CHAPTER 8

ENVIRONMENTAL AND SOCIAL CONSIDERATIONS

8.1 ENVIRONMENT IN THE PROJECT AREA

(1) Natural Environment and Environmental Problems

Mongolia is a landlocked country surrounded by Russia, China and Kazakhstan, and its area of 1,566,500 km^2 is four times larger than that of Japan. Geographically, it is characterized by the 4,000m-class Altai Mountains on the south-western side, the Hangayn Mountains from the north-western side to the central part, the Gobi Desert in the south and large prairie from the central part to the eastern part. Ulaanbaatar City, where the project site is located, is in North-Central Mongolia, and lies at an elevation of about 1,310 meters in a valley on the Tuul River.

Due to its high elevation, the city features brief, warm summers and long, bitterly cold and dry winters. Its average temperature is below freezing for half a year, and central heating systems in the city are an essential lifeline in these periods. Most of the annual precipitation falls in the summer season from June to September. The wind mostly blows from the north-west during the winter time. Otherwise, the wind directions are largely dependent on the geographical features in each location. (Detailed climate information shall be referred to Chapter 4.)

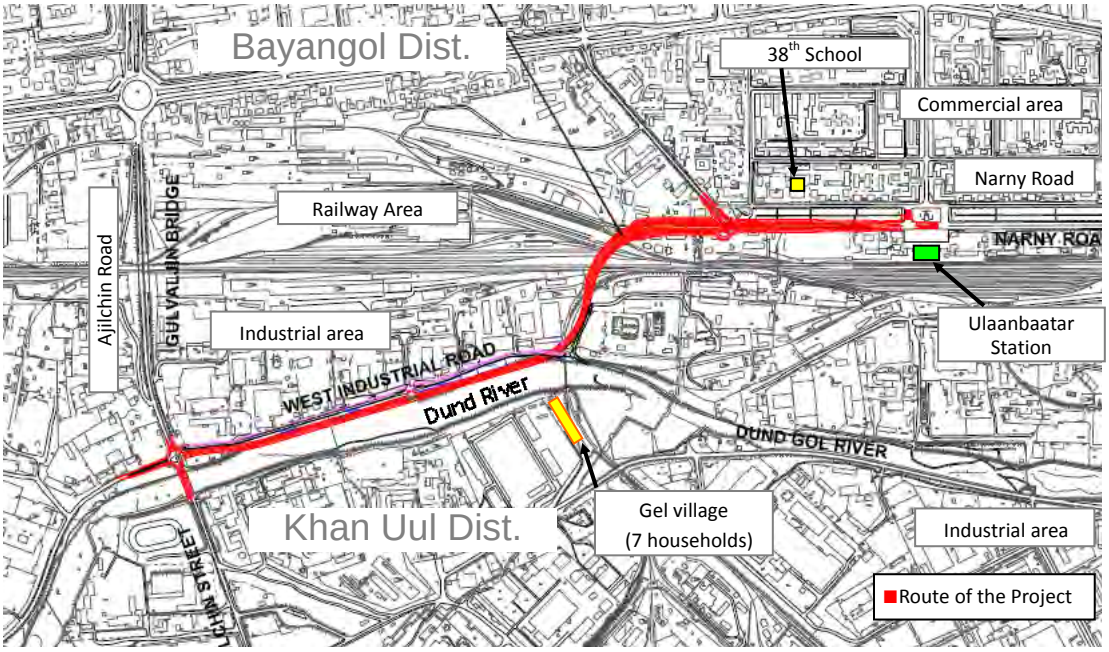


Figure 8.1.1 Land use around the project area

The project site, near Ulaanbaatar Railway Station, lies in an industrial area covering both Bayangol District and Khan Uul District. The project road extends in the east-west direction with a length of 2250m from the intersection with Ajilchin Street up to near Ulaanbaatar

Railway Station.

The Dound River, which runs between Bayangol District and Khan Uul District as a district border, is a dry river throughout most of the year. An access road at the west side passes through the industrial area and an east side access road connects to Narny Road in a commercial area. The major environmental problems faced by Ulaanbaatar City are summarized below.

i) Air Pollution

Air pollution, one of the most serious environmental problems in Ulaanbaatar City, and it has attracted the attention not only of the national agencies but also donor agencies; thus cooperation projects and studies in this field are indeed numerous[1]. In Ulaanbaatar City, wintertime air pollution mainly caused by coal combustion at three thermal power plants, 200 Heat Only Boilers (HOBs), more than 1,000 Coal Fired Water Heaters and around 140,000 ger stoves affect citizen's health seriously. Particulate Matter (PM) is considered particularly important as a targeted pollutant to treat among others such as dust, SO_2 and NO_2.

In addition to the above-mentioned sources, increasing transportation due to the robust economic growth especially in the highly urbanized Ulaanbaatar City has caused concern in recent years[2]. The current ambient air quality in comparison with the Mongolian environment standard (MNS4585) is summarized in Table 8.2 below.

Table 8.1.1 Air Quality in Ulaanbaatar (Yearly Average from Oct. 2010 to Sep. 2011)

Unit: $\mu g/m^3$

	MNS4585	**CLEM-1**	**CLEM-2**	**CLEM-4**	**CLEM-5**	**CLEM-7**	**CLEM-8**
SO_2	10	26	31	12	53	20	18
NO_2	30	40	93	49	42	37	31
PM_{10}	50	152	189	120	355	209	86
$PM_{2.5}$	25	—	154	49	—	—	—

Source: JICA's The Study on Implementation of Ulaanbaatar City Urban Transportation Project in Mongolia (Interim Report)

Note: Central Laboratory of Environment and Meteorology (CLEM) is institution of MNET. Mongolian national environmental standard on ambient air (MNS4585) is available at http://estandard.mn/file.php?sid=81 Also, an interview with a JICA expert of "Capacity Development Project for Air Pollution Control" confirmed that station number two (CLEM-2) in the table has a similar ambient environment in terms of traffic situation to the project site.

ii) Water Pollution

Due to the urbanization and concentration of industries in Ulaanbaatar City, deterioration of water quality is becoming another serious environmental issue[3]. The Tuul River originating

[1] For example, JICA started a technical cooperation project called Capacity Development Project for Air Pollution Control in Ulaanbaatar City in March 2010. The World Bank issued a discussion paper titled "Air Quality Analysis of Ulaanbaatar — Improving Air Quality to Reduce Health Impact" with special attention to Particulate Matter (PM).

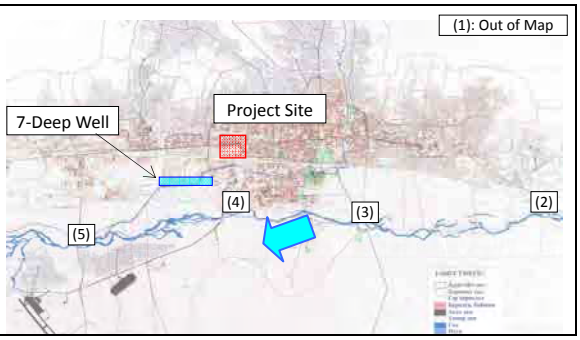
[2] According to the *Mongolia Environment Monitor 2004* issued by the World Bank, the source of air pollution in Ulaanbaatar reported a MNET estimation as CHP (44%), Transport (39%), HOB (9%), and Households (8%). Another publication of the World Bank, *Mongolia – Air Quality Analysis of Ulaanbaatar – Improving Air Quality to Reduce Health Impact (2011)* focuses on the single largest problem pollutant, particulate matter (PM); source of PM10 is estimated as ger households (36%), CHP (34%), Dust from roads (27%), HOB (2%) and Vehicle exhaust (2%).

[3] The ten-year trend of oxygen demand from 1997 on UNEP's Environmental Outlook 2007 shows a continuous deterioration in

in the Khentii Mountains is 819 km long and drains an area of 50,400 km^2. The River is considered an important water resource; however, the water quality especially in the lower stream, where discharged water from the city sewage plan flows in, has deteriorated seriously.

Table 8.1.2 Water Quality of the Tuul River

Sampling Points	COD (mg/L)	BOD (mg/L)	DO (mg/L)
Environmental Standard	<10	<10	>9
(1) Terelj	9.8	5.43	9.9
(2) Bayanzurkh bridge	29	4.54	9.61
(3) Zaisan	32.7	6.4	11.7
(4) Yarrmag	68.6	6.04	11.9
(5) Sonsgolon	58.8	6.38	11.6
(6) Songino bridge	117.6	2.41	5.61



Source: World Bank, Mongolia Environment Monitor 2004 (using WHO data on 2003)
Note: Mongolian national environmental standard on water quality (MNS4586) is available at: http://estandard.mn/file.php?sid=1288

In Mongolia, in order to assure the water quality, water sources and their basins are protected under Article 20.5 of the Law on Special Protected Area (1994), Article 5.1 of the Law on Sanitation (1998)[4], and the Law on Water (amended in 2004). The nearest water source to the project site is located on the western side of the third thermal plant, where seven deep wells exist.

iii) Soil Contamination

Soil contamination is another environmental issue that starts causing people concern. A wide spectrum of pollutants cause soil contamination from an extensive range of sources, i.e., vehicle exhaust and water discharged from factories[5]. Table 8.4 shows the status of soil contamination in 2010.

the water quality of the Tuul River.

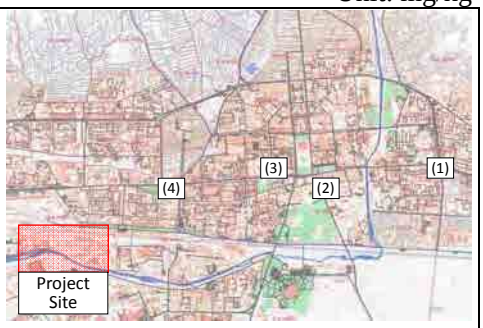
[4] The article says "Local administrative bodies, agencies in charge of water use, business entities and individuals shall take measures to establish security zones for drinking water sources, water distribution networks, main water reservoirs, pumping stations, and water distribution sites and protect them from contamination in accordance with the relevant regulations."

[5] For details of the soil contamination in each functional zone in the Ulaanbaatar City, see Ecological-Geochemical State of Soils in Ulaanbaatar, Eurasian Soil Science, 2011, Vol. 44, No. 7, pp. 709-721

Table 8.1.3 Status of Soil Contamination in Ulaanbaatar (2010)

Unit: mg/kg

Location	Position	Pb	Cd	Cr	Sr
(1) East Road Junction	South of road	18.2	0.16	120.1	305.7
	North of road	77.9	2.31	127.7	240.8
(2) The State Pedagogical University	South of road	116.8	0.78	165.2	546.5
	North of road	26.0	0.05	105.1	361.2
(3) Central Post Office	South of road	64.9	1.09	106.6	370.5
	North of road	90.9	2.60	166.7	740.4
(4) West Road Junction	South of road	84.4	1.50	165.2	518.8
	North of road	28.6	2.20	90.1	213.1
Average of the above four areas		63.4	1.3	130.8	412.1
Average of Ulaanbaatar City (2005)		43.7	1.9	90.5	375.1
Standard (MNS 58:50)		100.0	3	150	800



Location Map

Source: Environmental Outlook of the Ulaanbaatar City (2008) UNEP

Note: Mongolian national environmental standard on soil (MNS4550) is available at: http://estandard.mn/file.php?sid=436

(2) Social Environment

The Mongolian economy, which was negatively affected by the global downturn, experienced zero growth in 2009; however, the economy returned to robust growth in 2010 achieving more than 6% in real GDP growth rate. The engine for such growth is industrial development; industrial outputs grew 10.0% in 2010, achieving two-digit growth in spite of minus growth in 2009. In detail, the growth rate is as high as 10.1% in the mining sector and 11.4% in the manufacturing sector.

The above-mentioned steady economic growth attracts a migrant population and causes rapid urbanization, one of the serious social issues faced by Ulaanbaatar[6]. Likewise, socio-economic indicators such as literacy rate and educational attainment show a positive trend as seen in the tables below. In addition, it has been confirmed that the recent steady growth of the economy helps to reduce the poverty ratio in the country[7].

Table 8.1.4 Population and Economic Growth

Particulars	2000	2008	2009	2010	2011
Resident Population (1,000 persons)	2,373.5	2,666.0	2,716.3	2,761.0	2,811.6
Population in Ulaanbaatar (1,000 persons)	760.1	1147.4	1,196.8	1,244.4	1,287.1
Population in Ulaanbaatar (%)	32.0%	43.0%	44.1%	45.1%	45.8%
GDP Growth Rate	1.1	8.9	-1.3	6.4	17.3

Source: UNDP: Mongolia Human Development Report 2011, National Statistical Office of Mongolia, 2010 Population and Housing Census of Mongolia

[6] According to Mongolian Statistical Yearbook 2011, the population density of Ulaanbaatar City is as high as 253.85 while the national average is 1.80.

[7] See the World Bank: Mongolia Quarterly Economic Update, August 2011

Table 8.1.5 Comparison of Social Indicators

Particulars	Literacy Rate	Elementary Education	Secondary Education	Tertiary Education	Infant Mortality
Unit	%	%	%	%	per 1,000 birth
High HDI Countries	92.3	94.4	74.9	43.2	18
Medium HDI Countries	80.7	88.5	57.0	17.6	38
Low HDI Countries	61.2	73.4	30.9	6.0	83
Mongolia	97.3	88.7	82.0	49.8	34

Source: UNDP: Mongolia Human Development Report 2011
Note: HDI stands for Human Development Index. High HDI countries do not include OECD countries.

(3) Land Use

Land use in Ulaanbaatar City represented by the six (6) main districts is shown in Table 8.1.6. Development of urban areas and transportation land such as highways has not progressed in terms of land area; however, they such development has been rapidly promoted since UBMP was approved by the Parliament of Mongolia in January 2013.

Table 8.1.6 Land Use of Ulaanbaatar City

Land Use	Area	Occupancy
Total Area (six main districts in Ulaanbaatar City)	3256.6	100.0%
Agricultural Land	1791.1	55 %
Cities, Villages and Other Settlements Land	199.2	6 %
Transportation and Network Land	39.3	1 %
Forest Resources Land	746.7	23 %
Water Resources Land	40.4	1 %
Reserve Land for Special Use of the State	439.9	14 %

Source: Unified Land Territory Report (2006)

8.2 INSTITUTIONAL FRAMEWORK FOR ENVIRONMENTAL IMPACT ASSESSMENT (EIA) IN MONGOLIA

(1) Legal Framework for Environmental Assessment

Mongolia has enacted a comprehensive policy and legal framework for environmental issues. It has policies, legislations and strategies in place to manage the protected areas, to satisfy its international obligations, and to protect the quality of the environment for the health and well-being of its citizens. Several of the laws, plans and programs approved by the Government of Mongolia are of particular importance to the Project and are discussed below.

Table 8.2.1 Major Laws and Regulations

Category	Names (Year)	Brief Description
General	Law on Environmental Protection (1995/2005, Amended in 2008)	The law obliges people to conserve soil, underground resources, water resources, fauna and flora and ambient air. It also clarifies the responsibilities of central and regional governments and also that of public and private business entities.
EIA	Law on Environmental Impact Assessments (1998/Amended in 2001)	It provides a legal basis on EIA. It also clarifies environmental protection, prevention of deterioration in ecological balance, regulation of resource utilization, environmental impacts from development activities and approval of such development activities.
Pollution Control	Law on Air (1995/Invalidated in 2010)	It regulates protection of air quality and appropriate usage of air.
	Law on Air Pollution Fine (2010)	It defines vehicle emission and usage of raw coal as main causes of air pollution, and also strengthens regulations on fines which were originally introduced by the Law on Air.
	Law on Water (1995/Amended in 2004)	It regulates appropriate usage of water sources and its basin and its conservation and regeneration.
	Law on Hazardous and Toxic Materials (2006)	It regulates appropriate management of hazardous and toxic materials in order to protect citizens' health and the environment.
	Law on Labor Safety and Hygiene (2008)	It regulates how to prevent work-related accidents and also how to promote labor safety and occupational health.
	Mongolian Law on State Inspection (2003)	It regulates the role and responsibility of the State Professional Inspection Agency (SPIA), which inspects if the laws and regulations of each industrial sector are complied with. The SPIA also monitors the status of environmental protection along with the local authorities in the respective regions.
Environmental Standard	Air and Noise (MNS4585: 2007)	
	Water (MNS4586: 1998)	
	Soil (MNS5850: 2008)	

Source: JICA Survey Team

(2) Environmental Impact Assessment

The EIA requirements of Mongolia are regulated by the Law on Environmental Impact Assessment (1998, amended in 2002). The terms of the law apply to all new projects, as well as rehabilitation and expansion of existing industrial, service or construction activities and projects that use natural resources. The purpose of the law is environmental protection, the prevention of an ecological imbalance, the regulation of natural resource use, the assessment of environmental impacts of projects and procedures for decision-making regarding the implementation of projects. The EIA process in Mongolia is summarized below.

The type and size of the planned activity defines the responsible body as either MNET or Aimag (provincial) government. There are two types of EIAs defined in the Law:

(i) General EIA (screening) — to initiate a General EIA, the project implementer submits to the Screening Agency[8] a brief description of the project including a feasibility study, technical details, drawings, and other information. The General EIA may lead to one of four conclusions: (i) no detailed EIA is necessary, (ii) the project may be completed pursuant to specific conditions, (iii) a Detailed EIA is necessary, or (iv) project cancellation. The General EIA is free and usually takes up to 12 days.

(ii) Detailed EIA — the scope is defined by the General EIA. The Detailed EIA report must be produced by a Mongolian company which is authorized by the Screening Agency by means of a special procedure. The developer of the Detailed EIA should submit it to the Screening Agency. An expert of the organization who was involved in conducting the General EIA should review the Detailed EIA within 18 days and present it to Screening Agency. Based on the conclusion of the expert, the Screening Agency decides whether or not to approve of the project.

The Detailed EIA[9] will be open to the public and registered in the database of the Screening Agency.

(3) Organizational Framework

i) The Ministry of Environment and Green Development (MEGD)

The Ministry of Environment and Green Development (MEGD), which was newly institutionalized as a successor to The Ministry of Nature, Environment and Tourism (MNET), is the lead environmental regulatory agency. MEGG's mission is to develop relevant environmental conservation and natural resource use policies, regulations and laws. It also has exclusive authority over nationally protected areas. The organizational structure of MEGD includes the central headquarters at national level with local branches in all *aimags* and *soms* nationwide. MEGD has different departments and divisions that bear responsibility for green development and policy planning, natural resources and the environment, policy coordination and implementation, protected areas, etc. (Figure 8.2.1). Additionally they are responsible for overseeing the EIA process in Mongolia which includes conducting an initial screening to determine whether a detailed EIA is necessary for a proposed activity and reviewing any subsequent EIA to determine whether the EIA complies with Mongolian Law.

[8] The Screening Agency here is the Ministry of Environment and Green Development.
[9] DEIA includes both the Environmental Protection Plan and Environmental Monitoring Plan which are parts of the Environmental Management Plan in this Project.

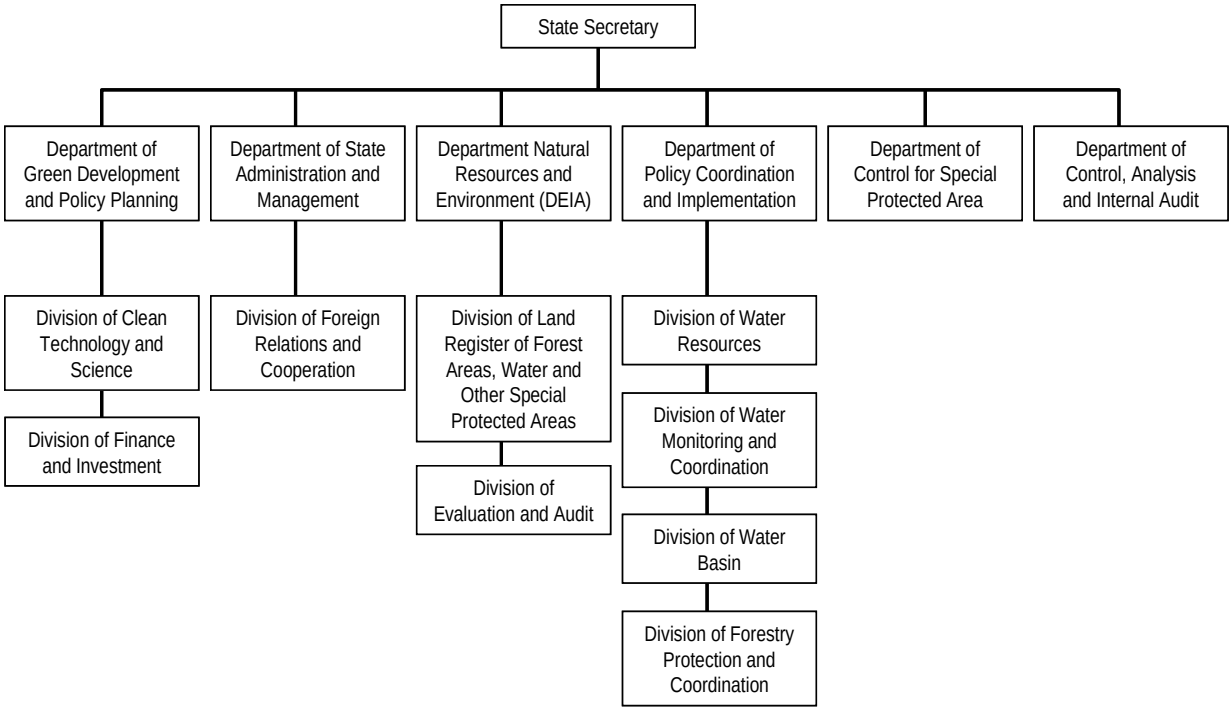


Figure 8.2.1 Organization of the Ministry of Environment and Green Development

ii) State Professional Inspection Agency (SPIA)

The SPIA is the essential government agency that enforces the Mongolian Law on State Inspection (2003) which regulates all state audits and inspections. The SPIA, formed in 2003, is responsible for environmental inspection services nationwide, and it covers Nature and Environment Inspection, Infrastructure Inspection (including transportation, road and communications), Industry and Trade Inspection and Food Safety and Agricultural Inspection. Environmental Inspectors are responsible for environmental monitoring, operational inspections and information collection. Inspectors have the authority to:

- require individuals, organizations or economic entities to eliminate activities that are harmful to the environment;
- suspend the operations of any entity in violation of environmental regulations, standards or permissible levels;
- enter any economic entity or organization to control environmental impacts, take samples and have samples analyzed; and
- impose administrative penalties as provided in law on those who violate environmental regulations and standards.

(4) Status of GEIA

The Road Department of Ulaanbaatar City Government submitted a GEIA application to MNET on April 5, 2012; as a reply, MNET provided the department with the result of GEIA on April 26, 2012, as per the attached document, instructing it to carry out the DEIA.

(5) Status of DEIA

(Confidential)

8.3 SCOPING AND STUDY ON ENVIRONMENTAL AND SOCIAL CONSIDERATION

(1) Scoping and Assessment Method

The JICA Survey Team conducted the necessary studies as a JICA-financed project including preparation of scoping. The scoping matrix mentioned below was circulated among and explained to relevant officers in the Ulaanbaatar City Government[10].

Table 8.3.1 Scoping Matrix

Environmental Items	Assessment		Likely Impacts	IEE Assessment Method
	(a) Pre/During Construction	(b) Operation Maintenance		
Air Quality	B-	C/B+	(a) Surface dust, hazardous emissions from heavy vehicles and bitumen are assumed to temporarily deteriorate ambient air quality. (b) Negative impacts from vehicle emissions and dust are assumed although the exact size of such impacts depends on the incremental traffic volume. On the other hand, dust may be reduced tremendously since unpaved roads will be changed to asphalted ones in the Project.	1. Review environmental standards on air quality. 2. Ascertain existing air quality in Ulaanbaatar City. 3. Assess the potential impacts of construction on ambient air quality (i.e., confirm details of construction works, the period, area, and kinds of construction vehicles, and review cases of similar construction projects). 4. Assess the potential impacts due to changes in traffic variables. (i.e., speeds, traffic volume and flow). 5. Undertake a site visit (i) to identify sensitive receptors that may be affected during both construction and operation and (ii) identify features that can influence pollutant concentration such as road gradients and congestion points.
Water Quality	D	D	(a) Discharged water from construction works, heavy machinery, construction vehicles	N/A

[10] They are officers from the Road Department and the Environmental Protection Department of the Ulaanbaatar City Government.

Environmental Items	Assessment		Likely Impacts	IEE Assessment Method
	(a) Pre/During Construction	(b) Operation Maintenance		
			and workers' compounds may impose burden on drainage unless appropriate measures are taken, but it is unlikely to directly affect surface water bodies. (b) The Dound River near the Project site is dry throughout most of the year, and there are no other water bodies in the area. Moreover, washout of dust on the road surface will be limited due to low annual precipitation. Thus, deterioration of water quality is not considered to be significant.	
Waste	B-	D	(a) Construction waste will be generated. (b) Waste which may have negative impacts on environments is unlikely during operation	1. Review laws and regulations on hazardous waste. 2. Ascertain an appropriate method for disposing of construction waste by reviewing cases of similar construction projects, and by consulting relevant persons.
Soil Contamination	C/B-	D	(a) If not properly taken care and stored, hazardous substances such as lubricants, fuel and other chemicals could run off, and cause soil contamination. (b) Soil contamination is unlikely to be significant.	1. Review environmental standards on soil contamination. 2. Assess the potential impacts of construction on soil (i.e., confirm storage, disposal and discharge of hazardous substances, and review cases of similar construction projects).
Noise and Vibration	B-	C/B-	(a) Heavy machinery and construction vehicles are likely to temporarily generate noise (incl. low frequency noise) and vibration. (b) Construction of a flyover and its access roads and rehabilitation of the Dound Bridge may induce an increase in traffic volumes, and eventually may generate noise and vibration. However, since the Project site is located within the industrial area, any substantial impact, i.e., impacts to residents, might be limited. The impact will be assessed after the details such as locations of sensitive receptors are clarified.	1. Review environmental standards on noise. 2. Undertake a site visit to identify sensitive receptors that may be affected during both construction and operation. 3. Assess the potential impacts of construction on noise and vibration (i.e., confirm details of construction works, the period and hours of operation, area, and kinds of construction vehicles, and review cases of similar construction projects). 4. Assess the potential impacts due to changes in traffic variables. (i.e., speeds, traffic volume and flow, types and sizes of vehicles).

Environmental Items	Assessment		Likely Impacts	IEE Assessment Method
	(a) Pre/During Construction	(b) Operation Maintenance		
Subsidence	D	D	(a) No reports say that the land of the project site is not robust, and no activities that may cause subsidence, i.e., massive utilization of groundwater, are planned. Thus, the impacts in this regard are unlikely during construction. (b) Similarly, the impacts during operation are not likely to be significant. (Please note that the detailed study on natural and hydrogeological conditions, which was carried out separately, supplements the information regarding risks of subsidence.)	N/A
Odor	D	D	No construction activities that may create an odor are planned. Even during operation, creation of odor is most unlikely.	N/A
Sediment	D	D	(a) Since no works such as bridge piers which may cause some impacts on sediment of the Dound River are planned, no impact is likely during construction. (b) No impact is likely during operation.	N/A
Protected Areas	D	D	No protected areas such as national parks and sanctuaries are located in and around the project site.	N/A
Ecosystem	D	D	The project site is located in an industrial area, and not the habitat of rare animals and species. Also no activities which may affect banks of the Dound River, where certain animals and plants are observed to live, are planned. Moreover, no changes in land use including a massive loss of trees are planned. Thus, impacts on the ecosystem are not likely to be significant.	N/A
Hydrology	D	D	The Dound River is basically dry throughout the year. Also no activities such as installing bridge piers which may induce impacts on water volume and flow are planned. Thus no impact is expected.	N/A

Environmental Items	Assessment		Likely Impacts	IEE Assessment Method
	(a) Pre/During Construction	(b) Operation Maintenance		
Topography and Geology	C/B-	D	(a) No reports say that land of the project site is not robust, and it is unlikely that construction of a flyover will impose substantial impacts on topology and geology. On the other hand, during the course of expansion of the access road along the Dound River, filling and excavating earth or rehabilitation of embankments will be carried out, and this will lead to certain impacts on topology and geography. (b) No impact is likely during operation.	1. Undertake a site visit, especially along the Dound River embankment. 2. Assess the potential impacts of construction on topology and geology. (i.e., confirm details of construction works and review cases of similar construction projects).
Resettlement	C/B-	D	(a) If the South-North route is selected, approximately seven families living in gers are likely to be affected and resettled due to the acquisition of land necessary for the access road. Even if a route which does not require involuntary resettlement of citizens is selected, land acquisition will be necessary for the same purpose. (b) No impact is likely during operation.	1. Review laws and regulations regarding land acquisition, if necessary consult the relevant officers in Ulaanbaatar city government and check other similar cases. 2. Ascertain the size of involuntary resettlement (in the case of the South-North route) through site visits, interview surveys and analysis of satellite images. 3. Ascertain the land use (incl. the categories of land) of the project site through site visits and consultation with land acquisition officers of the Ulaanbaatar city government. 4. Prepare a resettlement plan (abbreviated).
Poverty	C	C	(a) Some of the *ger* families mentioned above may include poor families, and thus if the South-North route is selected, the special considerations will be necessary during the course of developing resettlement plan. (b) The project site is located within the industrial area and there are no residents other than those *ger* families. Thus no impact is likely in this regard. The effect on people, who do not usually use	1. Ascertain the size of the poor families (in the case of the South-North route) through site visits, interview surveys and analysis of satellite images. 2. Ascertain the effect on pedestrians due to severance through site visits and analysis of drawings (road plans).

Environmental Items	Assessment		Likely Impacts	IEE Assessment Method
	(a) Pre/During Construction	(b) Operation Maintenance		
			motorized vehicles, though they are not identical to the poor, will be analyzed during site visits.	
Ethnic Minorities and Indigenous People	D	D	No ethnic minorities and indigenous people live in and around the project site, and therefore no impact is likely.	N/A
Local Economy (Employment and Livelihood)	D	C/B+	The construction of a flyover is planned in order to improve the city's situation, where currently a railroad divides the entire city between the south and the north parts, and also to restore urban functions by mitigating traffic congestion. Thus, if the Project is implemented, it will be beneficial to the city's economy. Also, even from micro-perspectives, the improvement of traffic networks by the Project is likely to improve transportation with regards to heavy loaded vehicles coming from nearby warehouses and factories.	N/A
Utilization of Land and Local Resources	D	D	The Project aims to improve the existing road network by constructing a new flyover in the industrial area. Thus it is unlikely to cause changes in utilization of land and local resources.	N/A
Utilization of Water	C	C	As for water utilization of the *ger* families, details such as utilization of wells will be clarified during site visits.	1. Ascertain water supply systems of Ulaanbaatar city by reviewing existing reports and documents. 2. Undertake a site visit to clarify the water utilization of the *ger* families.
Existing Social Infrastructures and Services	B-	C	(a) Traffic congestion due to contraction work is likely. In addition, some impacts are likely to the railway schedule and to the existing utilities during construction. (b) Further impact from increased volumes of traffic, i.e., changes in congestion patterns and traffic accidents should be assessed.	1. Undertake a site visit to identify sensitive receptors and existing infrastructures. 2. Assess the potential impacts of construction on infrastructures (i.e., road, railways and existing utilities). 3. Assess the potential impacts on sensitive receptors due to changes in traffic variables.
Social Institutions (Social Capital and Local Decision-making Institutions)	D	D	The Project aims to improve the existing road network by constructing a new flyover in the industrial area. Thus it is unlikely to cause any impacts on social institutions.	N/A

Environmental Items	Assessment		Likely Impacts	IEE Assessment Method
	(a) Pre/During Construction	(b) Operation Maintenance		
Equality of Benefits and Losses	D	D	Due to the same reason mentioned above, it is unlikely to exert any negative impacts on equality of benefits and losses.	N/A
Local Conflicts of Interest	D	D	Due to the same reason mentioned above, it is unlikely to exert any impacts on local conflicts of interest.	N/A
Cultural Heritage	D	D	There is no cultural heritage in and around the project site, and no impact is expected.	N/A
Landscape	B-	B-	By considering the size of flyover, a certain impact to the landscape is unavoidable, though within the industrial area. Also, the expansion of access road in front of Ulaanbaatar central station will require replanting of several trees of the planting zone.	1. Undertake a site visit to observe the existing landscape and planting zone, and to identify sensitive receptors. 2. Review the existing urban development plan and examine the project's conformity with the plan.
Gender	C	C	In case involuntary resettlement of citizens is unavoidable, special consideration to gender issues is needed. So this item should be assessed only after the necessity of such resettlement is clarified.	1. Ascertain (in case involuntary resettlement of citizens is unavoidable) the numbers of women and women-headed households affected by the Project through conducting a census survey.
Children's Right	C	C	In case involuntary resettlement of citizens is unavoidable, special consideration to children's rights is needed. So this item should be assessed only after the necessity of such resettlement is clarified.	1. Ascertain (in case involuntary resettlement of citizens is unavoidable) the numbers of children affected by the Project through conducting a census survey.
Infectious Disease, i.e., HIV/AIDS	C	D	(a) Although a massive inflow of workers is not expected and consequently infectious diseases are less likely to spread during construction, impacts in this regards will be assessed only after confirming the current situation in Ulaanbaatar. (b) No impact is likely during operation.	1. Ascertain the prevalence rate of HIV/AIDS by reviewing the existing data. 2. Consult with NGOs and activists who are working to prevent HIV/AIDS.
Working Conditions (Occupational Safety)	B-	D	(a) Special consideration to occupational health and safety of construction workers is required. (b) Activities that create negative impacts on workers are not likely during operation.	1. Review laws and regulations on occupational health and safety. 2. Review similar construction projects (incl. the contract documents of such projects).
Accident Prevention	B-	B-	(a) Measures to prevent accidents during construction are necessary.	1. Assess the potential impacts of construction on safety. (i.e., congestions due to construction

Environmental Items	Assessment		Likely Impacts	IEE Assessment Method
	(a) Pre/During Construction	(b) Operation Maintenance		
			(b) Increased volumes and speeds of traffic may lead to more traffic accidents.	works, mitigation and safety measures). 2. Assess the potential impacts during operation.
Trans-boundary Impact and Climate Change	D	D	The Project aims to improve the existing road network by constructing a new flyover in the industrial area. No carbon sink is located in and around the project site. Consequently, no impacts on trans-boundary areas and climate change are likely.	N/A

Assessment:
A+/-: Significant positive/negative impact is expected.
B+/-: Positive/negative impact is expected to some extent.
C+/-: Extent of positive/negative impact is unknown. A further examination is needed, and the impact could be clarified as the study progresses.
D: No impact is expected.

(2) Environmental Quality

As a part of DEIA, the following items were monitored in the field.

i) Air Quality

The air quality was measured at five (5) locations in the Project site. The analytical results of SO_2, NO_2, CO, PM10 and Pb are summarized in Figures 8.3.2 – 8.3.6. The red line shows air quality standards stipulated in "Mongolian Standard (MNS4585-2007)."

In the firefighting facilities in the railway property, SO_2 and NO_2 exceed the standard values. In the railway station, Gobi factory and Dund Gol railway bridge, NO_2 exceeds the standard. Both NO_2 and PM10 exceed the standard at Ajilchin intersection.

Table 8.3.2 Measurement Locations of Air Quality

	Locations	Latitude	Longitude
A1	Railway Fire Station	47°54'33.84"N	106°52'32.32"E
A2	Railway Passenger's Wagon Depot	47°54'31.10"N	106°52'18.29"E
A3	Southeastern corner of Gobi Factory	47°54'13.49"N	106°52'16.68"E
A4	Dundgol Railroad Bridge	47°54'22.27"N	106°52'13.41"E
A5	East of Ajilchin intersection	47°54'14.33"N	106°51'23.63"E

Figure 8.3.1 Measurement Locations of Air Quality

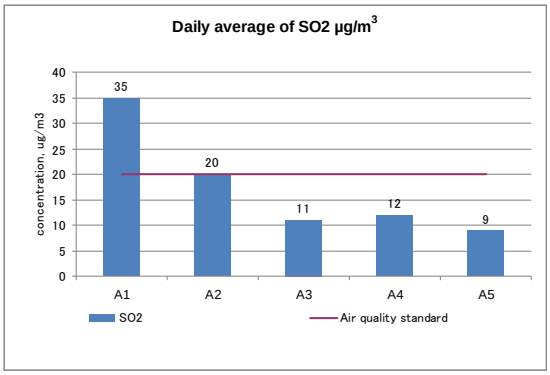


Figure 8.3.2 SO_2 (daily average)

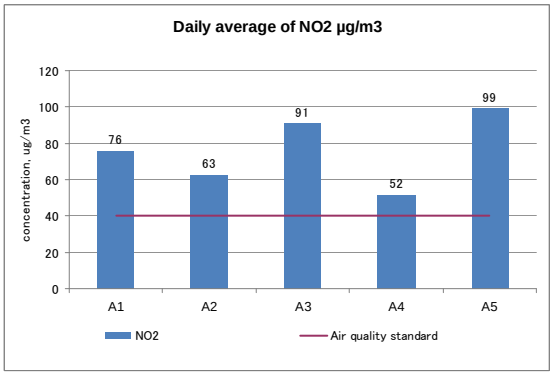


Figure 8.3.3 NO_2 (daily average)

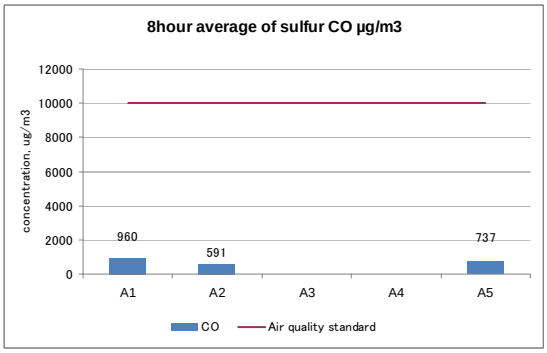


Figure 8.3.4 CO (daily average)

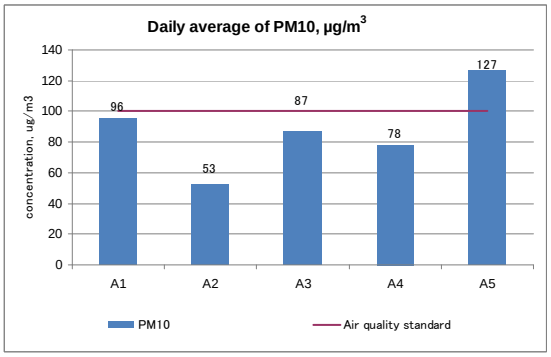


Figure 8.3.5 PM10 (daily average)

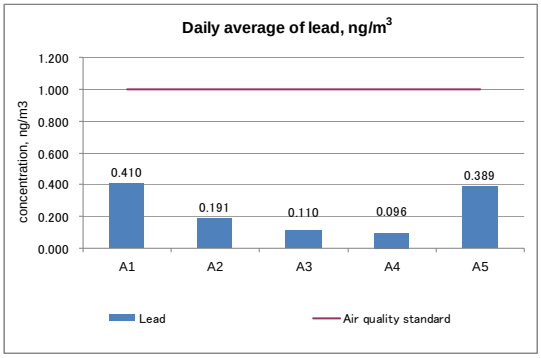


Figure 8.3.6 Pb (daily average)

Table 8.3.3 Air standard (MNS4585)

	Standard
SO_2	24 hour average < 20 μg/m
NO_2	24 hour average < 40 μg/m
CO	8 hour average < 10,000 μg/m
PM10	24 hour average < 100 μg/m
Pb	24 hour average < 1.0 μg/m

ii) Noise

Noise was measures at five (5) locations in the Project site as shown in Figure 8.3.7. The measurement results are summarized in Table 8.3.4, and are sorted as maximum, minimum and average in Figure 8.3.8. The standard of noise is also stipulated in "Mongolian air quality standard (MNS4585)."

Figure 8.3.7 Measurement Locations of Noise

Table 8.3.4 Result of Noise Measurement

Location	Maximum noise level (dB)	Minimum noise level (dB)	Average noise level (dB)	Environmental standard	
				07:00–23:00	23:00–07:00
N1	64.7-74.0	55.0-63.6	69.9	60 dB (16 hour average)	45 dB (8 hour average)
N2	76.7-104	66.0-83.0	73.4		
N3	62.3-77	55.0-68.4	66.7		
N4	62.8-91.0	57.9-69	68.3		
N5	66.6-89.0	62.9-71.7	68.6		

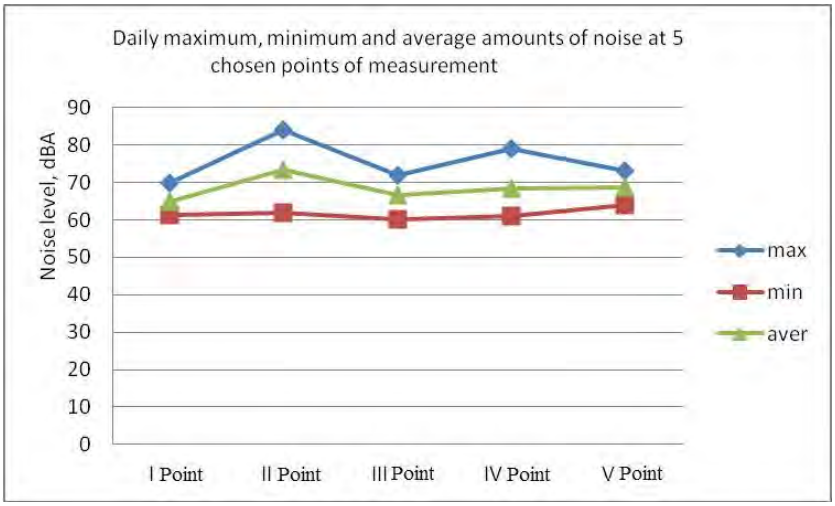


Figure 8.3.8 Measurement Result of Noise

iii) Vibration

Vibration was measured at five (5) locations in the Project site as shown in Figure 8.3.9. The measurement results are summarized in Table 8.3.5. There is no standard for vibration in Mongolia.

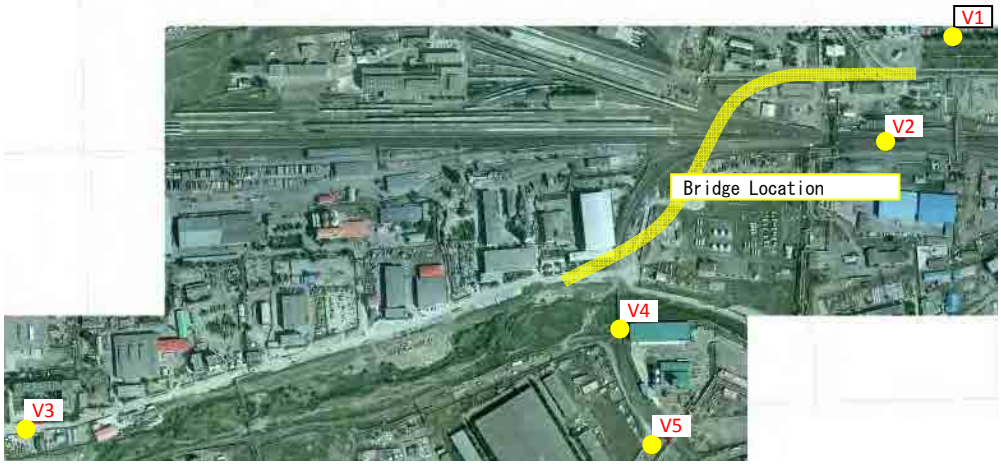


Figure 8.3.9 Measurement Locations of Vibration

Table 8.3.5 Result of Vibration Measurement

	Measurement Time							
Point 1 (Secondary school #38)	**15:00**	**18:00**	**21:00**	**00:00**	**03:00**	**06:00**	**09:00**	**12:00**
Hi m/cm^2	0.040	0.010	0.020	0.030	0.100	0.020	0.020	0.020
1 kHz/z cm/s	0.210	0.030	0.020	0.020	0.010	0.020	0.020	0.020
Low mm	0.015	0.014	0.015	0.003	0.003	0.005	0.003	0.004
Point 2 (pedestrian bridge)	**15:40**	**18:40**	**21:40**	**00:40**	**03:40**	**06:40**	**09:20**	**12:20**
Hi m/cm^2	0.040	0.040	0.020	0.030	0.070 (train pass)	0.170 (train pass)	0.210 (train pass)	0.120
1 kHz/z cm/s	0.110	0.050	0.020	0.030	0.070	0.270	0.080	0.020
Low mm	0.021	0.014	0.029	0.004	0.003	0.121	0.015	0.011
Point 3 (Ajilchin intersection**)**	**16:00**	**19:00**	**22:00**	**01:00**	**04:00**	**07:00**	**10:00**	**13:00**
Hi m/cm^2	0.030	0.020	0.040	0.040	0.010	0.020	0.020	0.020

1 kHz/z cm/s	0.010	0.040	0.040	0.040	0.010	0.020	0.010	0.020
Low mm	0.007	0.014	0.019	0.004	0.003	0.003	0.005	0.004
Point 4 (Dund River Railroad Bridge)	**16:20**	**19:20**	**22:20**	**01:20**	**04:20**	**07:20**	**10:20**	**13:20**
Hi m/cm^2	00.20	0.020	0.010	0.020	0.020	0.170 (train pass)	0.020	0.020
1 kHz/z cm/s	0.040	0.020	0.010	0.020	0.020	0.060	0.010	0.010
Low mm	0.005	0.003	0.003	0.003	0.003	0.005	0.005	0.005
Point 5 (Southeast of Gobi Factory)	**16:25**	**19:25**	**22:25**	**01:25**	**04:25**	**07:25**	**10:25**	**13:25**
Hi m/cm^2	0.010	0.010	0.030	0.020	0.010	0.010	0.020	0.010
1 kHz/z cm/s	0.020	0.020	0.020	0.010	0.020	0.010	0.010	0.020
Low mm	0.007	0.003	0.011	0.003	0.003	0.004	0.004	0.004

iv) Water Quality

Water quality was analyzed in surface water and groundwater (see Figure 8.3.10). Three (3) surface water samples and another three (3) groundwater samples were taken from the Dundgol River and adjacent existing wells, respectively. Additional sampling for microorganism analysis was done from the surface water of Dundgol River. The results of water quality analysis are summarized in Tables 8.3.6 and 8.3.7.

Figure 8.3.10 Locations of Water Quality Analysis

Table 8.3.6 Results of Water Quality Analysis

Item	Unit	Standard	Surface water (Dond Gol River)			Groundwater		
			SW1	SW2	SW3	UW1	UW2	UW3
1. Chloride	mg/l	500	24.8	24.8	24.9	24.8	24.9	25.0
2. Sulfate	mg/l	3,000	25.0	24.3	22.5	22.5	64.0	25.0
3. Substance to be weighed	mg/l	50,000	29.5	29.9	28.5	-	-	-
4. Alkalinity	mg/l	600	44	44	44	44	44	44
5. Corrosive CO_2	mg/l	<3.4	2.9	8.4	8.8	0.7	0.7	0.71
6. pH	-	>5.5	7.9	7.9	8.0	7.40	7.42	7.40
7. pH for surface water	-	6.6-8.5	7.9	7.9	8.0			
8. BOD	mg/l	3	0.637	0.676	0.676	-	-	-
9. COD	mg/l	10	5.10	5.41	5.41	-	-	-
10. DO	Mg/l	6	6.59	6.51	6.48	-	-	-

Standard for 1–6; MNS900:2005, Standard for 7–10; MSN 4586-1998

Table 8.3.7 Results of Water Quality Analysis on Microorganism (E-1)

	Number of microorganism	Microorganism in entro-group	Anaerobic microorganism	Disease-causing germs in entro-group
Referred Standard	MNS 00-2005	MNS 4697-98	MNS 7939:2000	MNS 6340-2003
Standard	100	0	n/a	No description
Measured	5 x 10^4	Colon detected	Perfringens germs	Disease-causing germs not detected

v) Soil

Soil was analyzed to identify soil pollution and the content of heavy metals in disposal land in residential areas. The locations of soil sampling are shown in Figure 8.3.11. Five (5) soil samples and another two (2) river sediment samples were taken from X1-X5 and Sed1-Sed2, respectively. The environmental standard for soil pollution refers to MNS 5850:2008.

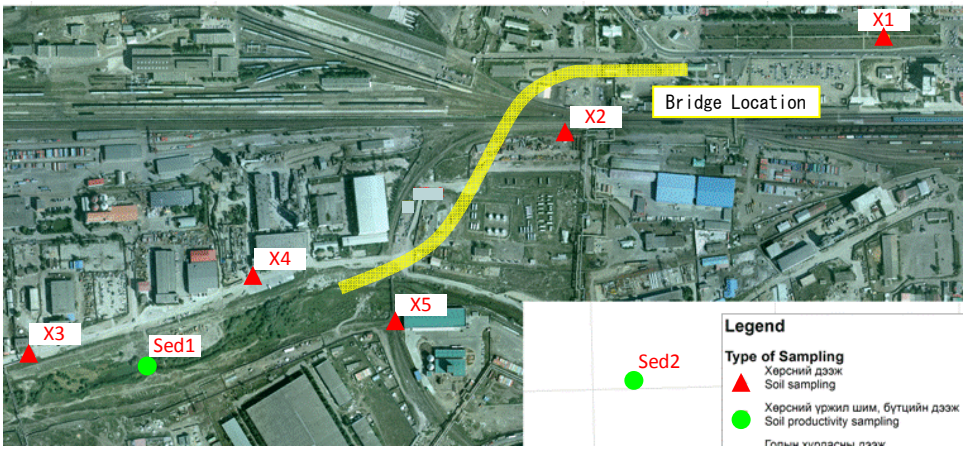


Figure 8.3.11 Locations of Soil Sampling

Table 8.3.8 Content of Heavy Metals in Soil

(unit: mg/kg)

	Hg	Cd %	As	Pb	Cr
X-1	0.15	<0.005	18	45	49
X-2	0.19	<0.005	11	27	68
X-3	0.13	<0.005	7	62	40
X-4	0.05	<0.005	6	25	44
X-5	0.19	<0.005	9	97	51
MNS 5850:2008	2	3	50	100	150

Table 8.3.9 Content of Heavy Metals in River Sediment

(unit: mg/kg)

	Hg	Cd	As	Pb	Cr
Sed-1	0.05	<0.005	11	481	23
Sed-2	0.11	<0.005	13	57	91
MNS 5850:2008	0.010–0.85	0.010–2.0	0.1–40	2–300	5–1500

(3) Study on Environmental and Social Consideration

Table 8.3.10 shows the result of Study on Environmental and Social Consideration based on the foregoing scoping.

Table 8.3.10 Result of Study on Environmental and Social Consideration

Environmental Items	Assessment at Scoping		IEE Assessment		Results
	(a) Pre/During Construction	(b) Operation/ Maintenance	(a) Pre/During Construction	(b) Operation/ Maintenance	
Air Quality	B-	C/B+	B-	B+	(a) Surface dust, hazardous emissions from construction vehicles and bitumen are assumed to temporarily deteriorate the ambient air quality, especially along access roads. (b) The current pollution level is worse than the level set by the Mongolian national environmental standard on ambient air (MNS4585) throughout UB City, and it is considered as one of the most serious environmental problems. PM is known to be particularly important as a targeted pollutant among others, and the following are considered to be the primary sources: (i) coal combustion from around 140,000 yurt stoves (36%), (ii) coal combustion at thermal power plants (34%) and (iii) traffic dust (27%), while on the other hand, vehicle emissions contribute only 2%. As for CO and NO_2, they may increase as the number of vehicles increases. However, an apparent positive impact (impact to reduce CO and NO_2) is expected through solving traffic congestion and improving driving speed. As a result, the Project is highly likely to have a positive impact in this regard.
Waste	B-	D	B-	D	(a) According to the Mongolian Law on Household and Industrial Waste (2003), the project owner and the contractor for construction work are obliged to hand over construction waste and soil to the approved contractors and make sure that wastes are disposed of appropriately. In response to the increasing problems of inappropriate management of construction waste in UB City in spite of the Law, UB City along with the Ministry of Environment, Natural Resources and Tourism is currently preparing rules and regulations on construction wastes. As for the Project, generation of soil and construction waste is expected especially through excavating access roads and such like.
Soil Contamination	C/B-	D	B-	D	(a) If not properly taken care and stored, hazardous substances such as lubricants, fuel and other chemicals could run off, and cause soil contamination.
Noise and Vibration	B-	C/B-	B-	B-	(a) Heavy machinery and construction vehicles are likely to temporarily generate noise (incl. low frequency noise) and vibration. However, since a certain distance

Environmental Items	Assessment at Scoping		IEE Assessment		Results
	(a) Pre/During Construction	(b) Operation/ Maintenance	(a) Pre/During Construction	(b) Operation/ Maintenance	
					from the sensitive receptors[11] is secured, the negative impact would not be substantial provided appropriate mitigation measures are taken. (b) Construction of a flyover and its access roads may induce an increase in traffic volume, and eventually may generate noise and vibration. However, the Project site is located within an industrial area near to the Ulaanbaatar Central Station, and a certain distance from sensitive receptors is secured. Thus, a substantial impact, i.e., impacts to residents, might be limited. However, it is appropriate to monitor the situation, and take countermeasures, if necessary.
Topography and Geology	C/B-	D	B-	D	(a) No reports say that the land of the project site is not robust, and it is unlikely that construction of a flyover will impose substantial impacts on topology and geology. In addition, during the course of expansion of the access road along the Dound River, filling and excavating earth or rehabilitation of embankment will be carried out, and it indeed leads to certain impacts on topology and geography. However, the project site is located in an industrial area, and rare topographical and geographical resources of scientific importance are not located there. Thus the actual negative impact is considered to be negligible.
Resettlement	C/B-	D	B-	D	(a) Although no involuntary resettlement of citizens is required, land acquisition is required from the Mongolian Railway and other several private enterprises in order to build access roads[12].
Poverty	C	C	D	B-	(a) Since involuntary resettlement is not required by the Project, no social impact in this regard is expected. (b) The project site is located within an industrial area and there are no residents other than seven yurt families. Thus no impact is likely in this regard. For the people, who do not usually use motorized vehicles, though they are not identical to the poor, some consideration such as sidewalks for access roads is required.
Local economy (employment and livelihood)	D	C/B+	D	C/B+	(a) The construction of a flyover is planned in order to improve the city's situation, where a railroad divides the entire city between the south and the north parts, and also to restore urban functions by mitigating traffic congestion. Thus, if the plan is implemented, it is likely to be beneficial to economy of the entire city. Also, even from microperspectives, the improvement of

[11] The nearest sensitive receptor is the 38th School across the access road, whose distance from the project site is approximately 80 m. The second nearest is the yurt families along the railway branch line whose distance from the project site is about 100 m.

[12] The exact size of land acquisition and its compensation scheme are detailed in section 8.5 in this chapter.

Environmental Items	Assessment at Scoping		IEE Assessment		Results
	(a) Pre/During Construction	(b) Operation/ Maintenance	(a) Pre/During Construction	(b) Operation/ Maintenance	
					traffic networks by the Project is likely to be advantageous with regards to transportation by heavy loaded vehicles from nearby warehouses and factories.
Utilization of water	C	C	D	D	(a)/(b) As for water utilization of the yurt families, it became clear that one household owns a well for domestic use, but not for drinking purposes. Moreover, the well is located more than 130 m away from the project site, and also no construction work which may cause pollution of groundwater is planned. Thus it is unlikely to affect utilization of water.
Existing social infrastructures an services	B-	C	B-	B-	(a) Traffic congestion due to contraction work is expected. In addition, some impacts are likely to be exerted on the railway schedule and on the existing utilities during construction. (b) Improvement of roads may improve road safety, but the increased traffic volume may induce accidents, although no simple correlation is observed between the number of vehicles and number of accidents[13]. For the people, who do not usually use motorized vehicles, considerations such as sidewalks along access roads are necessary.
Landscape	B-	B-	B-	B-	(a)/(b) Although, considering the size of the flyover, a certain impact on the landscape is unavoidable, it will be constructed in an industrial area and therefore the impact is not substantial. Also, the expansion of an access road in front of Ulaanbaatar Central Station will require replanting of several trees of the planting zone.
Gender	C	C	D	D	In case involuntary resettlement of citizens is unavoidable, special consideration to gender issues is needed. Resettlement is not required this time, so no impact is expected.
Children's Right	C	C	D	D	In case involuntary resettlement of citizens is unavoidable, special consideration to children's right issues is needed. Resettlement is not required this time, so no impact is expected.
Infectious Disease, i.e., , HIV/AIDS	C	D	D	D	(a) According to an interview with an NGO specialized in HIV/AIDS prevention and awareness raising, registered numbers of people who are living with

[13] Data from UNESCAP-Status Paper on Road Safety 2010, Mongolia.

	Items	2006	2007	2008	2009	2010
1	Registered vehicles (no.)	176,716	200,288	230,044	265,572	303,744
2	Fatal injury (cases)	530	455	372	415	447
3	Serious injury (cases)	2,013	1,443	1,285	1,431	1,497
4	Death rate (per 10,000 vehicles)	29.9	22.7	16.17	15.62	14.71
5	Death rate (per 100,000 people)	18.7	15.41	12.41	13.64	14.48

Environmental Items	Assessment at Scoping		IEE Assessment		Results
	(a) Pre/During Construction	(b) Operation/ Maintenance	(a) Pre/During Construction	(b) Operation/ Maintenance	
					HIV/AIDS is 106 persons as of April 2012. In addition, no influx of construction workers is expected. Thus, no substantial impact is expected.
Working Conditions (incl. Occupational Safety)	B-	D	B-	D	(a) Based on the Mongolian Law on Labor Safety and Hygiene (2008), special consideration to the occupational health and safety of construction workers is required.
Accident Prevention	B-	B-	B-	B-	(a) Measures to prevent accidents during construction are necessary. (b) Increased volumes and speeds of traffic may lead to more traffic accidents.

Assessment:

A+/-: Significant positive/negative impact is expected.
B+/-: Positive/negative impact is expected to some extent.
C+/-: Extent of positive/negative impact is unknown. A further examination is needed, and the impact could be clarified as the study progresses.
D: No impact is expected.

8.4 MITIGATION MEASURES AND MONTORING PLAN

(1) Mitigation Measures

Table 8.4.1 shows proposed mitigation measures for the expected environmental impacts of the Project.

8.4.1 Mitigation Measures for the Project

(Confidential)

(Confidential)

(Confidential)

(Confidential)

(2) Monitoring Plan

As required in the DEIA, the Environmental Management Plan (EMP) is prepared. Environmental monitoring is considered to be a crucial activity of EMP and its implementation framework is as follows.

i) Institutional framework for Implementation of EMP

Once the DEIA report, which includes EMP, is approved by the Ministry of Environment and Green Development (MEGD) of Mongolia, the agencies mentioned in Table 8.4.2 below conduct environmental monitoring.

The Project Implementation Unit (PIU), which is organized by the MRT and the Road Department of Ulaanbaatar City, will be responsible for supervising the implementation of the EMP, including environmental monitoring. Its monitoring activities will be primarily carried out by PIU along with officers of SPIA and the environmental inspectors of the local government of Bayangol District.

Table 8.4.2 Role of Agencies for EMP Implementation

Item No.	Name of Organization	Role in the Project	Role of EMP
1	Ministry of Environment and Green Development of Mongolia (MEGD)	State central body for environmental policy formulation and policy implementation	• Review DEIA report and EMP content. • Review yearly report of EMP implementation. • Approve EMP for next year.
2	Ministry of Road and Transportation of Mongolia (MRT)	Project executing agency	• Coordinate agencies responsible for project activities and convene project management committee meetings whenever necessary. • Provide guidance for implementation of EMP. • Conduct M&E for EMP implementation.
3	State Professional Inspection Agency (SPIA)	State central organization to inspect whether rules and regulations are confirmed in every sector, including environmental inspections.	• Review annual and quarterly EMP implementation report submitted by UB department and District division. • Report to MEGD on EMP Implementation.
4	Road Department of Ulaanbaatar City (UBRD)	Project implementing agency	• Coordinate activities of project implementation unit for EMP implementation. • Coordinate consultant and contractor activities related to EMP. • Review monthly, quarterly and annual EMP implementation reports and approve EMP for next year. • Submit EMP implementation report to SPIA and MEGD.
5	Project Implementation Unit (PIU)	Implementation unit for EMP	• Oversee contractor's activity on EMP implementation. • Coordinate consultant and contractor for bridge and road construction for EMP implementation. • Facilitate EMP implementation. • Organize and implement monitoring activities according to EMP. • Submit annual performance report for EMP implementation. • Develop EMP for next year.

ii) Monitoring Items

Based on the conclusion of environmental and social consideration and DEIA, environmental monitoring items were established as below. The frequency of the monitoring for the natural environment during the construction is basically two (2) times a year in the warm season and cold season, since the construction period is quite limited as half of the year is midwinter.

a) Air Quality

Item	Duration	unit	Standard	Frequency
SO	Average for 24h	μm/m^3	30	During construction: Bi-annual (June and Nov.) In-service: Annual (after 2 years)
CO	Average for 8h	μm/m^3	10,000	
NO_2	Average for 24h	μm/m^3	40	
Dust (TSP)	Average for 24h	μm/m^3	100	During construction: Bi-annual (June and Nov.)

The location of monitoring shall be as follows.

Locations	Latitude	Longitude
Railway Fire Station	47°54’33.84”N	106°52’32.32”E
Railway Passenger’s Wagon Depot	47°54’31.10”N	106°52’18.29”E
Southeastern corner of Gobi Factory	47°54’13.49”N	106°52’16.68”E
Dundgol Railway Bridge	47°54’22.27”N	106°52’13.41”E
East of Ajilchin intersection	47°54’14.33”N	106°51’23.63”E

b) Noise and Vibration

Item	Unit	Standard	Frequency
Noise	dB	07:00-22:00: 60dB (Average in 16h) 22:00-07:00: 45dB (Average in 8h)	During construction: Bi-annual (June and Nov.) In-service: Annual (after 2 years)
Vibration	dB	07:00-22:00: 65dB 22:00-07:00: 60dB	

The monitoring locations shall be as follows.

Location	Latitude	Longitude
V1 No.38 School	47°54’35.52”N	106°52’44.51”E
V2. Logistic Company	47°54’28.25”N	106°52’36.59”E
V3.Intersection of Ajilchin Road	47°54’14.40”N	106°51’21.80”E
V4. Dund Gol Railway Bridge	47°54’19.19”N	106°52’13.83”E
V5. Gobi Factory	47°54’10.05”N	106°52’13.73”E

c) Water Quality

The effect on water quality that the Project has is estimated as small; however, the following three items shall be monitored during construction since these items have been commonly monitored during construction work near a river in Mongolia and the DEIA recommended to monitor these items as well. The frequency of the measurement can be once a year at times when the river is not frozen.

Item	Unit	Standard*	Measuring Point	Frequency
pH	-	6.5-8.5	Two locations along Dund-gol River	Yearly (April to May)
BOD	mg/l	3	Two locations along Dund-gol River	Yearly (April to May)
COD	mg/l	10	Two locations along Dund-gol River	Yearly (April to May)

*Standard; MSN 4586-1998

d) Soil Contamination

A large amount of steel members for a bridge will be transported and temporarily placed in a stock yard. Most of these members are coated by galvanization or painting including components of Cd or Pb. Thus, these two items shall be monitored in the stock yard for steel members.

Item	Unit	Standard*	Location	Frequency
Cd	mg/kg	3	Construction Yard	Bi-annual (April and October)
Pb	mg/kg	100		

* Standard; MNS 5850:2008

e) Waste

Monitoring of industrial waste hauled during the construction should be carried out every month. The total amount of industrial waste transported to the disposal site specified, is monitored monthly.

f) Others

In addition to above, the following shall also be monitored during the Construction Period.

- Allocation of Security Guards for Traffic Control
- Planting
- Safety Measures for Construction (safety patrol and safety education to labor)
- Grievance Adjustment

iii) Monitoring Form

1. Responses/Actions to Comments and Guidance from Government Authorities and the Public

Monitoring Item	Monitoring Results During Report Period
Number of Responses/Actions to Comments and Guidance from Government Authorities	Twice a year during construction Once a year during operation for two years

2. Pollution

(1) Air Quality (Ambient Air Quality)

Item	Unit	Measured Value (Mean)	Measured Value (Max.)	Country's Standards	Referred International Standards	Remarks (Measurement Point, Frequency, Method, etc.)
SO_2	µg/Ncm			30 (24 hour)	-	Semiyearly (June & Nov.) during Construction, Once a year during operation.
NO_2	µg/Ncm			40 (24 hour)	-	
CO	µg/Ncm			$1*10^4$ (8 hour)	-	
Dust(TSP)	µg /m^3			150 (24 hour)	-	

(2) Water Quality (Effluent/Wastewater/Ambient Water Quality)

Item	Unit	Measured Value (Mean)	Measured Value (Max.)	Country's Standards	Referred International Standards	Remarks (Measurement Point, Frequency, Method, etc.)
pH	-			6.5 – 8.5	-	Upstream entry point and downstream exit point of Dund River within the project area (yearly from April to May during construction)
BOD	mg/L			3	-	
COD	mg/L			10	-	

（JP: Ministry of Environment of Japanese ）

(3) Soil Quality

Item	Unit	Measured Value (Mean)	Measured Value (Max.)	Country's Standards	Referred International Standards	Remarks (Measurement Point, Frequency, Method, etc.)
Cd	mg/kg			3	-	Semiyearly (April and October)
Pb	mg/kg			100	100 (WHO)	

(4) Noise/Vibration

Item	Unit	Measured Value (Mean)	Measured Value (Max.)	Country's Standards	Referred International Standards	Remarks (Measurement Point, Frequency, Method, etc.)
Noise Level/ Vibration Level	dBA			07:00–22:00: 60dB 22:00–07:00: 45dB	70 (Industrial & Commercial)/ WHO	50 m from the construction site; semiyearly during construction and once a year during operation.

(5) Waste

Monitoring Item	Location of Disposal Site	Monitoring Results During Report Period
Solid Wastes (tons/day) Unsuitable Soil (m^3/day)		Monthly during Construction

3. Others (Every Month)

Monitoring Item	Monitoring Results During Report Period
Security Guard for Traffic Control	Number and location
Planting	Number of trees and their locations
Safety Measures for Construction	Safety Education to Labors: (Date and Content) Safety Patrol: (Date and Result of the Patrol)
Grievance Adjustment	Number of Response / Received

8.5 LAND ACQUISITION

(1) Legal Framework for Land Acquisition and Resettlement (LAR)

In 1990, Mongolia began a comprehensive transition towards a new political and economic system, away from the communist regime and moved from a planned economy to a market-based economy. In accordance with the process of this epoch-making transition, a legal framework relating to land acquisition and resettlement (LAR) was formulated. The Constitution (1992), the Land Law, originally enacted in 1994 and amended several times later, and the Law on Land Allocation for Mongolian Citizens for Ownership (2002) are particularly important in terms of LAR.

i) Constitution of Mongolia

The Constitution of Mongolia guarantees the citizens of Mongolia the rights to own private property, have safe and peaceful living accommodation and receive material and financial assistance.

Article 6.4 of the Constitution is the source of the state's power to expropriate land owned or possessed privately. The grounds for involuntary acquisition are when there is a special public need. Article 16.3 obligates the State to make due compensation and payment in the case of taking private property for public use. Land may also be confiscated (i.e., without compensation) if it is used in a manner adverse to the health of the population, the interests of environmental protection or national security.

ii) Land Law

The Land Law contemplates three kinds of private land tenure: (1) *ownership*, which means a legitimate control of land with the right to dispose of it, and this may be granted only to the citizens of Mongolia; (2) *possession*, which means a legitimate control of the land in accordance with purpose of its use and terms and conditions specified in respective contracts, and this may be granted under license to Mongolian citizens, economic entities and organizations, for terms of 15 to 60 years, extendable up to 40 years at a time; (3) *use*, which means a legitimate and concrete activity to make use of some of the land's characteristics in accordance with contracts made with the owners or possessors of land, and this may be granted to Mongolian citizens or to foreign legal entities and so on for 5 years, renewable for 5 years at a time.

Article 43 of the same law explains compensation for expropriating land in *possession* with or without replacement prior to expiration of the contract. The article stipulates that possessors are entitled to replacement land and compensation at the current market price for buildings and other constructions plus all expenses related to relocation[14]. Details are negotiated individually and a contract is concluded between possessors and the respective

[14] According to an interview with the Department of Property Relations, compensation for structures is estimated based on the Government Resolution No. 336 (2010), which contains a list of budgetary information for public works.

governors of *soms* and districts.

The possessors shall vacate the concerned land and transfer it to the respective *soms* and districts within 90 days of entering into the contract. In detail, the governors of a *som* or a district shall pay compensation to the citizen, the company or the organizations which possessed the land, within 60 days after the contract is signed, unless stated otherwise in the contract. The land possessor shall vacate the land within 30 days after receiving the compensation in full.

There is no clear provision in the Land Law concerning LAR over land in *use*, except the obligation of the land office to provide prior notice. The Law is silent on negotiation and compensation. However, although appropriation of used land is not clarified, it will not cause any serious issue since the land that will need to be acquired for the proposed Ajilchin Flyover is all *possessed*.

iii) Law on Land Allocation for Mongolian Citizens for Ownership (Land Allocation Law)

The Land Allocation Law includes articles that explain the acquisition of *owned* land. Article 32.1 states that special needs for which owned land can be acquired are:

- Ensuring national defense and security;
- Creating a permanent exploitation field for scientific and technological experiment and environmental or climatic observation; and
- Building roads, lines and networks and other objects of a national scale.

The State must notify owners and enter into negotiations with owners at least one year prior to a decision to expropriate, attempting to agree on: i) the value of the lad and immovable property located on it; ii) transportation costs regarding resettlement or relocation; iii) investment made by the owner on the land; iv) location, size, characteristics and quality of replacement land that is provided by state; v) conditions and deadline for vacating the land; and vi) the amount of compensation, payment procedure and date. If an agreement is reached, the owner must vacate within one year of the agreement date. If no agreement is reachable, the dispute will be referred to the court.

Under Article 33, district governors may establish servitudes over private land for the purposes of access through the land, installing survey markets, drainage or other land management measures. No compensation need be paid for such access. If the land becomes difficult or impossible to use because of the servitude, the owner has the right to demand that the authority purchase the land or compensate for damages.

Article 37 of the Law outlines the principles applicable to compensation that landowners are entitled to upon exploitation[15]:

[15] Although the Land Law and Land Allocation Law require that (owned) land be compensated for at market value, this is not the case in practice. Rather the practice is to value land for compensation based on rates set by the government. Compensation for land is valued at 13,200 to 44,000 MNT per square meter, based on Cabinet Resolution No. 103 of 2003 and decided finally through negotiation with the land owners.

- Replacement land must be not worse in character and quality than the owner's land;
- Land and immovable property will be compensated for at market value;
- Improvements made to the land will be compensated for;
- Losses incurred by the owner due to the taking of the land and relocation must be compensated for; and
- No compensation is paid for immovable property built or improvements made after the notice given at the start of the process.

(2) Comparison of Land Acquisition and Resettlement Policies

There are several significant differences in policy between the Mongolian legal framework and policies of donor agencies, i.e., JICA's Guideline for Environmental and Social Conditions (April 2010) and the WB standards, including OP 4.12. According to Mongolian law or practice:

- Non-titled occupants of land (without ownership or possession license), including lessees of land and structures, are not eligible for compensation and rehabilitation entitlements.
- Compensation (unless alternative land is provided) for affected land is based on a government compensation tariff, not replacement rates, although there is room for negotiation with individual PAPs.
- A depreciation coefficient is applied in the valuation of affected structures.
- Income and livelihood rehabilitation are not normally considered in local land acquisition and resettlement practices.
- There are no grievance procedures internal to a project preceding dispute resolution by governors and the courts.
- Public consultation and information disclosure is not mandatorily practiced.
- An eligibility cut-off date is not declared.

Table 8.5.1 Comparison of Land Acquisition and Resettlement Policies

Item	Provision of Mongolian Laws	JICA/WB Policies[16]	Measures taken under the Project
Land Acquisition and Resettlement Policies	• Invoking eminent domain is only legally recognized when taking back land due to special needs of the State, including lines and networks and other objects of national scale (Land Allocation Law, Articles 32 and 37; Land Law,	Eminent domain is generally recognized and subject to policy provisions aiming at avoiding and minimizing land acquisition and resettlement and replacement of lost assets and rehabilitation of	Minimized land acquisition and avoided resettlement as much as possible through route selection and road design.

[16] The relevant policy papers are *Operational Manual OP4.12 Involuntary Resettlement* (December 2001, Revised February 2011) for the World Bank and *Guidelines for Environmental and Social Considerations* (April 2010) for JICA. Since the JICA Guideline clearly states that JICA confirms that projects do not deviate significantly from the World Bank's Safeguard Policies in Section 2.6, Laws, Regulations and Standards of Reference, the Table covers both JICA's Guideline and OP4.12 of WB.

	Articles 42 and 43). This law does not apply to the Project. Current practice by government in local-scale projects entails a demand letter with threat of sanctions and offer of payment of compensation. • The Civil Code of Mongolia is the legal basis for contractual agreements on the transfer of land in the Right-of-Way (ROW) from Project Affected Persons (PAPs) to the government (Chapter 15, Articles 1, 6, 7, 8, 109 and 112, among others).	livelihoods.	
Eligible PAPs	• Licensed owners, possessors and users of land can transfer their titles to other legal persons recognized under the Land Law (Articles 35 and 38) and the Land Allocation Law (Article 27). • Non-titled occupants of land as illegal possessors are not eligible to transfer the land occupied or receive compensation (Land Law, Article 27.4). • The Civil Code recognizes the right of a long term non-owner occupant of ownerless immovable property (incl. land) to own it after 15 years, if registered in the State register (104.2).	Lack of formal legal title to land is not a bar to compensation entitlements. PAPs with formal legal rights and PAPs with recognizable claims to land/assets are entitled to compensation for affected assets at replacement cost. PAPs with no recognizable claims to the land they are occupying are not eligible for land compensation but be entitled to resettlement assistance such as land, other assets, cash and employment as necessary.	All the lands which will be acquired by the project are possessed lands; all PAPs hold formal legal titles. Thus, all PAPs are eligible for compensation entitlements.
Compensation for Land	• Contractually agreed payment for land transferred to the government. • Local practice applies the government land valuation	Land compensated for in-kind (replacement land of similar size and quality) and/or cash compensation at replacement cost (value to acquire land of similar	For full loss or in case the remaining land becomes economically unviable, the PAP may choose between

	tariff (Cabinet Resolution 103, 2003), but negotiates with PAPs as well. • Replacement land can be provided if AP's entire land or a large part thereof is acquired.	size, quality, location advantages and level of improvements, including transaction costs).	the following alternatives: i) provision of replacement land of comparable size, value, location, and utility as lost plot; ii) cash compensation at replacement rates or the government compensation tariff, whichever is higher, based on contractual agreement. For partial loss or in case the remaining land plot is economically viable, the above-mentioned ii) will be applied for the lost plot.
Compensation for Structures	Contractually agreed payment for transfer of structures located on land acquired. The value of structures is determined either by a government valuation tariff (Cabinet Resolution 336, 2010) or at market rates, with depreciation deducted from the gross value of the structure.	Structures compensated for in-kind (replacement of structure of similar size, quality and amenities) and/or cash compensation at replacement cost (equivalent to the market cost of the materials to build a replacement structure with an area and quality similar to or better than those of the affected structure, or to repair a partially affected structure, plus the cost of transporting building materials to the construction site, plus the cost of any labor and contractors' fees, plus the cost of any registration and transfer taxes, without deduction of depreciation). PAPs shall be permitted to salvage materials.	Compensation amount is estimated as replacement cost based on Cabinet Resolution 336, 2010 or market prices.
Income and Livelihood Rehabilitation	No provision in contractual agreements for transfer of	Assistance for economic rehabilitation due to loss of	PAPs are eligible for income and

	property.	income sources or means of livelihoods, including (i) income compensation or support for the period of interruption of business or employment, (ii) economic support after displacement, for a transition period, based on a reasonable estimate of the time likely to be needed to restore their livelihood and standards of living; and (iii) additional development assistance, such as land preparation, credit facilities, training, or job opportunities.	livelihood rehabilitation.
Relocation and Transaction Cost	All registration and other fees, as well as cost of relocation, are the responsibility of parties to a contract and can be included in a contract.	Relocation and transfer expenses, including fees for the registration of properties and other administrative charges, are part of the replacement cost of lost assets and included in compensation.	PAPs are eligible for compensation for relocation and transfer cost.
Grievance Redress	The Land Law refers disputes over land to the governors of administrative units and eventually the courts (Article 60). The Civil Code and Land Allocation Law refer various types of disputes to the courts.	An adequate grievance redress mechanism for affected people is required.	Working group on land acquisition[17], which will be established in UB City, handles grievances.
Information Disclosure and Public Consultation	No provision for public consultation and information disclosure. In practice, all cases involve a period of negotiation.	PAPs are to be fully informed and closely consulted on compensation and resettlement options. Draft, final and revised Land Acquisition and Resettlement Plan (LARP) is to be disclosed to relevant PAPs through public consultation meetings, and discussed	Public consultations are organized to discuss the land acquisition plan. The final plan is disclosed also through public consultations.

[17] As for the details regarding the working group, please see iv) Institutional Arrangement and Implementation Schedule of (3) Land Acquisition and Resettlement for the Project.

		with PAPs in order to reflect their feedback in the LARP.	
Cut-off Date	No provision in Mongolian laws.	An eligibility cut-off date is typically the date the census begins. The cut-off date could also be the date the project area is delineated, prior to the census, provided that there has been an effective public dissemination of information on the area delineated.	A cut-off date has been defined by Dept. of Property Relation in Ulaanbaatar on May 10, 2013 and the notice was sent to Bayangol District. It is expected that the Cut-off date would be announced through the website of UB City and also through direct notification to PAPs.
Right-of-Way	BNbD (Building Norms and Regulations) Clause 6.24 state that 20 to 25m of ROW is required for Urban Arterial Road.	No conflict with WB requirements.	In order to minimize land acquisition, ROW is defined as road width plus 1 meter at the outside.

(3) Land Acquisition and Resettlement for the Project

i) Economic Activities in the Project Area

Land possessors and their economic activities in the Project area are summarized in Table 8.5.2.

Table 8. 5.2 Land Possessors and Economic Activities in the Project Area

(Confidential)

(Confidential)

ii) Affected Area and Facilities

- For the respective alternative routes, the area of each project affected building/facility was measured and confirmed with the concerned agencies of the Mongolian Government. Regarding definitive routes, the following are the major findings from the detailed survey.“Possessed Lands” are subject to the land acquisition for the Project. No owned land and or private land is located in the project site.
- Involuntary resettlement would not occur in the Project.

Table 8.5.3 shows the area of lands to be acquired and facility to be relocated and/or compensated.

Table 8.5.3 Area of Land Acquisition

(Confidential)

(Confidential)

Table8.5.4 Affected Facilities and Buildings

(Confidential)

(Confidential)

iii) Compensation Strategy and Livelihood Restoration Measures

The compensation strategy and livelihood restoration measures and required cost are summarized in Table 8.5.5 and Table 8.5.6, respectively. These costs will be secured by the MRT as a part of implementation cost for the Project.

Table 8.5.5 Entitlement Matrix

Type of Loss	Eligibility	Compensation Entitlements	Implementation Issues	Responsible Organization
Land (commercial, for full loss or in case the remaining land becomes economically unviable)	Possessor	The PAP may choose between the following alternatives: • Replacement land for land lost through provision of replacement plot of comparable size, value, location, and utility as lost plot. Possession license extended for longer periods up to 60 years as stated in Land Law. • At their choice or if equivalent replacement land is unavailable, cash compensation at replacement rates or the government compensation tariff, whichever is higher, based on contractual agreement.[18] • Assistance to find replacement land.	• Consult with relevant PAPs. • Identify the exact size of affected land and facilities. • Estimate the compensation amount/ Prepare the replacement land.Prepare LARP. • Approve LARP. • Disclose the contents of LARP. • Make contract for land acquisition and its compensation. • Pay compensation amount to relevant PAPs.	PIU/ WG for land acquisition
Land (commercial, for partial loss or in case the remaining land plot is economically viable)	Processor	• Cash compensation for the portion acquired at replacement rates or the government compensation tariff, whichever is higher, based on contractual agreement.[19] • If land is located in areas of	Same as the above.	PIU/ WG for land acquisition

[18] Due to the nonexistence of a matured land market, the replacement rates are not very well estimated. Thus, the practice is to value land for compensation based on rates set by the government. Usually, compensation for land is valued at 13,200 to 44,000 MNT per square meter, based on Cabinet Resolution No. 103 of 2003 and decided finally through negotiation with the land owners.

[19] The same as footnote 18.

		the City approved to allocate land for ownership in the land management plans, ownership certificate on the remaining land. • If land is not identified for land allocation for ownership, possession certificate on the remaining land.		
Structures (commercial) (This includes acquisition of a portion of land but the residual is no longer viable)	Possessor	Cash compensation for the lost part of a structure and reconstruction of the remaining structure at replacement cost based on market rates or the government tariff used for budgeting public works (Cabinet Resolution 336, 2010), whichever is higher, without deduction of depreciation, based on contractual agreement.	Same as the above.	PIU/ WG for land acquisition
Livelihood Rehabilitation Measures/Enterprise-based Income	All business entities so affected	• For temporary business loss with or without physical displacement due to land acquisition or construction activities by the Project, cash compensation equal to net income lost during interrupted period. • For permanent closure, compensation shall include any costs required for physical and financial re-establishment of business. If the business needs to be relocated, the business entities affected may choose between the following alternatives: (i) replacement land prior to relocation; or (ii) if an acceptable plot of land cannot be found, rehabilitation measures including outright cash payment for a limited time while the owner shifts to a new enterprise. The maximum cash payment will be equivalent of the net income of the enterprise for one year.	• Consult with relevant PAPs. • Conduct socio-economic survey on relevant PAPs. • Estimate income loss. • Pay compensation to relevant PAPs.	PIU/WG for land acquisition
Livelihood Rehabilitation Measures/Employment	All employees	• For temporary employment loss due to land acquisition	• Consult with relevant PAPs.	PIU/WG for land

	so affected.	or construction activities, cash compensation for lost wages for the period of interruption of employment. • For permanent employment loss, cash indemnity of 3 months' wages. In addition, skills development training and assistance to arrange new employment will be provided.	• Conduct socio-economic survey on relevant PAPs. • Estimate wage loss. • Pay compensation to relevant PAPs.	acquisition
Relocation Assistance	All DPs that are physically displaced, permanently or temporarily.	The following items on actual cost basis at current market rates will be provided. • Cost of developing residential resettlement sites; • Cost of transporting affected people and their assets to the resettlement sites. • Any transfer fees, taxes or other administrative costs; • Costs of identifying new housing or land. • Cost of consultation with the host community. • Any expense for temporarily sheltering physically DPs between the time of displacement and the time of relocation.	• Consult with relevant PAPs. • Estimate amount of relocation assistance. • Pay relocation assistance to relevant PAPs.	PIU/WG for land acquisition

iv) Required Cost for Compensation Strategy and Livelihood Restoration

Required cost for land acquisition was estimated as per the following conditions.

- There is no market price of possessed land for commercial purposes in Ulaanbaatar City. Therefore, the cost for land possession is set at 26,400MNT/m^2 consisting of (a) process fee for another land possession, (b) land acquisition cost applied for possessed land in the road improvement project until 2012 under ADB fund and (c) base price of land in Bayangol district set forth by Ulaanbaatar City.
- Demolishing cost and compensation cost for relocation/resettlement are set on the basis of (a) market price of real estate in Ulaanbaatar City and (b) actual compensation prices in the road improvement project by ADB.
- Compensation for facilities of Ulaanbaatar Railway Corporation is based on the letter 2013-3-27 Letter No.13/394 sent from Ulaanbaatar Railway Corporation to Road Department of Ulaanbaatar City. In the same letter, Ulaanbaatar Railway Corporation requests alternative land instead of monetary compensation.
- Amounts of business compensation to affected enterprises are computed on the basis of LARAP prepared in this preparatory survey.

Table 8.5.6 Required Cost for Compensation Strategy and Livelihood Restoration

(Confidential)

(Confidential)

v) Institutional Arrangements and Implementation Schedule

For implementation of the Project, the Working Group (WP) for land acquisition shall be established in Ulaanbaatar City and consist of the following members.

1) Governor of Bayangol District (Chairman)
2) Governor of Khoroo (Vice Chairman)
3) Land acquisition specialist of UB City (Member)
4) Representative from the UB City Road Department (Member)
5) Representative from the UB City Property Relations Department[20] (Member)
6) Representatives of the PAPs (Member)

vi) Representative from a CBO or NGO registered by the government (Member), if available.

The WG for land acquisition, which includes representatives of the Property Relations Department, is responsible for identifying the owners and occupants of affected land and valuating the properties of PAPs. The PIU will be responsible for reporting the progress in implementing the LARP to the Ministry of Road and Transportation (MRT). Members of WG for land acquisition are as follows:

a) Internal Monitoring

Internal Mentoring is implemented to ensure: (i) proper execution of responsibilities of key stakeholders; (ii) protection of the rights of PAPs; (iii) adequate and prompt payment of

[20] Due to the organizational restructuring, the Land Administration Department was amalgamated into the Property Relations Department in 2013.

compensation; and (iv) timely grievance redress. The WG conducts its own internal monitoring of land acquisition and submits monthly reports to the PIU. The PIU compiles such information in its quarterly reports to MRT. Upon completion of land acquisition activities in the Project, the WG will prepare a resettlement completion report for submission to MRT.

In addition, the State Professional Inspection Agency (SPIA) will independently audit and monitor the agencies involved in the land acquisition and resettlement process, based on the relevant laws and regulations.

b) External Mentoring

The main objectives of external monitoring are to: i) assess the effectiveness, impact and sustainability of land acquisition and resettlement measures; ii) determine whether safeguard compliance has been met; and iii) learn strategic lessons for future policy formulation and planning. The PIU has to establish an External Mentoring Agency (EMA) by hiring consultants, NGO personnel, academicians, and such like; the EMA will investigate and assess the land acquisition process for the Project. Over four years, the EMA will conduct the monitoring and submit monitoring reports to the PIU. External monitoring consists of following activities:

- Review and verification of the internal monitoring reports submitted by the PIU;
- Review and augmentation of the socio-economic baseline surveys, if necessary;
- Assess the contents of compensation for land acquisition and business losses;
- Assess adequacy for measure to PAPs and living standards/incomes of PAPs before and after the Project;
- Assess PAP’s satisfaction level towards resettlement implementation;
- Assess compliance level regarding relevant laws and guidelines; and
- Assess the process of consultation with local stakeholders

c) Implementation Schedule

The following schedule for land acquisition activities is proposed.

Work Items	1st Year				2nd Year				3rd Year				4th Year				5th Year				6th Year			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Detailed engineering design																								
Tender and construction																								
Public consultation																								
Cadastral survey																								
Identification of affected plot and buildings																								
Review of Land Acquisition and Resettlement Plan																								
Valuation of compensation cost																								
Disclosure of compensation framework to PAPs																								
Approval for land acquisition plan																								
Processing of payment																								
Securing land for relocation																								
Restoration of affected structures on the remaining land and/or replacement land																								
Implementation of livelihood rehabilitation measures																								
Internal monitoring																								
External monitoring																								
Formation of Grievance Redress Committee																								

Figure 8.5.1 Implementation Schedule for Land Acquisition

vii) Grievance Redress Mechanism

The Khoroo Governor as Vice Chairman of the WG will be the initial recipient of the grievance and log it in the specialized format, tentatively named as the Grievance Action Form (GAF). The GAF will be signed by the Khoroo Governor and the PAP, who will receive a signed copy. All GAFs shall be consolidated by the Khoroo Governor and presented to the WG for deliberation and appropriate action, on a weekly basis. Grievances unresolved at the WG level within two weeks shall be referred to the respective District Governor for resolution within one week. Recommendations of the Governor will be referred to the Citizens' Representative Khural for approval and final action. If there are still unresolved grievances after another week, a case may be filed by the claimant in the appropriate courts.

Table 8.5.7 Grievance Redress Procedure

Item No.	Procedures	Period
PAP lodges grievance with Khoroo Governor		
1	Khoroo Governor prepares GAF and initiates WG meeting	2 weeks or less
	The WG addresses grievance, informs PAP and initiates action	
If grievance is not resolved		
2	WG submits grievance to District Governor	1 week or less
	District Governor addresses grievance, informs PAP and proposes resolution to District Citizens Representative Khural	
	District Citizens Representative Khural initiates action for resolution	1 week or less
If grievance is not resolved		
3	Grievance is referred to court system	Open

viii) Internal Monitoring Form (Draft)

Land acquisition and resettlement activities	Planned total	Unit	Progress in Quantity			Progress in %		Expected Completion Date	Responsible Organization
			During the quarter	Till the last quarter	Up to the quarter	Till the last quarter	Up to the quarter		
Preparation Stage									
Employment of consultants		Man-Month							PIU/WG
Implementation of Census Survey (incl. Socioeconomic Survey)									PIU/WG
Public Consultation (1st)		Date							PIU/WG
Finalization of LARP		Date							PIU/WG
Finalization of PAPs List		No. of PAPs							PIU/WG
Public Consultation (2nd)		Date							PIU/WG
Implementation Stage									
Progress of Compensation Payment									
PAP-		No. of entities							PIU/WG
PAP-		No. of entities							PIU/WG
PAP -		No. of entities							PIU/WG
PAP -		No. of entities							PIU/WG
Progress of Land Acquisitions									
PAP -		ha							PIU/WG
PAP -		ha							PIU/WG
PAP -		ha							PIU/WG
PAP -		ha							PIU/WG
Progress of Livelihood Rehabilitation Measures/ Enterprise-based Income									
PAP -		No. of entities							PIU/WG
PAP -		No. of entities							PIU/WG
PAP -		No. of entities							PIU/WG
PAP -		No. of entities							PIU/WG
Progress of Relocation Assistance									
PAP -		No. of entities							PIU/WG
PAP -		No. of entities							PIU/WG
PAP -		No. of entities							PIU/WG
PAP -		No. of entities							PIU/WG
Number of Grievance Adjustment									
PAP -		responded / received							WG
PAP -		responded / received							WG
PAP -		responded / received							WG
PAP -		responded / received							WG

8.6 PUBLIC CONSULTATION

(1) First Public Consultation Meeting

In cooperation with the JICA Survey Team, the First Public Consultation Meeting (PCM) organized by the Road Department of Ulaanbaatar City took place on July 27, 2012, when the Scoping Matrix (Draft) is ready to be open to participants. Nine (9) households and seven (7) entities in the vicinity of the project site were invited through directly delivered invitation letters with an agenda of the meeting five days before the PCM. In addition, Ulaanbaatar Railway and two (2) NGOs for environmental conservation were invited as well. An overview of the 1st PCM is shown as below.

Table 8.6.1 Record of First Public Consultation Meeting

The First Public Consultation Meeting	
Date & Time	July 27, 2012 14:00 – 16:00
Venue	Meeting room at Suuri LLC
Participants	Twenty-six (26) in total including the following persons: • Officer-in-charge (OIC) from Road Department, UB City • OIC from Land Administrations Department, UB City • Four (4) persons from the ENVIRON LLC • Two (2) persons from Ulaanbaatar Railway • One (1) person each from two environmental NGOs • Sixteen (16) persons from affected business entities
Presentation/ Q&A Sessions	**Presentation** • An expert from ENVIRON LLC, a DEIA company hired by the JICA Survey Team, made a presentation to explain the purpose of public consultation meetings (PCMs), DEIA and resettlement survey. • OIC from Road Department, UB City, explained an outline of the Ajilchin Flyover Project. **Q&A Session** As seen below, most questions were related to land acquisition reflecting the participants' strong concerns. Those questions were mainly answered by OICs of UB City. The major points raised during Q&A Sessions are as follows: • (Affected Entity); I would like to know which are the affected areas exactly. When are we able to get such information? (Answer: A separate survey for land acquisition is planned. The survey team is going to visit each affected entity with detailed ROW. You will know the exact areas at that time.) • (Affected Entity); Why do you need such a great bridge width especially above the railway line? (Answer: Indeed it looks wide since it includes ramp ways. We would like you to understand that we carefully reviewed several options before selecting the best plan we introduced to you today.) • (Affected Entity); The railway is a joint venture of Mongolian and Russian sides. As for land acquisition in the railway premises, we have to explain to our partner beforehand. We request you to hold a meeting at our headquarters to explain the project. (Answer: Another public consultation meeting will be conducted later. Let us discuss later if we should invite railway officials to the

	next PCM or visit your office to explain our project.) • (Affected Entity) We understand the difficulty of land acquisition, but the long-term benefits should be seriously considered especially for any big-scale project. Heavy vehicles should smoothly go through without causing traffic jams. (Answer: OICs in UB City appreciates the participants' understanding. In addition, the current issues as to land acquisition were explained by the OIC from the Land Administration Department, UB City)

(2) Second Public Consultation Meeting

Upon the completion of Draft DEIA Report and Draft Land Acquisition and Resettlement Report, Ulaanbaatar City Government held the Second Public Consultation Meeting (2nd PCM) in cooperation with ENVIRON LLC on November 17, 2012. Five (5) households and eight (8) business entities were invited through directly delivered invitation letters with an agenda five to seven days before the 2nd PCM. Two NGOs for environmental preservation were invited, the same as the 1st PCM. An overview of the 2nd PCM is shown as below.

Table 8.6.2 Second Public Consultation Meeting

The Second Public Consultation Meeting	
Date & Time	Nov. 17, 2012 15:00-17:20
Venue	Conference room at the "Suuri" LLC
Participants	Twenty-six (26) in total, which include the following persons: • One (1) representative from UB Road Dept. • One (1) representative from UB Land Administration Dept. • Four (4) persons from ENVIRON LLC. • Two (2) persons from Environmental NGO • Five (5) citizens from nearby living households • Thirteen (13) persons representing 8 affected entities
Consultation Process	**Presentation** 1) Results of environmental studies on air, water and soil qualities and pollution levels against the national standards and projected negative and positive impacts from the flyover bridge construction and operation. 2) Study results of land acquisition and resettlement. **Q&A Session** Participants were interested in the environmental study results as to whether or not air pollutants exceed the acceptable level and whether the quality of the water they drink is acceptable or bad. Also, they are interested in how much the proposed bridge construction will reduce the current traffic jams and if there would be an increase or decrease in air pollution due to the flyover bridge. Land acquisition and resettlement issues were crucial for participants especially for some affected entities. Q (Affected Entity); If you want to build, why don't you plan to build a road along and above the Dundgol River? If the river is somewhat polluted already as

	your study shows, then you can construct columns along both sides of the river banks and make a road. You do not need to make too broad a road and impact peoples' property. (Answer: A feasibility study for various alternatives was done and many road and traffic experts were involved and various factors have been examined to propose the optimum route.) Q (Affected Entity); Can you show whose objects are affected and how much they are affected? (Answer: ENVIRON LLC shared the results of a land acquisition plan and introduced the legal environment of Mongolia and JICA guidelines; resettlement impacts; affected entities, citizens and properties; compensation and livelihood restoration measures; grievance redress mechanism and LARP implementation arrangements.) Q (Affected Entity); Who defines this Cut-off-Date? Is there any provision in a regulation? (Answer: There is no Mongolian regulation in this regard, but we follow international best practices and JICA guidelines. It is essentially meant to restrict people who try to make profit on others' issues.) Q (Affected Entity): Mongolia has an inadequate legal basis for land resettlement. In addition to this, recently, there was a road expansion in front of our entity. Why are you talking about another expansion? (Answer: We have a weak regulation on land acquisition and resettlement. Existing legal gaps are complemented by compensation measures on this project, which JICA and the World Bank have been applying successfully for many other countries. Moreover, in Mongolia, a draft law on Land Acquisition and Resettlement is being discussed publicly and if this passes through the Parliament, the legal environment will be much improved.) Q (Affected Entity): An ROW line passes through a water reservoir with a volume of 200 m^3 located to the northwest corner of our company. Is it possible not to dismantle the reservoir? (Answer: Part of the flyover bridge will be constructed in the airspace along your portion of land.) Q (Affected Entity): Can't you move ROW to this garden area instead of passing through my entire land area? I am not against improving the road. Regarding the property compensation, you should be aware while making a valuation that costs will change with the passing years. (Answer: Regarding compensation and livelihood restoration strategy, the affected person's living condition should not be reduced with this project implementation. We would like to re-emphasize Tuvdendorj's introduction of the resettlement results. As was explained, every affected person/entity will receive compensation/assistance differently according to the provisions indicated in the entitlement matrix.) Q (NGO): When will the Project be started? (Answer: Optimistically, we anticipate the loan agreement may be signed in 2014; otherwise, in 2016 or even later.)

CHAPTER 9

FORMULATION OF THE CONSTRUCTION PLAN

9.1 CONDITIONS FOR THE CONSTRUCTION PLAN

(1) Conditions for the Work Schedule

In general, outdoor construction work including concrete work and asphalt work can be executed in the period between May and the end of September (5 months/year) in Mongolia. Six (6) days with rainfall of 10 mm or more are expected during this period on average. In addition, there are 20 Sundays and 4 holidays in this period. Therefore, the number of workable days in this six-month period is estimated to be approx. 120 days, and so the working ratio in the period is estimated to be around 0.80. These figures imply the need for efficient construction planning including shop fabrication and manufacturing of secondary products during the winter season.

(2) Construction Yard

Since the Project site of the Ajilchin Flyover is located in a city area, which includes railway properties and lots of operating plants, the availability of space that can be used for the construction yard of this Project is extremely limited. At the moment, the two (2) lots mentioned below have been identified as candidate lots for the construction yard.

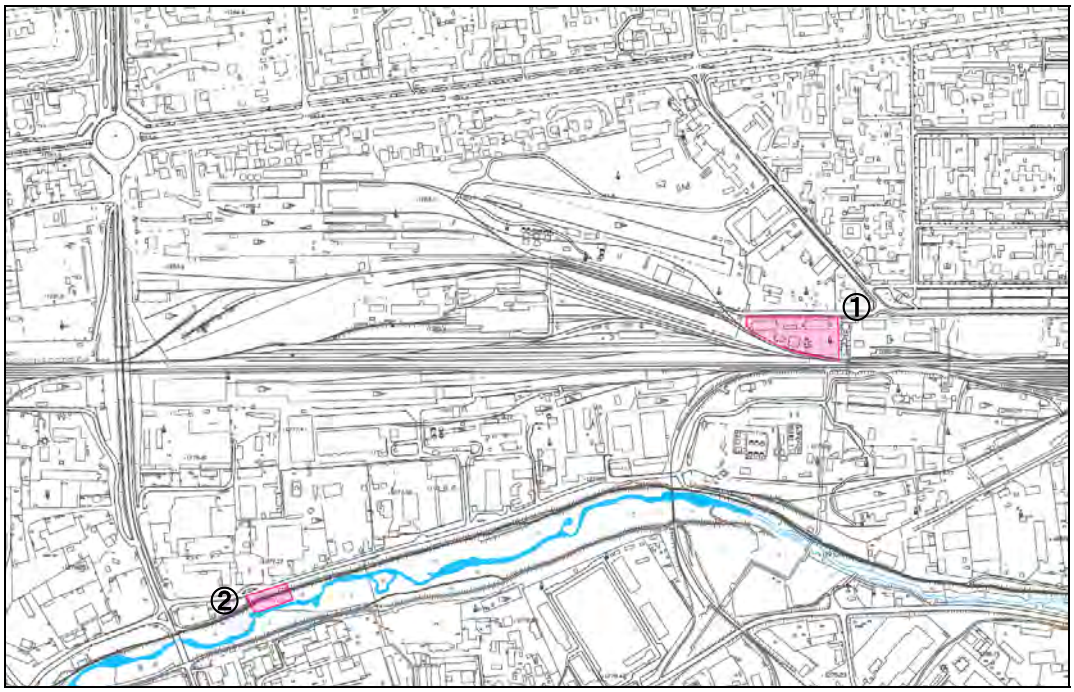


Figure 9.1.1 Location of Candidate Lots for the Construction Yard

- Facility lot of Ulaanbaatar Railways (approx. 12,000 m^2): Ulaanbaatar Railways own the lot and rents out the facilities in it to tenants engaged in the physical transportation business. Since the facilities in the lot are old and dilapidated, their reconstruction is planned.
- Container Yard on the West Industrial Road (4,500 m^2): The entire container yard will have to be relocated since the work to improve the intersection in which the yard is located is included in this project. Therefore, it will be possible to use this lot as a construction yard after it has been purchased for the improvement work.

9.2 BASIC POLICY OF THE CONSTRUCTION PLANNING

(1) Procurement of Materials and Equipment and Work Schedule

As outdoor construction work can be implemented only in the period between April and the early September, shop fabrication and procurement and transport of materials and equipment will be implemented in the rest of the year. A plan with careful consideration given to efficient implementation will be formulated so that the project can be completed in the shortest time. Concrete, asphalt, and so forth will be procured from the closest existing plants as much as possible.

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
Construction period	Severe winter season				Period for outdoor construction work					Severe winter season		
Rainy season						Rainy season						
Activities	Shop fabrication and transport of materials and equipment				Concrete work, paving work and girder erection work					Shop fabrication and transport of materials and equipment		

Figure 9.2.1 Basic Policy for the Formulation of Work Schedule

(2) Conditions around the Project Sites

The figure below shows the locations of the concrete plant, asphalt plant, borrow pit and quarry around the project sites in Ulaanbaatar City expected to be used in the Project. It takes around one hour to transport industrial waste from the city to the industrial waste disposal site in Ulann Chuluut. Since a large number of construction works are implemented in the city during the short period of six months between April and September, there are concerns about a shortage in the supply of concrete during this period. Therefore, the amount of concrete supply from the existing concrete plant is estimated to be approx. 200 m^3/day in the construction plan.

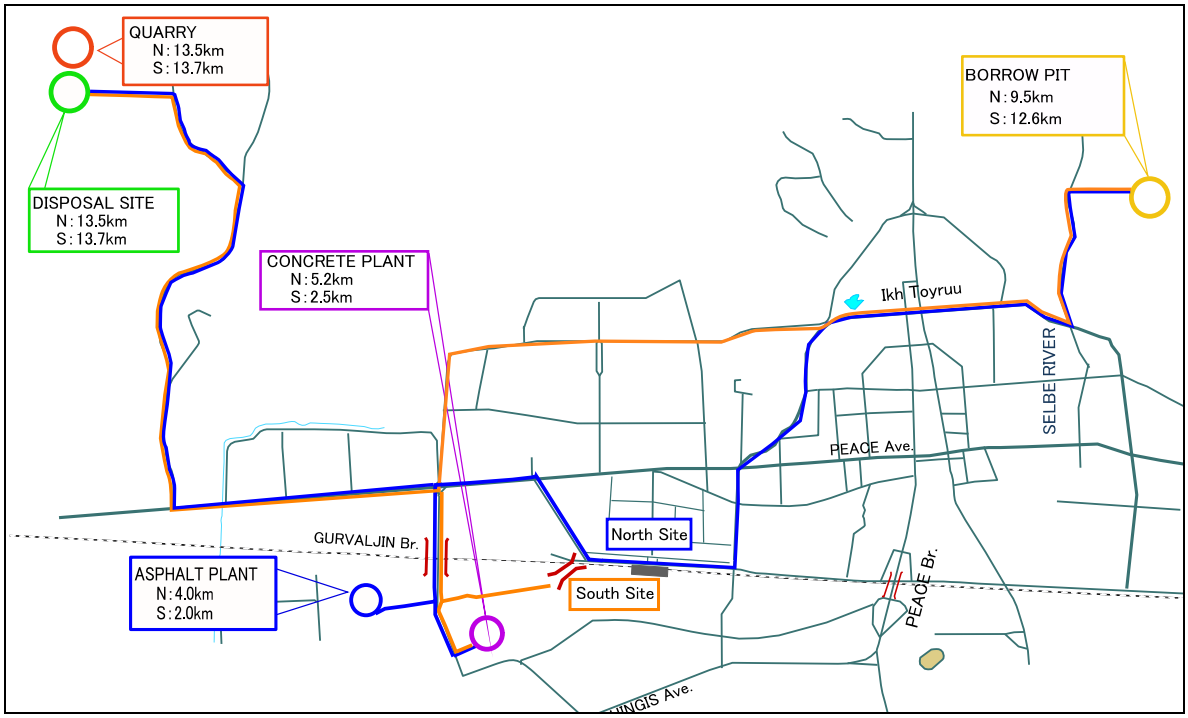


Figure 9.2.2 Locations of Sources of Construction Materials, such as Borrow Pit around Construction Sites

(3) Bridge Girder Erection Methods

Either the “launching erection method” or the “crane erection method” will be used for the construction of a viaduct in accordance with the positional relation between the construction sites and the railway line and the existing roads. Although the schedules of international passenger trains on the main tracks cannot be changed, those of freight trains can be rescheduled for the construction work. It is estimated that the length of such time in which trains can be stopped (window time) will be six (6) hours per day.

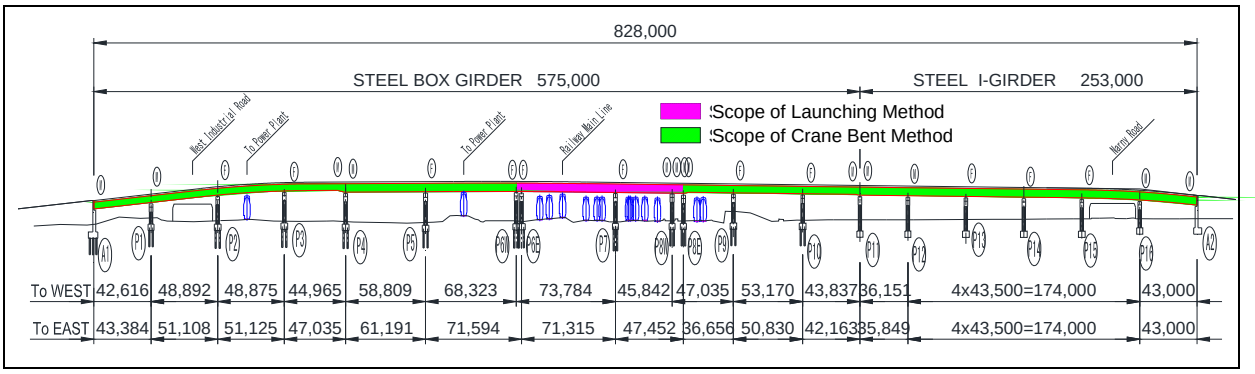


Figure 9.2.3 Girder Erection Methods for the Construction of Viaduct

i) Girder Erection Method for the Section above the Railway Line (Main Tracks)

The launching erection method will be used for girder erection in the section above the main tracks and the adjacent sections (between P5 and P8) so that the erection work does not interfere with train operations. In the launching erection method, hydraulic motors and jacks are used to launch prefabricated girders. The same method was used on the overpass part of the Narny Bridge. However, it will have to be performed on a curved overpass part of the viaduct in this Project. Since such girder erection is technically complicated, a contractor with ample experience in this method shall be selected.

Figure 9.2.4 Launching Erection

ii) Erection Method for the Other Sections

The most widely used girder erection method, the crane-bent erection method, will be used for girder erection in sections where it is possible to install a crane and bents (temporary support structures to support bridge girders). Despite the requirement for temporary detours at grade-separated intersections between the viaduct and roads, this method will enable the quickest and most cost-efficient girder erection to be carried out.

Figure 9.2.5 Crane-Bent Erection

(4) Construction near the Railway Line

The construction work near the railway main/feeder lines will be implemented with a fence erected at the distance of 2.5 m from the nearest railway track to demarcate the construction area clearly. Excavation near the railway line will be implemented with monitoring of displacement (horizontal displacement and subsidence) and change in the inclination of the ground, in accordance with the agreement with the railway authorities.

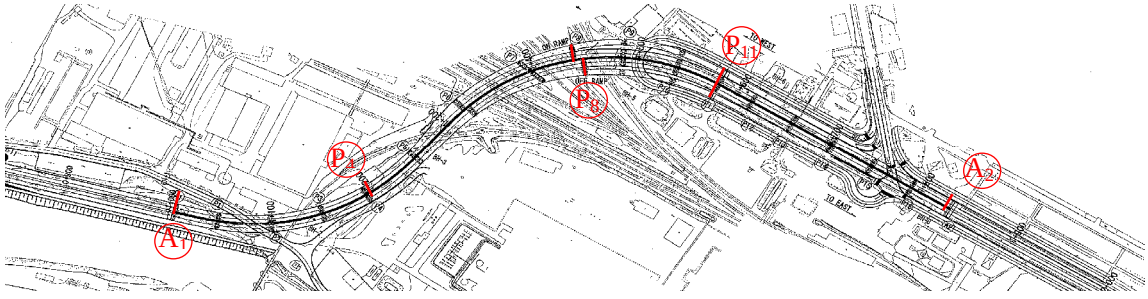
9.3 DIRECT CONSTRUCTION WORK

(1) Types of Work to be Implemented

The viaduct construction in this project consists of the types of work mentioned in the table below.

Table 9.3.1 List of Types of Work to be Implemented

Types of Work	Descriptions		Application
Superstructure Erection Work	4-span continuous steel box girder: A1-P4	42.616 + 48.892 + 48.875 + 44.965	West-bound lanes
		43.384 + 51.108 + 51.125 + 47.035	East-bound lanes
	4-span continuous steel box girder: P4-P8	58.809 + 68.323 + 73.784 + 45.842	West-bound lanes
		61.191 + 71.594 + 71.315 + 47.852	East-bound lanes
	3-span continuous steel box girder: P8-P11	47.035 + 53.710 + 48.837	West-bound lanes
		36.656 + 50.830 + 42.163	East-bound lanes
	6-span continuous steel plate girder: P11-A2	36.151 + 4 × 43.500 + 43.0	West-bound lanes
		35.849 + 4 × 43.500 + 43.0	East-bound lanes
	3-span continuous box girder: P8-P11	47.035 + 53.710 + 48.837 (shown as the length of CL on the main road)	On-ramp
		36.656 + 50.830 + 42.163 (shown as the length of CL on the main road)	Off-ramp
	Bridge deck slab work	Steel-concrete composite deck slab A = 20,000 m^2	
	Bearing installation work	106 pieces	
	Expansion device installation work	4 × 17.780 m + 32.98 m + 2 × 6.390 m = 116.88 m	7 locations
	Bridge deck work	Water-proofing work, paving work	A=16,600m^2
Substructure Work	Abutments	Single abutments for the lanes in both directions on the main road at A1 and A2	2 each
		Ramps	2 each
	Piers	T-type, column piers at P1, P2, P3, P4 and P5, separate piers for the lanes in the opposite directions	10 each
		Rigid frame, column piers at P6, P7 and P8, separate piers for the lanes in the opposite directions	6 each
		T-type column piers for on- and off-ramps at P9 and P10	4 each
Foundation Work (with piles)	Rotary penetration piles: φ1000	A1, P1, P2, P3, P4, P5, P6, P7, P8, P9, P10	
Roadwork	Reinforced soil wall work		
	Length of the road on the origin side	L=1,005 m	
	Length of the road on the terminus side	L=412 m	



(2) Selection of Construction Methods

The planned locations of the piers of the viaduct, P2, P3, P5, P6, P7, P8 and P9, are near the railway tracks. Pile foundation has been selected for the construction of A1 to P10 because of the relatively deep bearing ground at those sites. Therefore, a construction method which minimizes the impact of the pile driving on the operation of railways will have to be used in this project. The rotary penetration steel piles used in viaduct construction with similar conditions (construction of the Narny Bridge) have been selected as the foundation piles to be used in this project. The details of the comparative study of different types of foundation have been described in "7.3 Bridge Plan (6) Selection of the Type of Foundation."

A rotary penetration pile is a steel pile with a wing attached to its tip. The characteristic of this pile is that it can be driven into the ground without loosening the ground around it as a rotary penetration (RP) machine forces it to rotate and penetrate the ground without generating waste soil. In addition, since the RP machine used with rotary penetration piles is smaller than machines used for other types of foundation work, it requires a small operating space. Therefore, the use of rotary penetrating piles is considered appropriate for this project in which foundation work will have to be implemented in the small spaces between the railway tracks.

Figure 9.3.1 shows the arrangement of equipment and materials for the implementation of the rotary penetration steel pile method and Table 9.3.2 shows its implementation procedure.

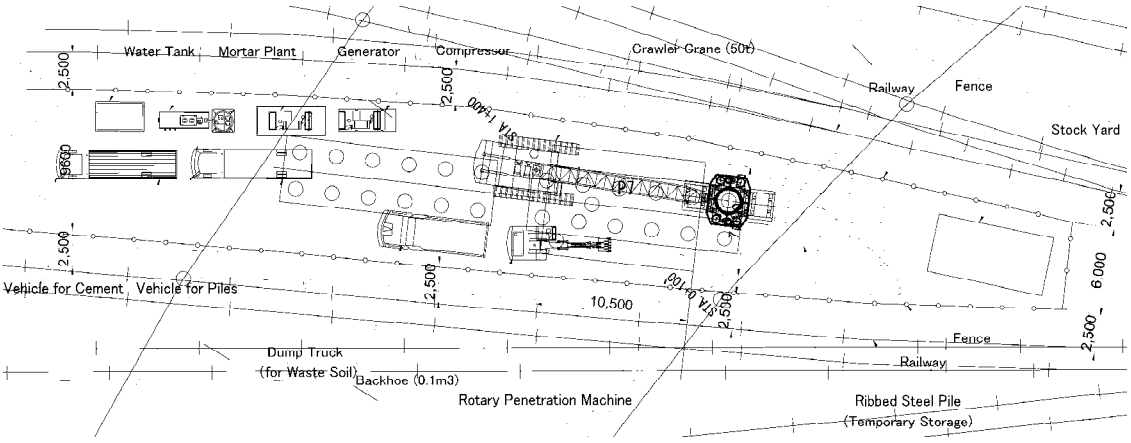
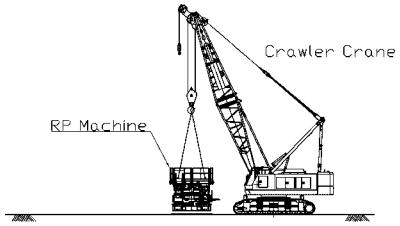
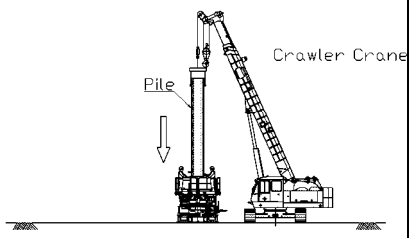
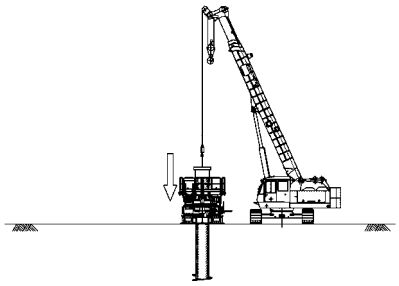
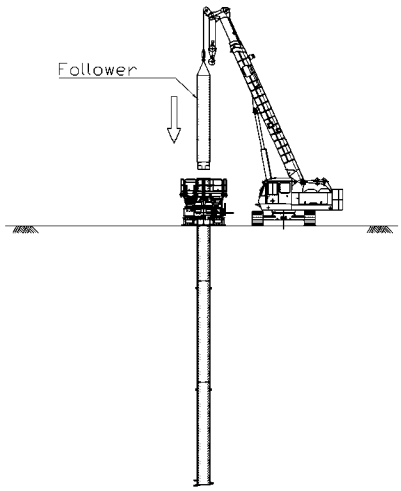
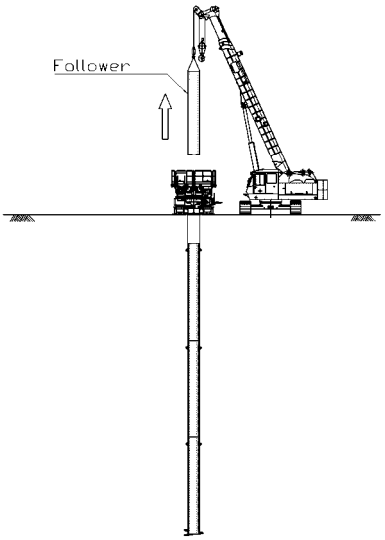
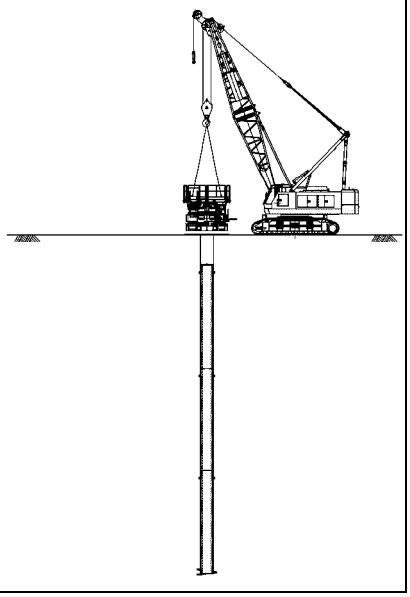


Figure 9.3.1 Arrangement of Equipment and Materials for the Implementation of the Rotary Penetrating Pile Method (P7)

Table 9.3.2 Implementation Procedure of the Rotary Penetrating Pile Method

1) Install rotary penetration (RP) machine	2) Install steel pile	3) Rotary-penetrate the pile
		
4) Install follower and penetrate	5) Pull out the follower	6) Remove RP machine
		

(3) Substructure Work

Different types of substructure work have been selected for the section with the original width and the section widened for the connection with the ramps. The reverse T-type abutment, the T-type pier and the rigid-frame pier have been selected as the structures of the abutments, the piers in the section with the original width and those in the widened section on the basis of cost-efficiency and workability (minimizing the amount of materials and the construction period), in principle.

Safety of the operation of the railways and the traffic on the roads near the construction site, level of groundwater and the period in which the construction work can be implemented (between May and the end of September) shall be taken into consideration when preparing the construction plan. The procedure shown in the figure below shall be used for the construction of

both the pile and spread footing foundations on the assumption of the use of open-cut excavation after the traffic on the existing roads has been detoured.

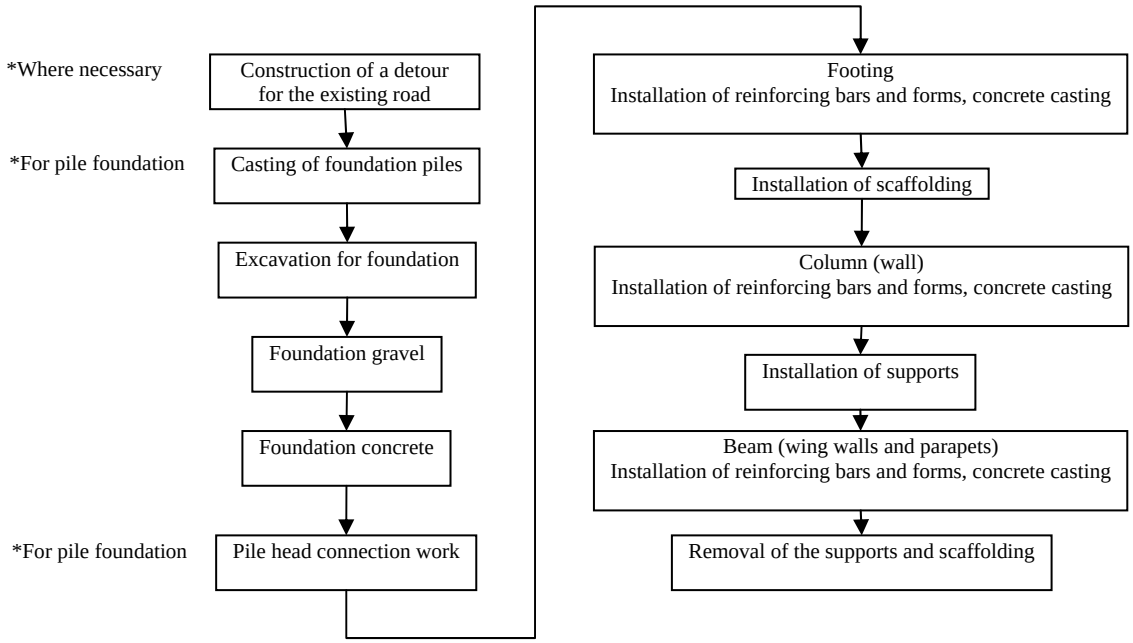


Figure 9.3.2 Implementation Procedure of the Substructure Work

(4) Superstructure Work

Either the “launching erection method” or the “crane erection method,” will be used for the girder erection of this viaduct in accordance with the positional relation between work sites and the railway line/the existing roads.

1) Erection of the Section between P6 and P8 (of the main road)

The inflection point of a horizontal S-curve is located in the section between P5 and P8. The minimum radius of curvature in this section is R200. The bridge girder constructed beyond P8 will be used as a yard for the assembling and launching of girders. As many temporary bents as possible will be constructed for the girder launching. A launching plan which allows completion of girder launching within the window time of the railway line, i.e., six (6) hours, shall be formulated.

Figures 9.3.3 and 9.3.4 show the procedure for the launching erection and the arrangement of equipment and structures for the launching erection, respectively.

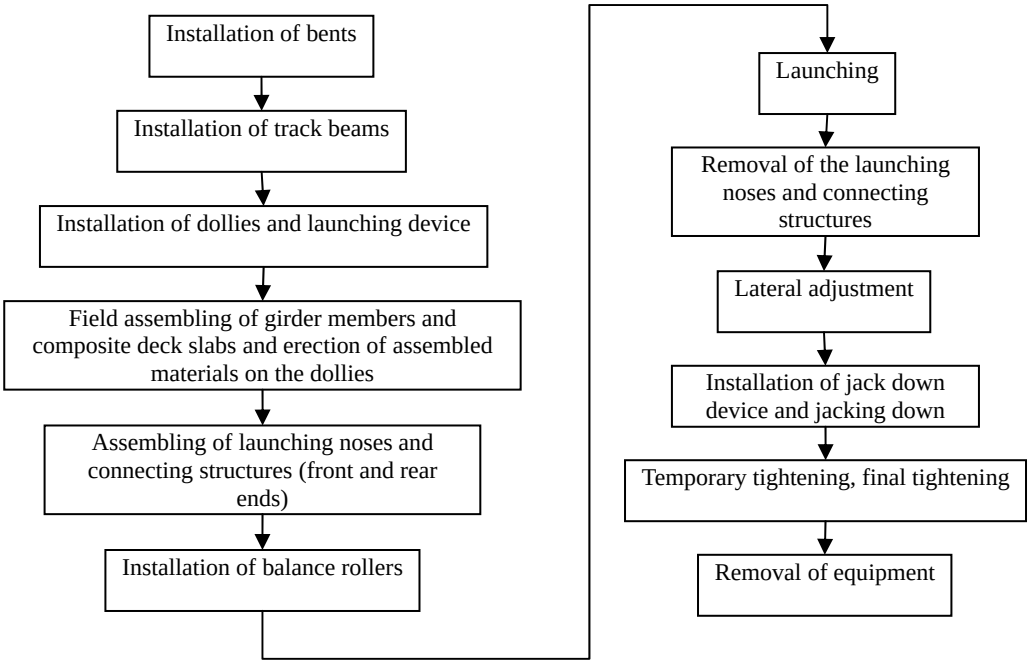


Figure 9.3.3 Procedure for the Launching Erection

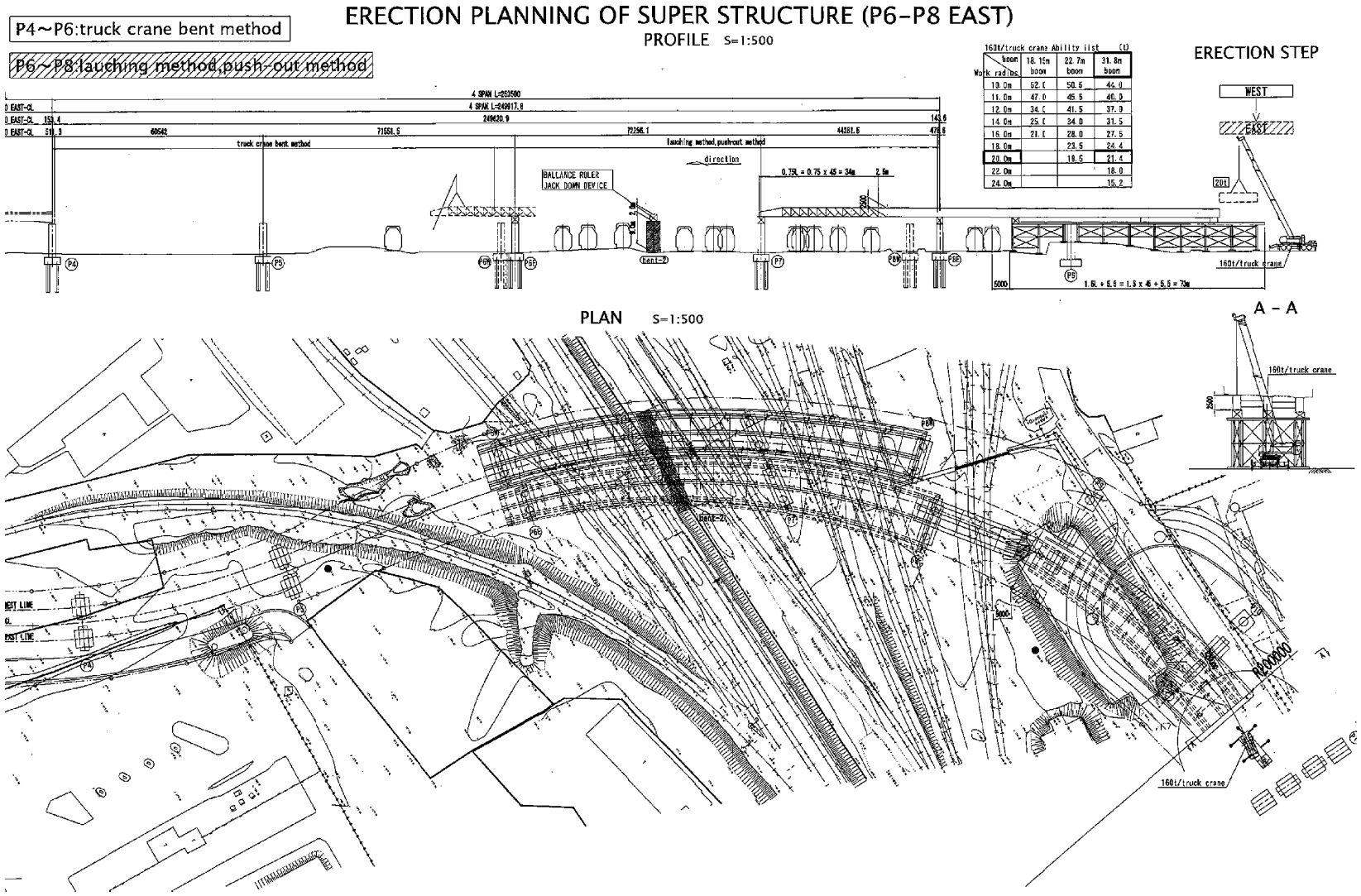


Figure 9.3.4 Erection Planning with Launching Method

2) Girder Erection in the Sections between A1 and P6 and between P8 and A2

The crane erection method will be used for the erection of girders in the section between A1 and P4. The erection shall commence after construction spaces, approaches to the spaces and parking spaces for the cranes have been leveled and a bent has been constructed at a location between P1 and P2 where it will not interfere with the traffic on the existing road.

Figure 9.3.5 shows the order of the erection decided on the basis of the restriction on the parking spaces for the cranes and for the work efficiency.

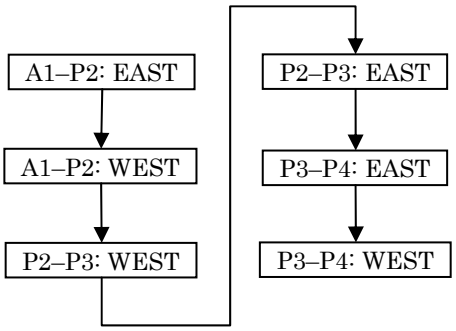


Figure 9.3.5 Order of the erection of the superstructure
(section between A1 and P4)

The erection of girders in the section between P4 and P6 with the crane erection method will commence after the completion of the launching erection in the section between P6 and P8. Before the erection, construction spaces, approaches to the spaces and parking space for the cranes will have been leveled and a bent will have been constructed at a location between P5 and P6 where it will not disturb the railway trucks.

Figure 9.3.6 shows the order of the erection decided on the basis of the restriction on the parking spaces for the cranes.

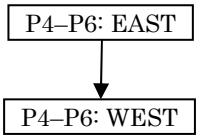


Figure 9.3.6 Order of the erection of the superstructure
(section between P4 and P6)

The crane erection method will be used for the erection of girders in the section between P8 and

P11. The erection shall commence after construction spaces, approaches to the spaces and parking spaces for the cranes have been leveled and a bent has been constructed at a location between P8 and P9 where it will not interfere with the operation of the existing railways.

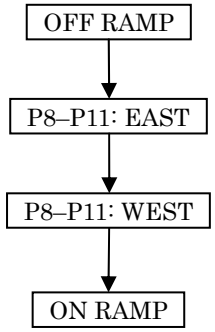


Figure 9.3.7 Order of Erection of the Superstructure
(Section between P8 and P11)

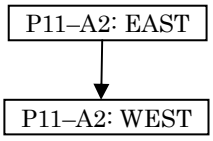


Figure 9.3.8 Order of Erection of the Superstructure
(Section between P11 and A2)

Figure 9.3.7 shows the order of the erection decided on the basis of the restriction on the parking spaces for the cranes.

The crane erection method will be used for the erection of girders in the section between P11 and A2. The erection shall commence after construction spaces, approaches to the spaces and parking spaces for the cranes have been leveled, a required detour for the existing road has been constructed for the maintenance of the traffic flow on the existing road and a bent has been constructed.

Figure 9.3.8 shows the order of the erection decided on the basis of the restriction on the parking spaces for the cranes.

Figures 9.3.9 and 9.3.10 show the arrangement of equipment and structures for the crane-bent girder erection.

Figure 9.3.11 shows the detour for the existing traffic during the erection of the girder.

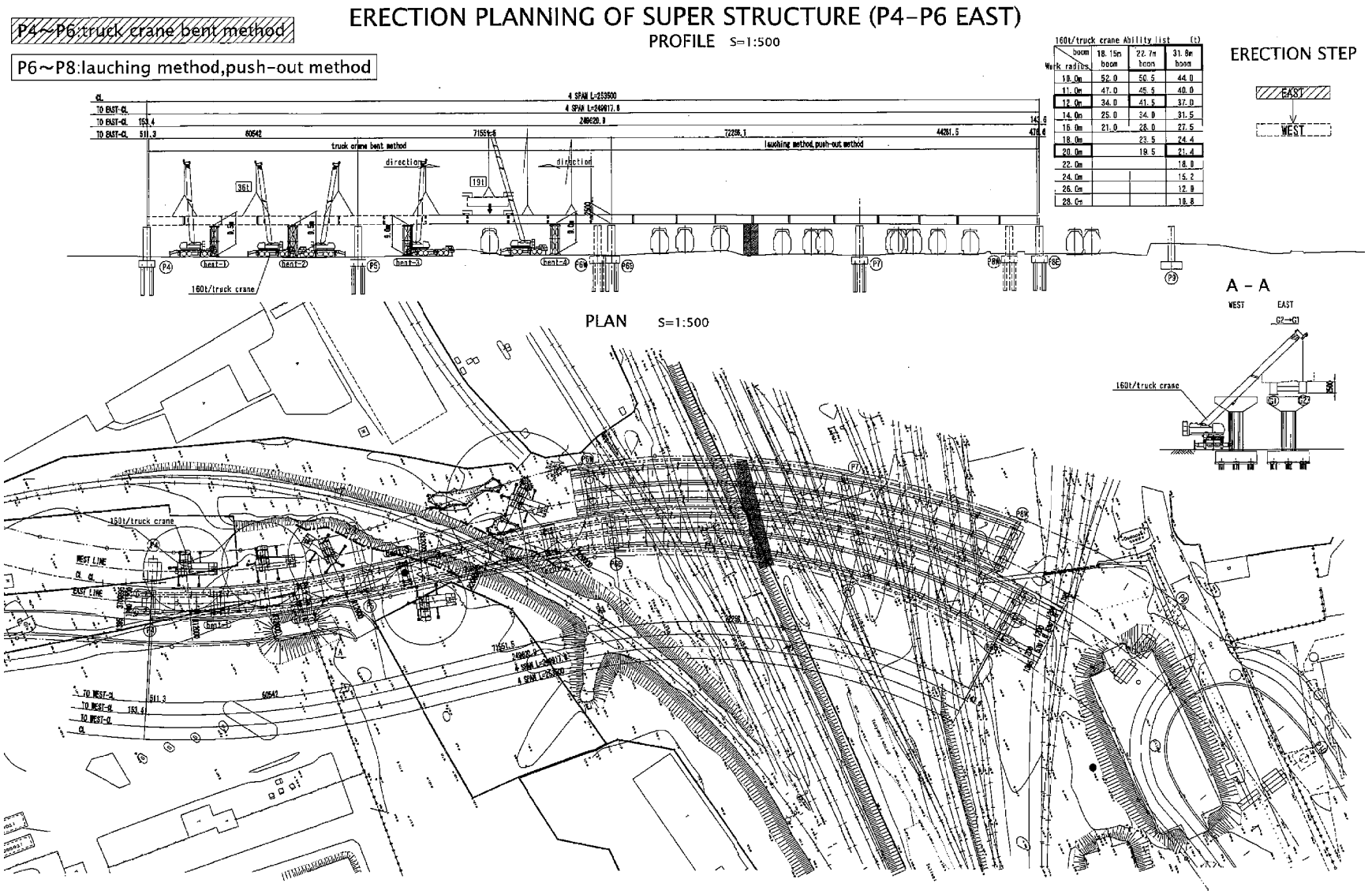


Figure 9.3.9: Arrangement of Equipment and Structures for the Crane-Bent girder Erection (between P4 and P6)

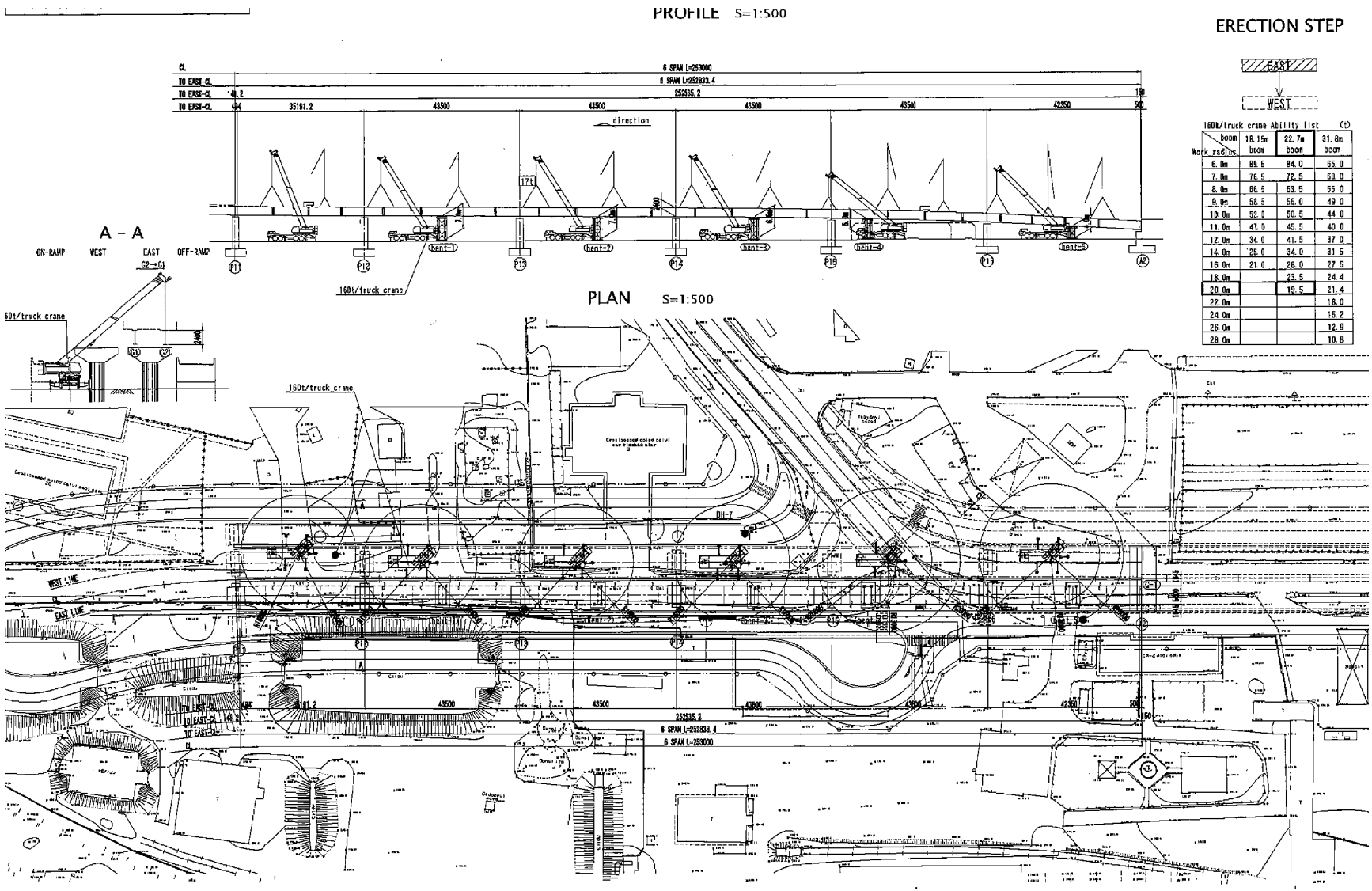
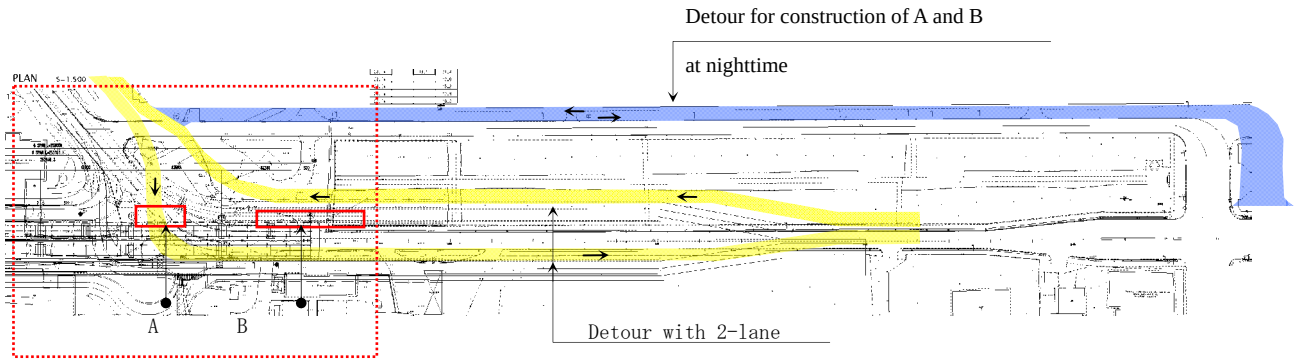
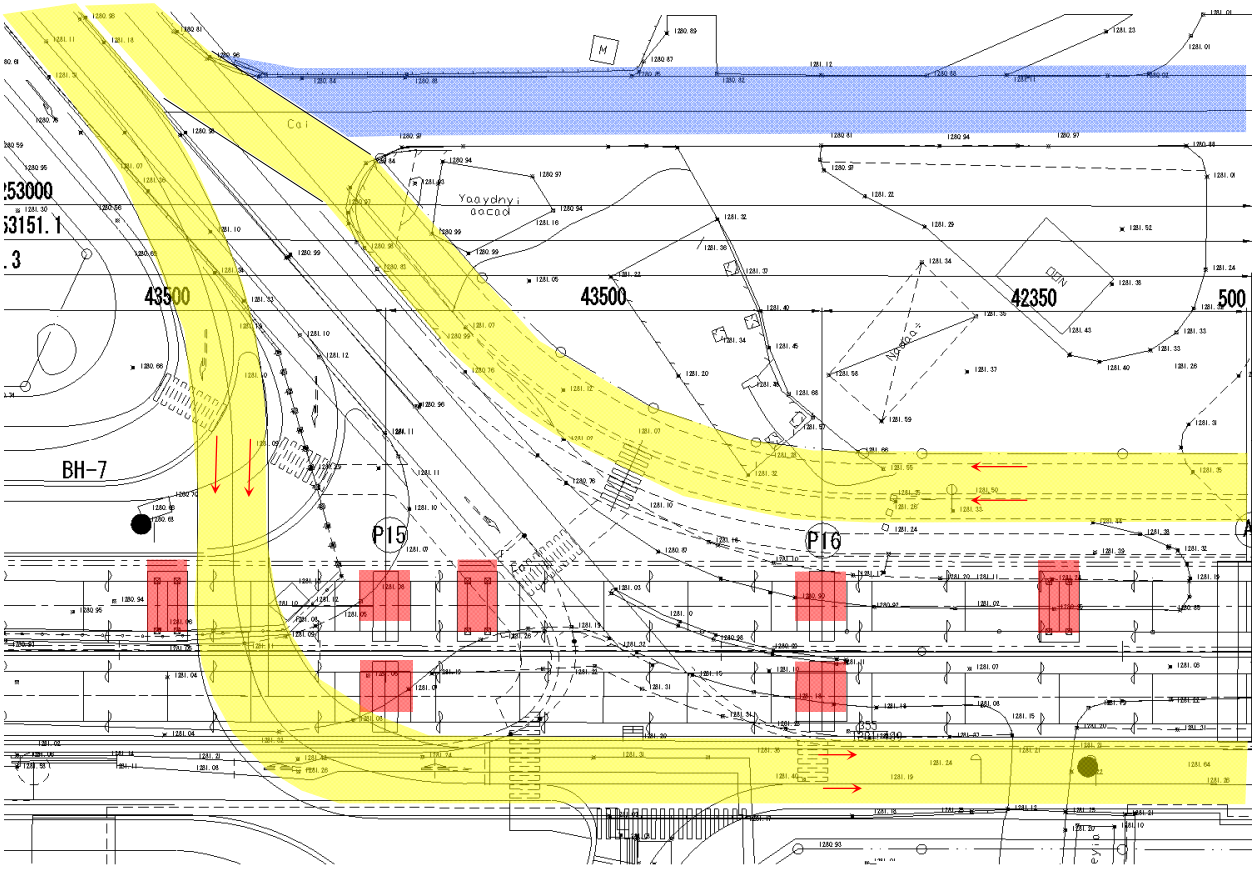


Figure 9.3.10: Arrangement of Equipment and Structures for the Crane-Bent Girder erection (between P11 and A2)



(a) Overall View of Detour



(b) Detailed Drawing of the Detour

Figure 9.3.11 Detour during Construction between P14 and A2

(5) Bridge Deck (Slab) and Wearing Surface Work

The applied deck (slab) type is a steel-concrete composite deck system. Steel panels should be prefabricated and transported to the site in winter. The panels will be installed on the girders using a mobile crane. After sealing at joints and installation of re-bars, concrete is placed and cured.

The bridge wearing surface work shall be planned to enable a reduction in the entire construction period of the viaduct, taking into consideration the superstructure erection methods, the order of the entire erection procedure and the period in which construction work can be implemented (between May and September). The bridge wearing surface work includes 80 mm-thick asphalt paving (application of two 40 mm layers), construction of railings (concrete wall railings), installation of expansion joints, and such like.

(6) Roadwork

The roadwork shall be implemented on the condition that it does not disturb the traffic on the existing roads. Therefore, it will be implemented with construction of detours for the existing roads as required. A construction plan for the roadwork shall be formulated carefully so as to eliminate the risk of reworking in the process from the bridge girder erection to the road paving work because such reworking will increase the construction costs and lengthen the construction period.

The road structure work includes construction of water drainage facilities, subgrade work, base course work, and paving work. The figure below shows the general implementation procedure of the paving work.

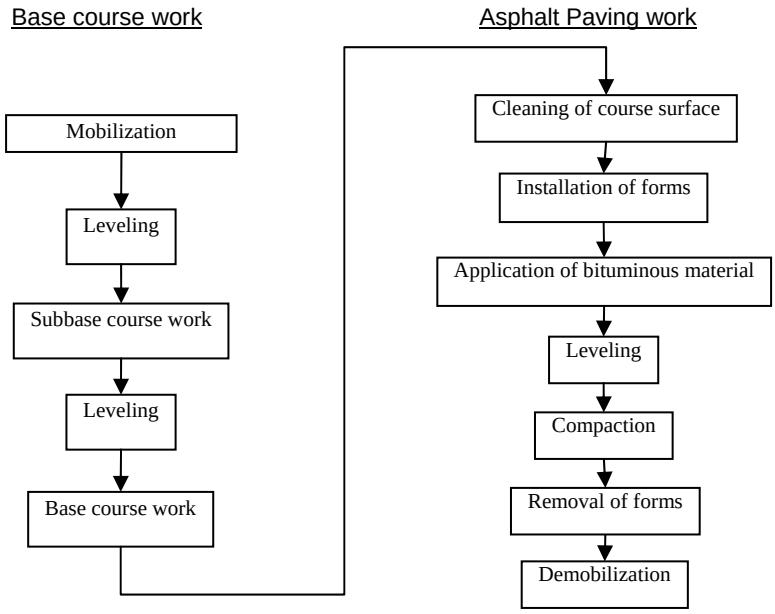


Figure 9.3.12 Implementation Procedure for the Paving Work

9.4 WORK SCHEDULE

(1) Work Implementation Order

Figure 9.4.1 shows the order of the work implementation and the relationships between different types of work.

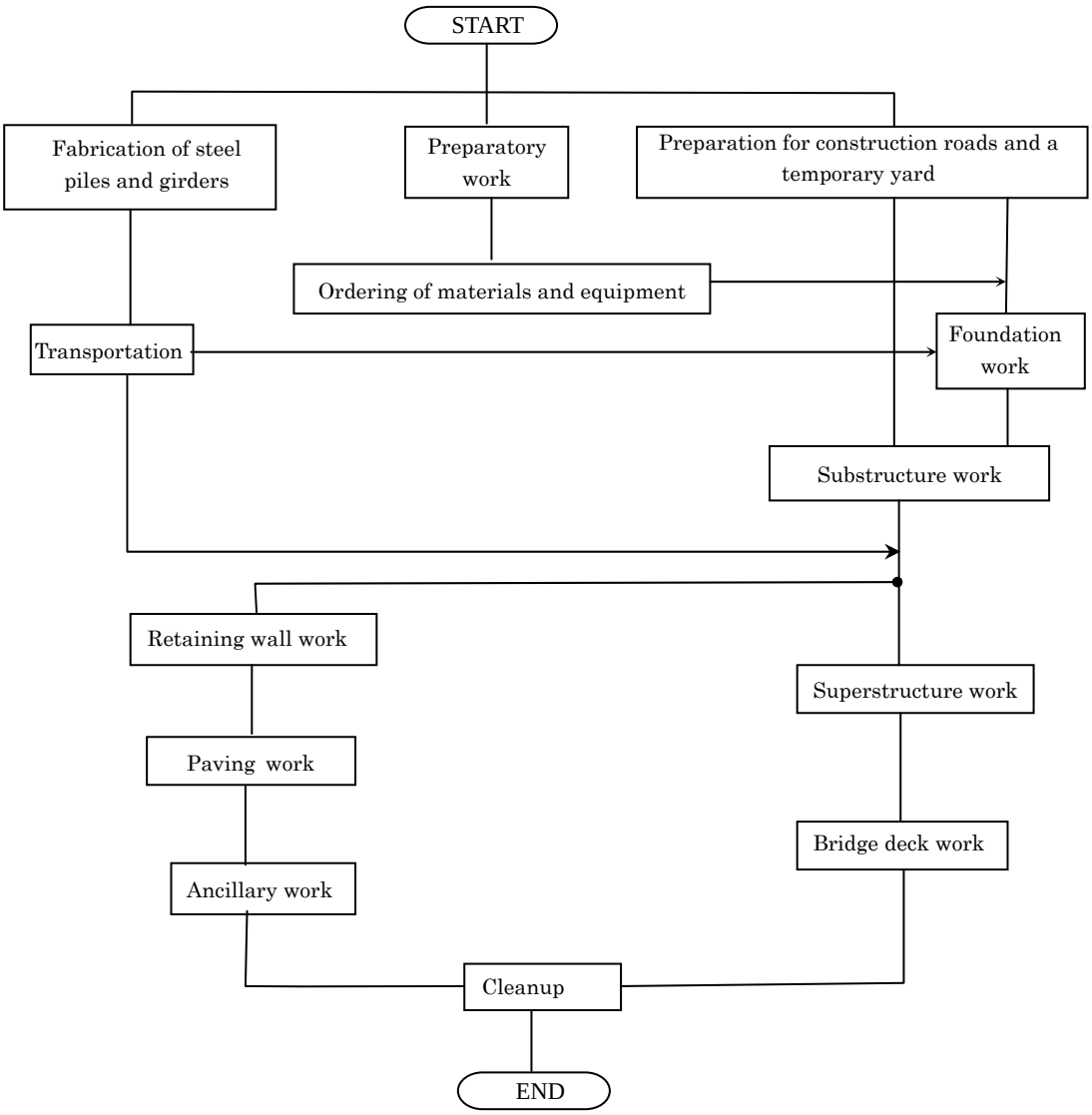


Figure 9.4.1 Order of Work Implementation

(2) Conditions for the Work Scheduling

Concrete work and asphalt work can be implemented when the average temperature is 5ºC or above. The five-month period between May and September generally satisfies this temperature requirement at the project site. The construction work shall be implemented intensively in this period in this project in order to eliminate risk of quality control due to low temperatures.

(3) Estimation of the Work Suspension Factor

Days with rainfall of 10 mm or more, Saturdays, Sundays and Mongolian holidays are considered as non-working days. The ratios of the number of actual working days to the number of working days (work suspension factors) have been defined as follows:

During the summer (May to end of September):	= 1.20
Rest of the year: 1/0.7	= 1.44

(4) Work Schedule

The decision on the orders of work implementation by type and site of work has been made so that the work can be implemented most efficiently. The following were taken into consideration when the work schedule was formulated.

The pile work will be implemented by one (1) party since an imported rotary penetration machine (procured in Japan) will be used.

The number of substructures to be constructed is 18. Construction of them in two years will require construction of at least nine substructures per year. Since the period in which construction work can be done is too short for just one party to construct more than one substructure, several work parties will be inevitably required for this project.

The plan for this project includes use of nine (9) substructure work parties at the construction site in the first year.

Among the types of superstructure work, work in the section for the launching erection (between P6 and P8) will be implemented in the second year because of the tight schedule for this section.

Therefore, the construction of the section between P6 and P10 including the yard work shall be completed in the first year.

Among the types of superstructure work, the girder erection and the deck slab work will be implemented in the first year (in the five-month period in the summer) and the bridge deck work and paving work will be implemented in the next summer.

The roadwork including construction of retaining walls will be implemented after the substructure and superstructure work has been completed so that it will not interfere with the other works.

Required Period for Major construction procedure is shown in the Table 9.4.1.

Table 9.4.1 Required Period for Major Construction Procedure

Item	Unit	Quantity	Remarks
Screwed Steel Pileφ1.0m	nos/day	0.7	Not applied adjustment factor
Construction of A1 (A2)	day/nos	90(82)	Adjustment factor = 1.2
Construction of P1–P5	day/nos	52	Ditto
Construction of P6–P8	day/nos	94	Ditto
Constriction of P9–P10	day/nos	53	Ditto
Construction of P11–P16	day/nos	50	Ditto
Assembly/disassembly of Temp. Prop	t/day	6～7	Not applied adjustment factor
Foundation of Temp. Prop (Steel Plate)	m^2/day	33	Ditto
Erection of Girders	t/day	25～65	Ditto
Assembly of Girders at Site	t/day	48	Ditto
High Tension Bolt	nos/day	1,900	Ditto
Installation of Bearings	nos/day	3.5	Ditto
Launching Erection	m/day	0.67	Length of Launching erection / Required period of Launching erection
Erection of Composite Slab	m^2/day	25	Per 1-party、Adjustment factor = 1.2
Installation of Barrier	m/day	5.7	RC-wall
Asphalt pavement (Bridge)	m^2/day	998	Not applied adjustment factor
Gravity Type Retaining Wall	m/day	2.8	Ditto
Reinforced Earth Retaining Wall	m/day	2.3	Ditto
Pavement (Approach Road)	m^2/day	328	Ditto
Drainage Structure	m/day	4.5	Ditto

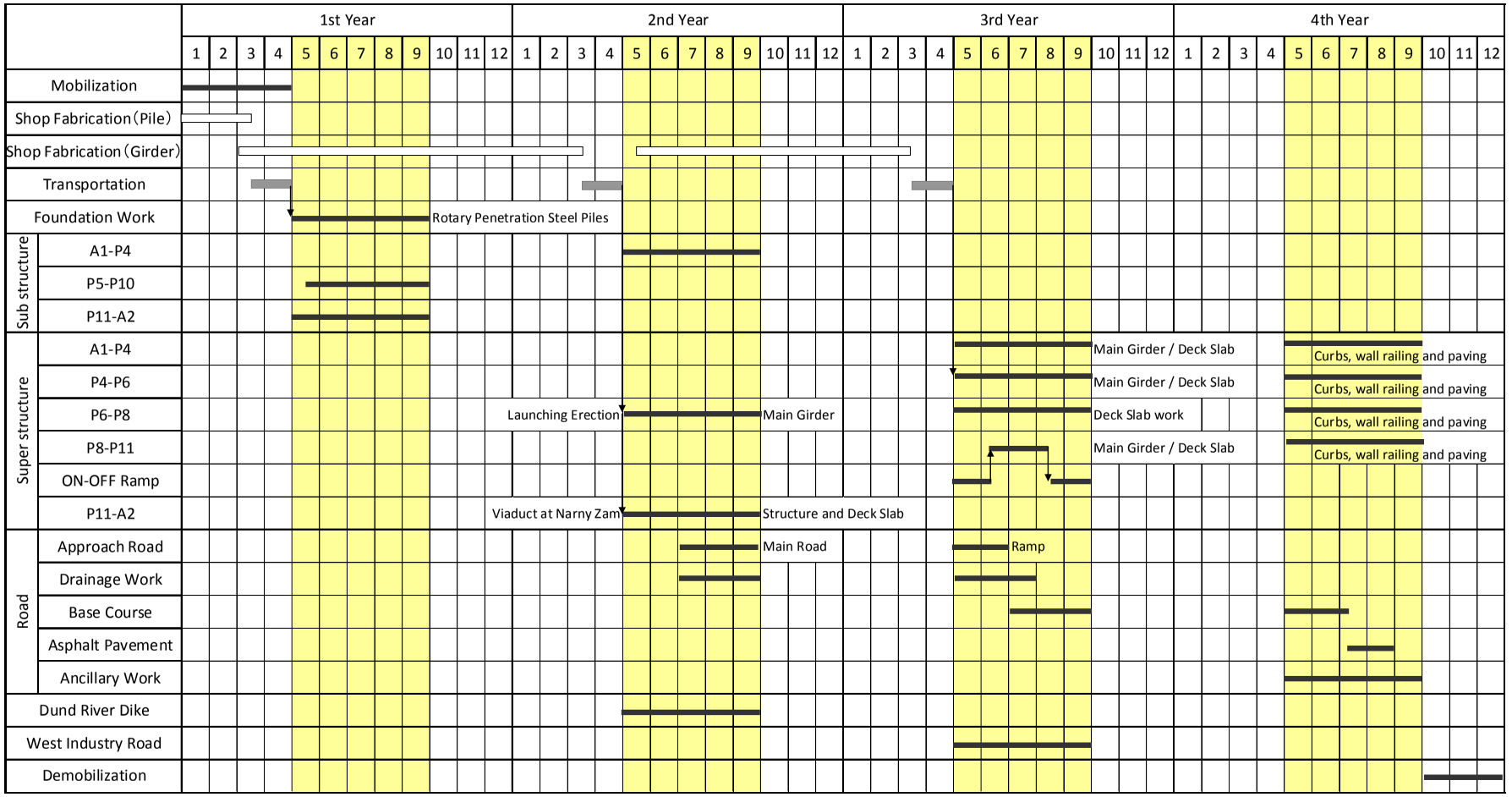


Figure 9.4.2 Schedule of Construction Work

CHAPTER 10

OPERATION AND MAINTENANCE SYSTEM

10.1 OPERATION AND MAINTENANCE SYSTEM OF ROAD FACILITIES IN ULAANBAATAR CITY

(1) Organization of Ulaanbaatar City Road Department

The Road Department established in 2005 is presently composed of 97 personnel who are responsible for planning, designing, construction and maintenance of road facilities in Ulaanbaatar City. The Operation and Maintenance Division of the Department has 12 personnel who are responsible mainly for the following operations:

- Widening, maintenance and daily monitoring of road facilities.
- Rebuilding damaged road facilities.
- Early repairing of road facilities damaged by disasters and ensuring traffic convenience.
- Maintenance of traffic management, signals and road traffic signs.

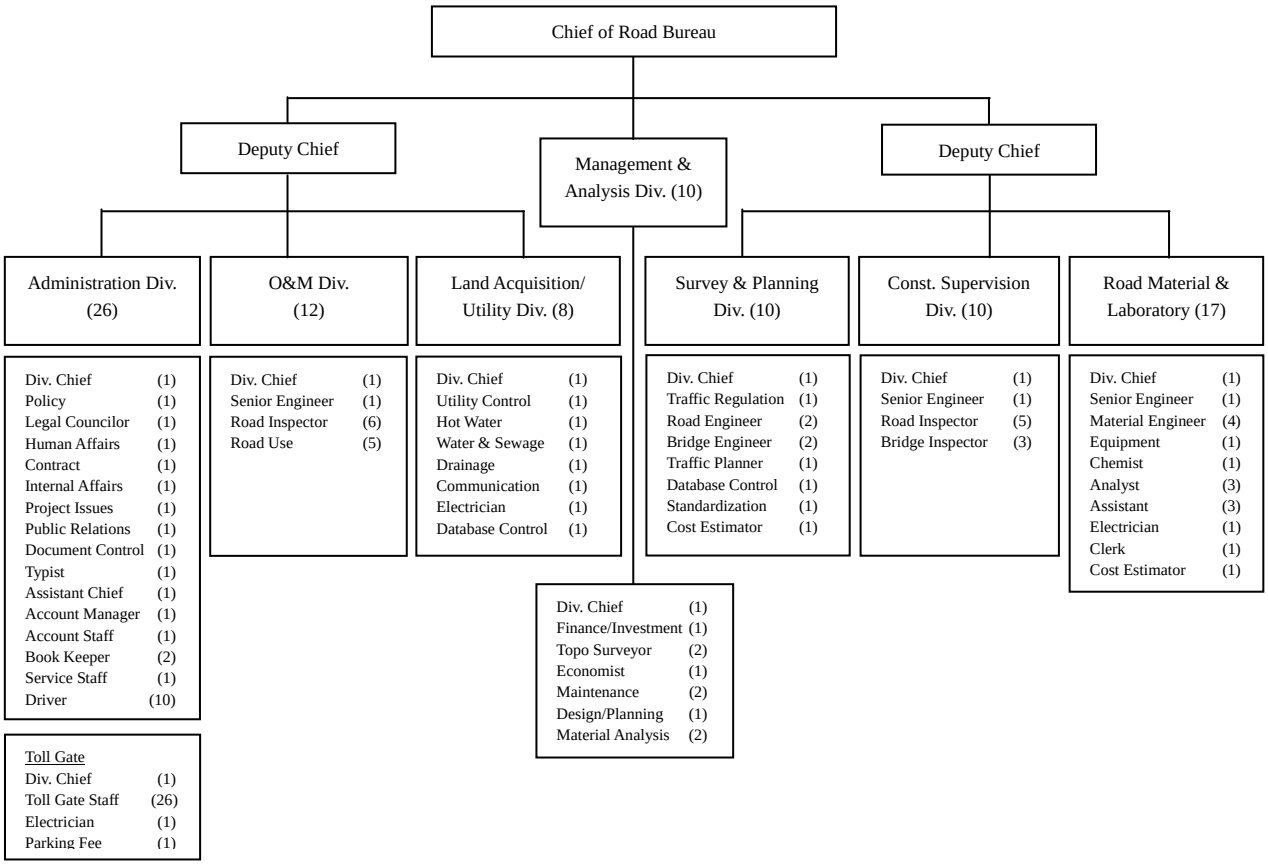


Figure 10.1.1 Organizational Chart of the Ulaanbaatar City Road Department

(2) Organization of Ministry of Roads and Transportation (MRT)

When the government ministries were restructured in August 2012, the Ministry of Road, Transportation, Construction and Urban Development (MRTCUD), i.e., the counterpart of the Survey Team at the commencement of the preparatory survey, was reorganized into the Ministry of Roads and Transportation (MTR).

In the former MRTCUD, design work, operation and maintenance of road facilities was conducted by the Road Agency which was established when the government ministries were reorganized in 2009. The maintenance section of this agency consisted of seven (7) members including the section chief, professionals of each area (5) and staff in charge of the database (1). Maintenance operations have been outsourced to 21 of the state-owned firms and private companies. The main activities of the Road Agency are as follows:

- Conducting government action plans and annual plans
- Creating the database of national roads and inputting of information
- Conducting researches on traffic volume
- Planning, applying, monitoring and evaluating maintenance plans
- Management of tollgates
- Selection, management and technical guidance of road maintenance providers
- Taking emergency countermeasures for road facilities damaged by natural disasters or other causes.

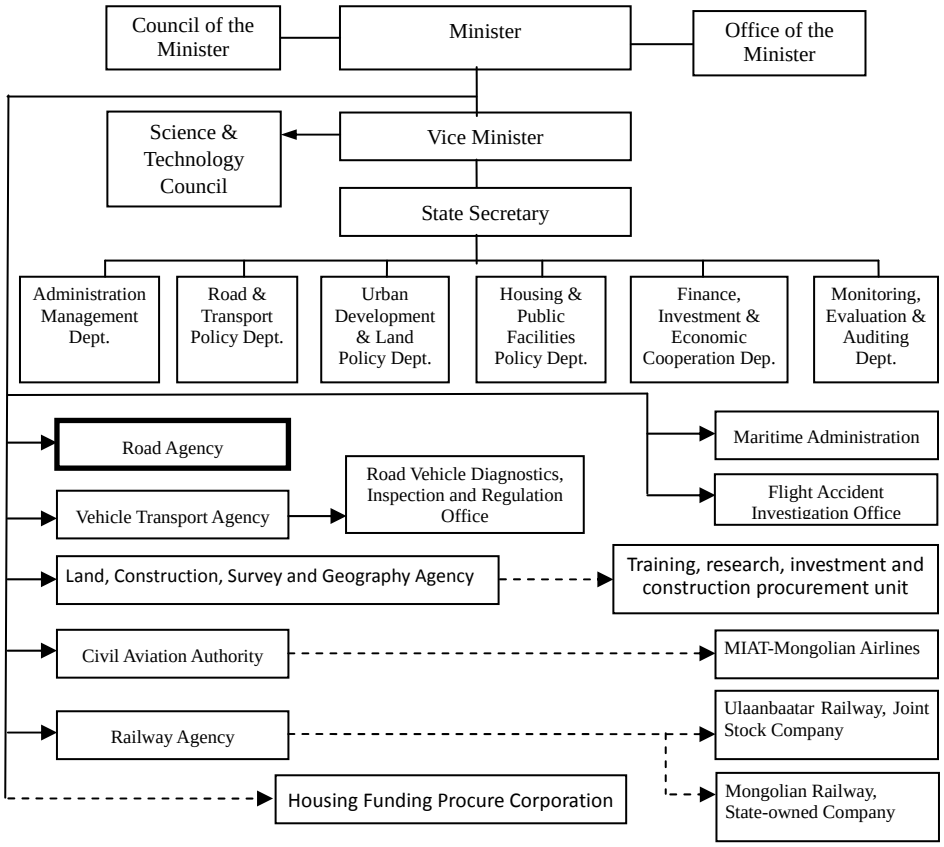


Figure 10.1.2 Organizational Chart of the Former MRTCUD

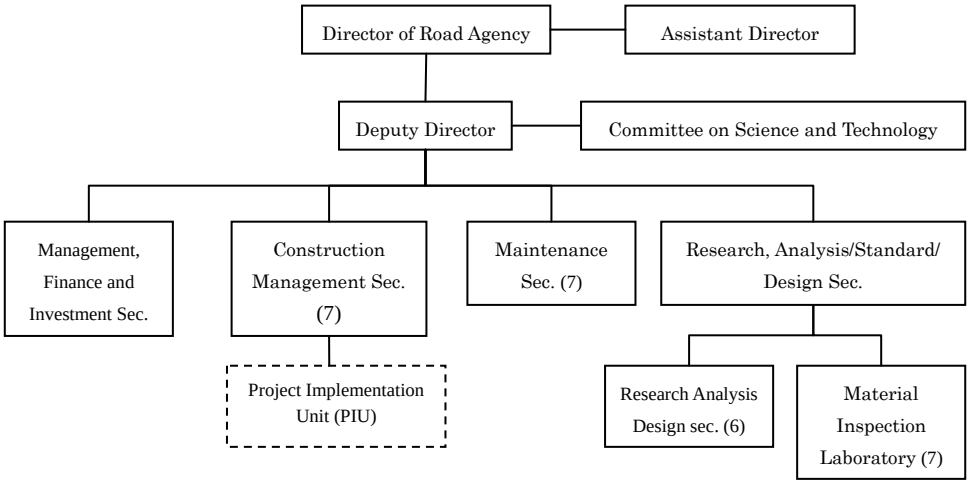


Figure 10.1.3 Organizational Chart of the Road Agency in the former MRTCUD

On the other hand, the new organization and the number of staff members were determined in 2012, and the Road Agency which had been in charge of construction and maintenance of national roads was divided into the Road Construction Section and the Road Maintenance Section in the Road Policy Implementing Agency Administration Office.

As a subsidiary of MRT, the Road Supervision, Science and Technology Center was established in October 2012 for research and investigation of road policies, preparation of design standards, and introduction of new technology, capacity building of operation and management, and so forth.

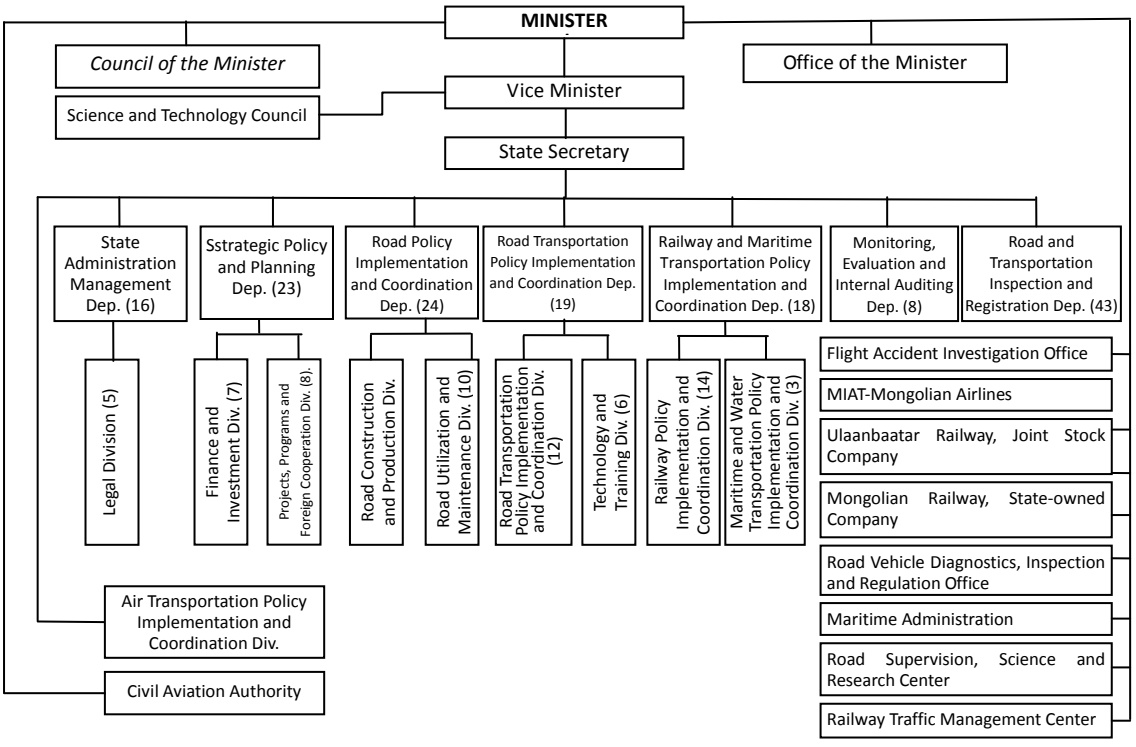


Figure 10.1.4 Organizational Chart of the New Ministry of Road and Transportation (MTR)

10.2 FINANCIAL CONDITION FOR MAINTENANCE

(1) Financial Resources for Maintenance of Road Sector in Mongolia

i) State Road Fund

The Road Fund established in 1991 as a stable source of revenue for the Road Sector became a legal system in 1995 and was divided into the “State Road Fund” and the “Local Road Fund” when the Road Act was promulgated in 1998. The main source of the fund is the fuel tax imposed on gasoline and diesel. The rate of fuel tax was 13% of the import price of fuel at first; however, it was replaced with a fixed rate on fuel weight in 1995.

The Fund was also supported by revenue from vehicle tax, road tolls, driver’s license tax, and subsidies or loans from the national budget, and managed by the Ministry of Roads and Transportation. At present, most of State Road Fund is covered by the national budget with an annual growth rate of 12–18%.

Table 10.2.1 Changes in the State Road Fund

(Confidential)

ii) Local Road Fund

Financial sources of the Local Road Fund are the vehicle tax, the annual license processing fee and the road toll fee collected by each municipality and the Ulaanbaatar City Government. Changes in income/expenditure of the Road Fund in Ulaanbaatar are as indicated in the table below.

Table 10.2.2 Income/Expenditure of Road Fund in Ulaanbaatar

(Confidential)

iii) Technical Support by ADB

The Road Sector Capacity Development Project (TA-7844 Mongolia) financed by the ADB and started in March 2012 is providing technical assistance in the capacity development of the road sector. The "Restructuring of the Road Fund and Reestablishing of Road Board" consists of the following sub-items which are included in these types of technical assistance.

a) Adequate Use of Road Fund for Maintenance
   (i) Evaluation of road user's cost coverage and identification of current and future coverage gaps or misalignments between charges, costs and resources;
   (ii) Recommendation of preferred options for securing sufficient and stable financial resources for the Road Fund;
   (iii) Recommendation of allocation procedures for the Road Fund;
   (iv) Recommendation of Road Fund financial management procedures;
   (v) Recommendation of composition and selection methods of the Road Board members
   (vi) Recommendation of the roles and responsibilities of the Road Board, e.g., related to (a) road fund management and budget allocation, (b) adjusting user tariffs, (c) maintenance planning and execution, and (d) investment planning;
   (vii) Recommendation of the nature and function of the Road Board Secretariat, (e.g., 1 to 2 people);
   (viii) Financing mechanism for operating the Road Board; and
   (ix) Proposal of amendments to the Road Act or updating the draft legislation for the Road Board;

b) Selection of members of the Road Board and Defining their Roles
   (i) Assistance in Road Board members' identification and nomination;
   (ii) Assistance in Road Board Secretariat recruitment, including the preparation of job descriptions;
   (iii) Definition of procedures for updating or recommending user's fee increases;

(iv) Definition of Road Fund auditing requirements, e.g., terms of reference for external audit;
(v) Definition of procedures for requesting and reporting use of funds;
(vi) Definition of annual reporting needs;
(vii) Organization of initial Road Board meetings, and training Road Board members in their new functions; and
(viii) Training of MRT staff and Road Board Secretariat in new procedures.

(2) Road Maintenance Budget Status in Ulaanbaatar City

Budgets for road development and maintenance in the last five (5) years are as shown in Table 10.2.3 and Table 10.2.4. Since 2009, the proportion of maintenance costs to the overall budget for the road sector has not expanded steadily, while both have largely increased. As compared to foreign countries (see Table 10.2.4), the proportion of maintenance costs in Ulaanbaatar is not larger than its average. Although the proportion should change in the future, the current maintenance budget can be expected to satisfy the prospective road maintenance cost in 2016 if properly used. (See Table 10.2.5.)

Table 10.2.3 Overall Budget for the Road Sector in Ulaanbaatar City

(Confidential)

Table 10.2.4 Budget for Maintenance of Roads and Bridges in Ulaanbaatar City

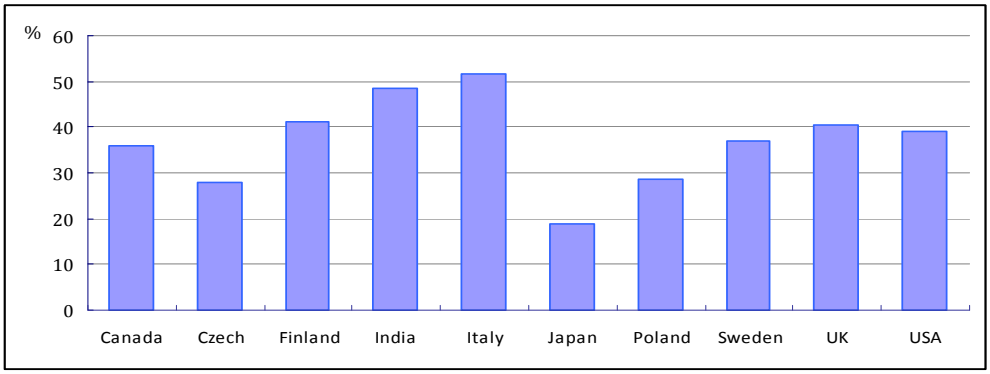
(Confidential)

Table 10.2.5 Required Cost for Annual Maintenance in Ulaanbaatar City

	2012			2016		
	Extension	**Maintenance Cost/km (Million MNT)**	**Total (Million MNT)**	**Extension**	**Maintenance Cost /km (Million MNT)**	**Total (Million MNT)**
Road	450km	11.8	5,310	662 km	11.8	7,812
Bridge	3.9km	172.8	674	6.1 km	172.8	1,054
Total			5,984			8,866

Reference: Maintenance Cost of Roads/km; Mongolia Road Sector Development to 2016 (2011, ADB)

Note: Routine Maintenance (3,000 USD/km) and Periodic Maintenance (5,750 USD/km) are booked for Maintenance Cost/km. Additionally; 0.5%/year of bridge construction cost briefly estimated is placed on maintenance cost of bridges.



Reference: International Transport Forum, Statistics Brief 2012

Figure 10.2.1 Proportion of Maintenance Cost in Road Maintenance Budget of Foreign Countries (2009–2010)

10.3 FORMER PRACTICE AND EXPERIENCE IN OPERATION AND MAINTENANCE

(1) Experience of Road Maintenance in MRT

Road maintenance conducted by MRT (formerly, MRTCUD) is outsourced to road maintenance companies and private road construction companies all over the country. Personnel of the Maintenance Section of the reorganized Road Agency are responsible for the area they are respectively assigned. ADB has provided technical support required for road maintenance including creating databases of road facilities (mainly pavement). At the same time, several grant aid projects financed by other foreign donors have been for implemented to procure road maintenance equipment for road maintenance companies. The performance on road maintenance has gradually increased; however, there are some problems in systematic maintenance plans based on daily inspection and quality management on construction. Besides, although the database of road facilities was created with the assistance of ADB, the data has not been updated continuously or adequately. In this connection, since ADB has been providing further technical assistance, certain improvement is of maintenance capacity expected in the future.

(2) Experience of Road Maintenance in Ulaanbaatar City

The Road Department of Ulaanbaatar City was established in 2005 and the maintenance of city roads was started. General maintenance such as repair of pavement is outsourced to the road maintenance companies. MRT places comprehensive contract with regional maintenance companies on annual basis. On the other hand, Ulaanbaatar City copes with specific damage by means of individual restoration contracts. The maintenance of bridges such as repair of deck slabs or reconstruction of extensively damaged bridges has been conducted on an irregular basis.

There is only one steel road bridge in Ulaanbaatar City; thus, experience in the maintenance of steel bridges is insufficient. Moreover, the Operation and Maintenance Division in the Department of Road of Ulaanbaatar City has not been familiar with bridge inspection and rehabilitation technology relevant to "Preventive Maintenance." From now on, it is crucial to establish a bridge operation and maintenance cycle consisting of inspection, maintenance and restoration along with improvement of an operation and maintenance system (institution, budge, guideline, etc.).

(3) Issues on Maintenance of Ajilchin Flyover

After completion of the Project, maintenance of access roads will be carried out by the Road Department of Ulaanbaatar City. So far, many bridges in Ulaanbaatar City were left without proper maintenance, and some bridges were reconstructed after damage extended to fatal conditions. Approx. 25% of the bridges in Ulaanbaatar City were constructed more than 30 years, and this length of time means they crucially require sound maintenance. However, capacity building or human resource development for bridge inspection and rehabilitation has not been attained due to lack of experience.

Technical Assistance by JICA for bridge maintenance and rehabilitation is scheduled for between 2013 and 2015, and it will contain technology transfer of steel bridge maintenance and preparation of corresponding manuals. Accordingly, it is expected that bridge maintenance and rehabilitation skills will have been improved with the completion of the Ajilchin Flyover Project.

The total budget for the road sector has been increased steadily in Mongolia. It must be noted that budget allocation for road maintenance and rehabilitation needs to be duly reviewed and updated as road infrastructures are further expanded.

10.4 RECOMMENDATION FOR OPERATION AND MAINTENANCE OF AJILCHIN FLYOVER CONSTRUCTION PROJECT

(1) Institutional Framework of Project Implementation

According to "the Law of Mongolia on Coordination of Foreign Loans and Grant Aid (2003)," it is stipulated that the Project Implementation Unit (PIU) shall be organized in the implementation agency (e.g., Ministry of Roads and Transportation for the Project) to manage implementation of the individual projects financed by foreign loan and/or grant aid.

In the case of the Narny Bridge construction project under Japan's Grant Aid, three (3) staff members of the PIU were in charge of quality control, schedule control, land acquisition, coordination for relocation of utilities, and so forth.

In the case of road projects in Ulaanbaatar City, the city government has to play a role as an implementing agency in ways such as coordination with connecting roads improvement, drainage plans, and relocation of underground utilities and land acquisition. The Road Department of Ulaanbaatar City has established the Land and Utility Department for smooth and efficient project implementation. Therefore, it is important that land acquisition and relocation of existing utilities be executed by sound coordination and collaboration of the PIU and Land and Utility Department of the Road Department of Ulaanbaatar City.

In the detailed design stage of the Project, it is necessary for the consultant to get approval for design products by the Expertise assigned by the MRT. The Expertise are classified in such special fields as bridges, roads, electricity and so forth.

Under Mongolian Law, the State Professional Inspection Agency (SPIA) has the power to intervene in the quality control and inspection for any project other than the Client. The responsibility and authority should be clearly stipulated in the conditions of a contract to create an effective quality control system for the Project.

With respect to construction work in the property of Ulaanbaatar Railway, it is necessary to execute sound coordination regarding a facility plan, pier location and required space, relocation of existing utilities, train operation management during construction work, and so forth.

Figure 10.4.1 illustrates the organization for implementation of the Project.

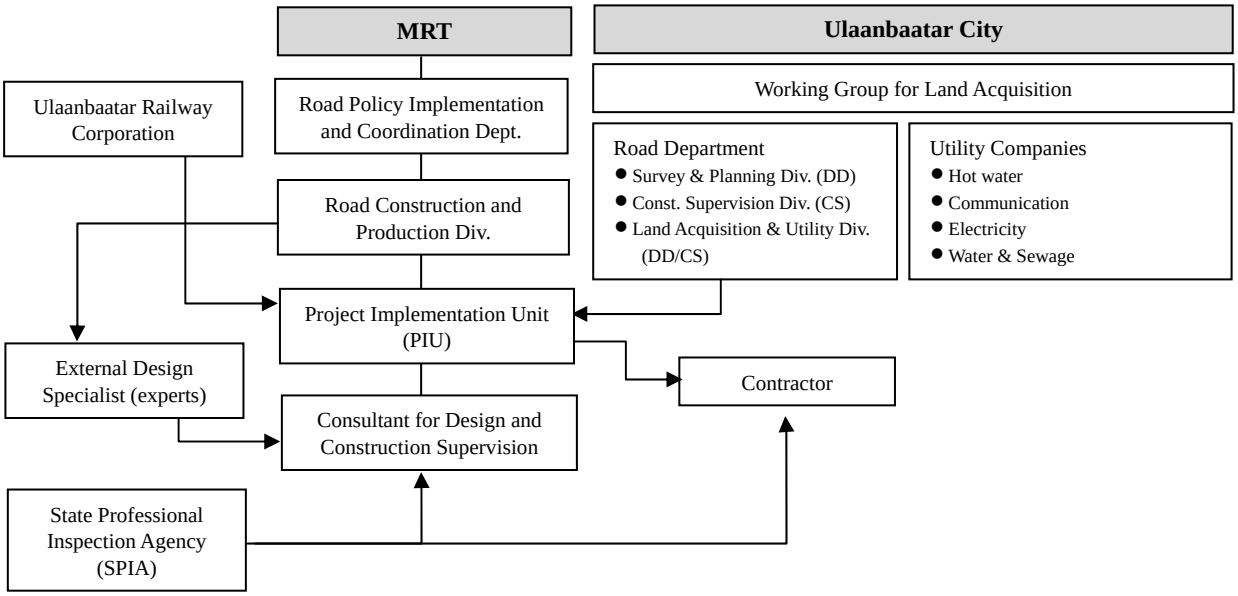


Figure 10.4.1 Organization Chart of Project Implementation

(2) Maintenance System

After completion of the Project, maintenance is to be managed by the Road Department in Ulaanbaatar City. As special maintenance work without routine maintenance such as cleaning and minor repair of surfacing of the bridge is not required for the Ajilchin Flyover for 10 to 20 years after construction, it is expected that Ulaanbaatar City will accumulate and improve the technologies necessary for steel bridge maintenance through several opportunities such as the Technical Cooperation Scheme implemented by JICA.

CHAPTER 11

COST ESTIMATES

(Confidential)

CHAPTER 12

ECONOMIC EVALUATION

(Confidential)

CHAPTER 13

SURVEY ON EXISTING ROAD STRUCTURES

13.1 ROAD CONDITIONS IN ULAANBAATAR CITY

(1) General

Ulaanbaatar City has advantageous conditions for an asphalt pavement such as little precipitation and a relatively strong subgrade. On the other hand, because of drastic changes in the temperature over the year, thermal cracks tend to appear on the asphalt surface and accelerate pavement deterioration. Since few road drainage facilities have been developed in the city, the roads become inundated by intensive heavy rain in the summer season, which is one of the causes of pavement deterioration. Furthermore in recent years, a rapid increase in the maount of heavy traffic, mainly for construction work in the city, has been accelerating pavement fatigue degradation. This survey examined the pavement types and state of damage at 42 spots on the major roads in the city.

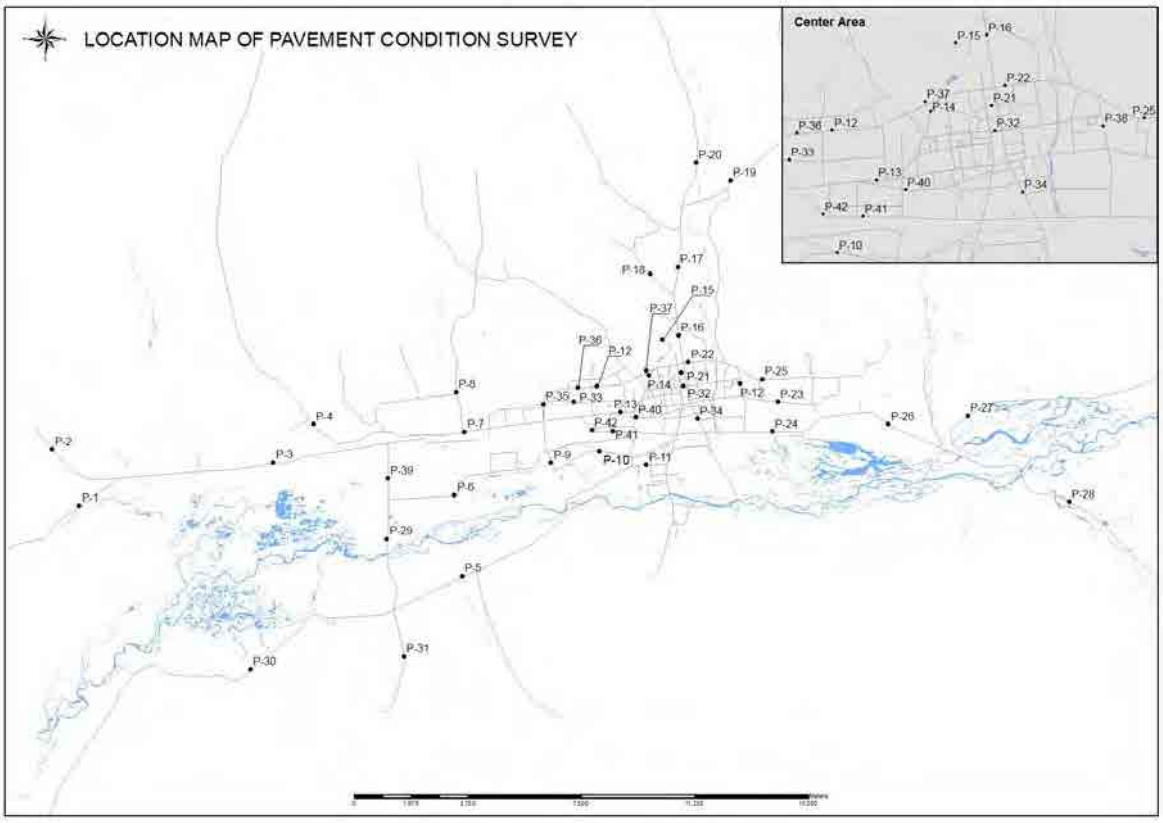


Figure 13.1.1 Location Map of Pavement Condition Survey

(2) Survey Results

This survey classified the pavement damage conditions into three grades (A, B and C) to figure out the condition of pavement damage in the city. The results showed that developed pavement

damage affecting traffic performance was confirmed in 62% of the survey spots in a visual inspection. On the other hand, maintenance work such as patching and sealing were observed on the existing roads, which means a certain level of road maintenane work has been implemented in the city.

Table 13.1.1 Summary of Pavement Condition Survey

Grade	Damage Type	Number of Spots	Composition Ratio
A	Ranging from no damage to a light crack in a transverse direction	16	38.1%
B	Ranging from an alligator crack to a rut or partial detachment of pavement	17	40.5%
C	Ranging from a pothole 20cm or more in diameter to pavement destruction	9	21.4%

A: No Damage – Cracking in a transverse direction
After construction, the surface tends to have cracks in a transverse direction due to temperature changes.

B: Alligator crack – Rutting or to a rut or partial detachment of pavement.
Cracks have expanded and the pavement strength has been reduced significantly.

C: Pothole 20cm in diameter – pavement destruction
After the potholes had formed, they became serious obstacles to traffic.

Figure 13.1.2 Typical Pavement Damages in Ulaanbaatar City

13.2 ROAD BRIDGE CONDITION IN ULAANBAATAR CITY

(1) General

A bridge condition survey was implemented on existing 67 road bridges in Ulaanbaatar City. Soundness and seismic resistance was analyzed and evaluated for each bridge on the basis of an inventory survey (collection of drawing data), visual inspection of structures, measurement of major structural dimensions, concrete strength, bar arrangement and grade of damage.

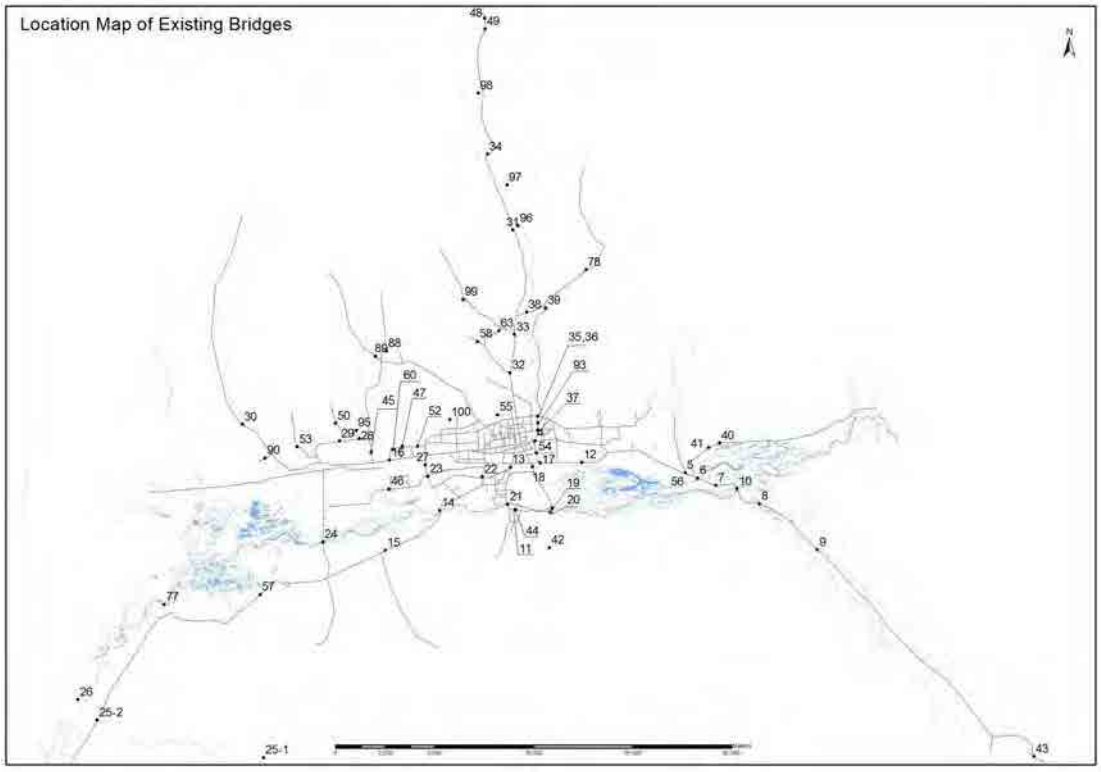


Figure 13.2.1 Location Map of Existing Bridges in Ulaanbaatar

(2) Survey Results

Most bridges in Ulaanbaatar City are reinforced concrete bridges, and there is one steel bridge and one wooden bridge. The oldest bridge was constructed in 1960 and about 25% of all bridges were constructed more than 30 years ago. Regarding the soundness of bridges, serious damage that needs to be repaired urgently was observed in seven bridges (10% of all bridges), and damage that needs to be repaired was observed in 48 bridges (72% of all bridges). Regarding seismic resistance, a relatively small number of bridges would be considered high risk due to their limited height. However, five bridges (7% of all bridges) have serious issues with regards to safety and thus require certain measures to enhance their seismic resistance.

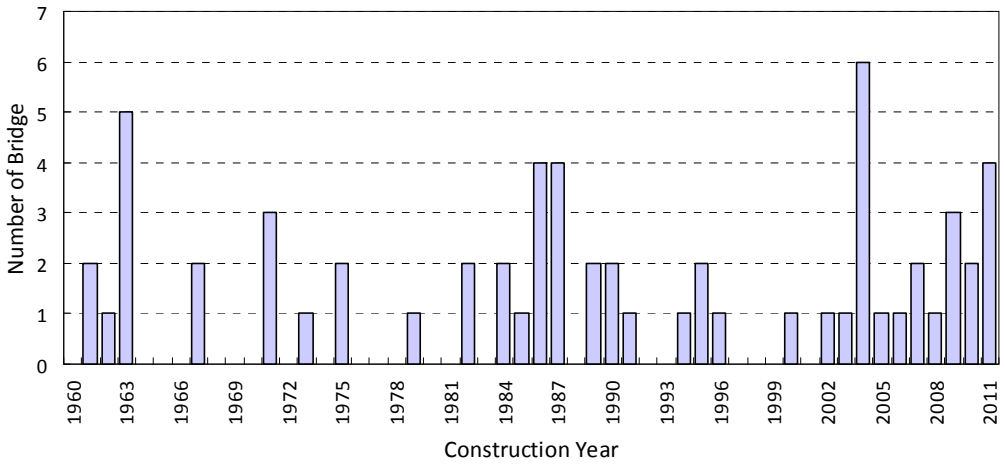
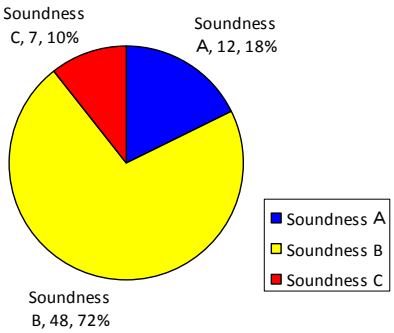
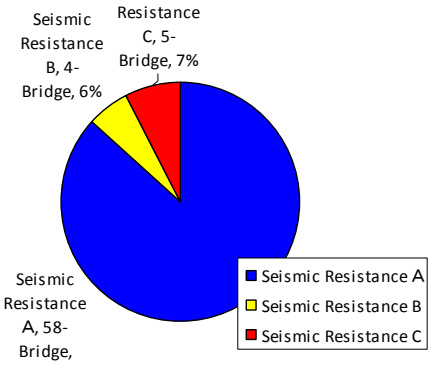


Figure 13.2.2 Construction Year of Road Bridges in Ulaanbaatar City



A: Less damage and few problems in bridge soundness
B: Some damage but the risk pertaining to the entire bridge is low
C: Damage in a wide area and low soundness

Figure 13.2.3 Summary of Bridge Soundness



A: Less problem in earthquake resistance
B: Seismic resistance is partially deteriorated.
C: Low earthquake resistance

Figure 13.2.4 Summary of Seismic Resistance

		
Damage in deck slab	Exposed steel bar	Subsidence of abutment
The concrete filled between girders is damaged by repetitive traffic loads. Major courses are poor workmanship, insufficient waterproofing on bridge deck, and unstable displacement of main girder due to lack of cross beams.	Sufficient thickness of concrete cover was not secured when fabricating the main girders. Concrete surface is deteriorated in Mongolia due to freezing, and thus steel bars are easily exposed due to stripping of insufficient cover.	Insufficient bearing capacity of foundation ground or decrement of bearing capacity due to scoring. The spread (direct) foundation applied to most old bridges in Mongolia is vulnerable to scoring.

Figure 13.2.5 Typical Damage of Bridges

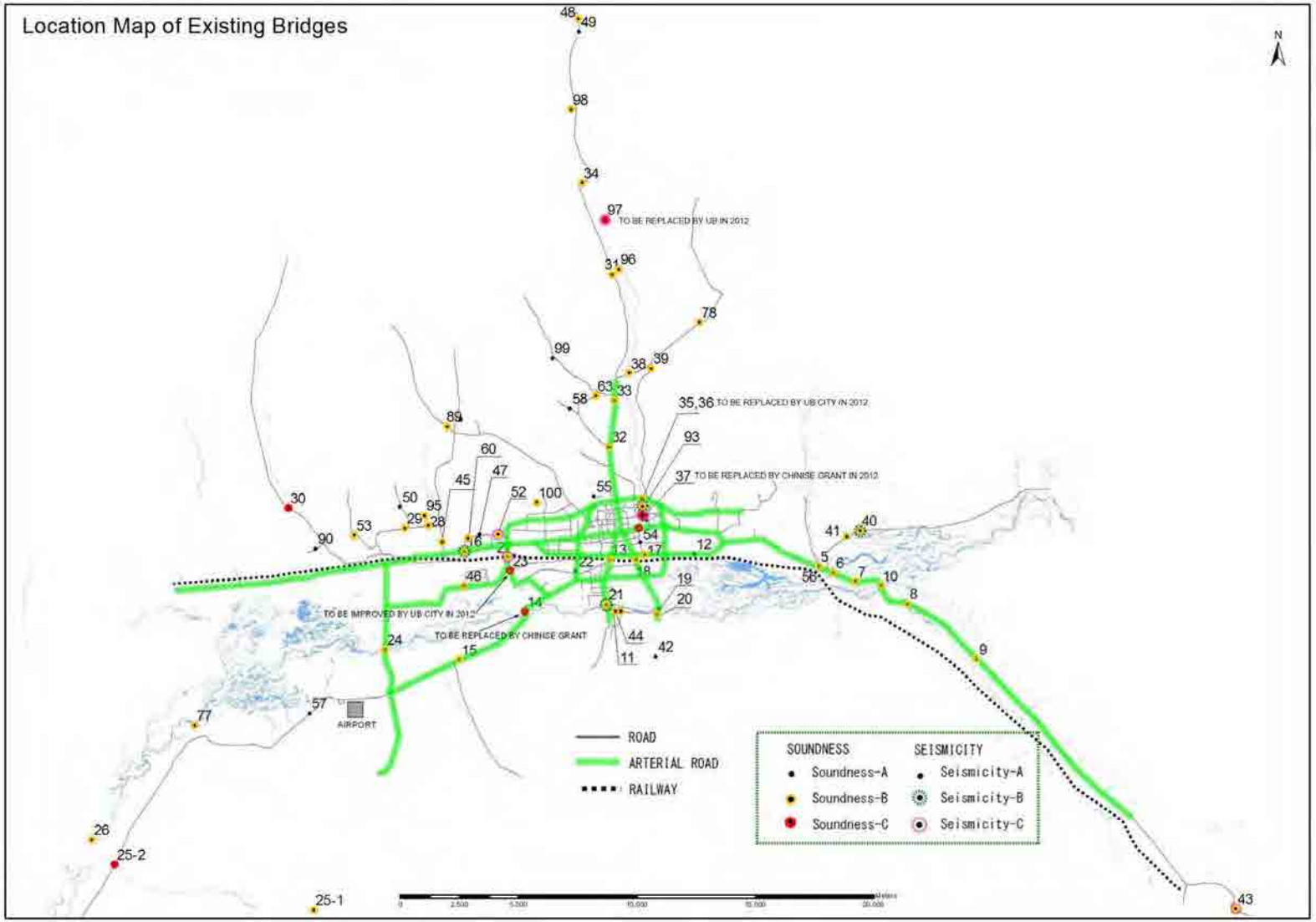


Figure 13.2.6 Result of Existing Bridges Survey

13.3 TECHNICAL ASSISTANCE PROJECT FOR ROAD MAINTENANCE

(1) Road Database Development Using Geographic Information System (TA 7297-MON; ADB 2011–2012)

While the maintenance and management of road facilities has been growing in importance, the Nationwide Road Maintenance and Management Information System was established based on GIS and a New Zealand formulated piece of software for asset management (d TIMS). In addition, the result was prepared in respect of inventory of national roads (11,200 km) as well as condition of paved road surveys (2,600 km). The Intelligent Transport Systemization Strategy for Nationwide Road Network and Planning Manual for Medium-Sized Road Maintenance was also created. On the other hand, there are still some issues remaining with regards to project sustainability including complicated manipulation of software and lack of understanding about the need for asset management.

(2) Road Sector Capacity Development Project (TA-7844 MON; ADB 2012–2014)

With support from the ADB, technology transfer of the following 10 articles has been implemented to MRT (former MRTCUD) and Ulaanbaatar Cityin order to improve their operation and maintenance capacity for the road sector in Mongolia. Along with introducing the maintenance and management software, practical technologies for road pavements including inspection procedures will be transferred. As for pavement construction methods and their technical standards, countermeasures for cold areas that could be taken by introducing Canadian technical specifications have been examined; provided, however, that designing and maintenance and management relating to bridges and structures are not included in theProject.

- Strengthen Road Agencies' Organization and Human Resources
- Restructure the Road Fund and Reestablish the Road Board
- Increase DOR's Project Management and Procurement Capacity
- Set-up an Outsourced Road Supervision System
- Implement a Road Periodic Maintenance Program
- Define a Road Maintenance Strategy and Standards for UB City
- Strengthen MRT's Project Planning and Evaluation Capacity
- Set up Regular Training and Re-training Programs
- Develop Local Capacity for Road Sector Technology Transfer
- Monitoring of Roadmap Implementation and Communicate with the Public

(3) Niigata Prefectural Technical Assistance Project for Implementation of Street Drainage in Ulaanbaatar (JICA, 2009 to 2012)

In order to solve the shortage of road drainage facilities in Ulaanbaatar City, technologies necessary for the development of them have been transferred to the public workers in

Ulaanbaatar City through dispatching specialists and providing training in Japan with technical assistance from the Niigata Construction Technology Center and private companies. Equipment including the steel forms necessary for the manufacture of precast concrete ditches and capacity development of drainage planning, construction and maintenance required for the future development of road drainage facilities was provided.

13.4 ISSUES ON OPERATION AND MAINTENANCE FOR ROAD FACILITIES IN ULAANBAATAR CITY

The nationwide road asset management system has been introduced especially with the assistance of the Asian Development Bank (ADB). It is about to reach the operational stage but its sustainability is not assured. Further, technical assistance with regard to operation and financial issues is currently in progress; for example, fund utilization, enhancement of organizations and entrusted contractor management is taking place as introduced in 13.3(2). As for maintenance technology for road pavements, technical assistance has been continuously provided since the establishment of a database for maintenance in 2011 and the "Road Sector Capacity Development Project" is currently in progress. The following table gives a summary of the technical assistance for road maintenance implemented in the past and currently in progress.

Table 13.4.1 Summary of Technical Assistance on Road Maintenance

		Issue	Required Assistance	Assistance in the Past
Capacity of Staff and Organization		• Insufficient staff number • Insufficient engineering technology	• Outsourcing to road maintenance companies • Establishment of Road Technology Center • Enhancement of existing road material laboratory	• Technical assistance of entrusted contractor management by ADB • It is included in ADB's technical assistance and scheduled to be established in the future. • Equipment was procured in 2009 by ADB.
Budget Allocation		Reestablishment of road budget (increase in budget for road maintenance)	• Budget application based on the medium-term road maintenance plan • Reexamination of road funds and fuel tax	• Technical assistance by ADB is in progress. • Same as the above.
Engineering	Road Pavement	• Construction of database • Technical transfer of inspection procedures • Planning of road maintenance • Technical guidance on rehabilitation work	• Introduction of database software • Technical guidance on inspection procedures • Procurement inspection equipment • Technical guidance to road maintenance companies and staff of UB City	• Implemented by ADB. • Same as the above. • Same as the above. • In progress by ADB.

		Issue	Required Assistance	Assistance in the Past
	Bridge	• Construction of database for maintenance • Technical transfers of inspection procedures for preventive maintenance • Planning of bridge maintenance • Technical Guidance on rehabilitation work	• Construction of sustainable database • Guidance of periodical inspection procedures • Planning of medium-sized bridge maintenance and repair works • Guidance of designing method and construction technology for bridge repairing	**Since no technical assistance for these articles has been implemented in the past, future assistance is required.**

On the other hand, no preventive maintenance technology has been established regarding bridge structures. Maintenance and management work are being implemented in the form of "breakdown maintenance method" where damage is left as it is until it begins extending and measures are taken after a problem arises with the traffic. Accordingly, when deterioration of the existing bridges in the city becomes a serious problem in the future, expenses for large-scale rehabilitation or replacement work will arise. Particularly, the traffic volume in Ulaanbaatar City is increasing significantly, and, on top of that, there are many factors accelerating the deterioration of bridges, such as overloaded vehicles and reinforcement being corroded by application of anti-freezing agents. The important issues are to improve the capacity of maintenance and management for bridge structures and to establish a preventive maintenance system.

Table 13.4.2 Breakdown Maintenance Type and Preventive Maintenance Type

Breakdown Maintenance System		**Preventive Maintenance System**	
Initial Damage ↓ Damage Expansion ↓ Problems in Traffic ↓ Budgetary Allocation for Maintenance ↓ Rehabilitation Works	 Service degradation for road users Large rehabilitation	Periodical Monitoring ↓ Medium Term Maintenance Plan ↓ Annual Budget for Maintenance ↓ Scheduled Rehabilitation ↓ Review of Maintenance and Management Plan	Early detection of damage Small rehabilitation
The long-term maintenance budget is increased.		The long-term maintenance budget can be reduced.	

13.5 BRIDGE MAINTENANCE AND MANAGEMENT PLAN IN ULAANBAATAR CITY

(1) Proposal of Bridge Maintenance Plan

Based on the suvey result, the need for replacement, rehabilitation and reinforcement of the existing bridges are summarized in Table 13.5.1 as the Mainteance Plan. The major concerns regarding the maintenance plan are as follows:

(a) Abstract the bridges to be replaced from the bridges scheduled to be replaced under the Medium Term Road Network Plan in Ulaanbaatar City (2011 to 2016).

(b) Bridges located on the routes scheduled to be widened under the Urban Development MP are deemed to be replaced.

(c) Replacement is carried out for the bridges along major arterial roads evaluated as "Soundness-C".

(d) Rehabilitation work is carried out for bridges other than the above.

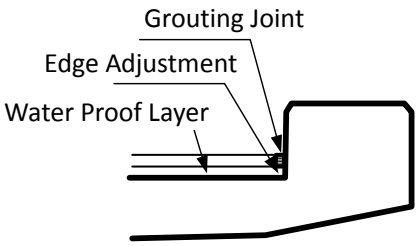
(e) Priority is given to the cost efficiency on the selection of rehabilitation work and reinforcement work; and

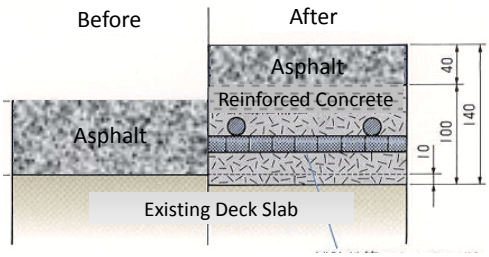
(f) Proposed rehabilitation work and reinforcement work are selected from the following table.

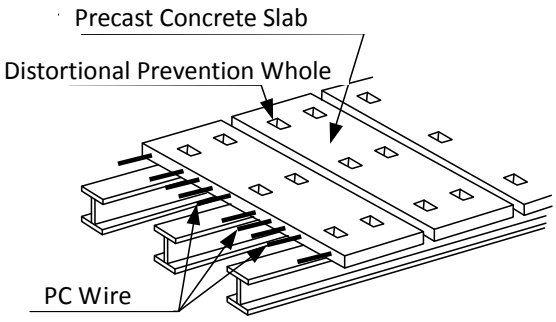
Item	Type of Work	Application
(1) Superstructure	Waterproofing of Deck Slab	A bridge with a lot of free lime from the deck slab.
	Reinforcement of Deck Slab	Deck slab with progressed damage due to insufficient strength.
	Rehabilitation of Main Girder (Restoration of Concrete Section/ Crack Sealing)	A spot where a damaged cross-section, steel bar exposure and wide cracks are observed.
(2) Substructure	Crack repair	A bridge where cracks have developed significantly.
	Scouring Prevention	A bridge having a pier around which scouring has occurred in the river.
(3) Bridge Accessories	Replacement/repair of bearings	A bridge having a significant decline in the strength of bearings.
	Replacement/repair of expansion joint	A bridge without an expansion joint or a bridge whose expansion joint needs to be replaced due to damage.
	Barrier repair work	A bridge where traffic safety is not secured due to a damaged barrier.
(4) Reinforcement of Seismicity	Pier strengthening (Reinforced Concrete Lining)	A bridge of Seismic Resistance C due to insufficient strength of pier.

(2) Outline of Various Rehabilitation Methods

i) Rehabilitation/Reinforcement of Deck Slab

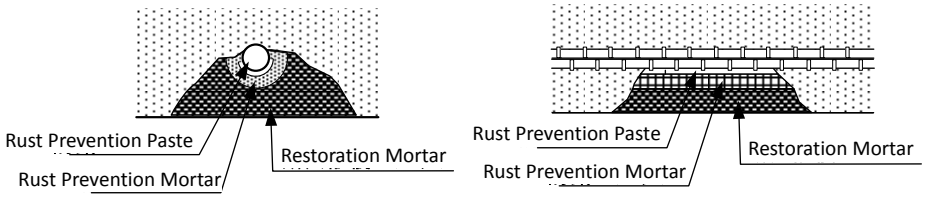
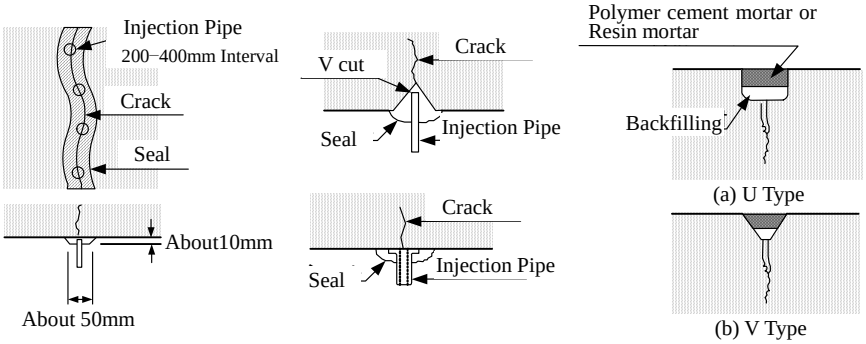
<table>
<tr><th colspan="2">Waterproofing of Deck Slab (Applicable to Concrete Deck Slab)</th></tr>
<tr><td>General Description</td><td>
This method bonds a waterproof sheet or applies waterproofing material to the upper face of a deck slab to prevent rainwater from seeping into the deck slab.



Constructing a Waterproofing of Deck Slab
</td></tr>
<tr><th colspan="2">Deck Slab Reinforcement (Applicable to Concrete Overlaying)</th></tr>
<tr><td>General Description</td><td>
This method is used to reinforce concrete deck slabs that have insufficient strength.
Traffic control is required for concrete overlaying although the construction cost is low.



</td></tr>
<tr><th colspan="2">Deck Slab Replacement (Applicable to Concrete Deck Slabs of Steel Bridge)</th></tr>
<tr><td>General Description</td><td>
Install the precast slab on the main girder, and bind it by pre-stressing in the longitudinal direction.
Reinforcement of the main girder is unnecessary due to weight saving.
It can withstand larger live loads and be widened as required.


</td></tr>
</table>

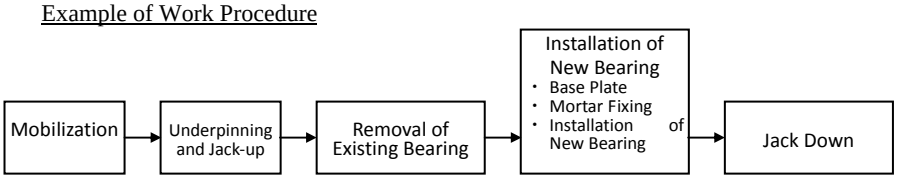
ii) Repair of Main Girder/Crack Repair

Restoration of Concrete Cross-Section (Applicable to Main Girder, Slab, Substructure)	
General Description	• This method repairs cross-section damage by applying several layers of restorative material using a trowel or a spatula after base treatment. • Materials to use are polymer cement mortar, concrete, epoxy resin mortar, non-shrinkage mortar, etc. 
Crack Sealing (Applicable to Main Girders, Slabs, Substructure)	
General Description	• This method pours or fills grouting material such as epoxy resin or polymer cement into a crack to prevent moisture or salt from entering the crack. • When a deteriorated concrete section needs to be removed due to damage, such as neutralization or salt damage, evaluate the possibility of restoring the cross-section together with this method. • Low-viscosity epoxy resin material to be injected at low pressure is suitable for crack repairing of 0.2 to 5.0mm wide. When temperature is 5°C or lower, the material does not harden, so that construction timing is important. • For a 5mm or wider crack, make a U-shaped groove along the crack and fill polymer cement mortar into the groove. 

iii) Scouring Prevention

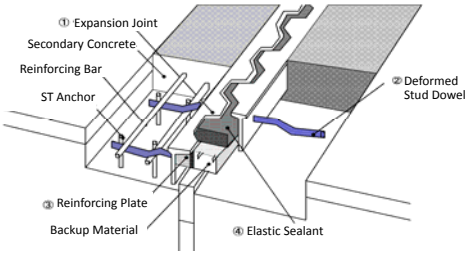
Measure for Scouring Prevention (Applicable to Substructure in a River with Fast Current Speed)	
General Description	• To prevent scouring around the pier, implement foot protection work. • Gabion mattress is used in foot protection work.  Scouring  Scouring Preventive Measure

iv) Bridge Accessory

<table>
<tr><th colspan="2">Rustproof Work of Steel Bearing (Applicable to Steel Bearing)</th></tr>
<tr><td>General Description</td><td>(1) Zinc Spraying
• Scraping is performed by blasting, so that it can be performed in places where hand scraping is difficult with short bearings.
• Osmotic epoxy resin coating is applied to zinc and zinc aluminum alloy spray film, so that the rustproof effect is superior to ordinary coating. (Cost is high)
• Effective for aging, water leakage from the expansion apparatus, or corrosion caused by accumulated dust.
(2) Refresh Coating
• After scraping the rusted area, apply fresh coating to the external surface of the bearing to prevent bearing corrosion.
• Sufficient space for scraping and coating work is required.
<u>Zinc Spraying Procedure</u>
Before Spraying ⇨ Blasting ⇨ Zinc Spraying ⇨ After Spraying
 
NETIS No.HR-100013-A</td></tr>
<tr><th colspan="2">Replacement of Bearing (Applicable to Bearing)</th></tr>
<tr><td>General Description</td><td>(1) Replacement with the same type
• When damage was not caused by the bearing type and structural problems were not caused by the existing bearing type, replace with a new bearing of the same type.
(2) Replacement with other type of bearing
• When damage was caused by the bearing type and the damage cause cannot be removed by the existing bearing type, replace it with a bearing of another type.
<u>Example of Work Procedure</u>
 
</td></tr>
</table>

<table>
<tr><th colspan="2">Replacement of Expansion Joint (Applicable to Expansion Joint)</th></tr>
<tr><td>General Description</td><td>

Remove the existing expansion joint and install a new one.
Select a type by considering the current expansion gap, expansion or deflection value of the target joint, and traffic volume.




</td></tr>
<tr><th colspan="2">Barrier Repair</th></tr>
<tr><td>General Description</td><td>

Replace and repair the damaged barrier.
An aesthetic design that suits the town needs to be selected for urban areas.

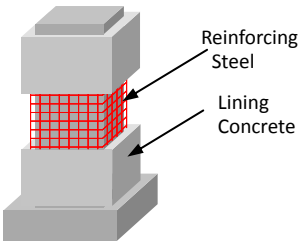


</td></tr>
</table>

v) Reinforcement of Seismic Resistance Method

<table>
<tr><th colspan="2">Reinforced Concrete Lining Method</th></tr>
<tr><td>General Description</td><td>

This method is to place reinforced concrete around the existing concrete to improve its ductility and loading capacity.
Lining thickness is 25cm at the minimum.



Reinforced Concrete Lining

Constructing Reinforced Concrete Lining
</td></tr>
</table>

Table 13.5.1 Bridge Rebuilding/Maintenance Plan

(Confidential)

(3) Bridges to be Replaced

Bridges that need to be replaced were selected based on the following three (3) points of view: (a) Soundness and earthquake resistance are remarkably low; (b) Road widening is requried in association with future road improvement plan; and (c) Bridges on an arterial road with traffic control for heavy trucks. Detailed investigations are recommended for the following bridges on the assumption of their reconstruction.

Table 13.5.2 Proposed Reconstruction Project for Major Bridges in the City

(Confidential)

Table 13.5.3 Bridges to Reconstruct due to Soundness and Seismic Resistance

(Confidential)

Table 13.5.4 Bridges to Reconstruct due to Future Road Plan

(Confidential)

CHAPTER 14

PROJECT IMPLEMENTATION PLAN

(Confidential)

CHAPTER 15

PROJECT EFFECT

15.1 SETTING OF EVALUATION INDICATOR

(1) Operation Indicator

Daily traffic volume (veh/day) is defined as the indicator to quantitatively measure the operational status of the Project. Sectional traffic volumes to be counted are at the bridge section of 1) Ajilchin Flyover, 2) Narny Bridge, 3) Peace Bridge, and 4) Gulvaljin Bridge as indicated Figure 15.1.1. In addition, the traffic volume of 5) Peace Avenue shall be counted to measure the effect of development of the East-West Arterial Road.

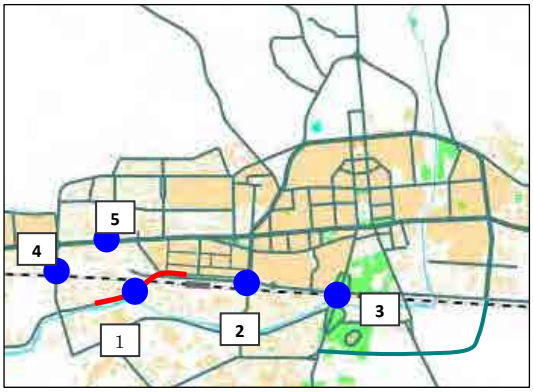


Figure15.1.1 Proposed Sections of Traffic Volume as Operation Indicator

Table15.1.1 Daily Traffic Volume as Operation Indicator for the Project

		Base Line (as of 2012)	2021 (veh/day)		2030 (veh/day)	
			WO/ Case	W/ Case	WO/ Case	W/ Case
1	Ajilchin F.O.	—		29,640	—	57,000
2	Narny Bridge[1)]	24,120	30,760	24,960	50,200	46,200
3	Peace bridge	49,300	49,240	46,900	73,000	70,300
4	Gulvaljin Bridge	48,700	67,640	52,870	115,700	76,000
5	Peace Avenue[2)]	66,900	70,180	55,270	98,800	61,300

1) Traffic volume in November 2012

2) Between Sapporo Intersection and west edge of Narny Road

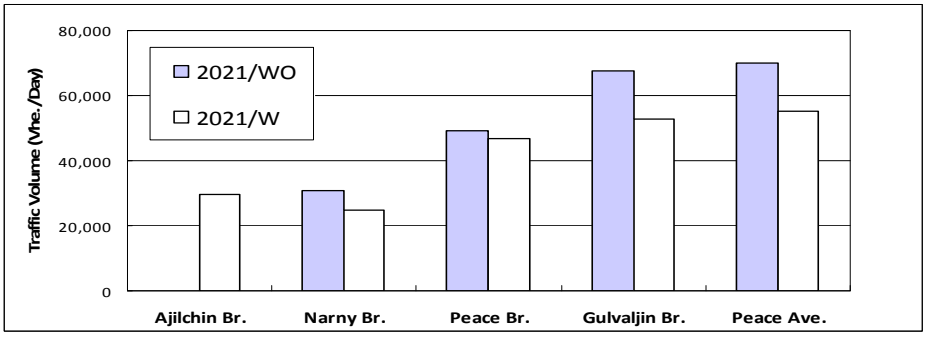


Figure 15.1.2 Daily Traffic Volume in 2021 (Without Case / With Case)

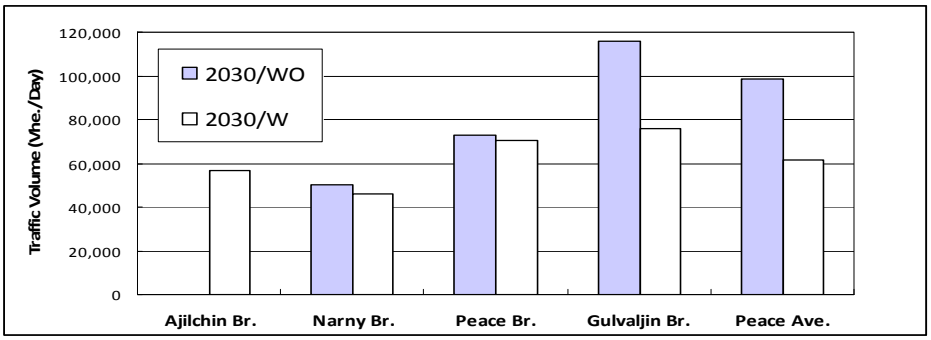


Figure15.1.3 Daily Traffic Volume in 2030 (Without Case / With Case)

(2) Effect Indicator

Indicators to quantitatively measure the effects of the Project are defined as below.

i) Travel Time

Travel time is one of the Effect Indicators for the Project. The average of inbound and outbound travel time from Ulaanbaatar railway station to the intersection of Ajilchin Street and West Industrial Road (L=3.5 km) is the Base Line as of 2012. "With Case" is measured by the Travel Time of Project road including Ajilchin Flyover (L=2.25km).

Table15.1.2 Travel Time Indicator

	2012	2021
	Base Line	After the Project
A.M. Peak Hour (8:00-10:00)	17 minutes	-
Mid day (12:00-14:00)	14 minutes	
P.M. Peak Hour (18:00-20:00)	28 minutes	
Daily Average	20 minutes	4 minutes *1

*1: Average Vehicle Speed V_{ave} = 31 km/h (based on JICA STRAD)

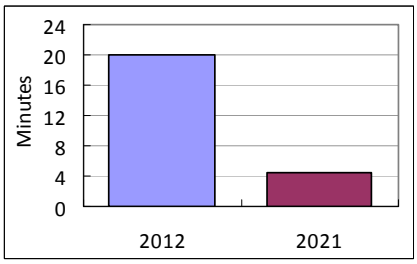


Figure15.1.4 Comparison of Travel Time

Figure 15.1.5 Route of Traveling Time Comparison

ii) Travel Time Saving

Based on the travel time estimated as above, Daily Travel Time Saving will reach 7,736 hours/day in 2021 with the Project as shown in Table 15.1.3. It should be noted that the above travel time saving was estimated for a single road, and a larger time saving can be expected if the Project is effective for road network improvement.

Table 15.1.3 Travel Time Saving

	Daily Traffic Volume	**Travel Time**	**Travel Time (Vehicle-Hour/day)**
1) 2021: Without Case	29,640 (veh./day)	0.33 hour (20 minutes)	9,781
2) 2021: With Case		0.069 hour (4 minutes)	2,045
Travel Time Saving: 1) − 2)			7,736

iii) Vehicle Operation Cost (VOC) Saving

VOC Costs regarding the With Case and Without Case in 2021 are estimated as below. The diference between VOC Saving With and Without is defined as the Effect Indicator. It is expected that 52.0 Million MNT per day will be saved after the Project in 2021.

Table 15.1.4 VOC Saving in 2021

	Daily Traffic Volume	**Distance (km)**	**VOC (MNT-Veh./km)**	**Daily VOC (Million MNT/day)**
1) 2021 Without Case	29,640 (vehicle/day)	3.50 km	699	72.5
2) 2021 With Case		2.25 km	317	20.5
VOC Saving: 1) − 2)				52.0

Note: 1 USD=1379.47 MNT, VOC is estimated based on the assumption of 1) V1 = 10 km/h and 2) V2 = 31 km/h

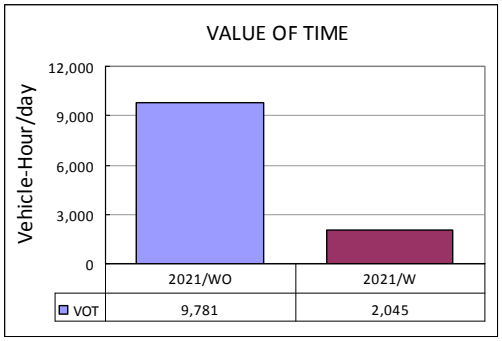


Figure 15.1.6 Comparison of Travel Time

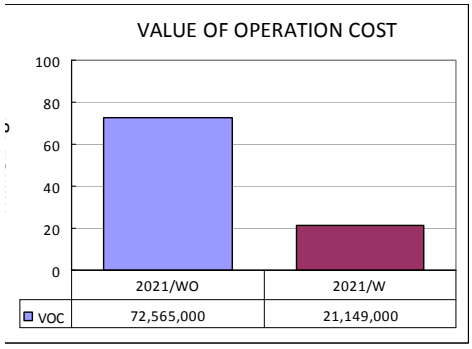


Figure 15.1.7 Comparison of VOC

15.2 QUANTITATIVE AND QUALITATIVE EFFECTS

The quantitative and qualitative effects to be derived from the implementation of the Project are as summarized below. The number of beneficiaries of the Project will be equivalent to the population of Ulaanbaatar City; namely, 1,221,000 people.

Current Status and Issues
• Railway severance of north-south traffic becomes a traffic bottleneck in terms of road network. • Traffic congestion has arisen at the existing railway flyover and its access road since the number of the flyovers is insufficient. • Traffic in the east-west direction suffers from congestion since the East-West Arterial Road is limited to Peace Avenue.

⇩

Input by the Project
Construction of Railway Flyover and its access road to establish new East-West Arterial Road in parallel with Peace Avenue.

⇩

Quantitative Effect	Qualitative Effect
i) Travel Time Saving from Narny Road in front of railway station to intersection of Ajilchin Road and West Industrial Road (reduced to 4 minutes from 20 minutes) ii) Reduction of VOC: 52 million MNT per day	i) Improvement of vehicular traffic movement and promotion of cargo movement. ii) Enhancement of convenience for residential/industrial estates at new development area in Southwest of Ulaanbaatar City and International Airport. iii) Facilitate development of west side of Ulaanbaatar City by means of developing the East-West Arterial Road, which contributes to sustainable development of Ulaanbaatar City. iv) Sustaining socio-economic activities in metropolitan area and improvement of accessibility to public facilities such as hospitals and schools. v) Reduction of car exhaust due to improvement of traffic speed and mitigation of adverse effects on the environment.

CHAPTER 16

CONCLUSION AND RECOMMENDATION

16.1 CONCLUSION OF PREPATORY SURVEY

- The Project is feasible from the viewpoints of technical, environmental and economic aspects. The Project fully complies with the Ulaanbaatar Master Plan and the Ajilchin Flyover will function as a part of an east-west major corridor in the prospective road network of Ulaanbaatar City.
- Realization of the Project will help to alleviate traffic congestion and save travel time in the Project area resulting in a significant economic effect.
- It is quite effective to apply advanced bridge construction technology from Japan pertinent to girder erection above the railway, piling work adjacent to the railway in service, construction of a stable structure with highly durable steel members and so forth.

16.2 RECOMMENDATION FOR IMPLEMENTATION OF THE PROJECT

- The Project Implementation Unit (PIU) shall be established under the Ministry of Roads and Transportation (Implementing Agency of Mongolian Government) when the detailed engineering design work commences to thoroughly manage the implementation of the Project including the construction of an 828 m long bridge.
- It is crucial to completely relocate existing utilities prior to commencement of construction work. To do so, it is necessary to identify the utilities to be relocated and execute actual relocation work at the stage of detailed engineering design. It is also necessary for Ulaanbaatar City to control the Project site so that no additional utilities are installed prior to project implementation.
- It is necessary to review and update a resettlement action plan at the stage of detailed engineering design in accordance with the final Right-of-Way. To thoroughly complete land acquisition prior to commencement of construction work, it is crucial to start resettlement actions along with detailed engineering design work.
- It is recommended to carry out i) widening of the road in front of Power Plant No. 3 to a 4-lane road and ii) grade separation of Ajilchin Road.
- A drainage design in an urbanized area shall be carefully studied in the detailed engineering design.
- After completion of the Project, maintenance will be managed by the Road Department in Ulaanbaatar City. Thus it is important that Ulaanbaatar City accumulates and improves its technologies necessary for steel bridge maintenance through several opportunities such as the Technical Cooperation Scheme implemented by JICA.

< *Appendix*>

Appendix-1

Minutes of Discussion on Preparatory Survey for the Construction of Ajilchin Flyover Project in Ulaanbaatar City

MINUTES OF DISCUSSION
ON
PREPARATORY SURVEY
FOR
THE CONSTRUCTION OF AJILCHIN FLYOVER PROJECT
IN ULAANBAATAR CITY
BETWEEN
JAPAN INTERNATIONAL COOPERATION AGENCY
AND
MINISTRY OF FINANCE OF MONGOLIA,
MINISTRY OF ROAD, TRANSPORTATION, CONSTRUCTION AND URBAN DEVELOPMENT OF MONGOLIA,
ULAANBAATAR CITY GOVERNMENT

Ulaanbaatar, 7 December, 2011

The Japan International Cooperation Agency (hereinafter referred to as "JICA") exchanged views and had a series of discussions with Ministry of Finance of Mongolia (hereinafter referred to as "MOF"), Ministry of Road, Transportation, Construction and Urban Development of Mongolia (hereinafter referred to as "MRTCUD"), and Ulaanbaatar City Government (hereinafter referred to as "UBC") on the draft implementation plan of JICA Preparatory Survey for the Construction of Ajilchin Flyover Project in Ulaanbaatar City (hereinafter referred to as "the Project").

JICA and MOF, MRTCUD, UBC hereby agreed upon the draft implementation plan of the Preparatory Survey of the Project as per Annex, subject to the approval by the competent higher authorities of both sides.

It should be noted that implementation of the Preparatory Survey does not imply any decision or commitment by JICA to extend its loan for the Project at this stage.

Annex: Draft Implementation Plan

Jadamba Bat Erdene
State Secretary
Ministry of Road, Transportation, Construction and Urban Development of Mongolia

Toshinori Isogai
Chief Representative
Japan International Cooperation Agency in Mongolia

Khurenbaatar Baavgai
Director General Department of Development Financing and Cooperation
Ministry of Finance of Mongolia

Munkhbaatar Begzjav
Vice Mayor,
Ulaanbaatar City Government

Annex

DRAFT IMPLEMENTATION PLAN
ON
JICA PREPARATORY SURVEY
FOR
THE CONSTRUCTION OF AJILCHIN FLYOVER PROJECT
IN ULAANBAATAR CITY

1. Background

Currently, the population in Ulaanbaatar City (UB) accounts for more than 40 percent of population of Mongolia, and the south of UB has developed quickly with economic and population growth. As its economy and population grow, the traffic volume has increased rapidly, and it is expected to increase further continuously. Moreover, the railway and the Dund River flowing east to west divide the city into two parts, the north and south, which aggravate traffic congestion and constrain economic activity and livelihood. Therefore in order to mitigate the traffic congestion and promote economic activity, it is vital to construct a new bridge over the railway and the Dund River to link the north and the south.

According to "MDGs based National Development Strategy (2007-2021)", it is highly prioritized to improve road network in UB. Also, in "the Mid-term Program of new construction in Mongolia", construction of railway flyover (at least seven flyovers) in UB including Ajilchin railway flyover is stated as one of the priority actions.

Based on the situation stated above and the result of mutual discussions with the authorities concerned of Mongolia, JICA decided to conduct the Preparatory Survey on the Construction of Ajilchin Flyover Project in Ulaanbaatar City (hereinafter referred to as "the Survey").

2. Outline of the Survey

(1) The Area covered by the Survey

The area covered by the Survey is shown in Appendix-1

(2) Implementation Structure

The responsible agency for executing the Survey is the Ministry of Road, Transportation, Construction and Urban Development of Mongolia (MRTCUD)

The executing agency is Road Agency of MRTCUD, the Governor's Office and the Road Department in UBC (hereinafter "the executing agency")

(3) Scope of the Survey

1) To produce results of feasibility study of the Project (e.g. Design Report, Drawing, Implementation Plan etc.)
2) To propose technical cooperation plan for the capacity development of the quality control and operation and maintenance (O/M) of road and bridge
3) To propose prioritized rehabilitation plan of existing bridges in UB

3. Terms of Reference of the Preparatory Survey

(1) Confirmation of the Needs and Background of the Project

1) To confirm the background and rationales of the Project with the considerations of national policy on road and bridge in Mongolia
2) To review and collect the existing study results and relevant documents of the Project
3) To review the legal framework (regulations and rules) of the road and bridge sector in Mongolia
4) To assess the executing agency's organizational structure, jurisdiction and their expertise
5) To confirm budget status and experiences of road and bridge construction, O/M of the executing agency.
6) To confirm other donors' relevant projects

(2) Confirmation of the Project Site Situation

1) To confirm the current condition of the Project site by meteorological, geological and topographic survey
2) To conduct survey of the current traffic condition and analysis of demand forecast of traffic volume
3) To inspect the existing roads and bridges in UB as listed in Appendix-2
4) To confirm the location, depth and type of the existing utilities by site survey and exploratory excavation (if needed)

(3) Basic Design of New Bridge(s)

1) To compare several alternatives of the candidate alignments / routes of Ajilchin Flyover (including approach road) and propose an appropriate design
2) To compare several alternatives of the candidate bridge type and propose an appropriate bridge type
3) To confirm the needs for improving access road(s) within the 1st intersection from Ajilchin Flyover
4) To develop the basic design of Ajilchin Flyover, approach road, necessary access road(s) and facilities
5) To develop the outline design of relocation and/or protection of existing utilities
6) To conduct survey of scour depth, and basic design of protection works of river bank and bed against the scour (if needed)

(4) Implementation Plan of the Project

1) To develop the construction executing plan and measures
2) To develop the procurement plan (including proposal of procurement package and methods)
3) To collect information on the number and experience of local contractors in UB
4) To propose the implementation schedule of the Project
5) To estimate the Project cost
6) To propose the implementation set-up with definite roles and responsibilities of the executing agency and other relevant organizations with the consideration of the current organizational system

7) To propose the details of consulting services
8) To propose the necessary O/M framework and structure for the Project in terms of technical and financial sustainability
9) To analyze the economic and financial viability of the Project

(5) Environmental and Social Impact

1) To analyze environmental and social impacts of the Project and propose mitigation measures and monitoring plan in accordance with the requirements of Mongolian laws and regulations and JICA's "Guideline for Environmental and Social Consideration"
2) To prepare the necessary documents and forms submitted to agency responsible for environmental and social impact in Mongolia

(6) Technical Cooperation Plan and Bridge Rehabilitation Plan

1) To confirm the needs for technical cooperation for the purpose of capacity development regarding quality control and O/M of road and bridge
2) To prioritize rehabilitation plan of existing bridges in UB
3) To hold a seminar on quality control and O/M of road and bridge (if needed)

(7) Evaluation of the Project

1) To propose operation and effect indicators (e.g. traffic volume, travel time reduction, travel velocity improvement) and monitoring plan
2) To collect baseline data of operation and effect indicators
3) To evaluate the qualitative and quantitative effects of the Project

(8) Conclusion and recommendations

4. Implementation Framework of the Survey

(1) Structure of the Survey team (Tentative)

JICA will select and dispatch the Survey team to carry out the Survey.

The team will include the following experts.

- Team Leader / Transportation Planner
- Bridge Engineer
- Road Engineer
- Execution / Implementation Planner / Existing Utilities Survey Specialist
- Natural Environment Survey Specialist
- Procurement / Cost Estimate Specialist
- Economic and Financial Analyst
- Environmental and Social Impact Consideration
- Road / Bridge Inspection Specialist / Technical Cooperation Planner
- Coordinator

The Survey team might employ local consultants, NGOs, and/or other supporting staffs.

(2) Survey Implementation Schedule (Tentative)

December 2011	- Signing of Minutes of Discussion
December 2011 - February 2012	- Selection of consultants by JICA
March 2012	- Mobilization of Survey Team
	- Submission of the Inception Report
	- Inception Report Mission
June 2012	- Submission of the Progress Report
	- Progress Report Mission
September 2012	- Submission of the Interim Report
	- Interim Report Mission
December 2012	- Submission of the Draft Final Report
	- Draft Final Report Mission
February 2013	- Submission of the Final Report

(3) Reports

1) Inception Report

20 copies will be submitted at the commencement of the first work period written in Mongolian.

2) Progress Report

20 copies will be submitted 3 month after the commencement of the Preparatory Survey written in Mongolian.

3) Interim Report

20 copies will be submitted 6.5 month after the commencement of the Preparatory Survey written in Mongolian.

4) Draft Final Report

20 copies will be submitted at the end of the last work period written in English and Mongolian. MOF, MRTCUD, and UBC will submit its comments within 1 month after the receipt of the Draft Final Report.

5) Final Report

20 copies will be submitted within 1 month after the receipt of the comments on the Draft Final Report written in English and Mongolian.

(4) Monitoring

The Survey team's work will be subject to periodic review by JICA. The JICA staff will attend meetings with Joint Coordinating Committee (JCC) and/or other organizations concerned during the implementation of the Survey may also attend the meetings if necessary.

(5) Guideline for Environmental and Social Consideration

the executing agency agreed to abide by "JICA Guideline for Environmental and Social Considerations" (April 2010) (http://www.jica.go.jp/english/operations/social_environmental/guideline/pdf/guideline100326.pdf) in order to ensure that appropriate considerations will be

made for the environmental and social impacts of the Project.

5. Undertakings by executing agency and other organizations concerned

the executing agency and other relevant organizations will undertake the followings in order to assist the implementation of the Survey on schedule, through close cooperation with the authorities concerned with Government of Mongolia (hereinafter referred to as "GOM"):

(1) To furnish the Survey team with all available and relevant data, information and documents requested by the Survey team

(2) To assign counterpart personnel

(3) To provide meeting space during the stay of the Survey team.

(4) To ensure issuance of entry permits necessary for the Survey team members to conduct field survey

(5) To ensure safety of the team members, if and when required

(6) To assist the team in making transportation arrangements

(7) To assist the team in medical services as needed

(8) To assist the team to obtain other privileges and benefits if necessary

(9) To establish Joint Coordinating Committee (JCC) for effective and successful implementation of the Survey, whose functions and composition are described in Appendix-3

6. Others

1) The nature of the services to be rendered by the Survey team shall be exclusively advisory, with all decisions as to whether to accept or implement any recommendation(s) made or instruction(s) given in the course of the implementation of the services shall be the responsibility of the executing agency and other authorities concerned of the GOM.

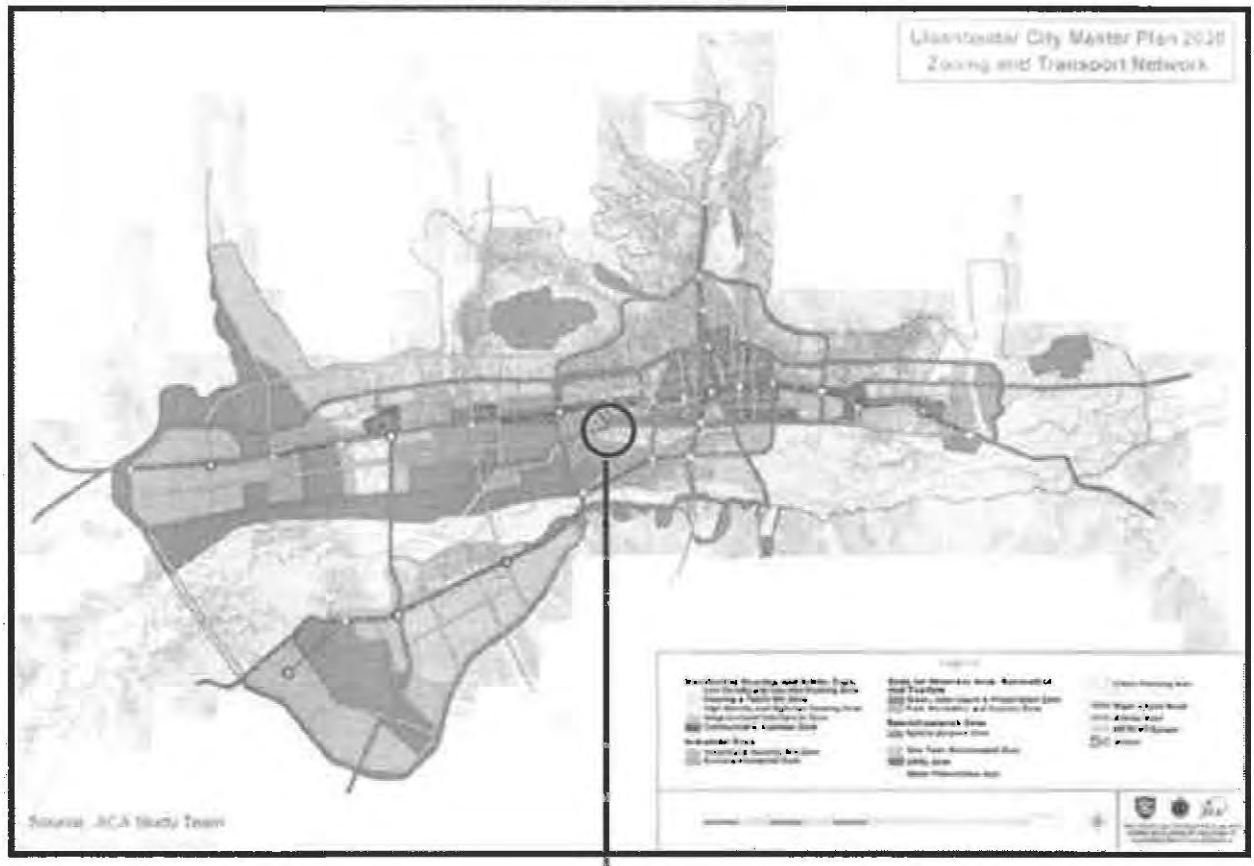
2) the executing agency and other authorities concerned of the GOM shall take, with their own responsibility, all the necessary measures for the utilization of the recommendations and outcomes of the survey in the JICA financed projects.

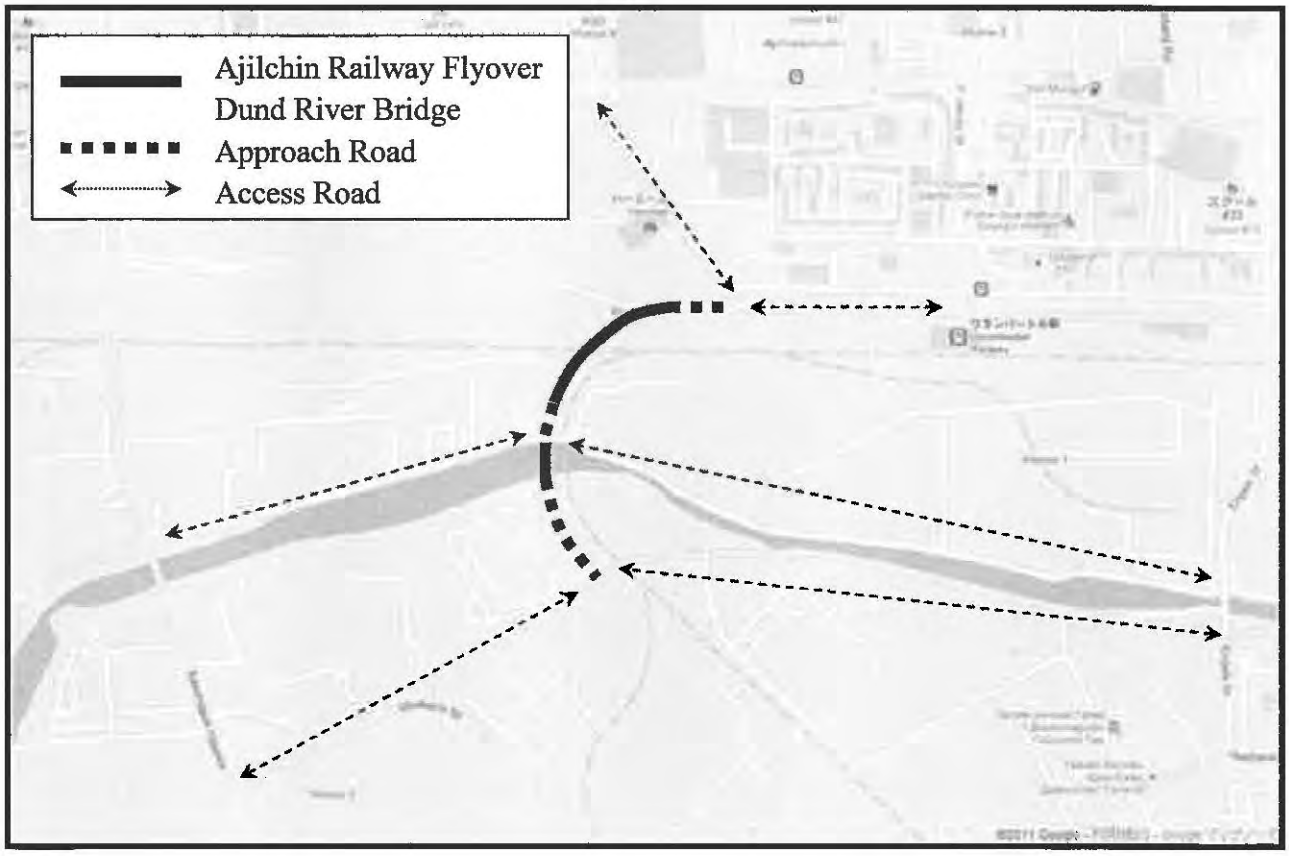
3) The Study team will propose the needs for the specific Japanese technics and/or materials in light of safety, economic and smooth implementation of the Project.

(end)

Appendix-1

Location Map Covered by the Survey





Appendix-2

Existing bridge list in UB

No	ID No.	Bridge name	Dimension		Constructed year	Type	Year made rehabilitation and maintenance
			L(м)	W(м)			
Middle size bridges /25-100м length/							
1	4	Arslantai Bridge	52	13	1962	RC	
2	5	Uliastai tsaad Bridge /Left/	97	8+1.0*2	1967	RC	2010
3	6	Uliastai tsaad Bridge	60	8	1985	RC	
4	16	Tolgoit Parallel Bridge	72		1987	RC	2010 maintenance
5	17	Selbe dund bridge	51.12	9.0+1.5	2002	RC	
6	18	Dund gol Deed bridge	60.4	9+1.5*2	1975	RC	
7	22	Dund gol Dund bridge	44		1961	RC	
8	23	Dund gol Dood bridge	67.95	11x2+3+1.5x2	1975	RC	
9	25	Turgen river bridge	39.75	10.5+1.5*2	1987	RC	
10	28	Naran brdge	36	10.5+1.5*2	1986	RC	
11	29	Bridge behind Meat Factory	54	10.5+1.5*2	1986	RC	
12	34	Sharga morit bridge	50.4	7+0.75*2	1982	RC	
13	35	Selbe gol Deed parallel-1	58	7.5+0.75*2	1963	RC	
14	36	Selbe gol Deed parallel-2	55	7.5+1.25*2	1982	RC	
15	37	Selbe gol Dund bridge	33	16	1963	RC	
16	38	Bridge behind Chinggis hotel	45		1990	RC	
17	41	Gachuurt bridge	30		1984	RC	
18	44	Nalaikh bridge	27			RC	
19	50	Baruun-uul Dithc bridge	27.67			RC	
20	58	Damdinsuren street bridge over the Selbe river	48.8		2009	RC	
21	39	Dambadarjaa bridge	60	8+1*2	1995	RC	
22	60	New rightside bridge of the Uliastai river bridge to become parallel	97		2010	RC	
23		Morin/Horse/ hill bridge	27		2009	RC	
23			**1193.09**				
Small size bridges /less than 25 м length/							
1	7	Uliastai tsaad bridge	18	8	1963	RC	
2	8	Bridge over the Hol river	21	8	1963	RC	
3	9	Chuluut am bridge	11	8+1.25*2	1963	RC	
4	11	Zaisan West am bridge	18	7.5	1971	RC	
5	12	Bridge in front of the 14 khoroolol	20	7+0.75*2	1963	RC	
6	15	Yarmag bridge to Airport	10	8+1.25*2	1961	RC	

7	20	Ikh Tenger dood bridge	12	7.5	1979	RC	
8	30	Nairamdal bridge	18	7.5	1986	RC	
9	31	Rashaant bridge	12	8+0.75*2	1991	RC	
10	32	Khailaast	24	18+3.0*2	1987	RC	
11	33	Chingeltei	24	18+3.0*2	1987	RC	
12	40	Dambadarjaa naad bridge	24.1	8+1.1*2	1990	RC	
13	42	Gachuurt bridge	18		1984;1988	RC	
14	43	Ikh Tenger deed bridge	17.5	8+0.75*2	1979	RC	
15	45	Zaisan East bridge	12	8+0.3*2		RC	
16	48	Milk factory bridge	15.8	14+4.55*2		RC	
17	52	Bridge to Khandgait-Sanzai	9		2004	RC	
18	53	East Bridge to Khandgait-Sanzai	9		2004	RC	
19	54	Tolgoit ger area road bridge	18		2004	RC	
20	55	Tolgoit Zuun salaa road bridge	12		2004	RC	
21	56	Bridge behind the 1 st district	18		2006	RC	
22	51	Bridge over the ditch behind the 1st khoroolol	16,5		2007	RC	
23	57	Naran river bridge	23.4		2009	RC	
24	59	Bridge over the ditch west of the 39-th secondary school	10.6		2010	RC	
25		Khailaast 1.1 km length road bridge-1	9		2011	RC	
26		Khailaast 1.1 km length road bridge-2	9		2011	RC	
26			**396.4**				
Large bridges /more than 100м length/							
4	13	Enkhtaivan bridge	339.5	16.8	1961	RC	2006
5	27	Gurvaljin birdge	108	12*2	1989	RC	2009-2010
6	24	Sonsgolon bridge	297	8+1*2	1971	RC	
7	14	Yarmag bridge	259.4	8.5+1.5*2	1961:1967	RC	
8	19	Ikh Tenger bridge	258	11.5+1.5*2	1994	RC	2008-2010
9	26	Poultry farm bridge	256	8	1989	RC	
10	10	Bayanzurkh bridge	252.6	7+0.75*2	1967	RC	2009
11	21	Zaisan bridge	224	9+1.5*2	1971	RC	
11			**1994.5**				
60		**Total length**	**3584.0**				

Appendix-3

Joint Coordinating Committee

1. Functions

To review the study on inception, progress, interim, draft final and final report
To exchange views on major issues arising during the Survey
To approve the modification to activities depending on the necessity
To identify the scope of proposed project

2. Composition

Chairperson: State Secretary, Ministry of Roads, Transport, Construction and Urban Development (MRTCUD)
Vice Chairpersons: Vice Mayor, Municipality of Ulaanbaatar
Secretariat: Head, Planning and Research Division of Road Department in UB City

Members:

(1) Mongolian Side

- Director General, Department of Development Financing and Cooperation, Ministry of Finance

MRTCUD

- Director General, Road and Transportation Policy Department
- Director General of the Department of Finance and Investment
- Member, National Development and Innovation Committee
- Chairperson, Railway of Authority
- Director, Ulaanbaatar Railway
- Director General, Road Agency

UB City

- Head, City Development Policy Department
- Head, Road Department
- Head, State Finance and Treasury Department
- Head, Department of Land Administrations
- Head, Construction Urban Development Planning Department
- Head, Urban Planning, Architecture and Design Institute of Ulaanbaatar City
- Head, Division of Engineering Facilities
- Head, City Property Relations Department
- Head, Environmental Protection Department

Relevant personnel accepted by the Chairperson, if necessary

(2) Japanese Side

- Chief Representative, JICA Mongolian Office
- JICA Experts
- Other personnel concerned, to be dispatched by JICA, if necessary

Appendix-2

Minutes of Discussion on 1st Joint Coordination Committee Meeting

RECORD OF DISCUSSION
ON
ADDITIONAL EXPLANATION
REGARDING
1ST JOINT COORDINATION COMMITTEE MEETING
FOR
THE PREPARATORY SURVEY ON
THE CONSTRUCTION OF AJILCHIN FLYOVER PROJECT
IN ULAANBAATAR CITY

25 September, 2012

In order to facilitate understanding of former discussion on the captioned project for new Vice Mayor, the meeting for additional explanation regarding 1st Joint Coordination Committee (JCC) was held among Vice Mayor of Ulaanbaatar City, JICA, and JICA Study Team based on "Minutes of Discussion on 1st Joint Coordination Committee Meeting for the Preparatory Survey on the Construction of Ajilchin Flyover Project In Ulaanbaatar City" dated July 17, 2012. Following issues discussed under 1st Joint Coordination Committee Meeting were explained and mutually agreed among the attendants.

1) **Route of the Bridge**: East-West (EW) Route could be the most appropriate and advantageous route as agreed upon the 1st JCC Meeting.
2) **Scope of the Study**: JICA Study Team shall carry out the Feasibility Study based on the selected route starting from Ajilchin Street up to Narny Road which is approximately 2200m in length as agreed upon the 1st JCC Meeting.
3) Ulaanbaatar City shall be in charge of organization of Working Group, and shall coordinate with Ministry of Road and Transport to organize 2nd JCC meeting to be held in the middle of October 2012.

<Attendants>
Mr. Nyamdavaa Gantumur, Vice Mayor of Ulaanbaatar City
Mr. Tomihara Takayuki, Project Adviser, JICA
Mr. Maruoka Kenji, JICA Expert
Mr. Okazaki Akio, Deputy Team Leader of JICA Study Team

Concurred by

Nyamdavaa Gantumur,
Vice Mayor of Ulaanbaatar City

MINUTES OF DISCUSSION
ON
1ST JOINT COORDINATION COMMITTEE MEETING
FOR
THE PREPARATORY SURVEY ON
THE CONSTRUCTION OF AJILCHIN FLYOVER PROJECT
IN ULAANBAATAR CITY

17 July, 2012

1st Joint Coordination Committee (here in referred to as "JCC") Meeting for the Preparatory Survey on the Construction of Ajilchin Flyover Project in Ulaanbaatar City (hereinafter referred to as "the Study") was held on the 3rd day of July, 2012 with the attendance of the JCC members who represent Ministry of Road, Transportation, Construction and Urban Development of Mongolia (hereinafter referred to as "MRTCUD"), Ulaanbaatar City Government (hereinafter referred to as "UBC"), Japan International Cooperation Agency (hereinafter referred to as "JICA") and JICA Study Team of the Preparatory Survey on the Construction of Ajilchin Flyover Project in Ulaanbaatar City (herein referred to as "the Study Team").

The Study Team and the JCC members exchanged views on the bridge route and scope of the Study and hereby agreed upon these issues as summarized in Annex-1. Based on the consent, the Study Team will proceed to stage-II of the Study to formulate the outline of the Project such as bridge type, number of lanes and design criteria as well as to prepare the basic design of new bridge which will be proposed in the Interim Report by the end of September 2012.

Jadamba Bat Erdene
State Secretary, MRTCUD

Munkhbaatar Begzjab
Vice Mayor, Ulaanbaatar City

ISOGAI Toshimori
Chief Representative
JICA Mongolia Office

for NAGATA Tsunemi
Team Leader of JICA Study Team

Annex-1

1. Route of the Bridge

Based on a comparative study on three (3) alternative bride routes; namely, 1) East -West (EW) Route, 2) North-South (NS) Route, and 3) Combination of EW and NS, it was concluded that 1) East-West (EW) Route could be the most appropriate and advantageous route in terms of prospective traffic demand, estimated project cost, land acquisition for ROW, and so forth.

2. Scope of the Study

Subsequent to conclusion of bridge route, the Study Team shall carry out Feasibility Study (FS) on the Project of Ajilchin Flyover Construction as defined by the scope given below and shown in Figure 1.

(1) The road length to be covered by the Feasibility Study shall be approximately 2,200m starting from the intersection of West Industrial Street and Ajilchin Road, and ending at the intersection of Narrny Road in front of Ulaanbaatar Railway Station.

(2) Ajilchin Flyover shall connect Narrny Road and West Industrial Road crossing railway and its feeder lines.

(3) Intersection plan shall incorporate three intersections; namely, 1) at Ajilchin Street, 2) near railway branch, and 3) at Narrny Road.

(4) Design of Dund River Crossing Bridge would be excluded from the Feasibility Study.

3. Other Issues

(1) Grade separation at the intersection of Narrny Road might be proposed depending on analytic examination of traffic demand forecast as well as economic efficiency during the Study.

(2) The Study Team was requested to provide certain ideas to mitigate traffic congestion along West Industrial Road which has been induced mainly by heavy duty traffics.

(3) Consideration should be given to the physical constraints such as railway double track plan at the vicinity of Ulaanbaatar Station and underground sewage pipes near the railway.

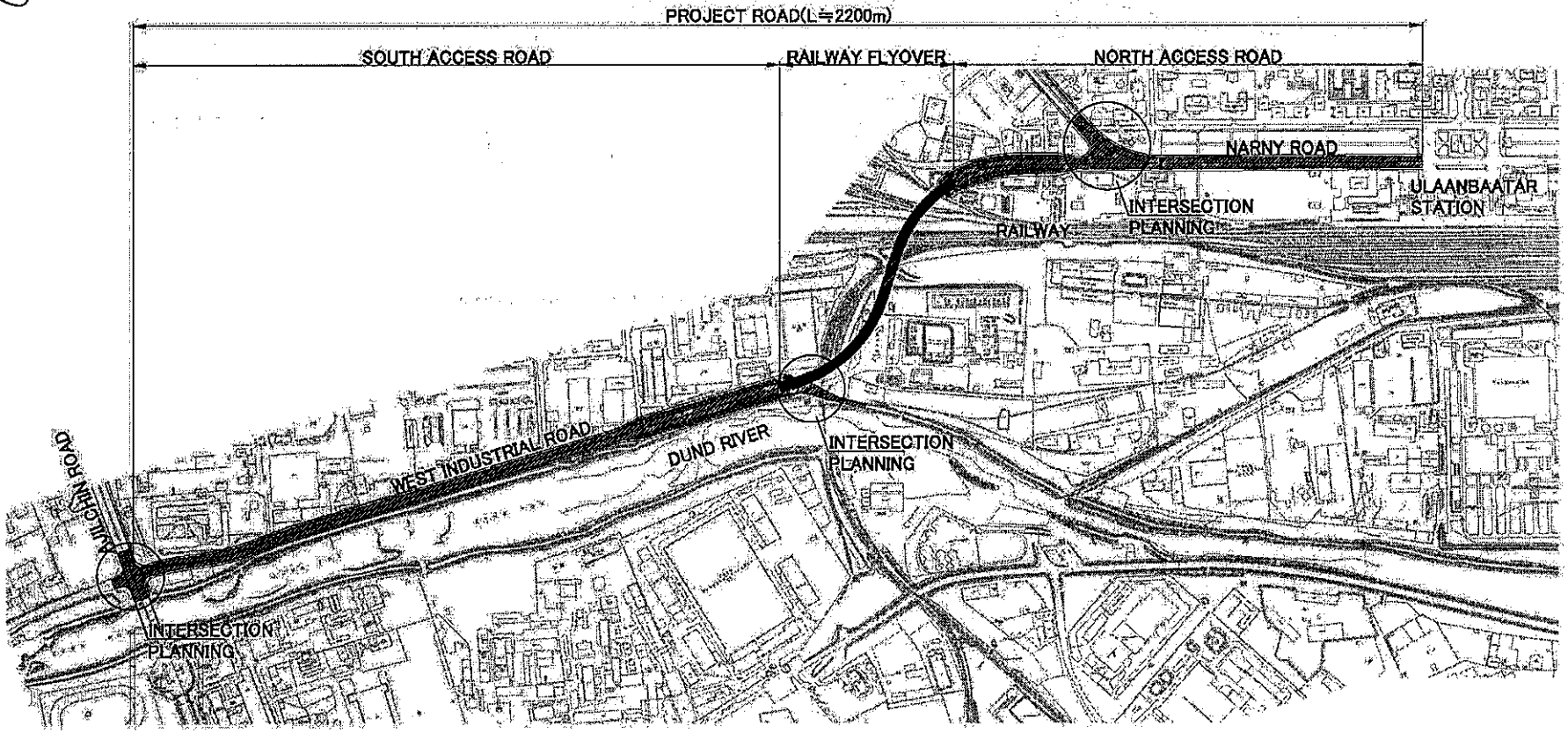


Figure-1 Study Area and Scope of the Project

Appendix-3

Minutes of Discussion on 2nd Joint Coordination Committee Meeting

MINUTES OF DISCUSSION
ON
2nd JOINT COORDINATION COMMITTEE MEETING
FOR
THE PREPARATORY SURVEY ON
THE CONSTRUCTION OF AJILCHIN FLYOVER PROJECT
IN ULAANBAATAR CITY

9 November, 2012

The Second Joint Coordination Committee (JCC) Meeting on the Preparatory Survey for the Construction of Ajilchin Flyover Project in Ulaanbaatar City, Mongolia (hereinafter referred to as "the Study") was held on the 7th day of November 2012 with the attendance of the JCC members representing the Ministry of Roads and Transportation (MRT), representatives of the Ulaanbaatar City Government (UBC), representatives of Japan International Cooperation Agency (JICA), and members of the JICA Study Team conducting the Preparatory Survey for the Construction of Ajllchin Flyover Project in Ulaanbaatar City (the Study Team).

The Study Team and the JCC members exchanged views on the outline of the Project such as road planning, general condition of bridge and design criteria, and confirmed the issues as summarized in Annex-1. Based on the conclusion of this 2nd JCC meeting, the Study Team will proceed to Stage-III of the Study to prepare the basic design of the new bridge, cost estimate and project evaluation which will be presented in the Draft Final Report to be submitted by the middle of January 2013..

Baasandorj. BATZAYA
State Secretary
Ministry of Roads and Transportation

Nyamdavaa GANTUMUR
Vice Mayor, Ulaanbaatar City

ISOGAI Toshinori
Chief Representative
JICA Mongolia Office

岡崎 彰典
OKAZAKI Akio
Deputy Team Leader
JICA Study Team

1. ROAD PLANNING

(1) No specific objection was given to the following concepts on road planning presented by by the Study Team in the 2nd JCC meeting.

- Intersection of Ajilchin Flyover and Narny Road shall be grade-separation to mitigate traffic congestion, while the bridge length be extended more than 200m and construction cost increase.
- Existing West Industrial Road and the new road to be constructed in the Project shall be separated to prevent traffic congestion. The existing West Industrial Road shall be operated as "service road" for the users of roadside facilities, and the new arterial road connecting to the Ajilchin flyover shall be constructed for the Through-Traffic at the south side of the existing road, together with the new river dike along the Dondgol River.

(2) Grade-separation at the intersection of Ajilchin Road and new road was proposed by JCC member. The proposal shall be taken in consideration as future plan which would improve and widen the Power Plant Road to 4-lane road. The Draft Final Report shall include this point of view as recommendation to be undertaken in the future.

(3) 4-lane road shall be recommended in terms of traffic demand, the condition of connecting road and cost-efficiency. 6-lane can not be adopted to existing access road due to physical constraints.

(4) It was confirmed that the project road was planned taking into consideration of future road plan and Master Plan of Ulaanbaatar City to formulate effective road network although the Regional Development Plan of the project site has not developed.

2. ENGINEERING DESIGN CRITERIA

The Criteria for the engineering design of road and bridge shown in Chapter 7 of the Interim Report were explained by the Study Team. It was advised by JCC members that engineering justification within the scope of conclusion made among 1st and 2nd JCC meeting would be confirmed by "the Science and Technology Council (STC)" in the MRT. According to the advice of JCC, the MRT shall be responsible for organizing the STC to approve the design criteria not later than the middle of December 2012. The Study Team shall be participated in the STC if required.

3. FUTURE PLAN OF RAILWAY

It was confirmed that information regarding future plan of railway such as railway diversion plan and double truck plan had been exchanged by and between Ulaanbaatar Railway

(UBTZ) and the Study Team. Location of piers and foundation of bridge was proposed based on the above information and it has been principally agreed by UBTZ.

4. LAND ACQUISITION AND RESETTLEMENT

(1) Land acquisition and relocation of buildings possessed by the Ulaanbaatar Railway (UBTZ) in the Right-of-Way for the Project was presented by the Study Team. JCC members requested to the Study Team to present the result of asset valuation to be compensated under the Project.

(2) Road alignment shall be adjusted to preserve the apartment building located in the vicinity of the intersection of Ajilichin Street and West Industrial Road from the view point of impact on social environment and its cost-efficiency. Land acquisition as a consequence of the above road alignment should be undertaken by Ulaanbaatar City.

(3) Detailed survey on land acquisition and compensation shall be carried out by the Study Team. Land Acquisition Report prepared by the Study Team shall be examined by Ulaanbaatar City to confirm validity of the cost for the compensations.

5. GENERAL CONDITIONS OF THE NEW BRIDGE AND STRUCTURES

No specific objection was given to the following proposals on the general conditions of the new bridge and related structures made by the Study Team based on site condition survey and comparative studies.

(1) Total length of new bridge is 828 m with four (4) lanes.

(2) Type of bridge superstructures considering cost, construction period and site conditions have been selected as below:

- At curve section from A1 to P11: Multi-Steel Box Girder Bridge
- At straight section from P11 to A2: Steel-I Girder Bridge

(3) The following advanced construction technologies developed in Japan will be effectively adopted utilizing their respective advantages:

- "Steel-Concrete Composite Deck Slab" shall be adopted due to advantages in terms of reliability of construction quality, construction period and durability.
- "Rotary Penetration Steel Pipe Pile" shall be used for foundation in the vicinity of railway track to minimize influence due to construction work.
- Bridge erection by "Launching Method" shall be adopted on the main railway track to minimize disturbance in railway traffic.

(4) No sidewalk beside the new bridge shall be required since the existing pedestrian bridge is located near the project site and less pedestrian has been passing through.

6. RELOCATION OF UTILITIES

Based on the series of discussions previously made between the Study Team and the respective utility agencies, such as those for electric power supply, heating pipe, water supply pipe, sewage, communication cable and network cable for railways, it was confirmed that the relocation of utilities for the Project would be required and that the relocation plans and approximate cost estimates should be provided by all of the concerned agencies to the Study Team not later than the 15th day of November 2012 to include such information in Draft Final Report.

7. OTHER ISSUES

Following requests were presented by JCC members.

(1) JCC members will carry our field reconnaissance together with Ulaanbaatar City Government to understand the site situation.

(2) Project Cost consists of Construction Cost, Consultant Fee, Land Acquisition, Utility Relocation and Tax related to the Project shall be presented in the Draft Final Report.

(3) Organization and its responsibility for implementation of the Project shall be clarified in the Draft Final Report.

Appendix-4

Minutes of Discussion on 3rd Joint Coordination Committee Meeting

MINUTES OF DISCUSSION
ON
3rd JOINT COORDINATION COMMITTEE MEETING
FOR
THE PREPARATORY SURVEY FOR
THE CONSTRUCTION OF AJILCHIN FLYOVER PROJECT
IN ULAANBAATAR CITY

27 February, 2013

The Third Joint Coordination Committee (JCC) Meeting for the Preparatory Survey for the Construction of Ajilchin Flyover Project in Ulaanbaatar City, Mongolia, which was continued from 4th WG meeting, was held on the 27th day of February 2013 with the attendance of the JCC members representing the Ministry of Roads and Transportation (MRT), representatives of the Ulaanbaatar City Government (UBC), representatives of Japan International Cooperation Agency (JICA), and members of the JICA Survey Team conducting the Preparatory Survey for the Construction of Ajllchin Flyover Project in Ulaanbaatar City (the Survey Team).

The Survey Team presented the result of road and bridge design, Construction Schedule, Utility Relocation, Land Acquisition, Project Cost, Project Effect and Project Implementation Schedule based on Draft Final Report. In addition, JICA introduced Special Terms for Economic Partnership (STEP) and recommended to apply it to the Project so that the Project can be implemented in the most economical manner.

Based on the above presentation and exchange of views among JCC members, it was mutually confirmed as stated Appendix-1 attached herewith. Based on this JCC meeting, JCC agreed that result of the survey should be promoted in Ministry of Economic and Development, and the Survey Team should prepare and submit Final Report in April 2013 reflecting the comments on the Draft Final Report to be presented by MRT not later than 15th March 2013.

Baasandorj. BATZAYA
State Secretary
Ministry of Roads and Transportation

Nyamdavaa GANTUMUR
Vice Mayor, Ulaanbaatar City

For ISOGAI Toshimori
Chief Representative
JICA Mongolia Office

岡崎 彰男

OKAZAKI Akio
Deputy Team Leader
JICA Survey Team

1. RESULT OF ROAD AND BRIDGE DESIGN

Bridge Type, Road Planning and Design Criteria stated in the Draft Final Report were confirmed by the Science and Technology Council in the MRT held on 17th December 2012. No specific comments on result of the design were stated during the JCC meeting.

2. CONSTRUCTION PLAN

Ulaanbaatar Railway and MRT expressed no objection on the construction methodology of bridge mentioned in the Draft Final Report including Window Time. Regarding Construction schedule, JCC members explained the importance to complete the Project by 2016 to coordinate with other projects such as BRT Project and MRT Project.

3. UTILITY RELOCATION PLAN

JCC member confirmed that Utility relocation should be implemented by UBC in accordance with the schedule mentioned in the Draft Final Report, and that relocation cost would be included in Preparation Cost to be excluded in principle from the Yen Loan.

4. LAND ACQUISITION PLAN

To prevent extra land acquisition and increasing of compensation, the Survey Team requested that 1) Cut-off Date should be immediately announced by UBC, 2) estimated R.O.W. should be informed to land possessor and 3) public notice should be made by means of message board at the Project site.

5. ENVIRONMENTAL IMPACT ASSESSMENT

It was confirmed that DEIA Report had been approved by the Ministry of Environment and Green Development in January 2013 and the Report would be disclosed on the Web site of the Ministry.

6. PROJECT COST

(1) The Study team explained that Land acquisition and compensation cost and Utility relocation cost were estimated and included in the Project Cost.

(2) The Survey Team explained that Price Escalation should consist of 9% per year in local portion and 2.1 % per year in foreign portion respectively, and that Physical contingency was estimated as 5% of construction cost and consultant fee.

(3) The Survey Team explained that the Construction Cost was estimated based on preliminary design which was result of comparison study to select optimal type of bridge. In response, JCC member remarked that further cost reduction would be strongly desired.

7. PROJECT IMPLEMENTATION SCHEDULE

Remarks were given by JCC members to the period which was estimated as more than two (2) years from procurement of consultant to commencement of the Construction in the Draft Final Report. Responding to the remarks, the Survey Team explained that the periods of detailed design, land acquisition, utility relocation and bidding were estimated based on required procedure and work volume.

However, JCC member strongly stated that D/D should be started in 2013 and Construction should be commenced in 2014.

8. SPECIAL TERMS FOR ECONOMIC PARTNERSHIP; STEP

JICA introduced advantage of Japanese ODA Loan namely "Special Terms for Economic Partnership (STEP)" in terms of interest rate, repayment period, grace period and Grant Assistance for the Detailed Design Work, and recommended to apply it to the Project so that the Project can be implemented in the most economical manner.

9. OTHERS

After the JCC Meeting, the Study Team, MRT and UBC held meeting respectively and agreed that MRT and/or UBC should deriver the comments on the Draft Final Report in writing to JICA Mongolia Office by March 15, 2013, which would be prepared by related agencies and to be well examined and arranged by JCC members.

Appendix-5

Record of Meeting for 1st Working Group Meeting

Preparatory Survey on the Construction of Ajilchin Flyover Project

In Ulaanbaatar City in Mongolia

1st Working Group Meeting

Minutes of Meeting

Date and Time : April 26th, 14:00-16:00
Venue : Meeting room B, 14th floor, Ulaanbaatar City Hall
Participants : See attached List of Attendees

1. **Opening remarks from Mr. B. Munkhbaatar, Deputy Mayor of UB City**
   Confirmation of WG members and explanation for progress of project was requested.
2. **Explanation for progress of project, project schedule and requests from Survey Team**
   Survey Team explained finished activities of the project, schedule, etc. The details are shown below:
   <Progress of project>
   1) Joint site observation (UB city, UB railway, consultant)
   2) Collecting information of UB city's Road plan
   3) Collecting information of Utilities
   4) Consideration of route of Ajilchin Flyover
   5) Confirmation of EIA procedure and GIA application
   6) Starting of Traffic survey (beginning from April 30th)
   7) Collecting the drawings of existing bridge in UB city (approx. 50 bridges)

   <Project schedule>
   1) Implementation of traffic survey and traffic demand forecasting
   2) Confirmation of route of Ajilchin Flyover
   3) Confirmation of project area
   4) Starting of DEIA
   5) Topographical survey, geological survey
   6) Bridge plan, road plan and intersection plan

   <Requests for UB city>
   1) Persuading traffic police and police stations to implement procedure for traffic survey
   2) Information provision of existing underground installed objects and utilities (hot-water supply line, electricity, telecommunication, water supply and sewerage system and railway)
   3) Persuading EIA procedure (GIA, DEIA)
   4) Discussion for confirmation of bridge design condition
   5) Discussion for technology transfer on bridge design and maintenance during project period
3. **About F/S of Ajilchin Flyover**

JICA Survey Team explained topics below, based on the presentation:

- Land use of project site and high-voltage line wiring plan (35kV)
- UB City road improvement plan 2012 (4-lane expansion of Narny Road, new construction of Dund River Bridge and 4-lane expansion of Dondgol Street)
- Alternative plan for route of Flyover (east-west route and north-south route)
- Draft plan of Narny Road intersection (grade separated or grade intersection)
- confirmation of project area (including or excluding Dund River Bridge improvement)

4. Survey on existing structure in UB City

Consultant reported the plan of survey on existing structure. The details are shown below:

(1) Existing bridge inventory survey
(2) Bridge soundness evaluation
(3) Developing bridge survey sheet
(3) Proposal of rehabilitation measures and retrofitting measures
(4) Proposal of supporting method of maintenance technology

5. Convening seminar on technology transfer

JICA Survey Team reported the seminar on technology transfer.

Draft date	:	Beginning of October (tentative)
Contents	:	Introducing Japanese technology of bridge construction, bridge maintenance , rehabilitation methods, etc.
Object person	:	20 persons (Engineer from UB City and Ministry of Road, Transport, Construction and Urban Development(MRTCUD))
Program	:	Further discussion will be implemented between Mongolian side to determine Program, period, participants, etc.

6. Question and answer

・Mr. Battogtokh, Deputy Director, Road Dept, UB City

- Road Department of UB City is conducting the project closely cooperation with JICA Survey Team and UB City Urban Development and Planning Department and Land Administration Department is supporting the project. Therefore the project is implemented following the original plan.
- Information of underground installed objects and utilities is provided by Mr. O. Odbayar and Mr. Erdenebayar, Urban Development and Planning Department, UB City.
- Land Management Department of UB City should provide the list of land owner.
- Mr. G. Khasbaatar, Road Department of UB City should persuade the procedure of General Impact Assessment (GIA), which related to Environmental Assessment.
- Mr. G. Khasbaatar, Road Department of UB City is in charge of asking cooperation about traffic survey implementation for traffic police, and it is already determined that nine police officer will provided during the survey. If the number of officer is short, Road Department can provide their own security guards.
- High-voltage line, of which capacity is 35kw, is highly possible to be an interrupt of this Flyover project, therefore the plan should be revised.

- JCC should be established as soon as possible. I will ask establishment to Mr.Gantmur, MRTCUD next week, when he will come back from his business trip.
- Expense burden of contractee for persuading EIA is needed to be issued Mandate by minister of MRTCUD. We should discuss it with Mr.Gantmur, Director of MRTCUD.
- Bridge design should be implemented after the route will be determined and it should take enough time. Technical transfer should reflect the opinions and requests from the other related organizations.

- **Mr. G. Khasbaatar, Road Department, UB City**

  Traffic survey will start on April 29th. Traffic police of UB City is agreed to cooperate the survey implementation. To obtain the accurate answer during OD survey, UB City Traffic Control Center and police will cooperate to the survey. Ministry of Environment and Tourism will provide the result of GIA this afternoon.

- **Mr. O. Odbayar, Head of the Division, Construction & Urban Development Planning Department, UB City**

  Our Department discussed with Survey Team and they provides us information of Ajilchin Flyover. We should discuss eight high-voltage lines with 35kw capacity with UB City Electric Cable Distribution Company. One of the interruptions along the railway, which mentioned during presentation, may be the brick barrier. We will provide the information of land owner. Members of project committee will be determined by next Monday or Tuesday and the related information will be provided from each Ministry and ready by the end of next week. We suppose to consider the bridge design conditions and construction conditions with Survey Team, after the line will be determined.

- **Mr. CH. Erdenedalai, Mongolian Railway Authority**

  Mongolian Railway Authority and Ulaanbaatar Railway are always discussing and cooperating. There are many kinds of underground objectives, such as telecommunication cable and railway related objects, in proposed project area. We, Mongolian Railway Authority, recognize that the study should be implemented in cooperate with the Survey Team. We experienced Narny Bridge construction, therefore we can provide all the related information. Furthermore, we conducted existing bridge survey in 2003, we can also provide its result if the Survey Team needs it.

- **JICA Survey Team (Mr. Okazaki, Deputy Team Leader)**

  I appreciate to the cooperation of all departments. Please note that to conduct the study rapidly, we sometimes need to discuss individually with WG members. In 2012, UB City road improvement plan listed 4-lane expansion of Narny Road, 4-lane expansion of Dondgol Street, and expanding construction of existing Dund River Bridge. We would like to confirm whether these projects will be implemented in this year. 4-lane expansion construction of Narny Road should be in harmony with the result of this Flyover project, as these two projects are related to each other.

- **Mr. Battogtokh, Deputy Director, Road Dept, UB City**

  We are discussing the mentioned improvement construction in the Government, Mandate 106 is already issued to implement the construction using budget of Development Bank, according to plan. The budget for 4-lane expansion construction of Dondgol Street is not determined yet.

- **Mr. Maruoka, Urban Transportation System Improvement in UB City (JICA)**
  I heard that Master Plan of UB City will be discussed in Parlament. Ajilchin Flyover is included in UB City MP (2030). In this MP, Ajilchin Flyover is a part of major arterial road, which runs east-west direction. Construction of this Flyover is planned to implemented using ODA loan from Japan and the construction plan is need to be in harmony with MP.
- **Mr. Battogtokh, Deputy Director, Road Dept, UB City**
  Ajilchin Flyover is included in MP of 2020 and 2030. MRTCUD is also discussing its project.
- **Mr. O. Odbayar, Head of the Division, Construction & Urban Development Planning Department, UB City**
  MP sais only the basic things and I think the detailed plan should be determined through this project. It is an opportunity to construct new bridge, therefore I hope the Flyover connects to the Southern road (Dondgol Street). I request also that the consideration of measure to cross Dund River after the Flyover is landed.
- **JICA Survey Team (Mr. Okazaki, Deputy Team Leader)**
  The route of Flyover will be determined following the concept of MP and after enough discussion between Mongolian side. If there is no request, Survey Team will propose implementation date of next WG. As a draft schedule, next WG should be held before JCC, which have to hold in the end of May.

Period

List of Attendees

№	Name	Organization	Position
1	Mr. B.Munkhbaatar	UB City, Administration Dept.	Deputy Mayor of UB City
2	Mr.E.Enkhbat	MRTCUD	Specialist
3	Mr.Battogtokh	UB City, Road Dept.	Deputy director
4	Mr.G.Khasbaatar	UB City, Road Dept.	Project officer
5	Ms.M.Ichinkhorloo	UB City, Road Dept.	Bridge engineer
6	Ms.N.Hishgee	UB City, Public transport department	Financial planning division
7	Mr.KH.Bat-Erdene	UB City, Urban Development Policy Division	Traffic engineer
8	Mr.O.Odbayar	UB City, Construction & Urban Development Planning Dept.	Head of the Division
9	Mr.D.Nyamdavaa	UB City, Land Management Department	Land Registration for Bayangol District
10	Mr. M.Sergelen	UB City, Land Management Department	Land Registration for Khan-Uul District
11	Mr.S.Baatar	Water Distributing Authority	Engineer
12	Mr.CH.Erdenedalai	Mongolian Railway Authority	State Inspector
13	Mr.D.Tuvshinbayar	Ulaanbaatar Railway	Engineer
14	Mr.D.Ochir-Erdene	UB Traffic Control Center	Senior Engineer
15	Mr.T.Gantulga	Usnii Barilga Baiguulamj (Water Facilirty) Company	Engineer
16	Mr.B.Zolmandakh	UB Electric Distribution Network Company	Drawing Engineer
17	Mr. Bum-Erdene	Urban Transportation System Improvement in UB City (JICA)	Road Consultant
18	Mr.Kenji MARUOKA	Urban Transportation System Improvement in UB City (JICA)	JICA Expert
19	Mr.Akio OKAZAKI	JICA Survey Team	Deputy Team Leader
20	Mr.Kimio KANEKO	JICA Survey Team	Transport Planner
21	Mr.Hitoshi NAKAMURA	JICA Survey Team	Bridge Engineer
22	Ms.Misa OISHI	JICA Survey Team	Social Impact Consideration
23	Mr.Mitsuhiro OYAMA	JICA Survey Team	Utility Survey&Construction Planner
24	Mr.Takayoshi KITAMURA	JICA Survey Team	Bridge Inspection
25	Mr.Toshiyuki SATO	JICA Survey Team	Bridge Design Assistant / Coordinator
26	Mr.N.Tserendorj	JICA Survey Team	Interpreter
27	Mr.O.Bold	JICA Survey Team	Interpreter

Appendix-6

Record of Meeting for 2nd Working Group Meeting

Preparatory Survey on the Construction of Ajilchin Flyover Project

In Ulaanbaatar City in Mongolia

2nd Working Group Meeting

Minutes of Meeting

Date and Time : May 30th, 14:00-16:15
Venue : Meeting room B, 14th floor, Ulaanbaatar City Hall
Participants : See attached List of Attendees

1. **Explanation for cost, effect and affected area of each alternative construction plan from Survey Team**
   The explanation was implemented to determine the route of Flyover and project area.
2. **Result of question and answer**

・**JICA Study Team**
- UB City demands to adopt north-south plan, although they understand east-west plan is the first option. Considering the compromise plan, connection point to Dondgol Street along north-south route is near to crossing of railway branch line. Consultant found out that number of accidents in/around crossing is some per year. There is afraid of traffic safety.
- Initial cost estimation which written in handout excludes fee for consultant service, land acquisition, resettlement compensation, etc.
- Number of lanes (width) of Flyover is determined after the route selection, traffic volume survey and consideration of structure.

・**Mr. Davaansuren, Road Department, UB City**
About route selection, Ajilchin Flyover is planned to take a role of the east-west direction traffic, meanwhile Narny Bridgeis expected to take a role of the north-south direction flyover.

・**Traffic Police, UB City**
However, please consider the north-south route as a compromise plan from the viewpoint of traffic network.

・**JICA Survey Team**
- Initial cost estimation is trial calculation at this moment and using Japanese standards such as unit cost for calculation (same as Narny Bridge). This is promised on Ajilchin Flyover project is implemented adopting ODA loan form Japan. After the route is determined, more detailed estimation will be conducted.
- There is high-voltage line project which is supported by WB. The construction under this project is already started and the changing is difficult. Consultant surveyed the construction site of steel tower and implement road alignment planning to avoid the steel tower.

・**Land Registration for Bayangol District, Land Management Department**

We experienced a problem of land acquisition around proposed area of Ajilchin Flyover, therefore the east-west route is appropriate. Complex plan is difficult to adopt because the land acquisition and resettlement for ramp construction. The east-west route should be adopted to minimize compensation and resettlement.

- **JICA Survey Team**
  - Indicate of socio-economical effect of this project is evaluated after route selection, structural consideration, and traffic volume forecast. The route is not determined at this time, therefore route selection is needed to be finished first. After that, economical evaluation, such as EIRR, will be conducted. EIRR is consisted of construction cost estimation and economical benefit estimation. The complex plan requires the high construction cost in spite of forecasted traffic volume is not huge, therefore the result of EIRR will be low.
  - The traffic volume which shown in handout is the result of survey conducted in 2012. Car OD survey is newly implemented and the more accurate analysis has been implementing.
- **JICA**
  - This project itself is not directly reflected to ODA loan project. We will consider the scale and contents of project and after that whether Mongolian side will pay or implementation using ODA loan will be considered. Through this meeting, we understand that Mongolian side requests north-south route, but we conclude that the east-west route is the first option, based on the result of past meetings.
  - Firstly the survey for the east-west route should conducted and implementation of the survey for the north-south route, which Mongolian side is strongly requested, is needed to reconsider in JICA. This opinion should be bring to JCC as result of today's WG and approved in JCC.

Period

List of Attendees

№	Name	Organization	Position
1	Mr.L. Tserendamba	UB Electric Cable Distribution Co.	Project Division
2	Mr. B. Erdenebat	UB Electric Cable Distribution Co.	Design Division
3	Ms.M.Ichinkhorloo	UB City, Road Dept.	Bridge engineer
4	Mr.G.Hasbaatar	UB City, Road Dept.	Specialist
5	Mr. L. Dungarmaa	Usnii Barilga Baiguulamj (Water Facilirty) Company	Engineer
6	Mr. YU. Davaansuren	UB City, Road Dept.	Head of Division
7	Mr.D.Ochir-Erdene	UB Traffic Control Center	Senior Engineer
8	Mr.D. Chinzorig	Ulaanbaatar Railway Authority, Technical Policy and Design Division	Engineer
9	Mr. T. Narmandakh	ICT Network Co.	Engineer
10	Mr. Nyambayar	UB City, Construction & Urban Development Planning Dept.	Construction Engineer
11	Mr. M.Sergelen	UB City, Land Management Department	Engineer
12	Mr.D.Nyamdavaa	UB City, Land Management Department	Land Registration for Bayangol District
13	Mr. Batjargal	Road Police	Senior investigator
14	Mr. L. Altangerel	UB City, Administration Dept., Facility Division	Head of Division
15	Mr. TOMIHARA	JICA Mongolia	Assistant Director
16	Mr. Tsunemi NAGATA	JICA Survey Team	Team Leader
17	Mr.Kimio KANEKO	JICA Survey Team	Transport Planner
18	Mr.Hitoshi NAKAMURA	JICA Survey Team	Bridge Engineer
19	Mr. Mitsuhiro OYAMA	JICA Survey Team	Utility Survey & Construction Planner
20	Mr. OGAWA	JICA Survey Team	
21	Mr. Masatoshi WATANABE	JICA Survey Team	
22	Mr. GOTANDA	JICA Survey Team	
23	Ms. Misa OISHI	JICA Survey Team	Social Impact Consideration
24	Mr. Takayoshi KITAMURA	JICA Survey Team	Bridge Inspection

Appendix-7

Record of Meeting for 3rd Working Group Meeting

Preparatory Survey on the Construction of Ajilchin Flyover Project

In Ulaanbaatar City in Mongolia

3rd Working Group Meeting

Minutes of Meeting

Date and Time : October 19th, 14:00-16:15
Venue : Meeting room B, 14th floor, Ulaanbaatar City Hall
Participants : See attached List of Attendees

1. **Opening remarks from Mr. N. Gantumur, Deputy Mayor of UB City**
2. **Massage from Mr. Nagata, Team Leader, JICA Survey Team**
3. **Explanation of Interim Report from Mr. Okazaki, Deputy Team Leader, JICA Survey Team**
   - Project activities which already finished and related information
   - Flyover route and project area determined in 1st JCC
   - Necessity of Ajilchin Flyover
   - Outline of Construction project
   - Road plan (plan of West Industrial Road part, grade separated intersection of Narny Road, land acquisition problem, design condition)
   - Bridge plan (pier position, bridge type, basement type, design condition)
   - Adoption of Japanese technology
   - Relocation of utility
4. **Comment**

・**Mr. N. Gantumur, Deputy Mayor of UB City**

- This project is supposed to implement using ODA loan. I heard that the construction cost is expensive, but project implementation is approved byMinistry of Economy and Development, after confirming the condition of ODA loan.
- Many railway facilities are needed to relocate to implement Ajilchin Flyover project. There is a plan to construct new railway station, therefore adequate discussion for land acquisition is very important.
- The plan which East-West Arterial Road runs until Ajilchin Street is based on the result of detailed survey, so that this is the necessary project. While the construction cost is expensive, I understand that the quality is very sufficient like Narny Road.
- It is important to implement under UB City Urban Development Master Plan and other planning project.
- UB City is now processing the 14 kinds of simplified approving procedure. Survey term is taken enough, now I hope the survey accomplish as soon as possible. I understand that Japanese government and Mongolian government will discuss to implementation of construction until the deadline of final report submission, next March.

5. Question and answer

- **Mr. D. Nanzaddorj, Director, Road Department, UB City**

  Please ask your question. Please ask after grabbing the description in Interim Report to avoid any problem to make Final Report.

- **Mr. SH. Erdenebulgan, Head of Center, UB Railway Technological Policy Design Center**

  - There are many facilities which will be affected in the project area of Ahilchin Flyover. We already submitted the official letter to Road Department and Land Management Department of UB City to extend UB Railway. Please proceed land acquisition and determination of detailed compensation based on the letter.
  - Bridge pier, construction yard and window time in the area of railway should be discussed based on the drawings, because the position of P7, P8 and P9 locate inside the land of National Railway.
  - Window time of railway is 4 hour per day at maximum. Window time in the area of branch lines and incoming lines is more than 4 hour, but it have to be discussed to answer. I would like to have individual discussion.

- **Mr. Nagata, Team Leader, JICA Survey Team**

  According to Deputy Mayor, new railway station is going to constructed around the project area. Please inform us the specific location and day of starting construction.

- **Mr. SH. Erdenebulgan, Head of Center, UB Railway Technological Policy Design Center**

  The day of starting construction is not determined, however the location is western side of existing station, where now the second-hand car shop is located.

- **Mr. D. Bat-undrakh, Land Acquisition Division, Land Management Department, UB City**

  There are many structures and facilities related to UB Railway, which are affected from this project, however, I think the problem of compensation can be solved with adequate estimation of asset price and discussing, same as construction of Narny Road.

- **Ms.T. Battsetsteg, Electricity Department, UB City**

  We have been discussing JICA Survey Team form the beginning of this project. We think there is no big problem. There are 2 electricity cables which are needed to relocate, but it is possible to estimate relocation cost, after confirming construction work information.

- **Ms. T. Narmandakh, Telecommunication Engineer, Information and Telecommunication Network Department**

  There are underground objectives, 10 telecommunication cables, under Dungol Bridge and Narny Road. These can be relocated and shown in maps after checking design drawings.

- **Mr. Okazaki, Deputy Team Leader, JICA Survey Team**

  All the drawings of this project are attached to Interim Report. We can also provide CAD data. To calculate the relocation cost, we would like to ask individual discussion. Please arrange meetings in Road Department of UB City between absent members who in charge of utilities.

- **Mr. D. Nanzaddorj, Director, Road Department, UB City**

  - Please attend observation and confirm carefully the information of utilities and underground objects of UB Railway.
  - UB City will in charge of implementation of utility relocation.
  - I understand the plan of road and bridge and design conditions are acceptable to agree.

- Please discuss well with each Department and person who in charge of utility relocation, especially UB Railway. Many of their facilities need to relocate please estimate the asset price carefully not to occur any problem during construction.

Period

List of Attendees

№	Name	Organization	Position
1	Mr. N. Gantumur	UB City, Administration Dept.	Deputy Mayor of UB City
2	Mr. D. Nanzaddorj	UB City, Road Dept.	Director
3	Mr. G. Khasbaatar	UB City, Road Dept.	Project officer
4	Mr. L. Erdenebat	UB City	Senior officer
5	Mr. O. Odbayar	UB City, Construction & Urban Development Planning Dept.	Head of the Division
6	Mr. L. Ganbat	UB City, Design Division, Construction & Urban Development Planning Dept.	Director
7	Mr.D.Bat-undrakh	UB City, Land Management Dept., Land Acquisition Division	Head of the Division
8	Mr.KH. Unurjargal	UB City, Traffic Control Center	Traffic Engineer
9	Mr. T. Battsetseg	UB City, Electricity Dept.	Director
10	Mr. SH. Erdenebulgan	UB Railway Technological Policy Design Center	Head of Center
11	Mr.T. Narmandakh	Telecommunication Engineer, Information and Telecommunication Network Department	Telecommunication Engineer
12	Ms. A. Bulgan	JICA	Program Officer
13	Mr.Kenji MARUOKA	Urban Transportation System Improvement in UB City (JICA)	JICA Expert
14	Mr. Tsunemi NAGATA	JICA Survey Team	Team Leader/Bridge Plan
15	Mr.Akio OKAZAKI	JICA Survey Team	Deputy Team Leader/Bridge Design(1)

Appendix-8

Record of Meeting for 4th Working Group Meeting

Preparatory Survey on the Construction of Ajilchin Flyover Project

In Ulaanbaatar City in Mongolia

4th Working Group Meeting

Minutes of Meeting

Date and Time : February 27th, 2013, 10:00-
Venue : Meeting room, 14th floor, Ulaanbaatar City Hall
Participants : See attached List of Attendees

1. **Opening remarks from Mr. N. Gantumur, Deputy Mayor of UB City**
2. **Confirmation of Draft Final Report of Preparatory Survey on the Construction of Ajilchin Flyover Project in Ulaanbaatar City in Mongolia**
3. **Question and answer**

- **Mr. Nanzaddorj, Director, Road Dept, UB City**
  We are going to hold two meetings successively, WG and JCC. Please express your opinion.
- **Mr. Okazaki, Deputy Team Leader, JICA Survey Team**
  Mr. Murayama from JICA Headquarter joins today's meeting. Please express your honest opinion.
- **Mr. Gantumur, Deputy Mayer, UB City**
  JCC is going to hold after WG, please make comments.
- **Mr. Okazaki, Deputy Team Leader, JICA Survey Team**
  (Explanation of Draft Final Report)
- **Mr. Gantumur, Deputy Mayer, UB City**
  Ministry of Economy and Development of Mongolia worries two things to construct the Flyover. One is the long period of construction, and another is expensive cost. Mongolian side hope to complete the construction as soon as possible. This project is related to BRT project and Metro project of ADB.
- **Mr. Erdenedalai, Specialist, Department of Road Transport and Registration, MRT**
  I think cost and construction period are adequate. Railway Department will cooperate to the project. We experienced Narny Bridge. About construction period, some days of April and October are also available for construction. Please consider it.
- **Mr. Bayarbaatar, Director, Strategic Policy and Planning Department, UB City**
  Construction cost of Narny Bridge seems to be deceased 20% due to the difference of currency exchange rate. I heard that price of steel is decreased 10%, is it because of the exchange rate?
- **Mr. Okazaki, Deputy Team Leader, JICA Survey Team**
  Steel price and currency exchange rate are not strongly related. Yen has been strong for long, but yen is becoming weak.
- **Mr. Nanzaddorj, Director, Road Dept, UB City**

What is included in contingency cost and preparation cost? As a comment, I think completion in 2019 is late. DD should start in 2013, construction work starts 2014 and completion in 2017. Completion in 2019 causes that relation between BRT project and metro project is not work well.

- **Mr. Okazaki, Deputy Team Leader, JICA Survey Team**
  Contingency cost includes price escalation cost (9.0% per year in domestic currency and 2.1% per year in foreign currency) and 5% of physical contingency cost as construction cost and consultant fee. We considered construct steel bridge and cost and period is most adequate.
- **Mr. Bayar-Ulzii, Director, Engineering Facilities Department, UB City**
  3.6BLN MNT is secured for relocation of underground objectives. Is it right that UB City pay this cost and ODA loan will not cover?
- **JICA Survey Team**
  Utilitiy relocation cost is not included in ODA loan usually.
- **Mr. T. Bat-Erdene, Head of Department, UB Railway**
  In case of Narny Bridge, relocation cost was needed which was not predetermined. I hope this will not occur in Flyover project.
- **Mr. Gantumur, Deputy Mayer, UB City**
  UB City will cover the relocation cost of railway facilities. I would like to finish WG meeting and go on to JCC.

Period

List of Attendees

№	Name	Organization	Position
1	Mr. N. Gantumur	UB City, Administration Dept.	Deputy Mayor of UB City
2	Mr. G. Hasbaatar	UB City, Road Dept.	Foreign relation
3	Mr.Artur	MRT, Railway Policy Implementation and Coordination Division	Director
4	Mr. CH. Erdenedalai	MRT	Specialist
5	Mr. T. Bat-Erdene	UB Railway	Head of Dept.
6	Mr. Bayarbaatar	UB City, Strategic Policy and Planning Dept.	Director
7	Mr. D. Nanzaddorj	UB City, Road Dept.	Director
8	Mr.O.Odbayar	General Planning Agency, Construction & Urban Development Planning Dept.	Head of the Dept.
9	Mr. L. Ganbat	UB City	Head of Dept.
10	Mr. Bayar	UB City, Property Relation Dept.	Head of Dept.
11	Mr. D. Bat-Undrakh	UB City, Land Management Dept.	Head of Dept.
12	Mr. S. Bayar-Ulzii	UB City, Engineering Facilities Dept.	Director
13	Mr. L. Erdenebat	UB City, Engineering Facilities Dept.	Senior Specialist
14	Mr. D. Ochir-Erdene	UB Traffic Control Center	Head of Task
15	Mr. D. Chinzorig	UB Railway	Engineer
16	Mr. Naranhishigt	UB Heating Network Maintenance and relocation	Engineer
17	Mr. T. Narmandakh	NETCOM Co.	Engineer
18	Mr. TS. Bayarmaa	Water Facility	General Engineer
19	Mrs. L. Dungarmaa	USUG	Engineer
20	Mr. Mitsuo MARUYAMA	JICA	Country Officer
21	Mr. Yutaka WAKISAKA	JICA	Representative
22	Mr. Tsunemi NAGATA	JICA Survey Team	Team Leader
23	Mr.Akio OKAZAKI	JICA Survey Team	Deputy Team Leader

Appendix-9

<u>Detailed Environmental Impact Assessment Report</u>
<u>(Confidential)</u>

Appendix-10

Land Acquisition and Resettlement Action Plan
(Confidential)

Appendix-11

Terms of Reference for Construction Services for Detailed Design, Tender Assistance and Construction Supervision of Ajilchin Flyover Project (Confidential)

Appendix-12

<u>Commnets and Answer on Draft Final Report</u>

Japan International Cooperation Agency

May 14, 2013

Mr. Batzaya.B
State Secretary
Ministry of Roads and Transportation

RE: Comments on Draft Final Report of
The Construction of Ajilchin Flyover Project in Ulaanbaatar City

Dear Mr. Batzaya.B

In response to your letter Ref. No. 3/2379 dated April 23, 2013, we, JICA would like to submit the attached comments.

We would like to request you to kindly proceed with the necessary steps for the official request of the Project to JICA in cooperation with Ministry of Economic Development and Ulaanbaatar City. Also, I am pleased to inform you that the JICA is preparing to submit the Final Report by May 27, 2013 and to dispatch a Fact Finding Mission from May 29, 2013.

We are looking forward to discussing key issues in detail of the Project during the Fact Finding Mission.

Very truly yours,

Mutsumi SATO
Director, East Asia Division,
East and Central Asia and the Caucasus Department

C.C:
- Mr. Gantumur. N, Vice Mayor, Ulaanbaatar City
- JICA Mongolia Office

"Ажилчны гудамжны гүүрэн гарц барих төсөл"-ийн урьдчилсан судалгаа

Эцсийн тайлангийн төсөлтэй холбогдон гарсан санал болон авах хариулт

No	Байгууллага	Он сар өдөр	Гарсан саналын утга	Харнулт /төсөл/(JICA)
0	Зам,Тээврийн Яам	2013-4-23	Төслийн өртгийг бууруулах, ажлын хугацааг багасгах талаар судалж, холбогдох байгууллагуудын саналыг эцсийн тайланд тусгаж ажиллах	- Төслийн өртгийг бууруулах, хугацааг богиносгох талаар эцсийн тайланд (11-р бүлэг) нэмэлт оруулав. - Байгууллагуудаас өгсөн саналын талаархи хариултыг дор тусгав.
1	"УБТЗ" Хувь Нийлүүлсэн Нийгэмлэг	2013-1-8 / /2013-3-27 өмнө өгсөн санал 13/394	- Газар чөлөөлөлтийн зардал(барилгын ажил багтсан) ; -4.99 тэрбум төгрөг - ИШС-г шилжүүлэх болон шинэчлэх зардал ; 1.465 тэрбум төгрөг - Газрыг нөхөн олговроор бус газраар солих	- Эцсийн тайланд (8-р бүлэг) тусгав. Нийслэлтэй зөвшилцөж, дүнг эцсийн байдлаар шийдвэрлэж өгөхийг хүсэж байна. - Эцсийн тайлангийн төсөлд Хүснэгт 6.4.1-д тусгасан. - Эцсийн тайланд (8-р бүлэг)тусгав.
2	НЗДТГ-ын Санхүү төрийн сангийн хэлтэс	2013-4-16/1118	- УБ хотын ерөнхий төлөвлөгөөнд тусгагдсан гүүрэн гарц - Төслийн өртөг өндөр - Зөвлөхийн зардал болон нөөцийн сангийн ажлын зардлыг дахин хянах - Япон улсын эдийн засгийн түншлэлийн зээл нөхцлийн хувьд боломжтой	(Ойлгосон) - Төслийн өртгийг бууруулах, хугацааг богиносгох талаар эцсийн тайланд (11-р бүлэг) нэмж тусгав. - Тус төслийг санхүүжүүлэхэд STEP нөхцөл хамгийн тохиромжтой бөгөөд, нарийвчилсан зураг төслийн зардлыг Жайка –ын хөрөнгөөр санхүүжүүлэх тохиолдолд, Зөвлөхийн зардлын тодорхой хэсэг буурах боломжтой. Нөөц сангийн ажлын зардлын тухайд, 5% иар магадлашгүй ажлын зардал болон төсөл хэрэгжих хугацаан дахь үнийн өсөлтийг тооцсон. Эцсийн тайланд (11-р бүлэг) тусгав. - (Ойлгосон)
3	НЗДТГ-ын Стратегийн бодлого, төлөвлөлтийн хэлтэс	2013-4-5 5/1170	- Өндөр ач холбогдолтой гүүр, түргэн хугацаанд хэрэгжүүлэх - Төслийн өртөг өндөр - Төслийн нарийвчилсаи зураг төслийг Япон улсын буцалтгүй тусламжаар хийх	-(Ойлгосон) - Төслийн өртгийг бууруулах, хугацааг богиносгох талаар эцсийн тайланд (Эцсийн тайлангийн 11-р бүлгийг үзнэ үү) нэмж оруулав. - STEP нөхцлөөр иений зээлээр хэрэгжүүлэх тохиолдолд нарийвчилсан зураг төслийн зардлыг Жайка –ын хөрөнгөөр санхүүжүүлэх бөгөөд, энэ талаарМонголын ЗГ болон Жайка

			- Газар чөлөөлөх, нөхөн олговрын талаар нарийвчлан судлах	хамтран ярилцаж шийдвэрлэнэ. - Эцсийн тайланд (8-р бүлэг) тусгав Гэвч, тасалбар болгох өдрийг зарласны дараа нөхөн олговрын дүн тодорхой болох тул яаралтай зарлах.
4	Нийслэлийн Ерөнхий төлөвлөгөөний газар	2013-4-4 6/674	- Инженерийн шугам сүлжээний байгууллагуудтай зөвшилцөх, ялангуяа дулаан, цахилгаан болон холбооны шугам	- Инженерийн шугам сүлжээний байгууллагуудтай зөвшилцсөн.
5	Нийслэлийн газрын алба	2013-4-4 10/1201	- Үл хөдлөх болон хөдлөх хөрөнгийн нөхөн олговрын зардлыг төслийн тойм зардалд тусгах	- Эцсийн тайланд (8, 11-р бүлэг) тусгав. Гэвч, тасалбар болгох өдрийг зарласны дараа нөхөн олговрын дүн тодорхой болох тул яаралтай зарлах. Мөн Ажилчны гудамжны гүүрэн гарцын төслийн хамрах нутаг дэвсгэрт өөрчлөлт хийхийг хориглосон (тасалбар болгох өдөр) мэдэгдлийг 5-р сарын 10-ны өдөр гэж ойлгосон, цаашид тухайн нутаг дэвсгэр рүү иргэдийн шилжилт хөдөлгөөн хийхийг хориглосон хэрэгсэл тавихыг хүсэж байна.(самбар босгож мэдээлэх зэрэг)
			- Нөхөн олговрын үнэлгээ бодитой байх - Эцсийн тайланг батлахаас өмнө нөлөөлөлд өртөж буй ААН, иргэдтэй газар чөлөөлөх тохиролцоо урьдчилсан байдлаар хийх	- Нөхөн олговрын үнэлгээг бодит үнэлгээн дээр үндэслэн тооцсон. - Газар чөлөөлөх ажиллагаатай холбогдох үндсэн зарчим, иргэдтэй уулзаж тайлбарлан, тэдний зөвшөөрлийг авах. Иргэд нэг бүртэй тохиролцлох ажилагааг, төсөл хэрэгжих шийдвэр гарсаны дараа, Нийслэл хот хэрэгжүүлнэ.
6	Нийслэлийн Зураг төслийн газар	2013-4-4 1/68	- УБ хотын ерөнхий төлөвлөгөөнд тусгагдсан тул тусгайчлан өгөх саналгүй. Дэмжиж байна	-(Ойлгосон)
7	Нийслэлийн Авто замын газар	2013-4-10 1/546	- УБ хотын ерөнхий төлөвлөгөөнд тусгагдсан чухал ач холбогдол бүхий гүүрэн гарц - Энэ хугацаанд, гүүрийн төлөвлөгөө, технологийн шийдэлд саналаа өгч ирсэн тул нэмэлт саналгүй.	-(Ойлгосон) -(Ойлгосон)
			- Төслийн хугацааг бууруулах төслийн өртөг /барилгын ажлын болон бусад зардлыг судалж, эцсийн тайланд тусгах	- Төслийн өртгийг бууруулах, хугацааг богиносгох талаар эцсийн тайланд (Эцсийн тайлангийн 11-р бүлгийг үзнэ үү) нэмэлт оруулав.
8	УБ хотын ЗАА-ны Инженерийн байгууламжийн хэлтэс	2013-4-12 03/508	- Төсөл нь иений зээлээр санхүүжигдвэл, удирдлагын зардал, бэлтгэл ажлын зардал, бусад зардлуудыг нэг эх үүсвэрээр санхүүжүүлэх - Зөвлөх сонгох, зураг төсөл боловсруулах хугацааг 1,5 жилээр	- Нийтэд нь иенээр болон төгрөгөөр тооцсон зардлыг тусгав (Эцсийн тайлан (11-р бүлэг)). - Зөвлөх сонгох + зураг төсөл боловсруулах хугацааг 18сар гэж тооцож

			багасгах - Инженерийн шугам сүлжээг шилжүүлэхэд газар хөдлөлтийг тэсвэрлэхүйц шинэ техник технологи ашиглах -Борооны ус зайлуулах, инженерийн бэлтгэл ажлыг сайтар төлөвлөх	байгаа боловч, STEP нөхцлөөр хэрэгжих тохиолдолд Зөвлөх сонгох хугацааг багасгах боломжтой. - Инженерийн шугам сүлжээг шилжүүлэхэд бүх шугам сүлжээний газруудтай зөвшилцөж, одоо ашиглагдаж буй материалаар төлөвлөж байгаа бөгөөд шилжүүлэх зардлын тухайд ч холбогдох байгууллагуудаар нягталж, магадлуулсаи болно. - Нарийвчилсан зураг төслийн үед ус зайлуулах төсөллөгөөг нарийвчлан шалгахаар эцсийн тайланд анхаарч ажиллах нэмэлт ажил хэмээн тусгав(Эцсийн тайлангийн 16-р бүлэг)
9	УБ хотын Замын хөдөлгөөний удирдлагын төв	2013-3-26 1/226	- Төслийг дэмжиж байна - Гэрлэн дохио, замын хөдөлгөөний хяналтын камер, хөдөлгөөний хурд мэдрэгч суурилуулах - Шилэн кабелиар холбох	- (Ойлгосон) - Тоног төхөөрөмж, түүнийг суурилуулах зардалд ойролцоогоор 500 сая төгрөг шаардлагатай бөгөөд энэхүү тоног төхөөрөмжийн зардлыг эцсийн тайланд тусгав (7 болон 11-р бүлэг)
10	“УБ Дулааны шугам сүлжээ” ХК	2013-2-262/238	- Дулааны шугамыг нягтлан үзэх, хамгаалалтын зурвасыг баримтлах - Нэвтрэх сувагт оруулах ажлын зардлыг тусгаж, гүйцэтгүүлэх - Ажлын зардлыг төслийн зардалд тусгаж, ажлыг гүйцэтгүүлэх	- 1ø1000мм, 2 ø 800мм-н голчтой 7а магистрал шугамыг шилжүүлэхгүйгээр зураг төслийг төлөвлөж байгаа(Зураг No.144)тул нэвтрэх суваг хийх шаардлагагүй. - SOT-3 зүүн урд талд Дундгол дээгүүр гарч байгаа ø 400мм-н голчтой дулааны шугамын тухайд ДШС-ээс ирүүлсэн шилжүүлэлтийн зардлаар тооцож байна.(6-р бүлэг) - ИШС-г шнлжүүлэх зардлыг (6-р бүлэг)тусгав.
11	“УБ Цахилгаан түгээх станци” ХК	2012-12-24	- Цахилгааны шугамыг шилжүүлэх ажлын төлөвлөгөө, тойм төсөвт өртгийг хүргүүлсэн	- Бидэнд ирүүлсэн шилжүүлэх ажлын зардлыг тусгав (Эцсийн тайлангийн, 6-р бүлгийг үзнэ үү)
12	“Мэдээлэл Холбооны Сүлжээ” ТӨХК	2012-11-6 1/1052 өмнө өгсөн санал 2013-3-5 1/230	- Холбооны шугамыг шилжүүлэх ажлын үнийн саналыг С798/2012 тоот техникийн нөхцлөөр хүргүүлсэн - Гүүрний их биеийн дагуу холбооны сувагчлал суурилуулах	- Бидэнд ирүүлсэн шилжүүлэх ажлын зардлыг тусгав(Эцсийн тайлангийн 6-р бүлгийг үзнэ үү) - Одоогийн байдлаар гүүрний их биеийн дагуу холбооны сувагчлал хийх төлөвлөгөө байхгүй ч, нарийвчилсан ажлын зураг төслийг боловсруулах үед тухайн шаардлагад нийцүүлэн эцсийн тайланд анхаарч ажиллах нэмэлт ажил хэмээн тусгав(6-р бүлгийг үзнэ үү)
13	“Усны барилга байгууламж” ХК	2013-3-28 48тоот	- Дундголын 2013 оны хамгаалалтын далангийн шинэчлэлтийн ажлын төлөвлөөгөөтэй уялдуулах	- Далангийн ажлын төлөвлөгөөг Дундголын далангийн шинэ ажлын төлөвлөөгөөнд тусгасан урсацын хэмжээтэй адил төсөллөсөн.(Эцснйи тайлангийн 7-р бүлгийг үзнэ үү)Нарийвчилсан зураг төслийн шатанд

				шинэ далангийн ажлын төлөвлөөтэй уялдуулан ажиллах талаар дахин шалгаж, эцсийн тайланд анхаарч ажиллах нэмэлт ажил хэмээн тусгав(16-р бүлгийг үзнэ үү)
14	Ус сувгийн удирдах газар	2012-11-7 1/1406 өмнө өгсөн санал 2013-4-1 1/485	- Туул-1 Бохир усны коллекторын анхны зураг өөрчлөгдсөн тул дахин судалж үзэх	- Өөрчлөлт орсон байршлыг нягталж үзээд, төслийн хүрээний байршилтай холбогдохгүй болохыг нягталсан.(Бусад бохирын шугамыг шилжүүлэх ажлын зардлыг тайлангийн 6-р бүлгээс үзнэ үү)

Appendix-13

Discussion with Authorities Concerned

Contents of Discussion with Authorities Concerned

Contents of discussion and the focal person of the authorities concerned with the Project are as follows. Utility relocation plans and its costs were discussed and confirmed with them based on drawing of the relocation plan as attached to “Annex-Drawings” of this report.

Authorities	Person in charge	Contents of Discussion
Mongolian-Russian Joint Stock Company Ulaanbaatar Railway	• Mr. Erdeneburgan (Head of Department of Technical Policy and Design) • Mr. Gombosuren SEREENEN DORJ (Chief Engineer, Department of Technical Policy and Design) • Mr. D. Chinzorig (Engineer Department of Technical Policy and Design)	• Window Time（time for temporary operation adjustment ） can be secured for 6 hours in main truck and more than 6 hours in feeder line. • Location of Piers and foundations in the premise of the railway and vertical clearance under the flyover. • Bridge Erection Plan above railway truck. • Utility relocation plan and its cost for the Project.
UB City Heating Network Company	• Sh.MUNKHJARGAL(Chief Engineer) • Mr. D.BYAMBAOCHIR (Engineer) • Mr. BAYARSAIKHAN (Engineer)	• Relocation plan of heating pipes and its cost. • Identification of the heating pipes administrate by UB City Heating Network Company and UB Railway.
UB City Electricity Distribution Network Company	L.Tserendamba (Project Div.) B.Erdenebat (Design Div.) T. Battsetseg (Technical Policy Dep.)	• New project and exact location of ongoing project which establish new power substation and allocation of high voltage line financed by WB. • New high-voltage (35kVA) cable construction connected to new building.]
Ulaanbaatar Water Supply and Sewage Authority (USUG)	Ms. L.Dungarmaa (USUG, Engineer) Mr.S.Baatar (Engineer) Mr.T.Gantulga	• Administration boundary of water pipes between USUG and Railway Authority.. • Construction route of new sewage trunk (φ1200 Colgate Pipe)
ICT Network Company	Ms. T. Narmandakh (Engineer) Mr. Naranhishigt (Engineer)	• Relocation plan of existing underground communication cable and its cost. • Cable space attached to new flyover in the future was requested (to be discussed during DD stage.).