HDF; however it has not been decided yet. The national government expects MHFC to operate HDF directly, but ADB is now examining whether it will provide HDF directly for the borrowers or via the commercial banks because of the lack of MHFC's capacity.

As it is vitally important to promote the housing development especially for the low and middle income groups in Mongolia, it has to be urgently examined to establish HDFI as a financing institution not only for operating HDF but also for operating other financial resources such as "Mongolian Development Fund", "National Pension Fund" and "Housing Development Mutual Fund". HDFI itself has the financial function as a mortgage corporation and will play an important role to provide the long term and low interest rate loans for the low and middle income groups. For the moment, the commercial banks and MIK may play this role; but it is difficult to substitute for HDFI for meeting the housing demand of the low income group.

- "Mongolian Development Fund" is the major financial resources of Mongolia, based on the tax revenue from the mining industry. It's expected to be utilized as investment resources of various fields, and this fund is expected to solve the worsening housing issues.
- "National Pension Fund" has a major role as financial resource for the housing development in Singapore and China, etc., and they have achieved to solve the housing issue with this fund. In Mongolia, it's legally prohibited to utilize "National Pension Fund" for other purposes but they have a fund of 100 billion TG and the effective use of this fund for the housing development is expected.
- "Housing Development Mutual Fund" is a membership-based system to provide funds for its members. This system is executed in the Philippines, etc., and is one of the choices to be examined in Mongolia.

The financing department of MHFC will be incorporated into HDFI as a national or municipal



agency and expected to play an important role for the finance of low cost houses. The style of a limited liability company is not desirable for executing the unprofitable financing work for the low cost housing; and the organizational character of MHFC should be changed and upgraded to a public institution as in other countries.

## **(2) Community Organization Development Institute (CODI)**

In Thailand, “Site and Service” and “Land Sharing System” was promoted before 1990; the financial burden to the government was so large that there were less achievements against the expansion of slum areas than expected. The national government has changed the traditional slum clearance policies to the enabling empowerment policies in the “7th National Economic and Social Development Plan (1992-1996)”, incorporating a micro-credit finance system such as Grameen Bank in Bangladesh, and CMP system in the Philippines.

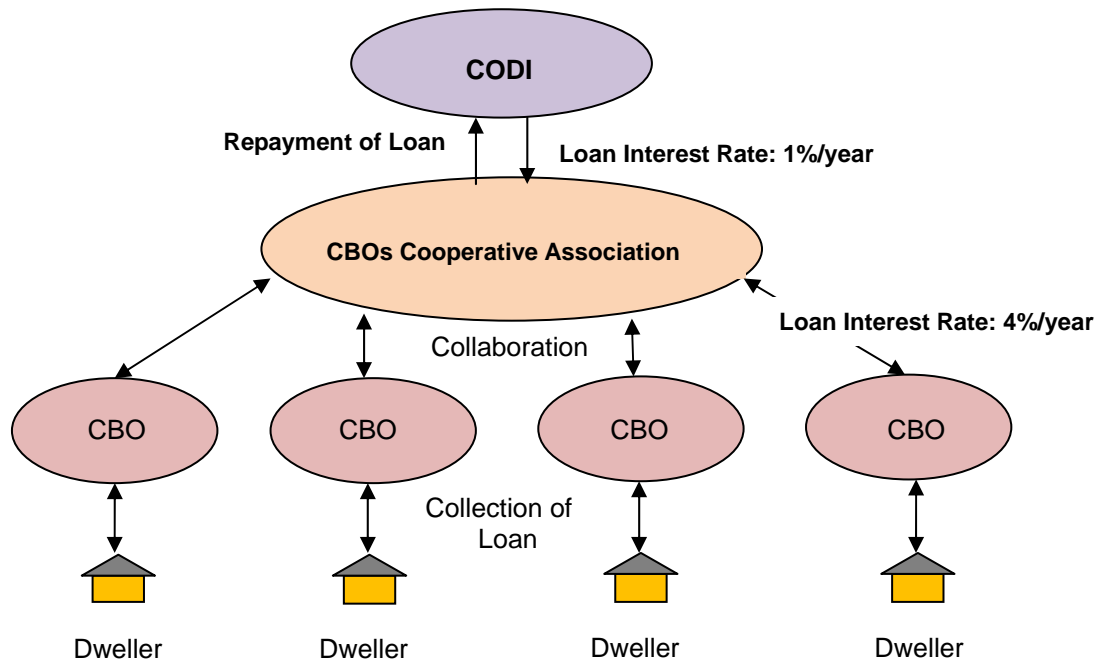
The Community Organization Development Institute (CODI) was established in 2000 in Thailand, for promoting the community development in slum areas. The history of CODI is as follows:

- Urban Community Development Office (UCDO) established in 1992 under National Housing Authority (NHA)
- Merged with Farm Village Development Fund in 2000 into CODI under Ministry of Social Development and Human Security

CODI takes a community network based bottom-up approach by providing the community mortgage loans and subsidy for the self-help housing construction, the improvement of living environment, and training to allow informal workers be engaged in formal jobs, etc. The traditional top-down approach by the government agency of National Housing Authority (NHA) was reviewed because of the limited financial resources. In 2003, the five-year Baan Mankong Program (BMP) was started to improve the living environment, which covers 300,000 households of 2,000 community districts in 200 cities of Thailand; now over 600 saving groups have been formed under the support of CODI.

The characteristic of community development by CODI is found in the process of mutual consent. The process starts from the identification of dweller's shared territorial bonds and consciousness for the living environment, which is done by NGOs, and then the mutual consensus in each of the small community groups comprised of 10 to 20 households is made. The community is divided into small community groups based on the shared territorial bonds of dwellers and the living environment issues which the dwellers are facing. The mutual consensus will spread out to the entire community by integrating small community groups. In this process, the small community groups will be reformed as “Community Based Organization (CBO).” At the same time, a savings group will be formulated to apply for a community mortgage loan in the future. The CBO members will select a CBO leader by voting and “CBOs Cooperative Association” will be formed with the representatives of the CBOs in the community. The community leader will be also selected by voting at the general assembly of “CBOs Cooperative Association”. This “CBOs Cooperative Association” is qualified as a legally approved corporation that enables the dwellers to get a community mortgage loans through the association, as illustrated on Figure 8.3.1.

**Figure 8.3.1 Operation System of CBOs in Bonkai District, Thailand**



Source: City Planning Theses No42-1, pp106-pp111, Japan City Planning Academy  
"Research on Community Development through Small Community Organization"  
by Atsushi Kawasumi and Toshinobu Fujii

**Figure 8.3.2 Targeted Housing Policy Framework—Income Group Covered by Targeted Housing Policies in Mongolia**

| Household Income Group                            | Housing Development (Supply Side)                              |   | Housing Finance (Demand Side)  |  |
|---|--|---|--|--|
| High Income Group<br>( > 700,000Tg./month)        | Private Sector   |   | Commercial Bank<br>+<br>Mortgage Corporation<br>+<br>Escrow Account (Down Payment Subsidy)   |  |
| Middle Income Group<br>(300,000—700,000Tg./month) | Contribution to Social Housing Development with PPP Mechanism  | Social Housing Corporation / Economic Development Corporation | Long Term Housing Loan   | Housing Development Financing Institution (Housing Development Fund / Central Provident Fund / Others) |
| Low Income Group<br>(63,000—300,000Tg./month)     | Community & Local Partnership Housing with Self-Help Mechanism | Housing Subsidy for Low Income Group                          | Community Organization Development Institute (CODI)<br><br>Community Mortgage Loan / Subsidy | Long Term & Low Interest Rate Housing Loan / Housing Subsidy   |
| Poor People<br>( > 63,000Tg./month)               |  |   |  |  |

Note: # Owing Function Itself as Secondary Mortgage Corporation

Source: JICA Study Team

CODI in Thailand had four (4) types of loans before 1998: (a) Revolving Fund Loan from the loan repayment, (b) Business & Income Creation Loan, (c) Land and Housing Development Loan, and (d) Housing Improvement Loan. The Revolving Network Loan for the savings groups and the network formed among communities, Community Entrepreneur Loan, and Miyazawa Revival Loan for the recovery from the economic crisis were newly incorporated in 1999.

The major achievements of CODI can be summarized as follows:

- To have enabled the poor people to build the self-help housing and to promote the improvement of their living environment by organizing savings groups and cooperative associations.
- To have enabled the communities to influence regional development by enhancing the community network system, and as a result, to establish the support system by CODI, NHA, and the local government.
- To have enabled the community organization to play major roles dynamically at every phase of development.
- To have proved that poor people can continue to live in their community under stable living conditions.

In Ulaanbaatar City, 60% of households are in Ger areas; most of them are very poor and suffer from the degradation of the living environment. The living conditions of Ger areas are different from the slum areas in Thailand, as most of land lots in Ger areas were allocated by the national government based on “Law of Allocation of Land to Mongolian Citizens for Ownership”. However, they have very similar issues related to the housing, infrastructure and environment. CODI can be a very good reference model for the self-help housing construction and the improvement of living environment in Ger areas by providing poor people with a community mortgage program.

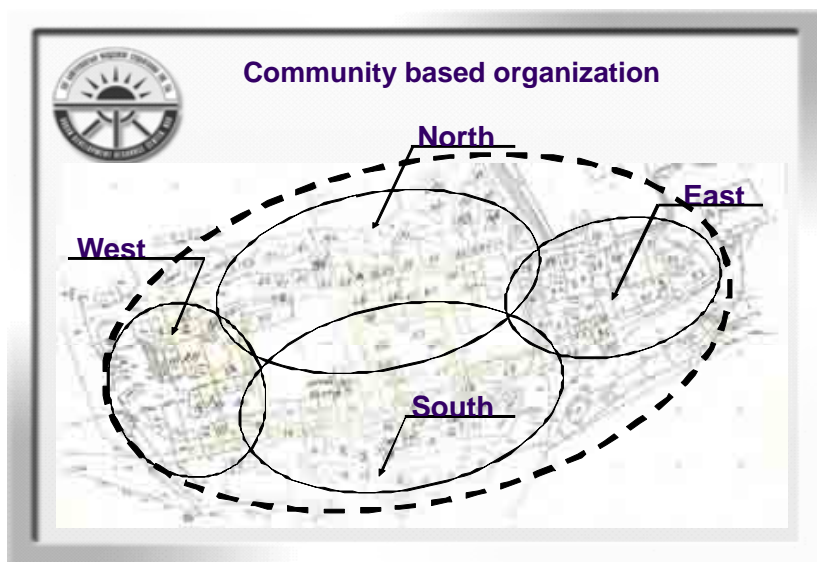
In Mongolia, an organization like CODI should be established at the national level as a national agency under Ministry of Social Welfare and Labor (MSWL). MSWL has about 700 social workers for providing social welfare, who may possibly be available for the activities of CODI together with NGOs for providing training programs.

In the case of Mongolia, the financial resources of CODI are expected to be comprised of various funds such as Donor grants and soft loans, NGO funds and CDM (Clean Development Mechanism) funds besides the aforesaid Mongolia Development Fund, National Bond, HDF, and Pension Fund. CDM is a new funding system to solve air pollution issues by reducing CO<sub>2</sub>, which is very serious in Ger areas. CDM projects also should be managed and operated by CODI.

In Ulaanbaatar City, projects with similar activities of CODI have been already conducted by Donors, such as “Housing Finance Project (HFP)” and “Japan Fund for Poverty Reduction (JFPR) Project” conducted by ADB and “Community-led Infrastructure Development Project” supported by World Bank-Netherlands Water Partnership. HFP was implemented in Dari-Ekh Ger area, as a model of housing development in Ger area, and completed in 2007. In Dari-Ekh, four (4) CBOs were formed in the project site together with the savings group, as

show in Figure 8.3.3. The Dari-Ekh site was redeveloped by using a similar system to the land readjustment, and the land value rose by 3.4 times after the development. Looking at these projects, there is a great possibility to introduce the CODI system into Mongolia in terms of the capacity of human resources.

**Figure 8.3.3 Formulation of CBOs in Dari-Ekh**



Source: Urban Development Resource Center

## **2) Housing Development System (Supply Side)**

Establishment of “Social Housing Corporation” for low cost house development and promotion of “Community and Local Partnership Housing System” for the self-help housing construction in Ger areas are essential for providing the houses for the low income class and poor people. An ideal method of carrying out these two (2) development systems is explained as follows.

### **(1) Social Housing Corporation (SHC)**

Social Housing Corporation (SHC) is the agency not only to provide the houses for low and middle income class, but also to promote comprehensive housing development projects through land and infrastructure development, redevelopment of old apartment houses, land readjustment of Ger areas, and cross-subsidy development income from the middle to the low income class, etc.

Social housing development project itself is not profitable. It is impossible for the private sector to promote such non-profit projects without the government financial support. The provision of social housing is a public duty and not the work of private sector. MHFC is operated by the irregular style of a limited liability company in spite of a public corporation, whose stocks are held by UB City (51%), then MCUD (24.5%) and MOF (24.5%). MHFC had financial problems and it was unable to pay salaries for its staff in 2007. The operation system of MHFC is not appropriate for these public works, and the planning, engineer and technical departments of MHFC have to be reorganized into the “Social Housing Corporation (SHC)” as a national or municipal agency.

The role of the SHC is to provide 10% of the total housing supply for the low cost housing as

one of its targets, referring to the housing policies in the four (4) Southeast Asian countries. The provision of rental houses is also expected to be examined as temporary accommodations for the immigrants to UB City and the seasonal workers. The household income has to be checked thoroughly, and the period for rent has to be limited to several years after they have the capability to purchase the houses with the formal jobs.

The aforesaid Mongolia Development Fund, HDF, and National Pension Fund as well as the National Bond Fund pooled in a commercial bank are expected to provide the financial resources of SHC for subsidies or loans.

## **(2) Community & Local Partnership Housing**

Community & Local Partnership Housing is a social system for the low income class and poor people who cannot qualify for a housing loan and thus cannot purchase the social housing provided by public and private institutions. This supply side system plays a role to assist the poor people in constructing self-help housing in the community mortgage program provided by CODI.

In Mongolia, it is necessary to establish "Community & Local Housing Partnership Association" by the initiative of MRTCUD, UB City, Building Material Manufacturer's Association of Mongolia, Architect and Construction Company's Association, NGO, and Community Representatives, etc. as an advisory institution for the low cost housing and self-help housing construction.

The Community & Local Housing Partnership Association will be in charge of giving appropriate technical advice for the self-help house construction system and the provision of low price and environment-friendly construction materials. This association will play a major role in the supply side of the targeted housing policies for low cost self-help housing.

## **8.4 Projections of Housing Demand and Supply in 2020 and 2030**

### **1) Methodology for Estimating Housing Demand**

The forecast for housing demand is made based on the prediction of future population. Figure 8.4.1 shows the forecasting flow for housing demand in 2020 and 2030. The housing statistics of Ulaanbaatar City and the home interview survey (HIS) are used as base data.

### **2) Current Structure of Housing Stocks and Desired Housing Pattern**

Looking at the structure of housing, as shown in Table 8.4.1, 39.2% of total housing stocks are apartment houses, 33.8% simple houses without infrastructure, and 25.5% Ger houses. According to the Household Interview Survey (HIS) results, 54% of the people answered "Want to move to the apartment houses", and 24% of people answered "Want to move to detached houses", and 17% of people answered "Want to move to townhouses". The people who answered "Want to rebuild" were: 52% for detached houses, 33% for Apartment houses.

### **3) Housing Units to be Re-Built and Constructed by Housing Type**

According to the forecast, there is a housing demand of about 129,000 newly constructed houses, between 2007 and 2020, and 179,000 newly constructed houses between 2007 and 2030. Including the demand of re-building, the total housing demand is estimated at 208,000 from 2007 to 2020, and 348,000 from 2007 to 2030 (see Table 8.4.4).

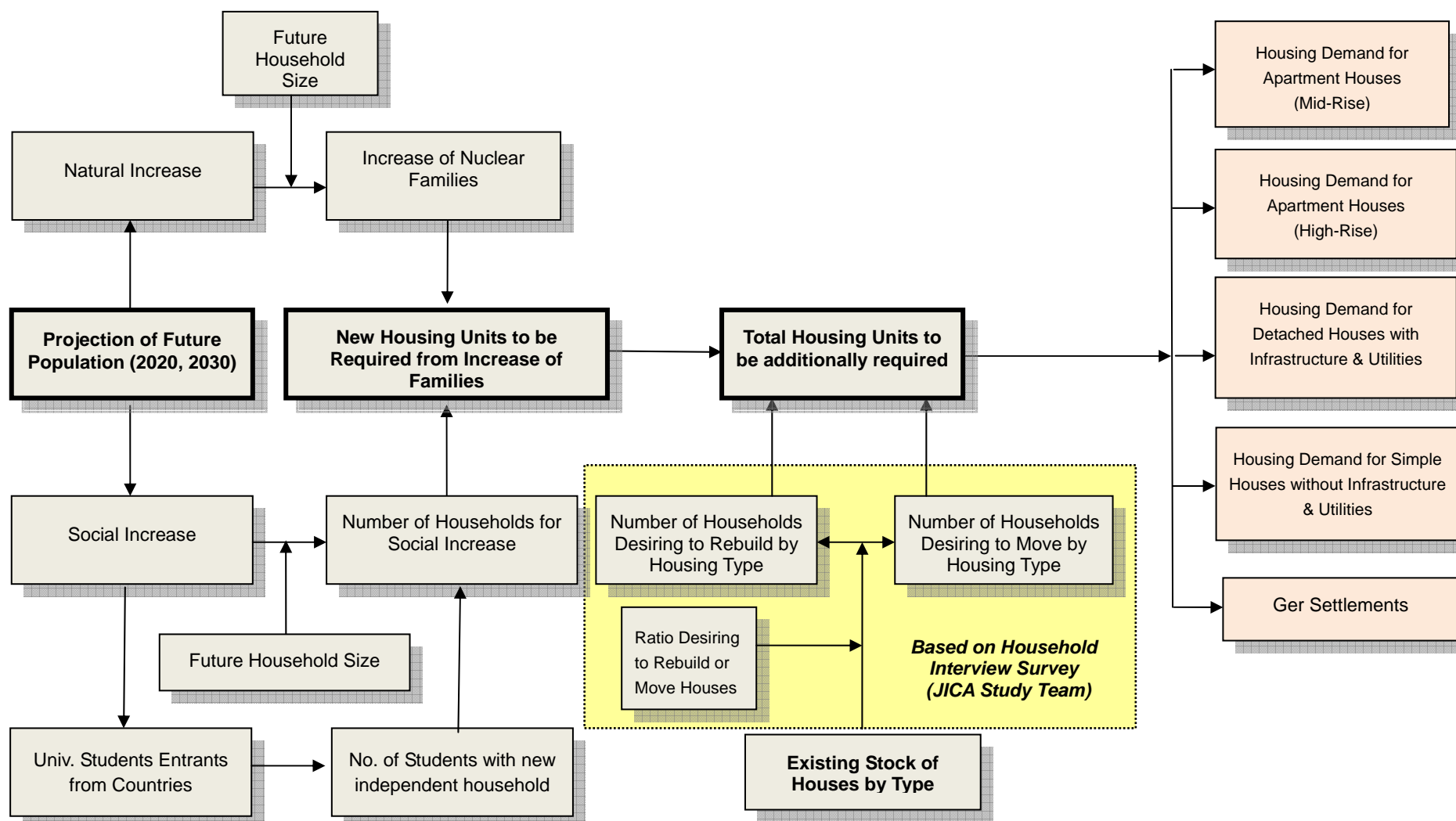
The demand of apartment houses is 64,300 newly constructed houses from 2007 to 2020, and 103,000 newly constructed houses from 2007 to 2030. Including the demand of re-building, the total demand is estimated at 110,000 from 2007 to 2020, and 199,000 from 2007 to 2030. Almost half of the total demand is formed by apartment houses. For the apartment houses, the mid-rise form 2/3 of the total demand, the high-rise 1/3 as shown in Table 8.4.4.

In addition to apartment houses, about 40% of the total demand is for detached houses with infrastructure.

### **4) Projected Housing Units by Housing Type**

The total housing units in UB City will be 349,000 houses in 2020, and 444,000 houses in 2030 as shown in Table 8.4.5. Almost half of the stock will be apartment houses.

**Figure 8.4.1 Forecasting Flow for Housing Demand**



Source: JICA Study Team



**Table 8.4.1 Structure of Housing Stock by Type in 2007**

|                                 | Existing Units | Share (%)     |
|---------------------------------|----------------|---------------|
| Apartment                       | 86,091         | 39.2%         |
| Mid-rise                        | 60,264         | 27.4%         |
| High-rise                       | 25,827         | 11.7%         |
| Detached with Infrastructure    | 1,957          | 0.9%          |
| Simple house w/o infrastructure | 74,283         | 33.8%         |
| Ger                             | 56,101         | 25.5%         |
| Homeless                        | 1,460          | 0.7%          |
| <b>Total</b>                    | <b>219,892</b> | <b>100.0%</b> |

Source: Statistic Data of Ulaanbaatar City, 2007

**Table 8.4.2 Desired Future Housing Types to Move or Rebuild**

|                 | Detached         | Apartment        | Town House       | Others         | Total             |
|-----------------|------------------|------------------|------------------|----------------|-------------------|
| Want to move    | 87 (24%)         | 199 (54%)        | 61 (17%)         | 22 (5%)        | 370 (100%)        |
| Want to rebuild | 260 (52%)        | 166 (33%)        | 58 (12%)         | 13 (3%)        | 397 (100%)        |
| <b>Total</b>    | <b>347 (40%)</b> | <b>365 (42%)</b> | <b>120 (14%)</b> | <b>35 (4%)</b> | <b>867 (100%)</b> |

Source: Household Interview Survey, 2007, JICA Study Team

**Table 8.4.3 Desired Housing Pattern for Rebuilding and New Construction up to 2030**

|                                 |                                 | <i>Future</i>         |                        |                        |                            |           |             |
|---------------------------------|---------------------------------|-----------------------|------------------------|------------------------|----------------------------|-----------|-------------|
|                                 |                                 | Apartment<br>Mid-rise | Apartment<br>High-rise | Detached<br>with Infra | Simple house<br>w/o Infra. | Ger       | Total       |
| <b>Present</b>                  | Apartment (Mid-rise)            | 35%                   | 25%                    | 40%                    | 0%                         | 0%        | 100%        |
|                                 | Apartment (High-rise)           | 25%                   | 25%                    | 50%                    | 0%                         | 0%        | 100%        |
|                                 | Detached w Infrastructure       | 45%                   | 10%                    | 45%                    | 0%                         | 0%        | 100%        |
|                                 | Simple house w/o Infrastructure | 40%                   | 20%                    | 40%                    | 0%                         | 0%        | 100%        |
|                                 | Ger                             | 40%                   | 15%                    | 45%                    | 0%                         | 0%        | 100%        |
|                                 | Homeless                        | 40%                   | 15%                    | 45%                    | 0%                         | 0%        | 100%        |
| Immigrate Household (2008-2020) |                                 | <b>35%</b>            | <b>15%</b>             | <b>40%</b>             | <b>5%</b>                  | <b>5%</b> | <b>100%</b> |
| Immigrate Household (2021-2030) |                                 | <b>40%</b>            | <b>20%</b>             | <b>40%</b>             | <b>0%</b>                  | <b>0%</b> | <b>100%</b> |

Source: Statistic Data of Ulaanbaatar City, 2007 (present), Household Interview Survey, 2007, JICA Study Team (future)

**Table 8.4.4 Projection of Housing Units to be Re-Built and Constructed by Type until 2020 and 2030**

|                                 | 2007 - 2020   |                   |                | 2007 - 2030    |                   |                |
|---------------------------------|---------------|-------------------|----------------|----------------|-------------------|----------------|
|                                 | Re-built      | Newly Constructed | Total          | Re-built       | Newly Constructed | Total          |
| Apartment                       | 45,505        | 64,337            | 109,842        | 96,574         | 102,532           | 199,106        |
| Apartment (Mid-rise)            | 30,856        | 45,036            | 75,891         | 65,409         | 69,856            | 135,265        |
| Apartment (High-rise)           | 14,649        | 19,301            | 33,950         | 31,165         | 32,676            | 63,841         |
| Detached with Infrastructure    | 33,656        | 51,469            | 85,125         | 72,243         | 74,360            | 146,603        |
| Simple house w/o infrastructure | 0             | 6,434             | 6,434          | 0              | 1,287             | 1,287          |
| Ger                             | 0             | 6,434             | 6,434          | 0              | 643               | 643            |
| <b>Total</b>                    | <b>79,160</b> | <b>128,673</b>    | <b>207,834</b> | <b>168,817</b> | <b>178,822</b>    | <b>347,640</b> |

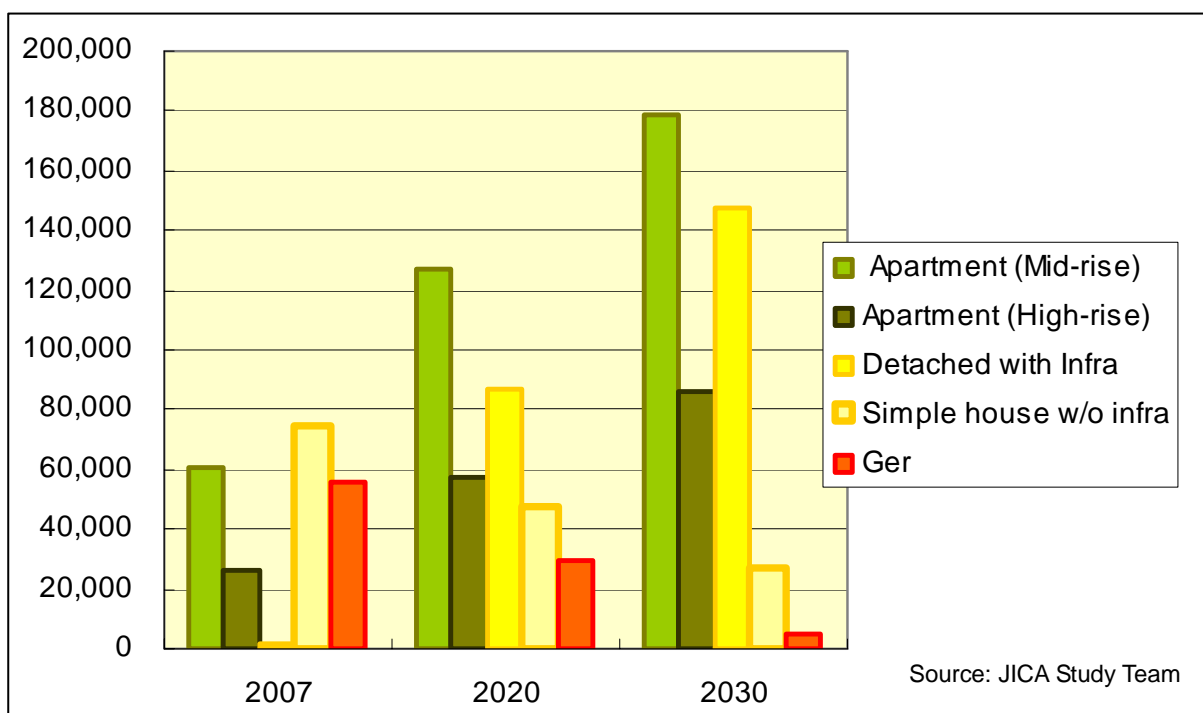
Source: JICA Study Team

**Table 8.4.5 Projection of Housing Units by Type in 2020 and 2030**

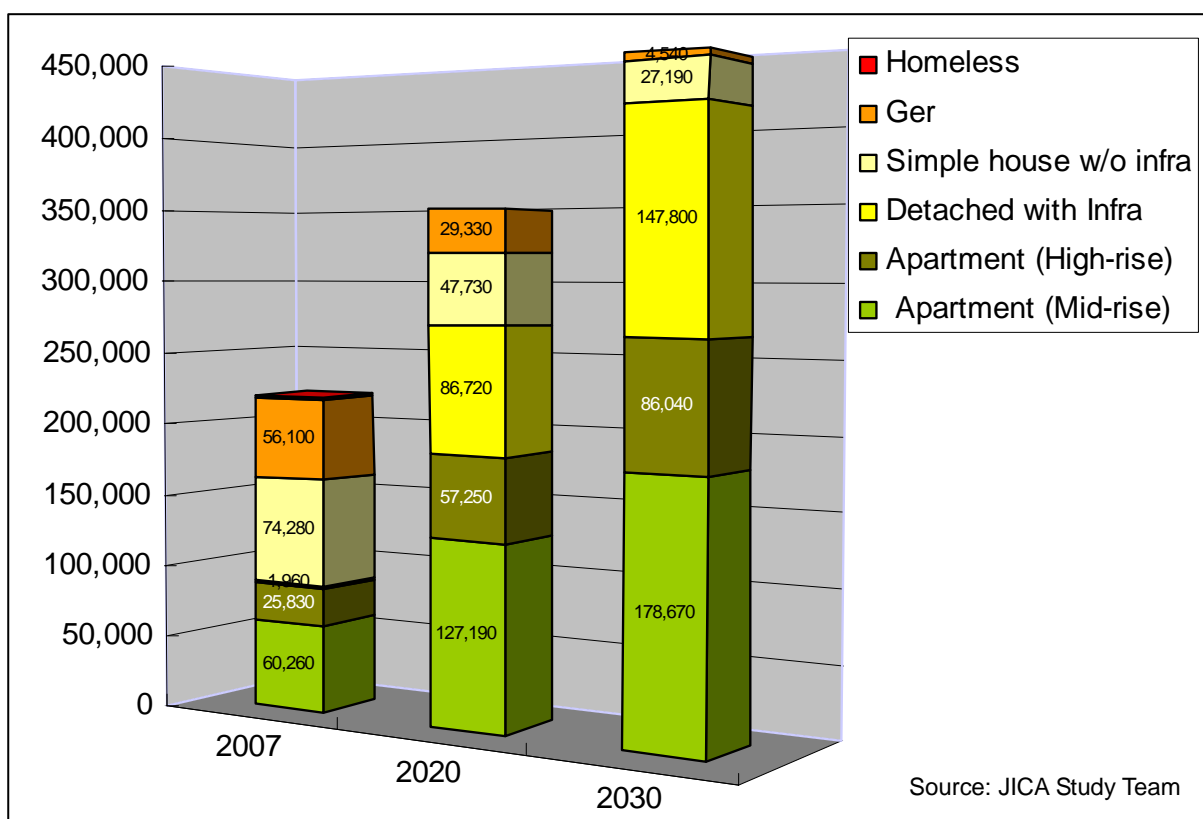
|                                 | 2007           | 2020           |                       |                | 2030          |                       |                |
|---------------------------------|----------------|----------------|-----------------------|----------------|---------------|-----------------------|----------------|
|                                 |                | Unchanged      | Rebuilt & Constructed | Total          | Unchanged     | Rebuilt & Constructed | Total          |
| Apartment (Mid-rise)            | 86,091         | 74,600         | 109,842               | 184,442        | 65,600        | 199,106               | 264,706        |
| Apartment (Mid-rise)            | 60,264         | 51,300         | 75,891                | 127,191        | 43,400        | 135,265               | 178,665        |
| Apartment (High-rise)           | 25,827         | 23,300         | 33,950                | 57,250         | 22,200        | 63,841                | 86,041         |
| Detached with Infrastructure    | 1,957          | 1,600          | 85,125                | 86,725         | 1,200         | 146,603               | 147,803        |
| Simple house w/o infrastructure | 74,283         | 41,300         | 6,434                 | 47,734         | 25,900        | 1,287                 | 27,187         |
| Ger                             | 56,101         | 22,900         | 6,434                 | 29,334         | 3,900         | 643                   | 4,543          |
| Others                          | 1,460          | 300            | 0                     | 300            | 100           | 0                     | 100            |
| <b>Total</b>                    | <b>219,892</b> | <b>140,700</b> | <b>207,834</b>        | <b>348,534</b> | <b>96,700</b> | <b>347,640</b>        | <b>444,340</b> |

Source: JICA Study Team

**Figure 8.4.2 Projection of Housing Units by Type in 2020 and 2030**



**Figure 8.4.3 Projection of Housing Units in Total and by Type in 2020 and 2030**



## 5) Housing Gap between Demand and Supply in 2020 and 2030

As the result of the housing demand projection, approximately 200,000 housing units are required to be constructed up to 2020, implying about 16,000 - 17,000 housing units are needed annually. As of 2007, the supply capacity of housing units is very limited in Ulaanbaatar to more or less 6,000 - 7,000 housing units, including apartments and detached houses.

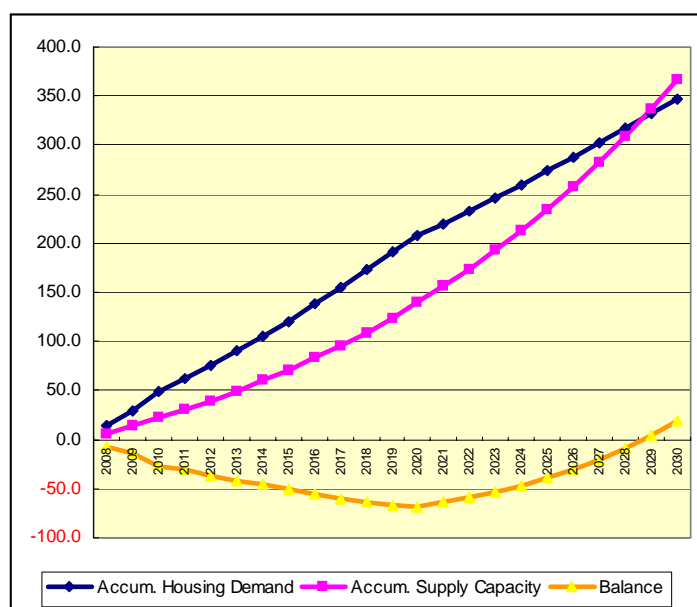
The anticipated gap between the housing demand and supply will be 7,000 units in 2008 and this gap will be enormous in the long-term, should the supply fail to be strategically strengthened. This means that housing prices will continuously increase year by year due to the strong pressure of a supply side shortage. Give, the assumption that the construction sector will grow at a higher rate than the average of GRDP, or 7% p.a., the gap will be minimized in the long run and will be balanced in 2030, as shown in Figure 8.4.4.

Needless to say, the construction sector should be encouraged in association with enhancement of local production capacity of basic construction materials, and rationalization of the transport and distribution system of construction materials.

**Figure 8.4.4 Anticipated Housing Gap between Demand and Supply**

|      | Accum. Housing Demand | Accum. Supply Capacity | Balance |
|------|-----------------------|------------------------|---------|
| 2008 | 13.8                  | 6.7                    | -7.0    |
| 2009 | 28.5                  | 14.1                   | -14.5   |
| 2010 | 49.0                  | 22.1                   | -27.0   |
| 2011 | 61.9                  | 30.6                   | -31.2   |
| 2012 | 76.3                  | 39.8                   | -36.5   |
| 2013 | 90.9                  | 49.5                   | -41.4   |
| 2014 | 105.8                 | 60.0                   | -45.9   |
| 2015 | 121.0                 | 71.1                   | -49.9   |
| 2016 | 138.0                 | 83.0                   | -55.0   |
| 2017 | 155.4                 | 95.8                   | -59.6   |
| 2018 | 173.2                 | 109.4                  | -63.8   |
| 2019 | 191.4                 | 124.0                  | -67.5   |
| 2020 | 207.8                 | 139.5                  | -68.3   |
| 2021 | 219.1                 | 156.2                  | -62.9   |
| 2022 | 232.4                 | 174.0                  | -58.5   |
| 2023 | 246.0                 | 193.0                  | -53.0   |
| 2024 | 259.8                 | 213.3                  | -46.5   |
| 2025 | 273.8                 | 235.0                  | -38.8   |
| 2026 | 288.0                 | 258.1                  | -29.9   |
| 2027 | 302.6                 | 282.8                  | -19.8   |
| 2028 | 317.3                 | 309.0                  | -8.3    |
| 2029 | 332.3                 | 336.9                  | 4.6     |
| 2030 | 347.6                 | 366.7                  | 19.0    |

|           | Economic Growth | Construction Sector |
|-----------|-----------------|---------------------|
| -2010     | 6.8%            | 8.8%                |
| 2010-2015 | 5.3%            | 6.9%                |
| 2015-2020 | 5.3%            | 6.9%                |
| 2020-2025 | 5.3%            | 6.9%                |
| 2025-2030 | 5.0%            | 6.5%                |



Source: JICA Study Team

## 8.5 Housing Development Strategies

### 1) Construction Cost Policy

The background of the steep rise in construction cost is that the demand and supply balance of construction materials was lost, and it caused a remarkable rise in the price of construction materials, since the national budget increased rapidly, after “40,000 Housing Units Program” was announced to the public. If the master plan for the construction materials made by GTZ would have been executed before “40,000 Housing Units Program”, they might not have incurred such cost increment.

The lack of the cement and iron reinforcing rod raises the construction cost more than anything else. There are two cement plants (one is public-owned, the other is private-owned) in Ulaanbaatar and Erdenet. They once supplied 50% of the total demand but they now supply only 30%, and the cement price has soared, as they have to rely on the import of cement. The construction of the new cement plant in Nalaikh, with the production capacity of 100,000 tons, is to be completed in 2008. Although there is a plan to construct a cement plant in a region rich in cement resources, it's not yet realized.

There is only one large scale public owned plant of iron reinforcing rod in Darkhan and iron rod is produced not from the iron ore but by remelting scrap iron. This plant produces 50% of total demand and 20% is produced in middle and small size plants; the remaining 30% relies on imports. This has resulted in a steep rise in prices due to insufficient supply.

The transportation volume on the national railway rapidly increased together with the enlarged demand of construction materials. As a result, the national railway couldn't keep up with the transport demand and the freight charge was raised by 20%.

In 2007, the price of coal was raised by 10% to 3,000Tg., due to the increase of the power and heating uses. The electricity charge during the night time was raised by 40%, and gasoline and oil also was raised by 40% to 50%. The minimum wage was raised from 70,000TG to 108,000TG and the salary of the national civil servants was also raised. These series of the price increases have produced a steep rise in construction cost.

A working group was organized among then MCUD, National Railway and Building Material Manufacturer's Association of Mongolia, for stabilizing construction costs for the transportation system of bricks, but this came to nothing. From the latter half of 2008, more rises in the costs are predicted. The rise in the land price and the speculative rise by constructors are also large factors for a jump in selling price. In fact, there is no difference in the price of construction materials for the apartment house sold at US\$650/m<sup>2</sup> and for the apartment house sold at US\$1,500/m<sup>2</sup>.

The price of the imported construction materials except the cement and iron reinforcing rod are stable, so they don't influence the price in the construction materials much. The percentage of imported and homemade construction materials is shown in Table 8.5.1 for reference.

**Table 8.5.1 Percentage of Imported and homemade Construction Materials**

| Construction materials | Percentage of imported and homemade construction materials  |
|------------------------|---|
| Wall materials         | 100% homemade   |
| Glass                  | 100% imported   |
| Window frame and door  | 100% homemade   |
| Roof materials         | 10% homemade, 90% imported  |
| Water pipeline         | 30% produced by Chinese and Korean plant in Mongolia. 100% imported for Joint materials of pipeline |
| Paint                  | 100% imported   |
| Concrete and brick     | 100% homemade   |
| Electric cable         | 100% imported   |
| Precast concrete       | In the past, produced, but the plant closed at present  |

Source: Building Material Manufacturer's Association of Mongolia

Strategies to stabilize the construction cost and make it cheaper are summarized below.

- Policy level support for the private sector on government projects is required to construct the plants of the cement and iron reinforced rod which influences the cost of construction material more than anything else. The introduction of "Plant Development Fund" has to be examined to enable middle and small size companies to borrow using the plant as collateral from the Bank, as now they cannot borrow money when they build plants.
- Cheaply priced transportation and supply system for construction materials such as cement and bricks, etc. has to be studied and introduced.
- A production system to lower the cost of construction materials has to be proposed so that one plant produces the materials to put the processed cement and the insulation material together as one insulation block.
- The distribution system has to be improved, in a way that the government will buy and stock construction materials in the winter season when the material cost is cheap, and sell them in the summer season at the peak of the demand for construction. The restart of the production of precast concrete is considered as one of the ways to do this.

Construction cost is a very important influence on housing policies. A working group on construction cost is expected to be organized as soon as possible among the related agencies to draw up effective plans.

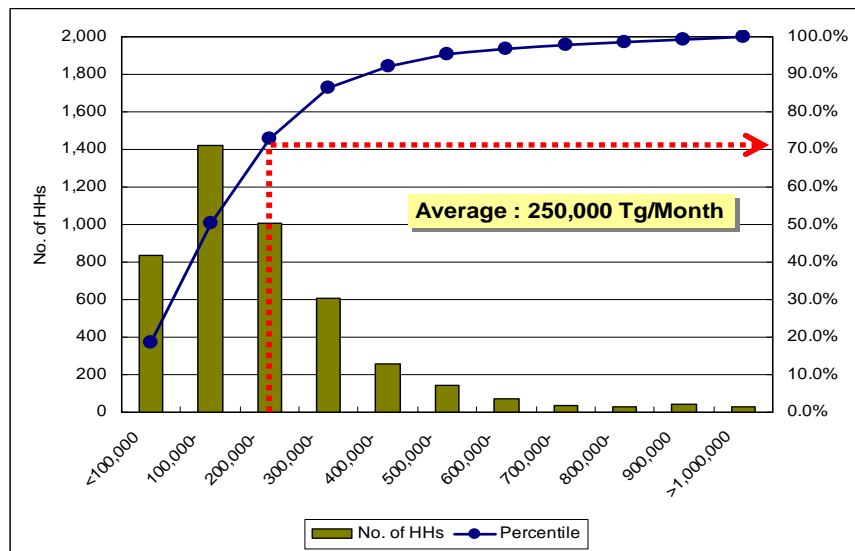


Tg.129,000 for the monthly loan repayment, and needs the income of at least Tg. 322,500 per month if the loan repayment is to be less than 40% of the total income. Basically, the average family cannot afford to purchase House A.

Given a subsidy to lessen the interest rate to 0.7% per month (instead of 1.0%) and 15 years repayment period (instead of 10 years), this average household can purchase "House B", as their required income is computed at Tg.265,000 per month.

As a result, the affordable housing model requires a unit cost of 400 US\$/m<sup>2</sup> with 35 m<sup>2</sup> of floor area.

**Figure 8.5.2 Household Income Distribution Pattern in Ulaanbaatar City in 2007**



Source: Household Interview Survey, 2007, JICA Study Team

**Figure 8.5.3 Affordable Housing Model for Average Household in Ulaanbaatar City**

|  | House A                 | House B                 |
|--|-------------------------|-------------------------|
| <b>Housing Market</b>                        |                         |                         |
| Floor Area per Household                     | 35 m <sup>2</sup>       | 35 m <sup>2</sup>       |
| Unit Price of Housing Unit                   | 550 US\$/m <sup>2</sup> | 400 US\$/m <sup>2</sup> |
| <b>Purchasing Plan</b>                       |                         |                         |
| Housing Purchase Price                       | 21,175,000 Tg           | 15,400,000 Tg           |
| Down Payment                                 | 6,352,000 Tg (30%)      | 4,620,000 Tg (30%)      |
| Mortgage Loan                                | 14,823,000 Tg (70%)     | 10,780,000 Tg (70%)     |
| <b>Loan Conditions</b>                       |                         |                         |
| Interest Rate                                | 1.0% per Month          | 0.70% per Month         |
| Repayment Period                             | 10 yrs                  | 15 yrs                  |
| <b>Requirements (Repayment &amp; Income)</b> |                         |                         |
| Monthly Repayment                            | 129,000 Tg/Month        | 106,000 Tg/Month        |
| Necessary Income                             | 322,500 Tg/Month        | 265,000 Tg/Month        |

Source: JICA Study Team



### **3) Needs for Low Cost Housing Supply**

In December 2008, the Mongolian government launched a new policy of “100,000 Housing Units Construction Program” based on more or less 80% achievement of the 40,000 Housing Unit Construction Program. It is announced that this target shall be attained in the coming 4 years or within the term of the current government regime. Looking at realities, the supply capacity of housing units was very limited in Ulaanbaatar as of 2007 at more or less 6,000 - 7,000 housing units, including apartments and detached houses, as examined in Section 8.4. Therefore, the achievement of this target will be very difficult without drastic government intervention.

Based on the housing analysis above, it is clear that provision of low cost houses is extremely important so that the majority of middle and low income households can manage to buy housing units. To this end, some crucial measures should be taken particularly focusing on the importance of government intervention. Organizational measures such as establishment of Social Housing Corporation and Housing Development Financing Institution (HDFI) and social measures to enhance community-based activities are proposed in the preceding section 8.3, and summarized in Table 8.3.1.

In addition to the measures proposed in Section 8.3, the following government interventions should be explored further.

- Encourage growth in construction industries and construction materials, by providing further incentives on Foreign Direct Investment (FDI) and soft loans for start-up.
- Appropriate special national budget to subsidize R&D activities to invent new locally made construction materials and low-cost housing structures,
- Guide and jointly work with the private sector to develop affordable low cost housing units and to facilitate housing area development with social housing units.
- Establish the Social Housing Corporation and prepare a 20,000 housing units construction program for lower middle and low income groups.
- Encourage the Social Housing Corporation to provide rental houses.