

Initial Environmental Examination

Project Number: 39256 MON
February 2012

Mongolia: Urban Transport Development Investment Program (MFF, Tranche 1)

Prepared by the Municipal Government of Ulaanbaatar for the Asian Development
Bank (ADB)

CURRENCY EQUIVALENTS

(as of 10 February 2012)

Currency unit	–	Mongolian Tughrik (MNT)
MNT1.00	=	\$0.000755
\$1.00	=	MNT1,325

ABBREVIATIONS

ADB	Asian Development Bank
AP	Affected Person
BRT	Bus Rapid Transport
BRT PMU	Bus Rapid Transport Project Management Unit
DI	Design Institute
EHSO	Environment, Health and Safety Officer
EHSMP	Environmental, Health and Safety Management Plan
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
GHG	Greenhouse Gas
GRM	Grievance Redress Mechanism
IEE	Initial Environmental Examination
LARP	Land Acquisition and Resettlement Plan
LIEC	Loan Implementation Environmental Consultants
MFF	Multi-Tranche Financing Facility
MUB	Municipality of Ulaanbaatar
MNET	Ministry of Nature, Environment And Tourism
PIS	Project Impact Significance
PM	Particulate Matter
NO ₂	Nitrogen Dioxide
PCB	Polychlorinated biphenyl
PMU-SU	Safeguards Unit
PPCU	Project Public Complaints Unit
RIS	Residual Impact Significance
RP	Resettlement Plan
SO ₂	Sulphur Dioxide
SPS	Safeguard Policy Statement
UNFCCC	United National Framework Convention on Climate Change
WHO	World Health Organization

WEIGHTS AND MEASURES

°C	–	degree Celsius
km	–	kilometer
m	–	meter
dB	–	Decibel
L _{Aeq}	–	Equivalent Continuous Level 'A weighting' - 'A'-weighting = correction by factors that weight sound to correlate

with the sensitivity of the human ear to sounds at different frequencies

NOTES

In this report, "\$" refers to US dollars
Aimag - Provincial country division
Khoroo – sub-district division

This initial environmental examination is a document of the borrower. The views expressed herein do not necessarily represent those of ADB's Board of Directors, Management, or staff, and may be preliminary in nature. Your attention is directed to the "Terms of Use" section of this website.

In preparing any country program or strategy, financing any project, or by making any designation of or reference to a particular territory or geographic area in this document, the Asian Development Bank does not intend to make any judgments as to the legal or other status of any territory or area.

TABLE OF CONTENTS

I.	EXECUTIVE SUMMARY	2
A.	PROJECT INTRODUCTION AND PURPOSE.....	2
B.	DESCRIPTION OF THE ENVIRONMENT.....	3
C.	ALTERNATIVES.....	4
D.	PROJECT CATEGORIZATION AND ENVIRONMENTAL RISK	4
E.	ENVIRONMENTAL IMPACTS AND MITIGATION DURING CONSTRUCTION.....	5
F.	ENVIRONMENTAL IMPACTS AND MITIGATION DURING OPERATION.....	6
G.	PUBLIC CONSULTATION AND GRIEVANCE REDRESS MECHANISM (GRM)	6
H.	ENVIRONMENTAL MANAGEMENT AND MONITORING PLAN	6
I.	CONCLUSION	6
II.	INTRODUCTION	8
A.	INTRODUCTION AND PURPOSE	8
B.	ENVIRONMENTAL CATEGORIZATION, ADB AND MON APPROVAL OF IEE	8
C.	STRUCTURE OF THIS IEE REPORT.....	9
III.	POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK	10
A.	MONGOLIA'S ENVIRONMENTAL POLICY	10
B.	ENVIRONMENTAL IMPACT ASSESSMENT REQUIREMENTS	12
IV.	DESCRIPTION OF THE PROJECT.....	16
A.	JUSTIFICATION AND RATIONALE.....	16
B.	PROJECT COMPONENTS AND SUBCOMPONENTS UNDER TRANCHE 1	18
IV.	DESCRIPTION OF THE ENVIRONMENT	24
A.	PROJECT'S AREA OF INFLUENCE	24
B.	GEOGRAPHY, TOPOGRAPHY AND GEOLOGY.....	25
C.	METEOROLOGY AND CLIMATE	26
D.	HYDROLOGY, SURFACE WATER QUALITY	26
E.	AIR QUALITY	28
F.	NOISE	30
G.	CLIMATE CHANGE	31
H.	NATURAL DISASTERS.....	32
I.	ECOLOGICAL RESOURCES	33
J.	PHYSICAL CULTURAL RESOURCES	34
K.	SOCIO-ECONOMIC SITUATION	36
L.	LAND USE, URBAN DEVELOPMENT MASTER PLAN	38
V.	ALTERNATIVE ANALYSIS.....	40
A.	WITH AND WITHOUT PROJECT ALTERNATIVES.....	40
B.	TRANSPORT CORRIDOR OPTIONS AND PUBLIC TRANSPORT ALTERNATIVES SELECTION	40
VI.	ANTICIPATED IMPACTS AND MITIGATION MEASURES.....	42
A.	POSITIVE IMPACT AND ENVIRONMENTAL BENEFITS.....	42
B.	SCREENING OF POTENTIAL IMPACTS	43

C.	IMPACTS AND MITIGATION MEASURES ASSOCIATED WITH PROJECT LOCATION, PLANNING AND DESIGN	48
D.	ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES DURING CONSTRUCTION	48
E.	ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES DURING OPERATION....	58
F.	INDIRECT AND CUMULATIVE IMPACTS	59
G.	UNANTICIPATED IMPACTS DURING CONSTRUCTION AND OPERATION	61
VII.	ECONOMIC ASSESSMENT	62
A.	ENVIRONMENTAL MANAGEMENT AND MITIGATION COSTS	62
VIII.	CONSULTATION, PARTICIPATION AND INFORMATION DISCLOSURE	64
A.	CONSULTATION DURING PROJECT PREPARATION	64
B.	FUTURE CONSULTATION PROGRAM.....	69
C.	INFORMATION DISCLOSURE	70
IX.	GRIEVANCE REDRESS MECHANISM.....	71
A.	CURRENT PRACTICE IN MONGOLIA	71
B.	PROPOSED GRIEVANCE REDRESS MECHANISM FOR THE PROJECT	72
C.	TYPES OF GRIEVANCES EXPECTED AND ELIGIBILITY ASSESSMENT	72
D.	GRM STEPS AND TIMEFRAME	73
X.	ENVIRONMENTAL MANAGEMENT PLAN	75
A.	OBJECTIVE AND STRUCTURE	75
B.	IMPLEMENTING ORGANIZATIONS AND THEIR RESPONSIBILITIES	75
C.	SUMMARY OF POTENTIAL IMPACTS AND MITIGATION MEASURES	77
D.	ENVIRONMENTAL MONITORING AND INSPECTION	87
E.	INSTITUTIONAL STRENGTHENING AND TRAINING	90
F.	ENVIRONMENTAL REPORTING	92
G.	MECHANISMS FOR FEEDBACK AND ADJUSTMENT.....	93
XI.	CONCLUSIONS	94
A.	PROJECT RISKS AND ASSURANCES	94
B.	MAJOR ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES.....	95
C.	OVERALL CONCLUSION.....	96

APPENDICES

- 1. SITE BASELINE DESCRIPTIONS**
- 2. ENVIRONMENTAL MONITORING INTERVIEW FORMS**
- 3. GENERAL EIA (PREPARED BY MNET)**

I. EXECUTIVE SUMMARY

A. Project Introduction and Purpose

1. This Initial Environmental Examination (IEE) has been prepared for the first tranche of the Urban Transport Development Project (multi-tranche financing facility (MFF)) in Ulaanbaatar, Mongolia. The comprehensive investment program aims to (i) improve road infrastructure bottlenecks to maximize the road network capacity; (ii) apply traffic management measures to increase traffic flow efficiency and safety; (iii) develop and implement parking, traffic, and travel demand management policies; (iv) develop a BRT-based public transport system; and (v) improve the public transport management and quality of services. The first tranche, covered in this IEE, comprises the following components:

- (i) **Component A: Bridge Improvements.** This component will improve traffic flows across Peace Bridge in the center of Ulaanbaatar. The bridge will be widened either side of the existing structure to allow additional traffic lanes for the BRT. The new lanes will follow the existing bridge structure across the river bed and railway, taking account of the existing pier locations. Two new slip lanes will allow the BRT to access to Namii Road running East-West to the South of the city.
- (ii) **Component B: Road Improvements.** This component includes the upgrade of two road sections (7.7 km) along the North-South transport corridor. The road improvements will include road widening, surface improvement, improvement of pedestrian facilities (sidewalks, road crossings, lighting) and stormwater drainage.
- (iii) **Component C: Electric Trolleybus Infrastructure.** The component includes the replacement of overhead infrastructure including electric wiring and feeder cables. The component also includes the installation of two sub-stations along the North-South corridor.
- (iv) **Component D: BRT Corridor Improvements.** This component includes the construction of BRT stations and a dedicated BRT line in the median of the road, delineated by physical barrier. Safety improvements include pedestrian sidewalks and crossings. Additional improvements along the corridor include changes to intersection geometry to improve traffic flows. The corridor runs North-South across the city (14 km).
- (v) **Component E: Intelligent Transport System.** This component involves the development of systems to improve public transport management and includes a smart card system and Geographical Positioning System (GIS) technology to track vehicles. Component C is not considered further in this IEE as it is not related to infrastructure provision or other activities which are likely to have negative impacts on the environment or community health and safety, and do therefore not require an environmental assessment.
- (vi) **Component F: Capacity Building and Skills Transfer.** The project will work with MUB to promote economic efficiency, institutional and organizational development, and urban environmental improvement. Institutional development for the project will include establishing a public transport committee set up by MUB by end of 2012; and training for MUB's staff in the Public Transport, Urban Development and Road Departments. The project will also conduct a series of training related to environmental management.

2. The IEE describes the baseline environmental conditions, including physical, ecological and socio-economic resources in the project area, assesses environmental impacts of the proposed activities, and provides mitigation measures. The IEE presents the public consultation process undertaken and the Grievance Redress Mechanism established. The IEE includes an environmental management plan (EMP) with an environmental monitoring plan. It has been prepared following ADB's Safeguard Policy Statement (SPS, 2009).

3. The objectives of this IEE are to: (i) provide necessary baseline data about the project; (ii) provide understanding on potential impacts of the project; (iii) provide information on potential mitigation measures to minimize negative impacts including mitigation costs; (iv) provide information on the public consultation process undertaken, and the project level Grievance Redress Mechanism (GRM) established; and (v) formulate Environmental Management and Monitoring Plans (including definition of institutional responsibilities, capacity building and training plans, and budgeting).

B. Description of the Environment

4. Mongolia has a severe continental climate. Ulaanbaatar is the coldest national capital in the world, with temperatures ranging from approximately -30 °C to +25°C. The country is also prone to severe winters, known as *zud*. The winters of 1999, 2000 and 2001 were *zud* years, which resulted in the deaths of more than 25% of the livestock population.

5. Ulaanbaatar is located in the Tuul River Basin. Currently the Tuul river is suffering from pollution, some caused by Ulaanbaatar's central sewage treatment facility, as well as heavy mineral and sedimentation pollution caused by gold mining in the Zaamar area. The Selbe River, a tributary of the Tuul River, flows along the Eastern side of Ulaanbaatar, becoming the Dond Gol river when flowing along the Southern side, eventually meeting the Tuul approximately 20 km downstream of the city. Many urban development activities have been implemented near the Tuul River and in its watershed including the Selbe River. This has led to the degradation of water quality, exacerbated by pollution (sewage and garbage) from unplanned settlements, particularly in the *ger* areas.

6. Air pollution in Ulaanbaatar is a major concern. Pollution levels have surpassed standard levels with adverse effects on environment and the population's health and well-being. Transportation is a major contributor to air pollution. Major air pollutants in Ulaanbaatar include fine particulate matter (PM_{2.5} and PM₁₀), sulphur dioxide (SO₂), nitrogen oxides (NO_x), and carbon monoxide (CO). Many of the diesel and petrol-run vehicles are outdated and do not meet environmental and safety standards.

7. Poor city planning also impacts on air quality. Approximately half the city's population lives in *gers*; the main *ger* district is at a higher elevation than the rest of the city. This results in the air emissions from *gers* travelling over the city, where they are often trapped by temperature inversion conditions.

8. Ambient noise levels throughout the city centre are consistent with little fluctuations. Average noise levels comply with Mongolian standards, but periodically exceed the standards especially along transport corridors, as traffic is the major source of noise in the urban area.

9. Localized flooding can be caused in the city through heavy rain events because of poor surface water drainage. This flooding is ephemeral and the water subsides rapidly. More than 75% of precipitation in the city occurs in July and August.

10. The project is based in Ulaanbaatar city and as such, ecological resources are

limited. The project will not encroach on legally protected sites; the project is sited in a crowded and noisy location, which has very little vegetation or exposed ground which may form habitats for fauna. However there is a limited number of bird species observable in the city, such as crows and sparrows, common to many urban environments. The project will not encroach on any physical cultural resources, but protective measures will be required to ensure no damage to the Winter Palace of Bogd Khan, which is located 100m from the project road.

C. Alternatives

11. Traffic congestion in the city is an issue, compounded by rising levels of vehicle ownership. Private vehicle ownership in Mongolia doubled between 2000-2007 while in Ulaanbaatar it tripled during the same period.

12. The without-project scenario would result in continued urban congestion, poor connection of *ger* areas with the urban core, high incidence of traffic accidents, poor pedestrian safety and comfort, and a lack of reliable public transport in the City. The situation would gradually worsen, compounded by a growing population. Economic development and the standard of living would decline leading to weakened competitiveness of the city and its attractiveness for outside investments. This would impede further social and economic development for Ulaanbaatar's citizens.

13. Compared to the without-project alternative, the with-project alternative will contribute to vehicular emission reductions and hence improved ambient air quality through more efficient motor vehicle use, improved public transport provision and shorter travel time. Following implementation of all MFF project Tranches, the improvement of intersections will lead to an average decrease of fuel consumption of 500-1800 l/h for each intersection. The annual emission reduction volume after completion of 3 BRT lines (after completion of the 3 project tranches) is estimated at around 100,000 t-CO_{2eq}. This reduction is achieved through (i) reduction of number of buses by 30%; and (ii) replacement of old and polluting buses by Euro4 standard buses and electric trolleybuses.

14. The improved road conditions and transport network will also help reduce traffic congestion and accidents. Pedestrian safety will be significantly improved along the BRT corridor through intersection and sidewalk improvements and pedestrian crossings. The project will also reduce the risk of local floods through improved road drainage.

15. Project specific alternatives considered during project preparation included (i) BRT corridors and thus roads to be improved under Tranche 1; (ii) type of public transport system; and (iii) the intersections to be improved under Tranche 2.

D. Project Categorization and Environmental Risk

16. Tranche 1 of the proposed project investment program was categorized "B" for environment, requiring an Initial Environmental Examination (IEE) in accordance to ADB's Safeguard Policy Statement 2009. The principal impacts identified during screening mainly relate to the construction phase. These are (i) increased traffic congestion which will contribute to the already slow traffic flows; (ii) increased noise and dust levels; (iii) possible impact on approximately 180 trees along the north-south transport corridor; and (iv) occupational and community health and safety issues. These impacts are considered reversible and site specific and can be mitigated to acceptable levels through sound environmental management planning.

17. The main project risks related to environment include: (i) low institutional capacity for environmental management and the possibility that the PMU and IA will fail to monitor the

environmental impact and implement the EMP during the construction and operation of the project; (ii) contractors may expect, or be expected by MUB, to work 24 hours a day, which is normal practice in Ulaanbaatar; (iii) increased nuisance levels for residents and businesses along the project roads, bridge widening neighborhood and BRT corridor due to traffic congestion, noise and dust; (iv) unplanned borrow pit and spoil disposal of road components, which could result in unacceptable environmental impacts; (v) occupational and community health and safety; and (vi) changes to the Mongolian EIA legislation, in draft with MNET during the time of this IEE study.

18. Mitigation measures are specified in the Environmental Management Plan (EMP) in order to ensure impacts are managed to an acceptable level. Assurances addressing these risks were defined, and will be incorporated in the loan agreement as loan covenants to ensure that the measures are implemented fully and on schedule.

E. Environmental Impacts and Mitigation During Construction

19. Land acquisition and resettlement impacts include a total of 27 households with approximately 162 affected persons¹ and the loss of 9012,05 m² of commercial land along the road in T1-A and T1-B of the North-South transport corridor. No impacts are anticipated to public/community facilities, agriculture land, pastures, and crops. The impacts are limited to the small commercial assets such as kiosks and shops/vendors along the existed road. In total, 379,1 m² of structures will be affected. Affected kiosks along the road will be relocated to new locations while the costs for other structures will be compensated, of which 5 will be partly affected and 14 deemed to have permanent impact. Tranche 1 project is classified as Category B² for land acquisition and resettlement. A land acquisition and resettlement plan was prepared and approved.

20. The Selbe River runs along two road sections which are to be widened; surface water drainage will be installed which may give rise to impacts on the Selbe river. Although the river is considered of low ecological value, and is not used as a potable drinking water source, the water will be protected by the project. Protection measures include containing wastes and chemicals during construction, ensuring construction workers sewage is properly collected, and installation of appropriate pre-treatment of stormwater drainage water prior to discharge to the Selbe river if deemed appropriate in the design stage.

21. The Dond Gol river bed lies under Peace Bridge, which is to be widened either side. The river bed is approximately 65 m wide under the existing bridge and predominantly dry with established scrub and grasses colonizing the bed as the river is channelized. As for the Selbe river, the Dond Gol is considered of low ecological value. Protection measures during construction include effective management and containment of construction materials including chemicals and wastes. Pollution control measures on the bridge to contain spills from vehicle accidents or polluted run-off may be deemed appropriate at the detailed design stage.

22. The project will not have significant impacts on fauna, but may require the removal of some of the 180 trees along Chinggis Avenue (T1-B). The trees are of low ecological value, however under Forest Law the trees will be replaced and a tree management plan will be developed and implemented.

¹ Estimations made based on available data for 16 AHs that suggest the median size of AHs family as 6 members. Data about some AHs is unavailable, i.e. households which were not available or not interested in taking part in census.

² According to ADB OM/F1 (March 2010), involuntary resettlement impacts are considered significant if 200 or more people will experience major impacts, which are defined as: (i) being physically displaced from housing, or (ii) losing 10% or more of their productive assets (income generating).

23. Community health and safety will be improved when the BRT project is completed through improved road safety and decreased air pollution. However during construction any risks to the community will be mitigated, including a traffic control and operation plan with an emphasis on public safety, and clear signage at construction areas with security fencing to discourage access.

24. Occupational health and safety issues inevitably arise during construction. These risks will be mitigated through stringent on site management controls. Contractors will be required to engage an Environment, Health & Safety Officer (EHSO), ensuring that all reasonable steps are taken to protect any person on the site from health and safety risks. The construction site will be a safe and healthy workplace and machinery and equipment will be kept safe and in good working order.

25. During the road construction, BRT corridor improvements (including Peace Bridge) and trolleybus infrastructure rehabilitation, it is anticipated that congestion will increase temporarily. This may mean longer journeys for residents and business owners. Mitigation will include clear warning in advance of road closures, and a traffic control plan which must be approved by the Municipality of Ulaanbaatar.

F. Environmental Impacts and Mitigation During Operation

26. Water quality monitoring during operation will confirm the absence of negative impacts of the project on the Selbe and Dond Gol rivers. The project is anticipated to have a positive impact on Ulaanbaatar when it is operational, improving traffic flows, road safety, pedestrian safety and air quality at all project sites.

G. Public Consultation and Grievance Redress Mechanism (GRM)

27. Public consultation meetings were held in September 2009, June 2011 and July 2011 in Ulaanbaatar in preparation for this project. Participants included a representative cross section of stakeholders including government officers, NGOs, academics and residents. This comprehensive consultation indicated that the majority of the affected people had a positive attitude toward the project and believed it would benefit them in the long term through shorter journey times, increased safety, and an improved local environment. A GRM has been established to address public complaints related to project activities during project implementation and operation. The GRM was discussed with potentially affected people during the consultation for this IEE (June 2011) and they are now aware that a finalized GRM will be issued in advance of project construction.

H. Environmental Management and Monitoring Plan

28. An environmental management plan (EMP) was developed that identifies all mitigation measures required to protect the environment and public health and safety. The relevant aspects of the plan will be monitored during and after construction. The majority of the EMP monitoring will be undertaken by a dedicated Safeguard Unit in the PMU (PMU-SU). The PMU-SU will be responsible for ensuring implementation of the EMP, and will undertake inspections as well as interview potentially affected people throughout project implementation. Environmental parameters are also included in the monitoring plan; air quality, noise and water quality will be monitored by a licensed laboratory to confirm the anticipated low impact of the project on the environment during construction, and positive impact during operation.

I. Conclusion

29. The project will have environmental and socio-economic benefits, particularly when

combined with the remaining tranches which seek to implement a BRT system. The Tranche 1 components are all within an urbanized area devoid of any unique or sensitive or protected zones. The sites are well populated and are already established transport hubs or routes. The bridge widening crosses industrialized areas and a scrub encroached river bed. The environmental impacts from this bridge and the other components in Tranche 1 are expected to be minor and easily prevented or mitigated. If the prescribed mitigation measures are fully implemented, it is unlikely that the project will have significant adverse impacts. Environmental Management and Monitoring Plans have been prepared, with budgets and responsibilities for implementation assigned.

II. INTRODUCTION

A. Introduction and Purpose

30. This Initial Environmental Examination (IEE) has been prepared for the first tranche of the Urban Transport Development Project (multi-tranche financing facility (MFF)) in Ulaanbaatar, Mongolia. The project investment program aims to (i) improve road infrastructure bottlenecks to maximize the road network capacity; (ii) apply traffic management measures to increase traffic flow efficiency and safety; (iii) develop and implement parking, traffic, and travel demand management policies; (iv) develop a BRT-based public transport system; and (v) improve the public transport management and quality of services. The first tranche will (i) widen Peace Bridge with two dedicated BRT lanes; (ii) upgrade 7.7 km of a roads allocated for the North-South BRT corridor; (iii) rehabilitate electric trolleybus infrastructure along the North-South BRT corridor (14 km); (iv) prepare the North-South BRT corridor; (v) introduce an intelligent transport system (ITS); and (vi) promote capacity building and skills transfer.

31. The IEE has been prepared by the Project Preparatory Technical Assistance (PPTA) consultant on behalf of, and in close collaboration with, the Municipal Government of Ulaanbaatar. The IEE describes the baseline environmental conditions, including physical, ecological and socio-economic resources in the project area, assesses environmental impacts of the proposed activities, and provides mitigation measures. The IEE presents the public consultation process undertaken and the Grievance Redress Mechanism established. The IEE includes an environmental management plan (EMP) with an environmental monitoring plan. It has been prepared following ADB's Safeguard Policy Statement (SPS, 2009).

32. The **general objectives of this IEE** are to:

- (i) Provide necessary baseline data about the project;
- (ii) Provide understanding on potential impacts of the project;
- (iii) Provide information on potential mitigation measures to minimize negative impacts including mitigation costs;
- (iv) Provide information on the public consultation process undertaken, and the project level Grievance Redress Mechanism (GRM) established; and
- (v) Formulate Environmental Management and Monitoring Plans (including definition of institutional responsibilities, capacity building and training plans, and budgeting).

B. Environmental Categorization, ADB and MON approval of IEE

33. **ADB environmental categorization.** Tranche 1 of the proposed project investment program was categorized "B" for environment, requiring an Initial Environmental Examination (IEE). The principal impacts identified during screening arise during construction. These are (i) increased traffic congestion which will contribute to the already slow traffic flows; (ii) increased noise and dust levels; (iii) the removal of 180 mature trees; and (iv) occupational and community health and safety issues. These impacts are considered reversible and site specific and can easily be mitigated to acceptable levels through sound environmental management planning. This IEE report is prepared in accordance with ADB's Safeguard Policy Statement (2009) and was approved by the East Asia Regional Department (EARD) of ADB on 22 November 2011, and disclosed on ADB's

project website on 10 December 2011.

34. **MNET environmental categorization.** A formal request was submitted by the EA to the Ministry of Nature and Environment (MNET) to conduct a General EIA (screening), in accordance with the Mongolian Law on Environmental Impact Assessment (1998, amended in 2002). The General EIA was completed in December 2011. The General EIA concludes that the project does not require a full EIA, but specific conditions were defined to be addressed during project implementation (see **Appendix 3**). This IEE has addressed the specific requirements from MNET.

C. Structure of this IEE Report

35. The IEE report is organized as follows:

- (vii) **Executive Summary** (Chapter I) outlines important facts, major findings, and recommended actions of the IEE.
- (viii) **Introduction** (Chapter II) describes the purpose of this IEE, the environmental categorization by ADB and MNET based on an environmental screening, and the structure of the IEE.
- (ix) **Policy, Legal and Administrative Framework** (Chapter III) describes ADB's and the Mongolian environmental impact assessment requirements and procedures, and applicable environmental regulations.
- (x) **Description of the Project** (Chapter IV) provides a justification of the project based on a sector analysis; a detailed description of the project, including project location and components.
- (xi) **Description of the Environment** (Chapter V) defines the project's area of influence, and provides a description of the potentially affected environment. The description is based on reviews of available documentation, statistical data, meetings with experts in the field and field surveys and investigations. The ADB definition of the environment requires environmental assessments to address four aspects of the environment: (i) Physical Resources, including topography and soils, air and water quality, noise etc.; (ii) Ecological Resources – flora, fauna, and protected areas; (iii) Physical cultural resources; (iv) Socio-economic situation, including economic development, public health and education, and poverty; and (v) Land use.
- (xii) **Alternative Analysis** (Chapter VI) provides information on the project's location and conceptual alternatives, as well as "No action" alternative.
- (xiii) **Anticipated Impacts and Mitigation Measures** (Chapter VII) 6 provides an assessment of potential impacts of the proposed development in light of the existing conditions. Direct, indirect, induced and cumulative environmental impacts are assessed in this IEE. It assesses environmental impacts on soil, surface water, noise, flora, fauna, cultural heritage, health and safety, and social economy, during design, construction and operation. It also defines mitigation actions to prevent and/or otherwise mitigate unavoidable impacts expected to be incorporated as integral parts of the project.
- (xiv) **Economic Assessment** (Chapter VIII) makes a preliminary assessment of environmental costs.

- (xv) **Information Disclosure and Public Participation** (Chapter IX) provides information on public consultation activities undertaken during project preparation, and introduces the plan for future public consultation.
- (xvi) **Grievance Redress Mechanism (GRM)** (Chapter X) presents the GRM established to handle grievances and complaints arising during project implementation. It defines GRM entry points, timeframe and institutional responsibilities of the GRM.
- (xvii) **Environmental Management Plan** (Chapter XI) presents the EMP defined for Tranche 1. The EMP defines the mitigation measures, performance indicators, environmental monitoring requirements, institutional responsibilities, training activities related to environmental management, reporting requirements, and a mechanism for feedback and adjustment.
- (xviii) **Conclusions** (Chapter XII) summarizes the major environmental impacts and mitigation measures, defines project risks and required project assurances, and concludes on the environmental soundness of the project.
- (xix) **Appendices.**

III. POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK

A. Mongolia's Environmental Policy

36. Mongolia has enacted a comprehensive policy and legal framework for environmental assessment and management. It has policies, legislation and strategies in place to manage the protected estate, to satisfy its international obligations, and to protect the quality of the environment for the health and well-being of its citizens. The hierarchy of policies and legislative provisions for environmental management in Mongolia comprises five layers ranging from the Constitution to international treaties, and to environment and resources protection laws³.

37. The main policy documents are the National Environmental Action Plan of 1996, the State Environmental Policy of 1997, the National Plan of Action to Combat Desertification, the Biodiversity Conservation Action Plan, and the National Plan of Action for Protected Areas, all developed under the Ministry of Nature Environment and Tourism (MNET) auspices, as well as the Mongolian Action Program for the 21st Century. The National Environmental Action Plan was updated in 2000 and the National Action Plan for Climate Change was added in the same year. Several program documents (e.g. National Water Program, National Forestry Program, Program of Protection of Air, Environmental Education, Special Protected Areas, and Protection of Ozone Layer) were also completed at the turn of the decade. State policy on Environmental Impact Assessment was in place in 1998. In addition, other guidance documents with important environmental repercussions were developed under the auspices of other ministries and these include the Roads Master Plan, the Power Sector Master Plan, the Tourism Master Plan, and the Renewable Energy Master Plan. Other documents, such as the annual Human Development Reports have increasingly incorporated environmental aspects.

38. A fundamental principle of the Mongolian state environmental policy is that economic development must be in harmony with the extraction and utilization of natural resources and

³ UNDP. 2008. *Institutional Structures for Environmental Management in Mongolia*. Ulaanbaatar and Wellington.

that air, water and soil pollution will be controlled. In April 1996, Mongolia's National Council for Sustainable Development was established to manage and organize activities related to sustainable development in the country. The country's strategy is designed for environmentally friendly, economically stable and socially wealthy development, which emphasizes people as the determining factor for long-term sustainable development.

39. The health of Mongolia's natural ecosystems and populations of wild species is of both national and global importance. The country forms an important part of the global ecosystem in the ecological transition zone in Central Asia, where the great Siberian taiga, the Central Asian steppe, the high Altai Mountains, and the Gobi desert converge. In recognition of its global responsibilities, Mongolia has acceded to a number of international environmental conventions and the key ones are tabulated below (**Table 1**).

40. Each of these conventions places obligations on signatory governments ranging from the provision of a legislative basis for implementation, to adherence to the requirements and conditions of each convention, to monitoring implementation performance on a regular basis, to reporting on a regular basis and to the conference of parties.

Table 1: International Environmental Conventions Signed by Mongolia

Convention	Year of Accession
Convention on Biological Diversity (CBD)	1993
UN Framework Convention on Climate Change (UNFCCC)	1994
Kyoto Protocol	1999
UN Convention on Combating Desertification (UNCCD)	1996
Convention on the Protection of Wetlands of International Importance (Ramsar)	1998
Vienna Convention for the Protection of the Ozone Layer	1996
Montreal Protocol (regulating substances that deplete the ozone layer)	1996
Convention on International Trade in Endangered Species of Fauna and Flora (CITES)	1996
Convention on the Transboundary Movement of Hazardous Waste (Basel)	1997
Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade	2000
Stockholm Convention on Persistent Organic Pollutants (POPs)	2004
World Heritage Convention	1990

41. The Government of Mongolia undertook a major environmental law reform in 1990 including the law of land, protected areas, water, forest, wildlife, and native flora resources. The legislation base is extensive as evidenced by the following table of key environmental legislation.

Table 2: International Environmental Conventions Signed by Mongolia

Name of the Law	Year Adopted
The Constitution of Mongolia	1992
Law on Environmental Protection	1995, 2006, 2008
Law of Land	2002
Law on Land Cadastre and Mapping	1999
Law on Land Fees	1997
Law on Land Possession	2002
Law on Special Protected Areas	1994
Law on Buffer Zones	1997
Law on Water	2004
Law on Water and Mineral Water Resource Fee	1995
Law on Forests	1995
Law on Prevention of Steppe and Forest Fires	1996

Law on Reinvestment of Natural Resource Use Fees for Conservation	2000
Law on Natural Plants	1995
Law on Protection of Plants	1996
Law on Fauna	2000
Law on regulation of export and import of endangered species (flora, fauna)	2002
Law on Underground Resources	1994
Law on Mineral Resources	1997, 2006
Law on Petroleum	1991
Law on Air	1995
Law on Hydrometeorology	1997
Law on Protection from Toxic Chemicals	1995
Law on Environmental Impact Assessment	1998, 2002
Law on Tourism	1998
Law on Solid Waste	2003
Law on prohibiting export and transportation of Hazardous Waste	2000

B. Environmental Impact Assessment Requirements

42. The project is subject to the environmental requirements of both Mongolia and those of ADB. These requirements are defined in the next two sections.

1. Environmental Assessment Requirements of ADB

43. Environmental safeguards requirements, including environmental impact assessment requirements, are defined in ADB's Safeguard Policy Statement (2009). All projects funded by ADB must comply with SPS 2009. The purpose of the SPS 2009 is to establish an environmental review process to ensure that projects undertaken as part of programs funded under ADB loans are environmentally sound, are designed to operate in compliance with applicable regulatory requirements, and are not likely to cause significant environmental, health, or safety hazards. The SPS 2009 provides the basis for this IEE. With respect to the environment, the SPS 2009 is underpinned by the ADB Operations Manual, Bank Policy (OM F1, 2010). The policy promotes international good practice as reflected in internationally recognized standards such as the *World Bank Group's Environmental, Health and Safety Guidelines*⁴.

44. Environmental assessment requirements of SPS 2009 specify that:

- (i) At an early stage of project preparation, the borrower/client will identify potential direct, indirect, cumulative and induced environmental impacts on and risks to physical, biological, socioeconomic, and cultural resources and determine their significance and scope, in consultation with stakeholders, including affected people and concerned NGOs. If potentially adverse environmental impacts and risks are identified, the borrower/client will undertake an environmental assessment as early as possible in the project cycle. For projects with potentially significant adverse impacts that are diverse, irreversible, or unprecedented, the borrower/client will examine alternatives to the project's location, design, technology, and components that would avoid, and, if avoidance is not possible, minimize adverse environmental impacts and risks;
- (ii) The assessment process will be based on current information, including an accurate project description, and appropriate environmental and social baseline data;

⁴ New Version of the "World Bank Group Environmental, Health, and Safety Guidelines", April 30, 2007, Washington, USA. <http://www.ifc.org/ifcext/enviro.nsf/Content/EnvironmentalGuidelines>

- (iii) Impacts and risks will be analyzed in the context of the project's area of influence;
 - (iv) Environmental impacts and risks will be analyzed for all relevant stages of the project cycle, including preconstruction, construction, operations, decommissioning, and post-closure activities such as rehabilitation or restoration;
 - (v) The assessment will identify potential trans-boundary effects as well as global impacts; and
 - (vi) Depending on the significance of project impacts and risks, the assessment may comprise a full-scale environmental impact assessment (EIA) for category A projects, an initial environmental examination (IEE) or equivalent process for category B projects, or a desk review.
45. Additionally, other key requirements of SPS 2009 include:
- (vii) *Environmental Management Plan*. The borrower/client will prepare an environmental management plan (EMP) that addresses the potential impacts and risks identified by the environmental assessment.
 - (viii) *Consultation and Participation*. The borrower/client will carry out meaningful consultation with affected people and other concerned stakeholders, including civil society, and facilitate their informed participation.
 - (ix) *Information disclosure*. The borrower/client will submit to ADB the following documents for disclosure on ADB's website: (i) a draft full EIA (including the draft EMP) at least 120 days prior to ADB Board consideration, and/or environmental assessment and review frameworks before project appraisal, where applicable; (ii) the final EIA/IEE; (iii) a new or updated EIA/IEE and corrective action plan prepared during project implementation, if any; and (iv) the environmental monitoring reports.
 - (x) *Grievance Redress Mechanism*. The borrower/client will establish a mechanism to receive and facilitate resolution of affected people's concerns, complaints, and grievances about the project's environmental performance.
 - (xi) *Monitoring*. The borrower/client will monitor and measure the progress of implementation of the EMP.
46. This IEE is intended to meet these requirements.

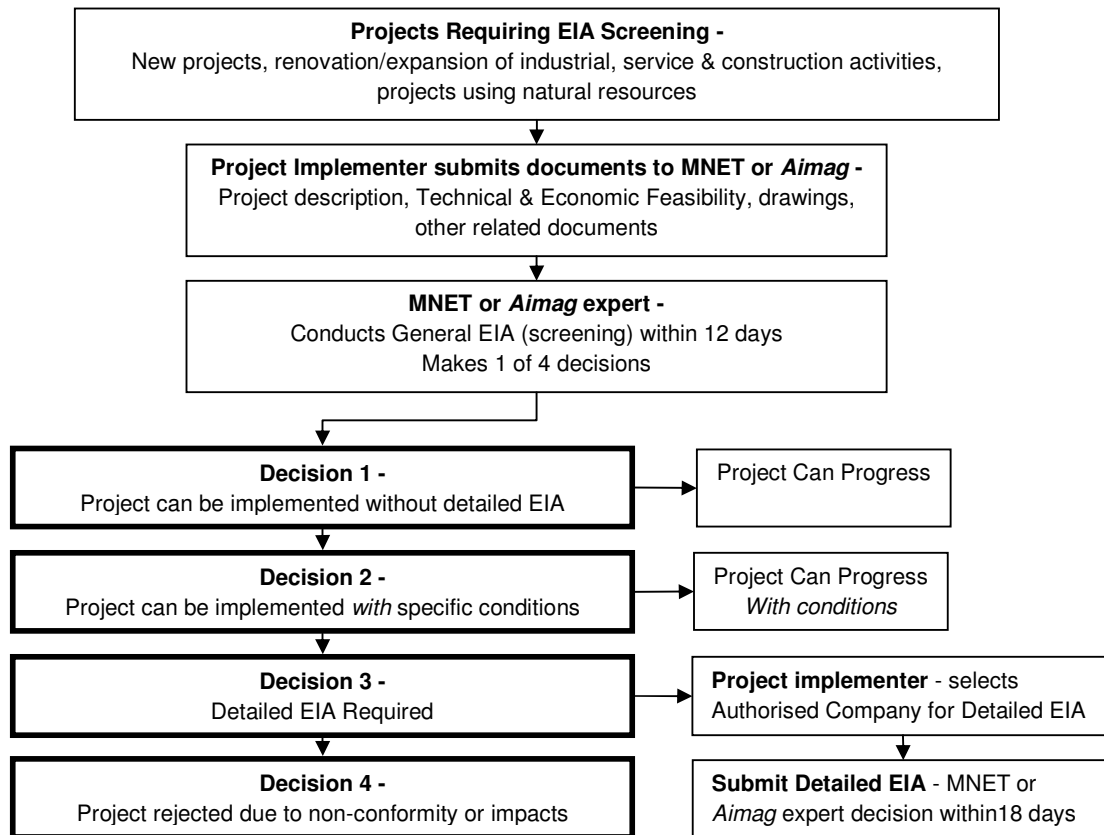
2. Environmental Assessment Requirements of Mongolia

47. The EIA requirements of Mongolia are regulated by the Law on Environmental Impact Assessment (1998, amended in 2002⁵). 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.
48. The purpose of the law is environmental protection, the prevention of ecological

⁵ Law of Mongolia on Environmental Impact Assessments (1998, amended in 2002). Unofficial translation available from <http://cdm-mongolia.com>. The EIA law is currently being revised. MNET confirmed that by Spring 2012 a new version of the Law will come into force. However at the time of this study, a version of the draft was not available.

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 in Figure 1.

Figure 1: EIA Process in Mongolia



Source: Adapted from Vol. 1 (2001) *Compendium of Laws: A Mongolian Citizens Reference Book*

49. The type and size of the planned activity define responsibility as either the Ministry of Nature, Environment and Tourism (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 MNET (or *Aimag* government) a brief description of the project including 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 MNET by means of a special procedure. The developer of the Detailed EIA should submit it to the MNET (or *Aimag* government). An expert of the organization who was involved in conducting General EIA should make a review of the Detailed EIA within 18 days and present it to MNET (or *Aimag* government). Based on the conclusion of the expert, the MNET (or *Aimag* government) takes a decision about approval or disapproval of the project.

- (iii) The Detailed EIA must contain the following chapters: (i) Environmental baseline data; (ii) Project alternatives; (iii) Recommendations for minimizing, mitigation and elimination of impacts; (iv) Analysis of extent and distribution of adverse impacts and their consequences; (v) Risk assessment; (vi) Environmental Protection Plan; (vii) Environmental Monitoring Program; and (viii) Opinions of residents on whether the project should be implemented.

50. On the EA's formal request, MNET has conducted a General EIA for tranche 1 (see **Appendix 4**). The General EIA concluded that no detailed EIA was necessary, and that the project may be completed pursuant to specific conditions. The conditions defined by MNET are described in **Table 3**. These conditions were addressed and incorporated into this IEE.

Table 3: General EIA Conditions Required by MNET

Condition	Period
Related project documents and permissions must be developed at proper level and necessary documents must be obtained.	At the beginning of the project
Project activities must be in compliance with the international and Mongolian standards.	At the commencement
Wastes from project operations should be stored at designated points, must be removed to the point set by the environmental, hygiene and infection control organizations according to a special schedule and carry out sanitation and disinfections at waste storage areas.	Regularly during operation
Lubricants and lubricant waste storage, transport and disposal must be organized in accordance with proper procedures.	Regularly during operation
Occupational safety during project implementation must be addressed in accordance with proper requirements.	Regularly during construction
A plan on environmental protection must be approved by the Capital City Environmental Protection Organization and its realization must be reported within a designated period.	Annually
Regular training should be provided for the staff during road and bridge construction and trolleybus line extensions. Environmental protection plan must incorporate clauses on meeting environmental requirements during BRT line and network extensions.	During project operation
Tentative research and a report on how extension of trolleybus numbers could eliminate city air pollution must be formulated and submitted to relevant organizations.	At the first phase of the project

IV. DESCRIPTION OF THE PROJECT

A. Justification and Rationale

1. Ulaanbaatar's Transportation Problem and its Consequences

51. **Rapid urbanization and increased travel demand.** Since the mid-1990s, Mongolia has experienced intensive urbanization and a high growth rate in the urban population. The population of Ulaanbaatar has doubled since 1998 reaching 1.17 million people in 2011. This increase is largely due to rural to urban migration as a result of the push factor caused by the underdevelopment of rural areas, and the pull factor of greater employment opportunities offered in the capital city. In Ulaanbaatar, the vast majority of urban migrants settle in *ger* areas, and travel demand has increased with population growth, urban expansion and commuting needs between *ger* areas and the urban core.

52. **Increased number of vehicles.** During the last decade, the number of registered vehicles in Mongolia has increased by 150%. Currently, about 35,000 vehicles are annually added to the Ulaanbaatar urban private vehicle pool, representing an increase of over 25% per year. The majority of the vehicles are causing congestion and emission problems in the already congested and polluted capital city. While technical and environmental standards for vehicle safety and emissions have been put in place, they are not sufficiently enforced. An improving economy will further stimulate car ownership, particularly if public transport systems are poor and no measures are taken to restrict car use⁶. The direct costs of increasing car ownership are higher road construction costs, higher fuel costs, travel time costs and increased garaging and parking requirements. The indirect costs include increased health costs and increased pollution levels. These costs are borne by society as a whole, and will have a detrimental social and economic impact on the quality of life in Ulaanbaatar. The project will seek to address these costs through improved public transport and traffic management in Tranche 1.

53. **Poor transport infrastructure and services.** Transport infrastructure and services in Ulaanbaatar are suffering from increasing road congestion, inefficient traffic management, poor safety conditions, and a weak public transport system. Most of the major intersections in the city center are suffering from severe congestion (220 seconds/vehicle) resulting in average speeds of 5–8 kilometers (km) per hour in the urban core during peak hours. Traffic congestion is aggravated by insufficient management and enforcement of parking, lack of pedestrian facilities, lack of driver discipline, and inadequate signaling and control. These factors contribute to economic inefficiency due to increased trip times, excessive fuel use, and health problems due to poor air quality, which all serve to reduce residents' quality of life and have a negative impact on the economic growth of the city.

54. **High traffic accident incidence.** Ulaanbaatar has a range of serious road traffic safety problems. The World Health Organization estimates that Mongolia has the 18th worst traffic accident incidence in the world. While the total number of recorded traffic accidents may have peaked in the year 2000 and appear to have been falling since then, the rates of traffic fatalities and personal injury accidents relative to the number of registered vehicles are at levels giving cause for concern. It is evident that, while the capital city is home for about 42% of the total population of Mongolia, Ulaanbaatar routinely accounts for over 70% of the annual traffic accidents in the country. A closer assessment of traffic fatality rates in Ulaanbaatar reveals the extent of the road safety issue. Ulaanbaatar has shown some reduction since 2000, although it continues to be above 7.5 deaths per 10,000 vehicles per year. In 2009 only, 918 people were killed on Ulaanbaatar's roads (**Table 4**).

⁶ ADB (2010) Draft Final Report, Urban Transport Development Project

Table 4: Road Traffic Accidents

Year	Accidents		Fatalities		Injuries	
	Mongolia	Ulaanbaatar	Mongolia	Ulaanbaatar	Mongolia	Ulaanbaatar
2003	1098	642	391	145	1224	692
2004	1062	609	385	143	1119	651
2005	1006	572	355	168	1046	643
2006	1133	619	378	152	1165	743
2007	1096	490	344	119	932	511
2008	977	334	313	59	891	394
2009	1387	786	317	98	918	511

Source: ADB (2010) Final Report: Urban Transport Development Project in Ulaanbaatar.

55. Major causes of accidents include⁷ (i) interference between motorized and non-motorized traffic (including pedestrians); (ii) poor knowledge of traffic rules; (iii) poor road pavement conditions; (iv) poor road markings and signage; (v) high-speed overtaking; (vi) poor weather conditions (ice and snow); and (vii) alcohol consumption. Discussions with the University of Science & Technology provided indications as to why there are high levels of accidents in Ulaanbaatar.

56. **Poor services and safety for pedestrians.** Pedestrian traffic in Ulaanbaatar accounts for approximately 30% of the daily traffic. If public transport users are included, pedestrian traffic represents 60% of the total traffic demand. Current services fall short to meet the demand and needs of pedestrians. The main problems include: (i) unpaved or poorly paved sidewalks, often misused by parked vehicles; (ii) insufficient width of pedestrian crossings especially in the urban core; (iii) crossings are not clearly marked; (iv) signal time is too short, especially for disabled and elderly people; (v) conflict with right-turn vehicles; (vi) lack of pedestrian protection facilities to segregate pedestrians from vehicles (such as pedestrian islands and safety fences). The poor services for pedestrians are also reflected in accident incidence statistics: According to the Ulaanbaatar traffic police, one third of the accidents in Ulaanbaatar involve pedestrians.

57. **Inadequate public transport services.** The public transport system in Ulaanbaatar is struggling with service quality, technical, financial, and institutional challenges. Public transport service has lagged behind the recent urban growth and majority of buses are more than 10 years old. Current public transport services are provided by a combination of trolley buses, diesel buses and taxis. The buses include large passenger buses as well as small minibuses; minibuses carry about 50% of public transport users, although it is reported that a half of these operators are illegal (unlicensed). Increasing traffic congestion also impacts on bus operating costs. The public transport tariffs do not fully cover the costs of the operators and about 40% of the passengers are subsidized by the municipal budget. Bus operators lack financial resources to renew and expand their bus fleet and provide adequate transportation services. The public transport routes are not designed as part of a feeder-and- main-line system, and the route allocation and management system needs to be improved.

58. **Increased air pollution.** Air pollution in Ulaanbaatar has been increasing to surpass standard levels with the adverse effect on the population's health and well-being as well as environmental balance. Particulate matter (PM₁₀ and PM_{2.5}) is the largest and relatively most severe air pollution problem in the City. Concentrations of sulphur dioxide (SO₂), nitrogen dioxide (NO₂), carbon monoxide (CO) also regularly exceed national air quality standards. Incidence of respiratory diseases is very high in Ulaanbaatar. The transport sector is a

⁷ Source: Statistics of Ulaanbaatar traffic police and University of Science & Technology (oral communication)

significant contributor to air pollution in Ulaanbaatar.

59. **Poverty-Transport Nexus.** The urban poor suffer disproportionately from an inadequate transport system. The road network in the *ger* areas, where many low income families live, is poorly maintained. Many primary feeder roads and un-surfaced connector roads are in poor conditions and represent a barrier for provision of public transport services. Poor public transportation services raise the cost of commuting and restrict access to jobs and services. The poor tend to be more exposed to risks associated with externalities in transport: they lack adequate means to avoid exposure to polluted air, face higher commuting distances and costs, and are particularly affected when there is a lack of provisions for pedestrians. The poor stand to benefit significantly from improved transportation services.

2. Objective and Approach of the Project Investment Program

60. The challenges and setbacks of Ulaanbaatar's urban transport system presented in Section 1 requires a comprehensive program that includes investments in infrastructure improvement combined with modern traffic management technologies, efficient and sustainable transport modalities, and institutional development.

61. The proposed investment program, which will comprise three tranches, aims to (i) improve road infrastructure bottlenecks to maximize the road network capacity; (ii) apply traffic management measures to increase traffic flow efficiency and safety; (iii) develop and implement parking, traffic, and travel demand management policies; (iv) develop a BRT-based public transport system; and (v) improve the public transport management and quality of services. The project investment program will be implemented in a period of about 8–10 years, starting in 2012. The expected total investments are about \$195.44 million.

62. The first tranche (\$69.9 million of which \$59.9 million is ADB loan), which is covered under this IEE, will (i) widen Peace Bridge with two dedicated BRT lanes; (ii) upgrade 7.7 km of a roads allocated for the North-South BRT corridor; (iii) rehabilitate electric trolleybus infrastructure along the North-South BRT corridor (14 km); (iv) prepare the North-South BRT corridor; (v) introduce an intelligent transport system (ITS); and (vi) promote capacity building and skills transfer. The investment component will be supplemented by grant assistance^{8, 9} aiming at (i) reducing and preventing road traffic accidents involving schoolchildren in poor *ger* areas of Ulaanbaatar; (ii) implementing effective public transport, traffic and parking management, traffic safety, and ITS policies and programs.

B. Project Components and Subcomponents under Tranche 1

63. This IEE covers for the first of three tranches of a Multitranche Financing Facility (MFF). Therefore this document, unless relevant, only refers to the components of Tranche 1 which are as follows:

64. **Component A: Bridge Improvements.** This component will improve traffic flows across Peace Bridge in the center of Ulaanbaatar. The bridge will be widened either side of the existing structure to allow additional traffic lanes for the BRT. The new lanes will follow the existing bridge structure across the river bed and railway, taking account of the existing pier locations. Two new slip lanes will allow the BRT to access to Namii Road running East-

⁸ The project team is preparing a Proposed Grant Assistance for Mongolia: Improving Road Safety of Poor Schoolchildren in Ulaanbaatar for potential financing from the Japan Fund for Poverty Reduction.

⁹ The project team is preparing the CDTA, which is attached to the project. The CDTA will develop MUB's capacity in the areas of urban transport planning, management, BRT operation, policy development and implementation, and public relations and consultations.

West to the South of the city.

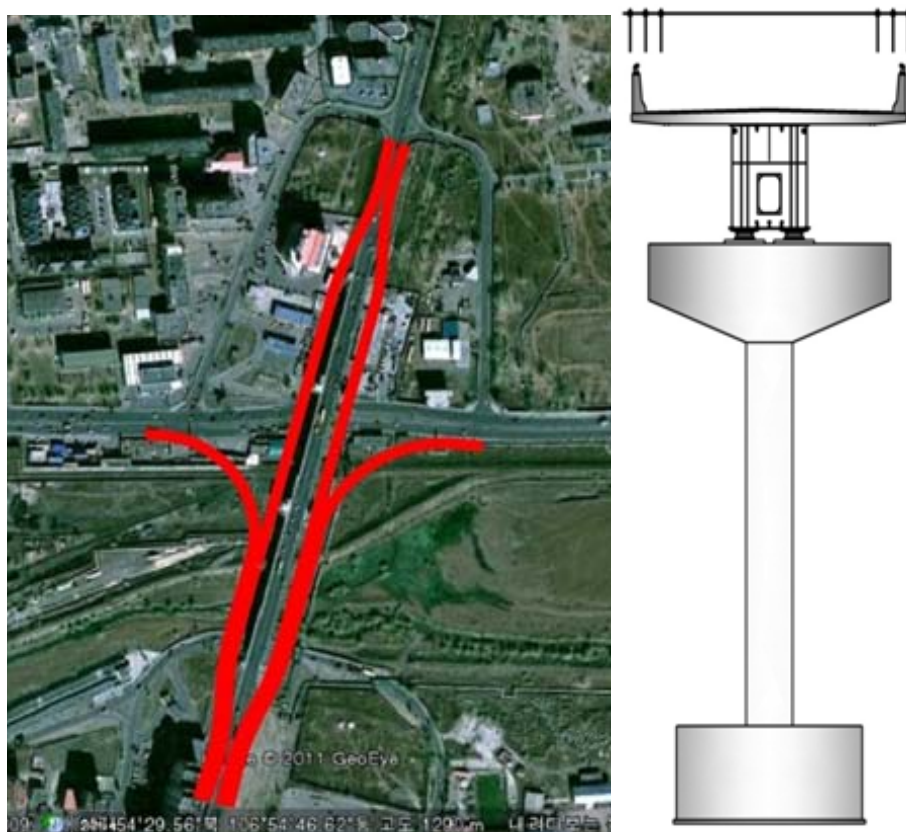
65. Peace Bridge runs North to South across the Dond Gol river, which is also known as the Selbe River when it borders the East of the city. The bridge is currently 4 lanes wide and has overhead wiring in place for trolleybuses. The bridge passes over the river bed containing a channelized river and the level of vegetation in the river bed indicates that the river bed is mostly dry. The bridge also passes over a single track railway line which is part of the trans-Mongolian railway route, linking with Russia to the North and China to the South. Either end of the bridge is in light industrial and residential areas where businesses include warehousing and car maintenance.

66. Figure 2 gives the location of Peace Bridge and Figure 3 gives a schematic indication of the new design including the location of the slip roads.

Figure 2: Component A Location – Peace Bridge



Figure 3: Peace Bridge Widening Schematics



Source: Traffic Management Team (ADB study team), *Traffic Management Report (2011)*

67. **Component B: Road Improvements.** This component includes the road upgrade of two sections of major arterial roads (i) Chingeltei Avenue (North, 4 km), and (ii) Chinggis Avenue (South, 3.7 km). The roads will remain within their existing legal boundaries but new surfacing will improve the quality and safety of the road and the road will be widened to within the current right of way, known as the Red Line, in Mongolia. The roads improvements will include road widening, surface improvement, improvement of pedestrian facilities (sidewalks, road crossings, lighting) and stormwater drainage.

68. Chingeltei Avenue (T1-A) is a major arterial road which connects the city with areas in the North including summer *Ger* areas. It is currently 4 lanes wide and ranges from 14.7 m to 16 m wide. It will be expanded to 26.5 m wide, reducing the size of the pedestrian area but including a new pavement 3 m wide on either side of the road. It runs through a *ger* area and the improved section of 2 km of road terminates in the North at the Dolon Buudal bus station, an important transport hub for the area, and starts in the South at the MT Gas Station junction.

69. Chinggis Avenue (T1-B) is a major arterial road to the South of Ulaanbaatar which connects the City with the airport area. It is currently four lanes wide in the north reducing to two lanes in the south as the road crosses Yarmag Bridge. The road will be improved over a distance of 3.6 km, from Peace Bridge to Yarmag Bridge. The road is between 9.1 m to 14.9 m wide and will be widened to 26.5 m including a 3 m pedestrian sidewalk either side of the road.

70. Figure 4 shows the location of Component B. T1-A is Chingeltei Avenue in the North;

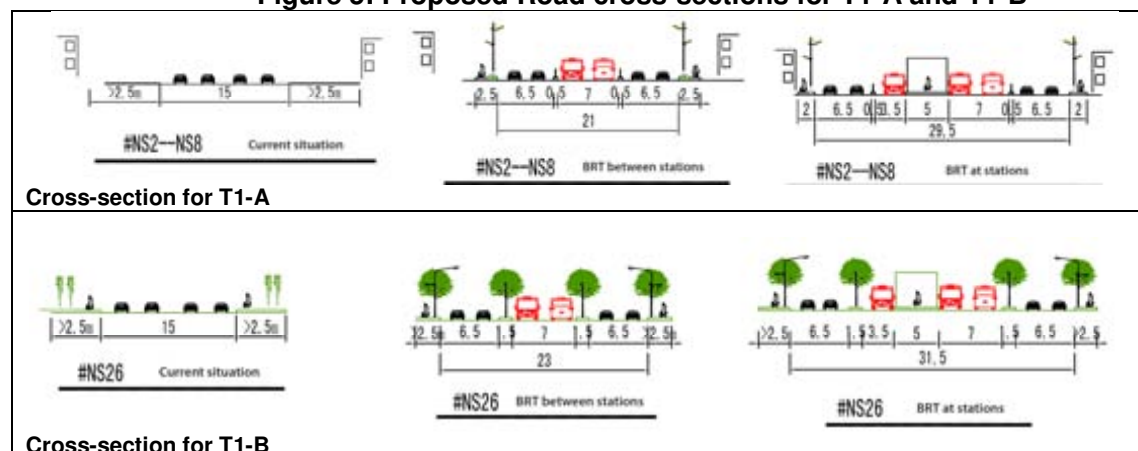
T1-B is Chinggis Avenue in the South. Figure 5 shows an example road improvement design.

Figure 4: Component B Location – Road Improvement



Source: Study Team Presentation to MUB

Figure 5: Proposed Road cross-sections for T1-A and T1-B

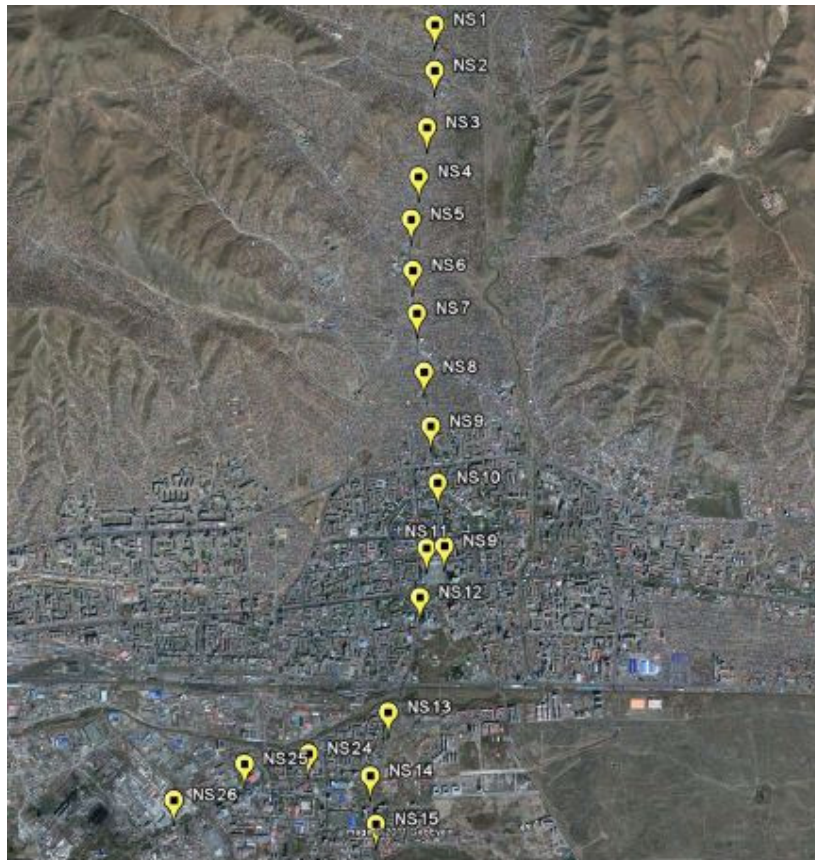


Source: ITDP (2011) Draft Report BRT in Ulaanbaatar

71. **Component C: Electric Trolleybus Infrastructure.** The component includes the replacement of overhead infrastructure including electric wiring and feeder cables. Along this corridor, overhead wiring and cables are already in place, however they require upgrading to meet the needs of the new BRT which includes installing wiring supports in the median of the road. The component also includes the rehabilitation of two sub-stations along the North-South corridor. The sub-stations are off-street, at existing bus terminals and the works for both the sub-stations and wiring will not involve heavy machinery or construction. The sub-stations may house PCB containing transformers, which were used in older sub-stations.

72. Figure 6 gives the location of the North-South corridor, along which the trolleybus infrastructure will be upgraded. The figure also gives the proposed bus stations along the corridor (NS1- NS26). Figure 7 shows the two sub-stations to be rehabilitated.

Figure 6: Component C Location – North-South Corridor



Source: ITDP (2011) Draft Report BRT in Ulaanbaatar

Figure 7: Component C Sub-stations



73. **Component D: BRT Corridor Improvements.** This component includes the delineation and construction of BRT stations at the locations shown in Figure 6. This corridor is a major arterial route running North to South in the city, as described under Component B, Paragraphs 68 and 69. The route runs through business and residential areas, ending in the *Ger* areas to the North of the city and the branches out into two directions south of Peace Bridge, ending in Chinggis Avenue (T1B) at station NS26.

Stations NS14 and NS15 are part of the North-South extension under Tranche 2.

74. A dedicated BRT line will be created in the median of the road, delineated by physical barrier. Safety improvements include pedestrian sidewalks and crossings. Additional improvements along the corridor include changes to intersection geometry to improve traffic flows. Figure 5 indicates the required arrangement of the BRT line across the road.

75. **Component E: Intelligent Transport System.** This component involves the development of systems to improve public transport management and includes a smart card system and Geographical Positioning System (GIS) technology to track vehicles. Component E is not considered further in this IEE as it is not related to infrastructure provision or other activities which are likely to have negative impacts on the environment or community health and safety, and will therefore not require an environmental assessment.

76. **Component F: Capacity Building and Skills Transfer.** The Project will work with the Municipal Government staff to promote economic efficiency, institutional and organizational development, and urban environmental improvement. Institutional development for the Project will include establishing a public transport committee set up by MUB by end of 2012; and training for MUB's staff in the Public Transport, Urban Development and Road Departments.

77. In order to enhance local environmental management capacities, the Project will implement a training program (see **Chapter X**). The Project will work with MUB's staff to increase their understanding of environmental management and monitoring. The Implementing Agency for Tranche 1, MUB's Road Department, lacks environmental expertise and experience. MUB has an Environment Department within its structure, however again the experience of the staff in this department is limited. MNET confirmed that even at Ministry level although a small number of staff have technical experience and qualifications in environmental management and engineering related subjects, the majority of staff are administrative rather than technical. Training will focus on environmental management and pollution control and the implementation and monitoring of EMPs.

78. **Associated facilities.** The project will not finance associated facilities such as sewer pipelines or water supply pipelines along the road sections and at intersections along the BRT corridor. The rehabilitation of the road sections (Component B) will include the installation of surface water drainage.

79. **Costs of Tranche 1.** Tranche 1 will require \$59.9 million from ADB and \$17.0 million of the government counterpart funds and the construction period is expected to last for four years from 2012 to 2016.

IV. DESCRIPTION OF THE ENVIRONMENT

A. Project's Area of Influence

80. Administratively, the Project is located the Ulaanbaatar Municipality. It is the cultural, industrial, and financial heart of the country. Ulaanbaatar is divided into nine districts (*düüregs*). Six of the *düüregs* break up the central urban area of the capital city (urban core), fanning out to the *ger* areas. Each district is subdivided into *Khoroos*, or numbered sub-districts; there are 121 *Khoroos* in Ulaanbaatar Municipality.

81. The Project North-South corridor (Components A, B, C and D) is along a major arterial route, connecting the urban core with the *ger* areas of Chingeltei and Sukhbaatar Districts to the North of the city; and Chinggis Avenue which connects the urban core with the airport in the South, in Khan Uul District.

82. The potentially affected environment in the project area is defined principally in regard to two factors: (i) the nature and scale of the proposed action; and (ii) the sensitivity and circumstances of the environment in which the proposed action will occur or issues of special concern (such as induced and cumulative impacts, etc.).

83. The nature of the actions proposed within the context of the current project is largely construction of a point objects (widening Peace Bridge) and linear objects (7.7 km of road expansion and rehabilitation and 14 km of BRT corridor preparation). Although the physical and ecological environment in which these actions will occur can be confined largely to the point and linear objects and immediately adjacent areas, socio-economic impacts may also occur over wider areas. In addition, indirect and cumulative impacts could take place over an appreciably larger area and the conceptual limits of the project area will be expanded in accordance with the circumstances of the particular environmental attribute under discussion.

84. For noise, the area of influence is taken to be 200 m from the noise source. According to Table 5, for the majority of construction equipment, which may be used during project implementation, within 200 m the noise levels can exceed the background levels monitored by MNET. Therefore it is taken that, for noise, the area of influence is 200 m as this is the distance at which noise levels may be elevated above background levels.

Table 5: Construction Machinery Noise

Machine Type	Distance to Machinery									
	5 m	10 m	20 m	40 m	60 m	80 m	100 m	150 m	200 m	300 m
Loader	90	84	78	72	68.5	66	64	60.5	58	54.5
Vibratory Road Roller	86	80	74	68	64.5	62	60	56.5	54	50.5
Bulldozer	86	80	74	68	64.5	62	60	56.5	54	50.5
Land Scraper	90	84	78	72	68.5	66	64	60.5	58	54.5
Excavator	84	78	72	66	62.5	60	58	54.5	52	48.8
Roller	87	81	75	69	65.5	63	61	57.5	55	51.5
Mixing Equipment	87	81	75	69	65.5	63	61	57.5	55	51.5

Source: Government of Mongolia. 2011. *Initial Environmental Examination (IEE) of the proposed Regional Logistics Development Project*.

85. Regarding impacts on air quality, it is anticipated that the project will have positive impacts (a city wide influence) with the improvements made to traffic flows and the use of electric trolleybuses. However for Tranche 1 components, it is anticipated that elevated dust

and emission levels caused by construction may cause localized air quality issues, but these are likely to be within the 200m area set for noise, due to dust suppression measures.

86. Regarding impacts on water quality, Tranche 1 requires the widening of a bridge over a water body. The project's area of influence could be expanded to include downstream impacts should a major pollution event occur as a result of Component A. However, pollution or contamination of the river is not anticipated given the nature of the bridge widening and existing degraded environmental conditions.

87. The project's area of influence regarding potential impacts associated with traffic congestion during Tranche 1 implementation will extend to all residents, businesses and users of services in along the North-South transport corridor.

88. **Appendix 1** presents baseline descriptions of the project sites. The sites were assessed for the preparation of this IEE, with particular attention paid to: (i) sensitive natural environmental receptors such as water bodies; (ii) sensitive human receptors such as schools or hospitals; cultural and heritage sites; and socio-economic situation.

89. The sensitivities of each site were identified based on site investigations and are listed in Table 6. Sensitive receptors include: health and education facilities; businesses that may be affected by noise or dust, particularly when eating or selling near roads; cultural heritage sites; amenity areas, *ger* areas and environmental resources.

Table 6: Receptors within the Project Area of Influence

Project Site	Sensitive Receptor & Distance from Project Site
Peace Bridge	Environmental Resource: River bed Infrastructure: District heating pipes (20m), trans-Mongolian railway Businesses: at North end Housing at South end, including apartment blocks (20m)
BRT Corridor Improvements including trolley bus infrastructure	Businesses: Sellers/hawkers and outdoor eating areas at points along the corridor Amenity: Park adjacent to Sukhbataar square (10m) Cultural resources: Sukhbataar square, central cultural palace, theatre and opera (adjacent) School: Kindergarten #25 (90m), School of Information Technology (adjacent), Hospital: Chingeltei District Health Centre (adjacent) <i>Gers</i> : (10m) See also T1A and T1B along the BRT corridor.
Road Widening North (T1-A)	<i>Gers</i> (5m) Environmental Resource: River bed (300m) Hospital: Local clinic (10m), General Hospital (150m) School: Secondary (180m) Businesses: Outdoor trading (along roadside)
Road Widening South (T1-B)	Environmental Resource: Mature Trees (along roadside) Cultural Site: Temple/Palace (80m)

Source: Study Team

B. Geography, Topography and Geology

90. The city is located at 1,350m altitude in the valley of four mountain ranges which rise to 1,650 to 1,949m altitude. Due to its location the city experiences many temperature inversions. At least 80% of these inversions occur from October to April when air temperatures are from 7.5 to 11.7 °C and land temperatures are from minus 21 to minus 39 °C. The average depth of the inversions is 650 to 920 m.

91. Geologically the Ulaanbaatar region belongs to the Khentii geosynclinal depression.

Ulaanbaatar City is mainly underlain by Cambrian, Devonian, and Carboniferous sandstone and mudstone. Ulaanbaatar City is located on an alluvial plain. MNET confirmed that in the City, soil is low in permeability and gullying and erosion is visible on steep slopes in the *ger* areas to the North of the City, particularly on unpaved roads.

C. Meteorology and Climate

92. **Climate.** Mongolia has a severe continental climate. Ulaanbaatar is the coldest national capital in the world, with temperatures ranging from approximately -30 °C to +25°C. The country is also prone to severe winters, known as *zud* which means any condition that stops livestock getting to pasture. The winters of 1999, 2000 and 2001 were *zud* years, which resulted in the deaths of more than 25% of the livestock population. This has a direct impact on increasing urbanization of the City as people migrate to find employment when herding is no longer possible.

93. **Precipitation.** The country averages 257 cloudless days a year, and it is usually at the centre of a region of high atmospheric pressure. Precipitation is highest in the north, including Ulaanbaatar (average of 200 to 350 mm per year) and lowest in the south, which receives 100 to 200 mm annually. In Ulaanbaatar, 95-97 percent of precipitation falls during the warm season, including 75-80 percent in the summer. In winter, the precipitation ranges from 1 to 3 mm, whereas in July it ranges from 100 to 120 mm. In average it rains 40-70 days a year, snow falls on 25-30 days, and land is covered with snow for 140-170 days.

94. **Wind.** The dry environment exacerbates the frequent dust storms occurring in Ulaanbaatar each year. Wind erosion of soil is a dynamic process of soil degradation in which the shear stress applied on the ground surface by wind exceeds the ability of the soil particles to resist separation and transportation. The wind erosion depends on the climatic factors, soil properties, landscape characteristics and availability of vegetation. In Ulaanbaatar, wind blows mostly from the north and northwest and average wind velocities are usually lower than in other parts of Mongolia. Monthly wind velocities average 1.6 – 4.4 m/s, with an average of 7 to 9 days per year where wind velocities exceed 10 m/s. Wind erosion in the project area is considered low (urban core) to moderate (*ger* areas), but periodic dust storms can affect traffic safety, especially in the *ger* areas.

D. Hydrology, Surface Water Quality

95. **Surface water.** Ulaanbaatar is located in the Tuul river basin. The Tuul river is 704 km long and drains an area 49,840 square km. Currently the Tuul river is suffering from pollution, some caused by Ulaanbaatar's central sewage treatment facility, as well as heavy mineral and sedimentation pollution caused by gold mining in the Zaamar area. The Selbe River, a tributary of the Tuul with a catchment area of 303 square km, flows along the Eastern side of Ulaanbaatar and is known as the Dond Gol river as it turns to flow along the Southern side, eventually meeting the Tuul approximately 20 km downstream of the City. The principal recharge mechanism for the Selbe river is the rain water in summer and autumn therefore, water levels fluctuate considerably. The water remaining in the river bed after the autumn rain is frozen from November to March. The Selbe (Dond Gol) river bed is frequently used as a place to dump garbage as even when flowing, the river does not cover the entire river bed. The river is considered to be of low biological relevance and is not used as a drinking water source or for agriculture.



Figure 8: Selbe River at Dolon Buudal Bus Station (T1-A)



Figure 9: Dond Gol River bed, from Peace Bridge

96. Poor urban planning has meant many city development activities have been implemented near the Tuul river and in its watershed including the Selbe (Dond Gol) river. This has led to the degradation of water quality, exacerbated by pollution (sewage and garbage) from unplanned settlements, particularly in the *ger* areas. While long term average water quality in the Tuul and the Selbe remain satisfactory (Table 7), quality rapidly deteriorates during low flow periods.

Table 7: Average water quality in the Selbe River in Ulaanbaatar (1998-2008)

	pH [-]	SS [mg/l]	DO [mg/l]	BOD ₅ [mg/l]	NH ₄ ⁺ [mg/l]	PO ₄ ⁻³ [mg/l]	SO ₄ ⁻² [mg/l]
Selbe River in Ulaanbaatar	8.1	30.9	9.4	2.9	0.3	0.02	24.6
MON standard for ambient water quality	6.5-8.5	-	6.4	3.0	0.5	0.1	100

Source: Altansukh O. 2008. Surface Water Quality Assessment and Modeling. A case study in the Tuul River, Ulaanbaatar City, Mongolia. Master Thesis. International Institute for Geo-information Science and Earth Observation. Enschede, The Netherlands.

97. The Ulaanbaatar Master Plan proposes measures for watershed management. This includes classifying the watershed area based on location instead of uniform controls, identifying zones where developments are allowed and prohibited; environmentally sound

river bank improvement such as regarding slopes instead of using concrete; and public awareness raising on water quality protection.

98. The proposed project (Tranche 1) involves road improvements in the *ger* area to the North of the City in the 13th and 14th *Khoroo*. MNET confirmed that the residents of the *gers* are supplied with water which is tankered into the area by MUB. The water is poured into underground tanks and then sold to residents by the liter; residents do not use groundwater in the *ger* areas. T1-A has a dry drainage channel running under the road to be improved; the channel is used for solid waste disposal and drainage for run-off during rain events (Figure 10).



Figure 10: Dry Drainage Channel under Chingeltei Avenue

99. **Groundwater.** Groundwater exists in unconfined aquifers (alluvial sediments of late quaternary to recent period) at depths between 4- 30 m. The static water level in the Tuul River valley is from 2-6 m in winter and 0.5-5 m in summer, if there are no wells in operation. However, extraction of groundwater can cause the static water level to drop from 10-13 m in winter and from 15-19 m in summer¹⁰.

E. Air Quality

100. Air pollution in Ulaanbaatar has been increasing to surpass standard levels with the adverse effect on the population's health and well-being as well as environmental balance. A World Bank study states that Particulate Matter (PM) is the largest and relatively most severe air pollution problem in the City. In terms of PM, Ulaanbaatar is "among the most polluted cities in the world"¹¹. The main sources of air pollution including PM_{2.5} (fine particulates¹²) are from heating and cooking, traffic and industrial sources such as coal fired power stations. Many of the diesel and petrol-run vehicles are outdated and do not meet environmental and safety standards.

101. Poor city planning also impacts on air quality. Approximately half the city's population lives in *gers*; the main *ger* district is at a higher elevation than the rest of the city. This results in the air emissions from *gers* travelling over the city, where they are often trapped by the inversion conditions. During the inversion periods, air pollutant levels frequently

¹⁰ JICA (2009) The Study on City Master Plan and Urban Development Program of Ulaanbaatar City.

¹¹ World Bank (December 2009) Air Pollution in Ulaanbaatar: Initial Assessment of Current Situation and Effects of Abatement Measures Discussion Paper

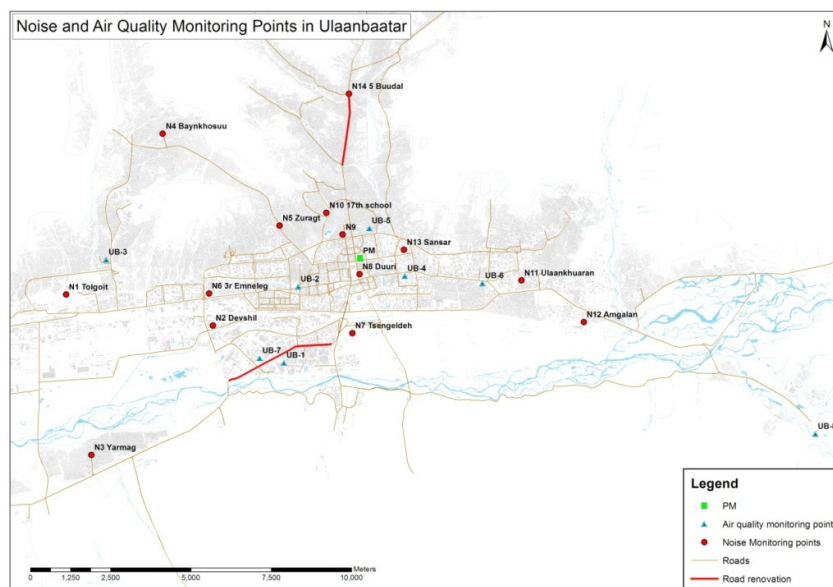
¹² PM_{2.5} is particulate matter with a diameter of 2.5 micron or less. These fine particulates can cause severe respiratory diseases given enough exposure.

exceed health-based standards in many urban areas.

102. The dry environment of the country results in approximately 26 dust storms occurring in Ulaanbaatar annually. High particulate levels are further heightened by high suspension and re-suspension of dust from dirt roads and streets.

103. **Available air quality data.** The National Air Quality Office operates a network of 11 air quality monitoring stations situated in the City. Data are collected and coordinated by the National Air Quality Office; Figure 11 gives the locations of 8 of the 11 air quality stations for which data were available, and shows noise monitoring stations in the City.

Figure 11: Air Quality and Noise Monitoring Stations in Ulaanbaatar



104. Annual average concentrations of PM_{10} are measured at the National University of Mongolia campus, close to the city centre and in the middle of the project area. Average yearly PM_{10} concentrations were as high as 141, 157 and 279 $\mu g/m^3$ for 2006, 2007 and 2008 respectively.

105. Further measurements at monitoring stations conducted in June 2008 (under World Bank's Air Monitoring and Health Impact Baseline Study) give even higher PM_{10} concentration levels. Recorded levels exceeded the Mongolian air quality standard (100 $\mu g/m^3$), World Health Organization (WHO) guideline value¹³ (50 $\mu g/m^3$ 24 hour mean PM_{10}) and the European limit value (40 $\mu g/m^3$). In addition, extremely high concentrations of PM were found at the mobile PM stations under World Bank's Air Monitoring and Health Impact Baseline Study in the *ger* areas. Mostly during winter months, some days recorded levels of up to 4000 $\mu g/m^3$, although the report states that this value should be revised down by 40%¹⁴ due to interference in the results by the relative humidity at the time of sampling.

106. More recent data for April 2011 are given in Table 8. The data show similarities with that presented by the World Bank for PM_{10} . Available limits for PM_{10} continue to be exceeded throughout the city.

¹³ WHO 2005 Air Quality Guidelines. Summary including guideline values available at <http://www.who.int/mediacentre/factsheets/fs313/en/index.html>

¹⁴ World Bank (December 2009) Air Pollution in Ulaanbaatar: Initial Assessment of Current Situation and Effects of Abatement Measures Discussion Paper

107. Table 8 also gives Sulphur Dioxide (SO₂), Nitrogen Dioxide (NO₂), Carbon Monoxide (CO) and PM_{2.5} values. It can be seen that the Mongolian Air Quality Standards were frequently breached in April 2011. Also WHO's comparable guideline value (24 hour mean) for SO₂ of 20 µg/m³ is also exceeded regularly.

Table 8: Air Quality Measurements & Mongolian Standards 2011

April 2011		SO ₂ µg/m ³	NO ₂ µg/m ³	CO mg/m ³	PM ₁₀ µg/m ³	PM _{2.5} µg/m ³
UB2	Average	26	115	1	190	53
	Max	52	135	2	1033	147
UB4	Average	20	48	1	157	47
	Max	44	65	1	269	63
UB5	Average	41	32	1	245	No data
	Max	85	53	2	530	No data
UB7	Average	17	35	1	189	No data
	Max	34	45	1	414	No data
UB8	Average	8	14	0	71	No data
	Max	21	27	1	195	No data
Mongolian Standard (24 hr mean)		20	40	3	100	-

Source: Central Laboratory 2011 and MNET

F. Noise

108. Ambient noise levels throughout the city centre are consistent with little fluctuations (Table 9). Average noise levels comply with Mongolian standards, but periodically exceed the standards especially along transport corridors, as traffic is the major source of noise in the urban area. These data are further supported by monitoring for a domestic EIA report¹⁵ which observed noise levels in the City at 62 dB at the kerbside in peak hour traffic, dropping slightly to 61 dB at the wall of the closest building at ground level. This figure reduces to 59 dB at 4 meters above ground.

Table 9: Noise Measurements dB

Monitoring Point Location		2009 Average	2010 Average
N1	Tolgoit	53.7	49
N2	Devshil	56.7	No Data
N3	Yarmag	56.5	49.25
N4	Bayankhoshuu	54.5	50.25
N5	Zuragt	57	No data
N6	3rd Hospital	56.4	No data
N7	Tsengeldeh	55.8	No data
N8	Duuri	59	No data
N9	4th school	61.3	No data
N10	17th school	57.2	No data
N11	Ulaankhuan	53.2	59
N12	Amgalan	52.5	51.75
N13	Sansar	55.6	57.5
N14	5 buudal	No Data	55.75
2009 based on 5 months morning and evening data			
2010 based on 2 months morning and evening data			

¹⁵ Domestic EIA report. Edem (2009) Construction of a Levelled Interchange, West of Main Intersection.

Mongolian National Noise Standards: MNS 2007-4585 allowable limits; daytime is 60 dB, night is 45 dB . Night is 10pm-6am according to the Act on Labor.

Source: Central Laboratory of MNET.

109. Noise measurements are made by the Central Laboratory of MNET at 14 locations using mobile equipment (Figure 11).

110. WHO¹⁶ states that guidelines on community noise (not industrial work place noise, therefore including traffic) should be based on the following:

- **Indoor sound levels**, thresholds for guidelines should be based on a combination of values of 30 dB (average equivalent over 8 hours L_{Aeq}) and 45 dB (maximum for an individual noise event);
- **Outdoor sound levels** should not exceed 50 dB L_{Aeq} to protect the majority of people from being moderately annoyed during the daytime. Most countries in Europe have adopted 40 dB L_{Aeq} as the maximum allowable level for new developments;
- **Hospital** patients have less ability to cope with stress, the equivalent noise level should not exceed 35 dB L_{Aeq} in most rooms in which patients are being treated or observed; and
- **Schools** the background sound pressure level should not exceed 35 dB L_{Aeq} during teaching sessions.

111. It is clear from the noise measurements in Ulaanbaatar that in the majority of locations, the traffic noise exceeds the WHO recommendations for community noise outside. However with regards to the noise within sensitive receptors such as households, schools and hospitals, the data are of limited value as the distance from the source is not given and measurements are not taken within buildings.

G. Climate Change

112. In order to address the issue of global climate change and its effects on people and the economy, Mongolia affirmed the United National Framework Convention on Climate Change (UNFCCC) in 1993 and its Kyoto Protocol in 1999. The Government of Mongolia has taken considerable steps toward the implementation of the UNFCCC, by accomplishing the required commitments such as the Initial National Communication, Technology Needs Assessment and the National Action Plan on Climate Change to address climate change and other legal commitments.

113. In 2007, Mongolia was ranked 96th in the list of CO₂ emitting countries, contributing around 0.04% to the global emission¹⁷. UNEP¹⁸ states that in Mongolia, the energy sector (including stationary energy, transportation and fugitive emissions) was the largest source of Greenhouse Gas (GHG) emissions comprising 65.4% of total emissions. The second largest source of GHG emissions was the agricultural sector (41.4%). The report also states that total CO₂ removal was more than total CO₂ emissions in 2006 due to an increase in the area of abandoned lands and a reduction in newly cultivated land. However by 2020, it is predicted that Mongolia's GHG emissions will be more than 5 times that of 2006.

¹⁶ World Health Organisation (1999) Guidelines on Community Noise. Available at: <http://www.who.int/docstore/peh/noise/guidelines2.html>

¹⁷ United Nations Statistics Division, Millenium Development Goals Indicators. Available at <http://mdgs.un.org/unsd/mdg/SeriesDetail.aspx?srid=749&crd=>

¹⁸ United Nations Environment Program (2009) Mongolia: Assessment Report on Climate Change 2009.

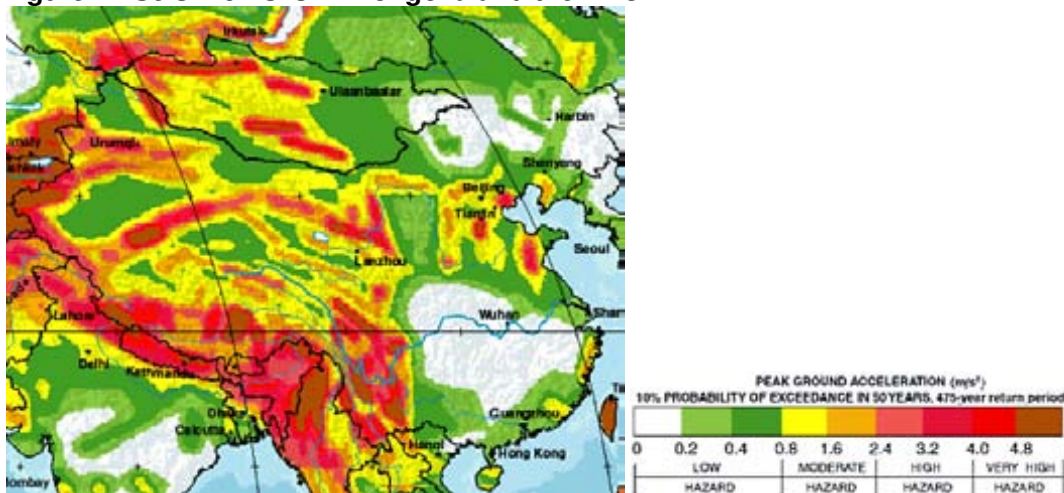
114. Climate modeling for Mongolia is projecting changes which include increased air temperatures, increased precipitation in some areas and a reduction of water resources in other areas.¹⁹ Potential evapo-transpiration increase would be higher than precipitation amount increase. The most vulnerable areas for the country are the agricultural, livestock, land use, water resources, energy, tourism and residential sectors. This indicates that future climate changes are expected to negatively impact Mongolia, mostly the agricultural and livestock sectors. This in turn will affect the society and economy, meaning climate change adaptation is a significant issue for the country.

H. Natural disasters

115. Natural disasters in the area surrounding Ulaanbaatar are mainly caused by forest fires, floods, extreme cold, snow storms and disease outbreaks. Forest fires accounted for 49% of the disaster events during the period 1990-2000. During this period, floods, disease outbreaks and extreme cold and snow storms accounted for 11%, 13% and 5%, respectively²⁰. Floods and earthquakes are the natural disasters of potential relevance to the project and thus further discussed below.

116. **Earthquakes.** Mongolia has experienced four major earthquakes ($M_s > 8$) and many more moderate earthquakes (M_s 5.3-7.5) in the last century. The seismic activity in Mongolia is related to its location between the compressive structures associated with the collision of the Indian-Australian plate with the Eurasian plate on the one hand and the extensional structure associated with the Baykal rift system on the other. The historical records (1903 onward) of the seismicity in Mongolia show a high concentration of seismic activity along the Mongolian-Alтай and Gobi-Alтай ranges and the north western boarder with Russia and around Mogod east of Hangay mountain. The multi-organizational Global Seismic Hazard Assessment Program classifies Ulaanbaatar as low to moderate earthquake risk area (Figure 12).

Figure 12 Seismic risks in Mongolia and the PRC



Source: Global Seismic Hazard Assessment Program. Global Seismic Hazard Map

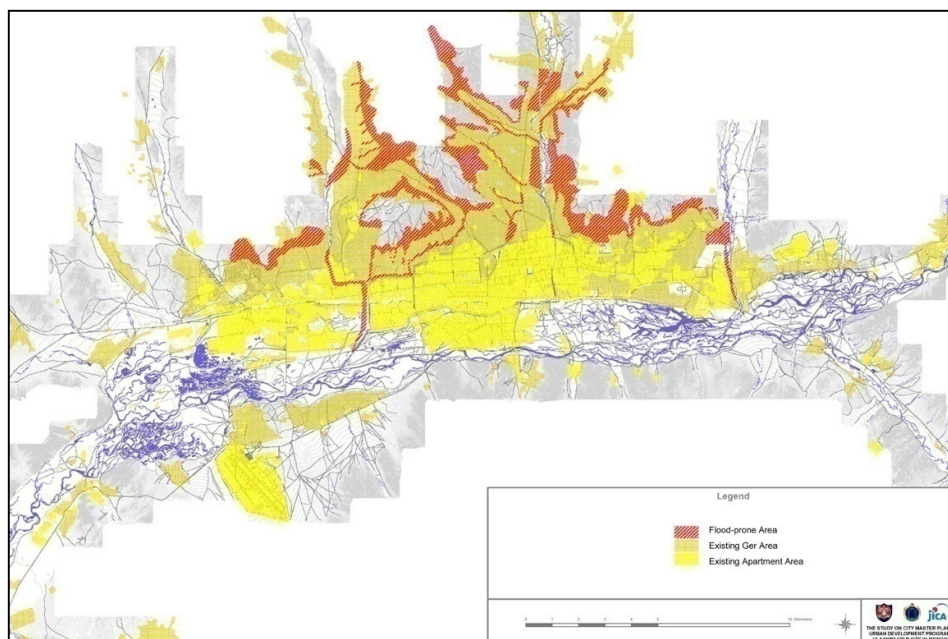
117. **Flooding.** Localized flooding can be caused in the City through heavy rain events because of poor surface water drainage. This flooding is ephemeral and the water subsides rapidly. More than 75% of precipitation in the City occurs in July and August. Serious floods, mainly caused by the Tuul River, occurred in 1915, 1939, 1959, 1966, 1967, 1971, 1973, 1982 and 2003. In 1966, the Tuul water level reached 3.2 meters with a flow of 1500-1800

¹⁹ Ibid.

²⁰ Source: National Center for Emergency, 2002.

cubic meters per second and the flood killed over 100 people. Figure 8 shows flood prone areas of the City. Project components under Tranche 1 are not located in flood prone areas.

Figure 13: Flood Prone Areas of Ulaanbaatar



Source: JICA Study on Ulaanbaatar City Master Plan. 'Flood Prone Area' map.

I. Ecological Resources

118. Ecological resources of the potentially impacted environment are defined to include the area's flora and fauna, and specially protected areas.

119. **Legally protected sites and species.** The project will not encroach on legally protected sites. The project is based in Ulaanbaatar city and as such, ecological resources are limited. Construction activities will be mainly within the urban area where there are no rare, threatened, or endangered species within the construction boundaries. This was confirmed by the Ulaanbaatar based WWF²¹ office. WWF considered that due to the high concentrations of houses, *gers*, businesses and people, the project area does not contain any rare or endangered species. If reptiles and insects are disturbed, they will already be urbanized common species which will have the ability to adapt.

120. **Fauna.** The project is sited in a crowded and noisy location, which has very little vegetation or exposed ground (not sealed by concrete, tar macadam) which may form habitats for fauna. However there are a limited number of bird species observable in the City, such as crows and sparrows, common to many urban environments. Consultation with the Mongolian Ornithological Society²² confirmed that Carrion Crows, Northern Ravens, Black-billed Magpies, and Daurian Jackdaws are all known to nest in locations near to the project area. The key nesting season for birds in the City is from late May to June. However consultation with Wildlife Conservation Society²³ confirmed that in addition to nesting, birds

²¹ Interview with Dr Lkhagvasuren Badamjau, Conservation Director, WWF Mongolia. May 4th 2011

²² Prof. Sundev Gombobaatar, President, Mongolian Ornithological Society and Head, Ornithological Laboratory, School of Biology and Biotechnology, National University of Mongolia Email 10th May 2011

²³ Wildlife Conservation Society, Mongolia, Mr Martin Gilbert. Email 10th May 2011

often seek refuge in the City during severe winters.

121. **Flora.** The southern section of the road to be improved (T1-B) is lined with approximately 180 mature trees, the majority of which were pollarded at the time of survey (Figure 14). The potentially affected trees provide shade for pedestrians in summer and also screen the road for apartment residents. In addition, the trees may provide nesting and nesting sites for birds in summer. Potentially affected trees may include: *Latrix sibirica*, *Populus Laurifolia*, *Ulmus Pumila*, *Acer Negunda*, *Armeniaca sibirica*, *Crataegus sanguinea* Pabl, *Malus baccata*, *Padus asiatica* kom, and *Caragana arborescences*. Many of the trees are located very close to the existing kerbside (from around 50 cm). According to Mongolia's Forest Law, each tree removed must be replaced with two trees. These trees should be of the same species and replanted in a suitable location as close to the existing site as possible. This is a biodiversity offsetting activity which must be managed well in order to ensure the survival of the trees. The EMP defines the requirements for a detail inventory of the affected trees, and a tree management plan.

Figure 14: Trees Along Chinggis Avenue (T1-B)



122. Public consultation conducted in the framework of the development of the Ulaanbaatar Master Plan²⁴, revealed that air pollution and degrading green areas (parks) are perceived as the most critical environmental problems in Ulaanbaatar City. This shows that increasing green areas in the city would be welcomed. Although it may not be possible to plant trees directly along the improved roads due to lack of space and encroachment by housing, the existing and new green spaces in the city can be enhanced with additional trees.

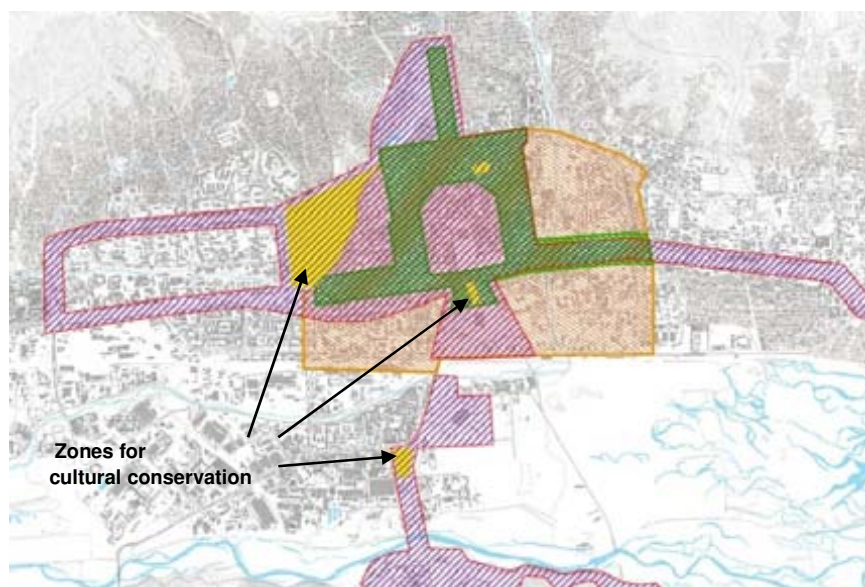
J. Physical Cultural Resources

123. Ulaanbaatar is rich in physical cultural resources. Famous sites are located in the Historical and Cultural Conservation Zone, defined in the Policy Zone map of the Ulaanbaatar City Master Plan (Figure 15).

124. The objective of this zone is 'to conserve the assets and heritages for tourism development as well as citizens'. The project will enhance this policy objective through improving access to cultural sites for tourists and residents by the provision of improved public transport networks.

²⁴ JICA (2009). The Study on City Master Plan and Urban Development of Ulaanbaatar City. Volume 2 Final Report.

Figure 15: Cultural Conservation Zone defined in the Ulaanbaatar Policy Zoning Plan



Source: JICA Study on Ulaanbaatar City Master Plan. 'Policy Zones' map.

125. Key sites in this zone include (i) the Gesar Sum (a Buddhist temple with Chinese influenced architecture); (ii) the Bakula Rinpoche Sum and Bethub Monastery; and (iii) the Winter Palace of Bogd Khan. The project will not encroach on the Historical and Cultural Conservation Zone.



Figure 16: Winter Palace of Bogd Khan

126. The Southern road improvement (T1-B) runs close (less than 100m) to the Winter Palace of Bogd Khan. The palace is over 100 years old and was the residence and monastery of Mongolia's last Bogd Khaan (religious and governmental leader), Javzan Damba Hutgat VIII. Bogd Khaan lived in this palace for 20 years and when he died (in 1924) the communist government prohibited any ongoing reincarnations. The palace includes six temples which are culturally significant, and contains religious and cultural items from the 17th century to the beginning of 20th century. The palace will not be impacted on negatively by the project but access to it for tourists or other visitors will be made easier through improvements to Chinggis Avenue.

127. Bogd Khan temple is given protection status in Ulaanbaatar and considered part of the Heritage Conservation Zone. This means that development on the sites is strictly prohibited as set out in the Urban Development Act. The project is not proposing

development within the boundary of this site and therefore will not conflict with the protection status. Given the close proximity of the Bogd Khan temple to the project road, the EMP defines the need to conduct a site condition assessment prior to construction in order to avoid false claims of project induced damages to the sites.

K. Socio-Economic Situation

128. **Population.** The population of Ulaanbaatar City, the capital city of Mongolia, has been increasing rapidly from 0.78 million (Mongolia: 2.40 million) in 2000 to 1.08 million (Mongolia: 2.67 million) in 2008 with an average annual growth rate of 2.8%. This rapid increase of population is chiefly due to a rapid migration from rural area to urban area. The average number of population migrated in the past 10 years is estimated at around 20,000 per year which cause the expansion of *Ger* area surrounding the apartment area of Ulaanbaatar City. At present Ulaanbaatar account 40% of the total population of Mongolia. The projected urban population of 2030 is 1.87 million or 1.7 times larger than the population in 2008.

129. **Economy.** The economy of Mongolia has grown rapidly at average annual growth of around 5.6% and transition to market economy has proceeded at remarkable speed as well. The economic growth has been pushed by increased international commodity price as well as expansion of copper output until the global financial crisis occurred in 2008. Meanwhile, the GRDP of Ulaanbaatar City accounts for around 56% of the National GDP, as the city has historically been the centre of the economy as well as of the administration.

130. In Mongolia, mining and quarrying are the biggest financial contributors to industrial output (58%) with manufacturing second (32%). In March 2011, six big mining companies prepared to bid for the Tavan Tolgoi area, which is the world's largest untapped coking coal deposit. Manufacturing includes metals (such as copper and steel foundries) as well as woolen products such as cashmere and carpets. Ulaanbaatar has some manufacturing plants but is also the base for offices of international and national companies; because of the current infrastructure constraints, it is considered difficult to operate a significant and effective business outside Ulaanbaatar.

131. **Unemployment.** According to the Mongolian Statistical Yearbook 2009, the 'Registered Unemployment Rate' for Ulaanbaatar is 1.6%. However this is the rate of people that are officially registered unemployed. The book also provides an 'unemployment rate' which is 14% for the City, derived from a new methodology of calculation based on the results of a Labor Force Survey.

132. **Poverty.** The Mongolian Statistical Yearbook 2009 provides background data on poverty levels within the City. The Poverty Headcount Index is a widely used poverty measure, giving the percentage of the population whose consumption is below the poverty line. For Ulaanbaatar, this rate is 36.7% in 2009, which compares to 38.7% nationally. This increases to over 49% in rural areas, showing that relatively speaking, Ulaanbaatar is more wealthy than the rural areas. This translates to an average household income of nearly 455,000 MNT in urban areas, and 332,000 MNT in rural areas.

133. **Ethnic minorities.** Ethnic Mongols account for about 85% of the population and consist of Khalkha and other groups, all distinguished primarily by dialects of the Mongol language. The Khalkha make up 90% of the ethnic Mongol population. The remaining 10% include Buryats, Durbet Mongols and others in the north and Dariganga Mongols in the east. Turkic peoples (Kazakhs, Tuvans, and Chantuu (Uzbek) constitute 7% of Mongolia's population, and the rest are Tungusic peoples, Chinese, and Russians. Most but not all Russians left the country following the withdrawal of economic aid and dissolution of the Soviet Union in 1991.

134. **Public Health.** Since 1990, key health indicators like life expectancy and infant and child mortality have steadily improved, both due to social changes and to improvement in the health sector. Respiratory disease is one of the most common diseases in Mongolia. In 2008, the registered number of respiratory diseases reached to 973 and 878 patients per 10,000 populations in Mongolia and in Ulaanbaatar respectively. Health records on the respiratory diseases indicate that Ulaanbaatar population is seriously affected by air pollution (**Figure 17**). As this figure suggests the increased number of vehicle relates closely with increased number of respiratory diseases patient in Ulaanbaatar.

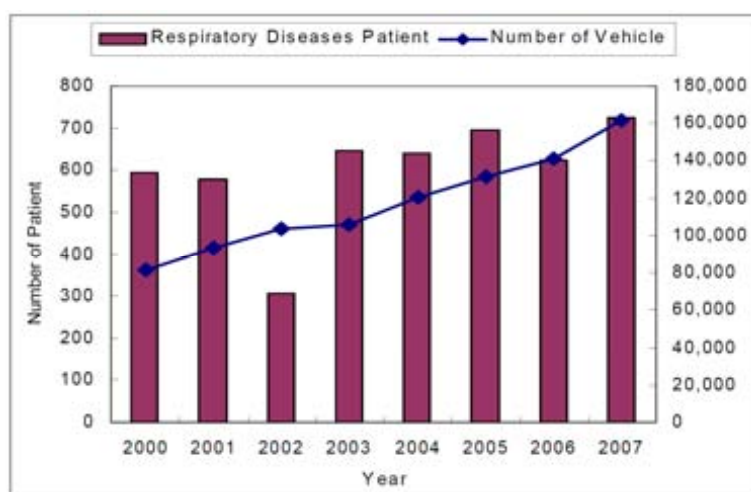


Figure 17: Relationship between number of vehicles and number of patients with respiratory diseases in Ulaanbaatar, period 2000-2007

135. **Health care services.** Mongolia has moved from a health service based on the Semashko²⁵ model of poli-clinics and mono-profile specialist hospitals²⁶ to a focus on primary health care provided by family doctors working in Family Group Practices. Secondary and tertiary care in Ulaanbaatar is provided by over 50 public hospitals. Six mono-profile hospitals managed by the Ministry of Health (MOH) provide tertiary and secondary care in cancer, traumatology and orthopedics, psychiatry, dermatology, pediatrics, and maternal and child care. Also, MOH manages three multi functional hospitals²⁷ that provide a wide range of secondary and some tertiary services. The remaining secondary care is provided by a range of district in and out patient hospitals that mainly provide internal medicine and neurology services. In addition there is a rapidly growing and poorly regulated private health sector consisting of hospitals clinics, laboratories and pharmacies.

136. **Education.** Mongolia ranks high among comparator countries in terms of education. In school year of 2009-2010, the enrollment ratio for primary and secondary education reached almost 100%, and the adult literacy rate has been maintained around 97%. Despite progress in increasing enrollment, Mongolia continues to face challenges across all levels in providing quality education and equitable access, upgrading the quality of teachers and staff, reforming curricula, rationalizing education facilities, and reducing financial barriers, particularly for vulnerable and disadvantaged groups. Dealing with growing internal migration from rural to urban areas has become a major challenge for efficient planning and management of education resources. In addition to Mongolia's challenges in basic

²⁵ The Semashko model was a Soviet-style centralized, hierarchical health system with strong emphasis on expensive curative services and hospital-based physicians in extensive and numerous facilities.

²⁶ Mono-profile hospitals specialize in a specific specialty (e.g., maternity hospital, pediatrics, traumatology); this can be justified for facilities providing highly specialized care, but in Mongolia, it leads to fragmentation of care making it difficult for patient to be served in an efficient way.

²⁷ A hospital with a wide range of services covering most hospital needs of the population.

education, there is a need to ensure that the higher education and technical and vocational education and training (TVET) subsectors produce a sustainable and competitive workforce in terms of the creative and analytical skills required in Mongolia's move towards a knowledge-based economy as well as in global and regional markets.

137. **Education and Healthcare Services in the project area.** The project area includes a number of schools, hospitals and clinics, which are within the area of influence. This includes major hospitals such as the Cancer Hospital and Infectious Diseases Hospital. In addition the project area includes primary health care centers which are located in each *Khoroo* or 'sub-district'. The project area also contains schools, colleges and universities. **Table 6** indicates health and education service receptors near the project sites.

138. **Occupational Health and Safety.** Occupational safety considerations are currently a low priority. Construction workers, laborers, maintenance staff etc can frequently be observed operating without Personal Protective Equipment (PPE) to reduce the likelihood of an injury at work. Observed examples include using oxy-acetylene torches without gloves or goggles, construction workers without hardhats and safety boots. Article 16 of the National Constitution of Mongolia states that every employee has the right to 'suitable conditions of work'. The government adopted a National Program for Occupational Safety and Health Improvement in 2001 and national standards are also adopted such as the National Standard on Occupational Health and Safety MNS 5002:2000.

139. **Community Safety related to Construction.** The City has many construction sites, some of which operate 24 hours a day. Discussions with the Road Department of MUB confirmed that it is not unusual for road construction sites to operate on a 3 x 8 hour shift basis. MUB considers this necessary because of the relatively short construction season (late May to end of September), meaning that all construction and improvements must take place within 4.5 months. As a result, MUB suggested that residents would prefer 24 hour construction even if it were a nuisance, as residents recognize it is necessary for the City. Mongolian standards currently establish a maximum environmental noise goal for residential receptors of 60 decibels (A-weighted) (dB(A)) during the daytime and 45dB(A) during the night time, with night being defined as between 22:00-06:00 hours. Depending on noise attenuation and proximity to the construction works, 24 hour a day construction may breach the National Standard for Noise (MNS 4585:2007). In addition, when construction work takes place in a public environment, safety measures are often lacking to protect the public.

L. Land Use, Urban Development Master Plan

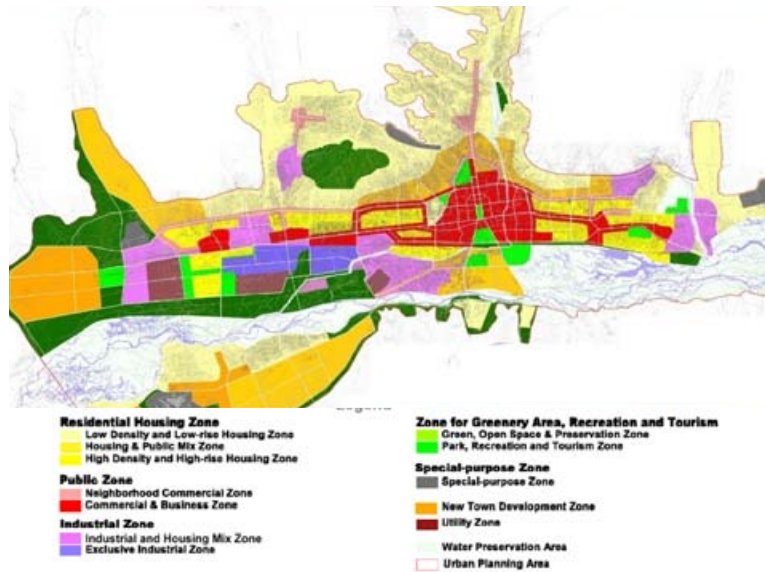
140. The Master Plan for Ulaanbaatar City was officially launched in 2001 with the target year of 2020. However with the need to revise the existing document in light of changing needs, and the need to integrate and co-ordinate support from a range of different donor organizations, a revised urban development master plan has been developed with assistance of ADB (TA7951), which is expected to be approved by end of 2011. The revised plan sets development targets up to 2030.

141. According to the (still valid) Master Plan 2001-2020, the project falls within a number of identified zones, with the central section of the North-South corridor falling within the 'Commercial and Business zone'. This is essentially the heart of the central business district, where the majority of offices and shopping areas are located. The Northern and Southern ends of the corridor (T1A and T1B) fall along the linear 'Neighborhood Commercial Zones'. Figure 18 shows the identified City zones in the Master Plan.

142. **Land Rights.** The project is in an urban area and as such the majority of land is used or occupied either formally or informally. According to the Construction Code of Mongolia (Norms and Rules for Urban and Rural Area Planning and Construction BNbD30.01.04) the "Right of Way" for a road is 70 m either side of the kerb i.e. over 140 m

wide. This Right of Way is Government owned land which can be used for widening or any other Government activity. However the Constitution of Mongolia takes precedence over the Construction Code; the Constitution gives Mongolian citizens the right to settle wherever they want on state land and they are able to become the legal owners of the land after 5 years of occupation. This is set out in the Land Law and the Land Authority is then able to provide contract documents to land occupiers to show that they are the legally entitled to the land.

Figure 18: Ulaanbaatar Planning Zones



Source: Ulaanbaatar City Master Plan 2001-2020. 'Zoning' map.

V. ALTERNATIVE ANALYSIS

143. An alternative analysis was conducted to (i) justify the project based on a with and without-project alternative analysis; (ii) prioritize the development of different transportation corridors; (iii) select the most suitable public transport system; and (iv) prioritize corridor improvements. Alternatives were proposed, screened against technical, economic, energy efficiency, as well as environmental criteria. In terms of the environmental consideration for the alternatives, the primary objective was to identify and adopt options with the least adverse environmental impacts and maximum environmental benefits.

A. With and Without Project Alternatives

144. **Without-project scenario.** The without-project scenario would result in continued urban congestion, poor connection of *ger* areas with the urban core, high incidence of traffic accidents, poor pedestrian safety and comfort, and a lack of reliable public transport in the City. The situation would gradually worsen, compounded by a growing population. Economic development and the standard of living would decline leading to weakened competitiveness of the city and its attractiveness for outside investments. This would impede further social and economic development for Ulaanbaatar's citizens.

145. **With-project scenario.** Compared to the without-project alternative, the with-project alternative will contribute to vehicular emission reductions and hence improved ambient air quality through more efficient motor vehicle use, improved public transport provision and shorter travel time. The annual emission reduction volume after completion of 3 BRT lines (after completion of the 3 project tranches) is estimated at around 100,000 t-CO_{2eq}. This reduction is achieved through (i) reduction of number of buses by 30%; and (ii) replacement of old and polluting buses by Euro4 standard buses and electric trolleybuses.

146. The improved road conditions and transport network will also help reduce traffic congestion and accidents. Pedestrian safety will be significantly improved through improvements along the BRT corridor including sidewalk rehabilitation and pedestrian crossings. The project will also reduce the risk of local floods through improved road drainage.

147. Tangible and immediate economic benefits will be the increased employment opportunities directly related to construction. Most of the unskilled labor during project construction will go to the local residents.

B. Transport Corridor Options and Public Transport Alternatives Selection

148. **BRT Line Options.** The BRT system will follow three main transportation routes. These routes have been selected based on a transport demand analysis. The transportation routes include (i) along Peace Avenue (East-West, 10.6 km); (ii) along Ikh Toiruu (East-West, 12.3 km); and (iii) the North-South corridor along Doloon Buundal Road, Sukhbaatar Street, and Chinggis Avenue.

149. **Type of Transport System.** 3 mass transit systems were considered, including BRT, underground metro, and LRT. Criteria to help select the best suited technology for Ulaanbaatar in the short and medium term period (2010–2025) included: (i) local spatial situation and future land use pattern; (ii) passenger need; and (iii) affordability for public transport use. Underground metro provides outstanding service, but at a very high capital and operating cost. The capital cost alone is around 20 times higher than BRT. Metro also has a long planning, design and construction time, and due to the high cost inevitably has only limited coverage, which reduces demand and fare revenue generation. LRT and to a lesser extent trolleybuses share the disadvantages of metro of operational inflexibility, high

cost and long construction times, but without the high capacity advantages of metro. As a result of the study team's evaluation, based on the selected criteria, the BRT approach was considered the most appropriate for Ulaanbaatar.

VI. ANTICIPATED IMPACTS AND MITIGATION MEASURES

A. Positive Impact and Environmental Benefits

150. The project will bring significant benefits to more than one million urban residents by improving transport conditions, the urban environment, public health and safety, as well as employment and incomes.

151. **Increased resilience to Climate Change.** The project generally conforms to the principles of the Bellagio Declaration on transportation and climate change, which recommends that adaptation strategies, at a minimum, contain the following aspects: (i) a long-term perspective (building climate-resilient infrastructure); and (ii) requirements for fixing and adapting what already exists (such as road rehabilitation). The project approaches are also generally in line with specific criteria and scope for adaptation identified in ADB's *Climate Change Fund: Implementation Guidelines*²⁸. For transport and urban development, the guidelines require "Climate proofing of road, rail, port, and subway projects to ensure adequate resilience to changing climatic conditions. In particular, the roads improvements will all include drainage, which is not common in the city, in order to control localized flooding which occurs after rain events.

152. **Contribution to reduced greenhouse gas emissions.** The first tranche of the project will contribute to the eventual implementation of a BRT system. The BRT system has a large positive environmental impact as it fundamentally changes the transport mix of the city, decreases greenhouse and toxic emissions, due to an increased speed of vehicles, reducing private car travel and the growth of car use, and increasing the use of environmentally efficient public transport. The annual emission reduction volume due to the completion of the BRT lines is estimated at around 100,000 t-CO_{2eq}²⁹.

153. **Improved air quality.** The ambient air quality of the City will improve when the BRT is in place, leading to health benefits for the residents. Table 10 gives the predicted reduction in transport emissions harmful to health associated with the project in comparison to the continuation of present traffic conditions for 2020 and 2030. Assuming that 5% of private car users will shift to the BRT system by 2020, annual CO₂, CO, NO_x and PM emission reduction are expected to reach 63,600 t, 4,500 t, 730 t, and 40,000 t, respectively.

Table 10: Emissions Reductions due to the BRT Project (tons per year)

Year	CO ₂	CO	NO _x	PM
2020	63,600	4,500	730	40,000
2030	69,000	4,700	840	46,000

Source: ADB Final Report (November 2010) Urban Transport Development Project Mongolia

154. Tranche 1 of the project will directly contribute to reduced vehicle emissions through improved road conditions on the North-South transport corridor, and through improved traffic movement through the city. By widening Peace Bridge and giving a dedicated trolleybus lane, it will improve the flow of vehicle traffic across the river and railway line.

155. The contribution of the Project to air pollution reduction will be further explored in Tranche 1 with a research report investigating how increasing trolleybus numbers may improve air quality, as required by MNET.

156. **Public safety.** The project will significantly improve road safety improved sidewalks, enhanced pedestrian protection facilities such as pedestrian islands and safety fences.

²⁸ ADB. 2008. *Climate Change Fund: Implementation Guidelines*, Manila.

²⁹ ADB Draft Final Report (2010) Urban Transport Development Project Mongolia. IEE Appendix 14.

Along the BRT corridor, improvements such as increased signal time for crossings will improve pedestrian comfort and safety. The improved road surfaces and intersection geometry along the North-South corridor, as well as the replacement of diesel buses by trolleybuses, will also reduce noise pollution along the transport corridor. Trolleybuses are usually between 10-24dB(A) quieter than a diesel bus equivalent.

157. **Poverty reduction and social benefits.** A more effective and efficient public transport system will benefit in particular, poorer city residents, who are not able to afford private vehicles. Increasing the availability of reliable and cost effective transport will improve the poorer residents' access to job opportunities, services and facilities, such as education or health care services, which may otherwise be harder to access³⁰. The improved pedestrian environment and road safety features (pedestrian crossings, lighting, traffic lights) will mean that short journeys are more likely to be made on foot, reducing transport costs for residents. The improvements to sidewalks will also make it easier for people with disabilities to travel to bus stops or replace private transport journeys with walking. The city will have "increased livability" as it becomes a better place for residents and businesses. The project will generate a particular number of jobs during road rehabilitation and bridge widening activities. Also, upon project completion, it will increase the number of business people at bus terminals and around bus stop areas.

158. **Gender benefits.** ADB's report³¹ identified that more women than men use public transport. Also women, who are generally the primary caretakers for children, noted that poor road crossings and pedestrian routes are a risk³². Therefore by improving the public transport network and road safety, women and children will benefit from the project.

B. Screening of Potential Impacts

159. The potential impacts were screened in order to identify the relative significance of potential impacts resulting from the project, reflecting the requirements set out by ADB's SPS, 2009.

160. The impacts were grouped under three categories: physical, biological and socio-economic impacts. Impacts during design, construction and operation phases were considered separately. Potential impacts from the project were considered under the following categories: (i) direct impacts – those directly due to the project itself; (ii) indirect and induced impacts – those resulting from activities arising from the project, but not directly attributable to it; and (iii) cumulative impacts – impacts which in combination would exert significant additional influence (see **Table 13**).

161. The following matrix was used during the screening process to anticipate the Potential Impact Significance (PIS), in order to identify the most significant likely impacts to be addressed in the Environmental Management Plan:

³⁰ ADB Final Report (November 2010) *Urban Transport Development Project Mongolia*

³¹ *Ibid.*

³² JICA (2009) *The Study on City Master Plan and Urban Development Program of Ulaanbaatar City*

		Magnitude of Impact		
		LOW	MEDIUM	HIGH
Receptor Sensitivity & Importance	LOW	Low PIS	Low PIS	Medium PIS
	MEDIUM	Low PIS	Medium PIS	High PIS
	HIGH	Medium PIS	High PIS	High PIS

- **“Receptor”**: the resource (human/natural environment/economic/social) which is potentially going to receive and have to cope with an impact.
- **“Sensitivity”**: ability to cope with an impact and/or its importance to the country of Mongolia. It is generally accepted that human health is always a high sensitivity receptor, however in terms of environmental/natural resources, the sensitivity varies according to the receptor e.g. scrubland with no significant biodiversity is considered less sensitive than a mature forest which supports ecosystems and livelihoods.
- **“Magnitude”**: the size of the potential impact. Impacts may be short term and considered low magnitude (e.g. noise or temporary reduction of income during a short construction project) or high magnitude (e.g. the poor disposal of large quantities of hazardous waste into a water course).
- **“Residual impact significance (RIS)”**: the significance of the impact remaining *after* mitigation has taken place. This more accurately describes the impacts of the project as it is anticipated that the requirements of the EMP will be followed and impacts satisfactorily mitigated.

Table 11: Impact Screening – Impacts related to Project Design

Category		Impact Yes/No	Receptor Sensitivity	Magnitude	PIS	RIS
DIRECT IMPACTS						
Physical	Water	Yes	Low quality water resource. Medium	During construction and operation but low contamination. Medium	Medium	Low
	Soil	No	-	-	-	-
	Air	No	-	-	-	-
	Noise	No	-	-	-	-
Biological	Fauna	No	-	-	-	-
	Flora	Yes	Urban trees. Medium	The trees are mature and will take time to be replaced. Medium	Medium	Medium
Socio-Economic	Land Acquisition	No	All construction will be within existing rights of way			
	Cultural Heritage	No	-	-	-	-
	Economic Displacement	Yes	Some local livelihoods may be temporary affected. Low	Long term impact for some residents. Low	Low	Low
INDIRECT, INDUCED AND CUMULATIVE IMPACTS						
No impacts anticipated resulting from project design/location						

Table 12: Impact Screening – Construction Impacts

Category		Impact Yes/No	Receptor Sensitivity	Magnitude	PIS	RIS
DIRECT IMPACTS						
Physical	Soil	Yes	Poor quality soil, not fertile lands. Already likely contamination from <i>ger</i> area sanitation. Low	Worst case is medium term if contamination is from chemical spillage e.g. spillage of PCB from sub-station. High	Medium	Low
	Flooding	No	-	-	-	-
	Water	Yes	Culvert flowing to Selbe River. Construction across Selbe (Dond Gol) river. Medium	Short term with contamination from construction waste/ sewage from laborers. Low	Low	Low
	Waste	Yes	Poor waste controls could affect soil / water, and public health. High	It is not anticipated that large quantities of hazardous wastes will be produced but PCB waste may arise from sub-station. Medium	High	Low
	Visual Impact	Yes	Impact for humans regarding the appearance of the road and surroundings. Low	Permanent but the area is already an urban environment i.e. not an area of natural beauty. Low	Low	Low
	Fauna	No	-	-	-	-
Biological	Flora	Yes	The trees are in urbanized area. Medium	Around 180 trees will be permanently removed. Medium	Medium	Medium

	Category	Impact Yes/No	Receptor Sensitivity	Magnitude	PIS	RIS
Socio-economic	Cultural Heritage	Yes	Ancient cultural building (Bogd Khan Palace). High	Temporary traffic impacts may affect people attending the site. Low	Medium	Low
	Community Health & Safety	Yes	Public health. High	Temporary during construction and traffic is likely to be slow near the construction sites including Peace Bridge. Low	Medium	Low
	Economic Displacement	Yes	Economic displacement is covered in the Resettlement Plan. A Resettlement Plan will be developed for the project according to ADB's SPS 2009. The Resettlement Plan will provide appropriate compensation for Affected People			
	Land Acquisition	No	-	-	-	-
	Occupational Health & Safety.	Yes	Occupational health. High	Throughout construction serious risks may arise. Medium	High	Low
	Utilities Provision	Yes	Limited economic impact assuming short term disruption. District heating pipes adjacent to Peace Bridge. Medium	Assume short term impact with social implications for heating disruption. Medium	Medium	Low
INDIRECT IMPACTS						
Physical	Physical resources	No	-	-	-	-
Biological	Biological resources	No	-	-	-	-
Socio-Economic	Induced Congestion	Yes	Travel time may be increased. Low	Short term during construction. Medium	Medium	Medium
CUMULATIVE IMPACTS						
Physical	Air Quality	Yes	Public health. High	Temporary during construction. Medium	High	Medium
	Noise	Yes	Can affect health (for example in hospital patients). High	Temporary and in the context of already high background noise levels along the roads, depending on the type of piling used for bridge widening. Medium	High	Medium
Biological	Flora & Fauna	No	-	-	-	-
Socio-Economic	Social, economic, cultural, health	No	-	-	-	-

Table 13: Impact Screening – Operational Impacts

	Category	Impact Yes/No	Receptor Sensitivity	Magnitude	Significance	Impact after Mitigation
Physical	DIRECT IMPACTS					
	Soil	No	-	-	-	-
	Waste	No	-	-	-	-
	Water	Yes	Selbe/Dond Gol river, low ecological value. Low	Short section of road and widened bridge with increased drainage to river. Low	Low	Low
	Noise and Air Quality	No	Positive impacts anticipated. To be confirmed with monitoring			
Biological	Flora	No	-	-	-	-
	Fauna	No	-	-	-	-
Socio-Economic	Cultural Heritage	No	-	-	-	-
	Road Safety	Yes	Positive impact as road signage, crossings and lane controls improved.			
INDIRECT AND CUMULATIVE IMPACTS						
No anticipated impacts						

162. The screening process showed that related to project design (design phase), the most significant impacts are: Land acquisition and resettlement impacts include a total of 27 households with approximately 162 affected persons³³ and the loss of 9012,05 m² of commercial land along the road in T1-A and T1-B of the North-South transport corridor, and the potential impact on 180 mature trees along T1-B. Expanding the Peace Bridge will not require land acquisition and will not involve physical displacement of people from housing. No tree is likely to be impacted as the location is lack of trees. Resettlement will be dealt with through a specific Resettlement Plan. The construction phase impacts are associated with increased noise and dust and increased traffic congestion during construction and improvements to 14 km of a major arterial road, and the potential impact on water quality in the Selbe (Dond Gol) river from construction site wastewater and storm water run-off. During the operation phase no significant negative impacts are anticipated. The project is expected to impact positively on the urban environment through improving air quality and a reduction in accidents for pedestrians and road users.

163. It has been recognized that the most efficient and cost-effective way to ensure that construction works are environmentally sound is to include these requirements in the construction contract provisions. The project will follow the standard specifications and General Conditions of Contract for construction contract purposes, as will be decided in the detailed design stage of the project. Provisions for the environment protection, occupational health and safety, and HIV/AIDS, are included in the EMP, which specifies mitigation measures and good management practices.

³³ Estimations made based on available data for 16 AHs that suggest the median size of AHs family as 6 members. Data about some AHs is unavailable, who were not available or not interested in taking part in census.

C. Impacts and Mitigation Measures Associated with Project Location, Planning and Design

164. In the preparation of the feasibility studies, this IEE and the resettlement plan, and the subsequent detailed design and construction preparation phase, the following mitigation measures have been and will be undertaken to minimize the project's environmental and socio-economic impacts:

- (i) The project alignment was carefully selected to avoid or minimize potential adverse impacts on the environment and surrounding communities.
- (ii) The project activities are located and designed to minimize resettlement impacts;
- (iii) Adequate technical design and scheduling of construction activities for the components, and coordination with schedules of other ongoing/proposed urban development projects such as the World Bank's Third Urban Services Improvement Project (USIP3) and ADB's Ulaanbaatar Urban Services Development Investment Program, will provide for safety, sanitation, and environmental protection in compliance with national regulations and international practices;
- (iv) Wide consultations with the key stakeholders and affected persons have been undertaken on the potential environmental and social impacts. The comments and suggestions from the consultation activities have been incorporated into the project design;
- (v) Tranche 1 has undergone the EIA process under the MON laws and regulations. The documents were prepared by qualified institutes, reviewed by MNET experts, and approved by MNET;
- (vi) Appropriate environmental mitigation and monitoring measures are included in the EMP. The proposed environmental mitigation measures will form part of the design documents for the components, and be included in the contracts for procurement of goods and services. All contractors and subcontractors will be required to comply with the EMP. The Contractors will be required to develop a full contractors EMP at the detailed design stage, to be approved by the relevant authorities.
- (vii) The environmental monitoring program will be incorporated into the overall project design to ensure that environmental impacts are closely monitored and the construction and operating activities are closely supervised against the approved EMP.

165. After implementation of these measures, residual impacts due to project design and location will be acceptable, and will include land acquisition, resettlement, economic displacement, and the removal of mature vegetation. These impacts are described in Chapter VI-D below (Impacts related to Construction).

D. Environmental Impacts and Mitigation Measures during Construction

166. The following impacts and mitigation measures refer to construction impacts which are common to components A to D. All components will require soil erosion protection, dust and noise control as well as management of the impacts from machinery operation, transport and haulage of materials and measures to ensure occupational and community health and safety.

1. Physical Impacts

167. **Impacts on Soil.** Three types of potential impacts on soil include: (i) soil erosion; (ii) soil contamination; and (iii) inappropriate management of borrow pits and spoil disposal.

- (i) **Soil erosion.** May be caused by roadbed construction, excavation of pipe trenches, and borrow pits, piling activities, stockpiles and spoils from earthwork during construction of roads, grading and bridge widening. The factors that are expected to contribute to accelerated erosion in the project area are winds and rainfall, especially during the rainy months of May to August. If erosion prevention measures described below in the construction phase are implemented, no significant impacts on soils are foreseen.
- (ii) **Soil contamination.** Contamination of soil in the construction phase may result from the inappropriate transfer, storage, and disposal of petroleum products, lubricants, chemicals, hazardous materials, liquids and solid waste.
- (iii) **Borrow pits and spoil disposal.** The need for borrow pits and spoil disposal sites for the road component (component B) was not identified at feasibility study stage. While it is not anticipated that borrow pits and significant spoil disposal will be required, and potential impacts would be short-term and localized, this will need to be confirmed during the detailed design. In addition, disposal of arisings from piling will need to be addressed at the detailed design stage. The quantity of arisings varies dependent on the type of piling required.

168. **Mitigation of impacts on soil.** The impacts on soil will be mitigated through a number of remedial measures which are defined in the EMP, which will be incorporated in the bid documents and construction contracts:

- (i) **Soil erosion:** (a) Soil erosion management plan to be prepared by the contractor and to be approved by the responsible authority before construction starts; (b) Minimizing the area of soil clearance; (c) Maintaining slope stability at cut faces by implementing erosion protection measures; (d) Construction in erosion and flood-prone areas should be mainly restricted to the dry season; (e) Control silt runoff; (f) Cover soil stockpiles; (g) Locate temporary soil stockpiles in areas where runoff will not induce sedimentation of waterways; (h) Properly slope and re-vegetate disturbed surfaces; and (i) Protect slopes on both sides of any culverts to prevent soil and water loss.
- (ii) **Soil contamination:** (a) Store chemicals/hazardous products and waste on impermeable surfaces in secure, covered areas with clear labeling of containers; (b) Remove all construction wastes from the site to approved waste disposal sites; (c) Establish emergency preparedness and response plan (Spill Management Plan); (d) Provide spill cleanup measures and equipment at each construction site; (e) Conduct training in emergency spill response procedures.
- (iii) **Borrow pits and spoil disposal:** (a) Site spoil and borrow pits far from industrial, agricultural, residential, historic and cultural sites; (b) Develop borrow pits and spoil disposal site management and restoration plans, to be approved by responsible authority; (c) Pit restoration will follow the completion of works in full compliance with all applicable standards and specifications, and will be required before final acceptance and payment under the terms of contracts; and (d) Identify MNET approved location for piling arisings disposal.

169. **Impacts on surface water.** The project may impact on surface water quality during construction through contamination and increased sedimentation of water courses within the project Area of Influence. Primarily, widening Peace Bridge involves construction directly over the Dond Gol river bed. Also during construction of surface water drainage, the project may increase the flow of water from the road to the Selbe River adjacent to T1-A. The surface water may contain sediments and contaminants from construction.

170. **Impacts on groundwater.** Groundwater in the project's area of influence is generally relatively deep (>4m). No wells/hand pumps are located in the area of potential impact. There will be no net loss of water access points. However, fuel and chemical substances used for road construction, bridge widening and sub-station rehabilitation could contaminate groundwater if they are not properly stored and disposed. Spills of toxic substances resulting from traffic accidents during construction and operation may also contaminate groundwater if no proper emergency response is undertaken. In addition, impacts to groundwater resources could potentially arise during piling, if required, for bridge widening activities. Deep piles may access groundwater resources.

171. **Mitigation of impacts on surface and groundwater.** The impacts on surface and groundwater will be mitigated through a number of activities defined in the EMP, and which will be incorporated in the bid documents and construction contracts:

- (i) Develop and implement contingency plans for control of oil and other dangerous substances (Spill Management Plan);
- (ii) Fuel storage, maintenance shop and vehicle cleaning areas must be stationed at least 300m away from the nearest water body;
- (iii) Construction wastes and materials (e.g. fuel) will be properly contained during construction. Wastes will be removed from site and taken to approved disposal facilities;
- (iv) Water collection basins and sediment traps will be installed in all areas where construction equipment is washed;
- (v) Effective septic treatment and disposal systems will be installed at construction camps;
- (vi) Installation of appropriate pre-treatment (sedimentation) for surface water drainage outlets if appropriate, to be investigated during design stage (T1-A); and
- (vii) Undertake a groundwater assessment for Peace Bridge prior to any deep piling activities, should piling be required.

172. **Impacts on air quality.** Moderate temporary air quality impacts during the construction stage of the project could be anticipated due to fugitive dust generation in and around construction sites and construction-related activities such as asphalt plants. Minor increases in the level of nitrogen oxides (NO_x) and sulphur oxides (SO_x) from construction plants and machinery are expected. Air quality impacts during construction are likely to result from the following sources: (i) Emissions from construction machinery and equipment, movement of haulage trucks; (ii) Fugitive dust from stripping of pavement; (iii) Increased traffic congestion in construction areas; (iv) During loading, unloading and haulage of spoil for disposal and construction materials from borrow pits; and (v) Dust created from unprotected surfaces by wind. These construction phase impacts will be localized and temporary, but could affect nearby residential areas, hospitals and schools.

173. **Mitigation of Impacts on air quality.** The potential impacts on air quality will be mitigated through a number of activities defined in the EMP. The civil works contract documents will specify that:

- (i) Asphalt plants and mixers will be located as far away as possible (at least 200 m downwind) from the nearest sensitive receptor (such as hospitals and schools);
- (ii) Water will be sprayed on construction sites and material handling routes where fugitive dust is generated;
- (iii) Effective dust suppression measures will be implemented near sensitive receptors such as schools, hospitals, or housing;
- (iv) Fuel & chemicals will be covered / stored to minimize emissions;
- (v) Trucks carrying earth, sand or stone will be covered with tarps or other suitable cover to avoid spilling;
- (vi) Construction vehicles and machinery will be maintained to a high standard to ensure efficient fuel-burning (note that local standards do not exist for vehicle emissions);
- (vii) Routine air quality monitoring will be undertaken around construction sites to confirm impact of project in accordance with the environmental monitoring plan.

174. **Solid waste management.** Waste production itself is not an impact however disposal of construction wastes could have adverse impacts on the soil, water and health of laborers and the community. Wastes streams will include inert construction wastes (soil, debris, concrete etc) and municipal type wastes (construction workers' food and packaging wastes from construction consumables) and hazardous wastes from construction (fuel containers, oil filters, oily rags etc.). Sub-station rehabilitation may give rise to transformers containing PCB contaminated oil. PCBs were widely used as dielectric and coolant fluids and may be found in older transformers used in sub-stations including those used for trolleybus transport. This would require disposal of PCB contaminated equipment as well as liquids.

175. **Mitigation of impacts from solid and liquid waste.** The potential impacts arising from solid and liquid waste production and disposal will be mitigated through a number of activities defined in the EMP, and which will be incorporated in the bid documents and construction contracts:

- (i) A schedule for waste removal and disinfection of relevant waste storage areas will be submitted to the relevant Hygiene and Infection Control organizations for approval.
- (ii) Storage and containment: Provide appropriate waste storage containers for worker's construction and hazardous liquid wastes; Install confined storage points of solid and liquid wastes away from sensitive receptors, regularly haul to an approved disposal facility according to schedule above;
- (iii) Use of contractors: Use licensed contractor to remove all wastes from sites; Hold contractors responsible for proper removal and disposal of any significant residual materials, wastes and contaminated soils that remain on the ground after construction;
- (iv) Management: Prohibit burning of waste; Carefully handle asbestos containing material (ACM) if found during any demolition activities following emergency

preparedness and response protocols on which the workers will be briefed; and

- (v) PCB Assessment: Assessment of likelihood of PCBs being present at sub-stations prior to works commencing; Disposal Strategy for PCB arisings which is likely to include incineration for total PCB destruction.

176. **Noise.** The major sources of noise pollution are piling, particularly driven piling if required, movement of construction vehicles, the haulage of construction materials to the construction site and noise generating activities at the site itself. Noise from piling will be short term and localized. Concrete mixing and material movements are the primary noise generating activities and will be uniformly distributed over the entire construction period. Construction activities are expected to produce noise levels in the range of 80-95 dB(A). Table 5 indicates noise levels for construction machinery. The major works will be carried out during the daytime. The noise produced during construction will however not have significant impacts on the existing ambient noise level. Noise levels might be elevated, but they will be temporary and localized, and largely in line with background noise levels 200m or more from the site.

177. **Construction noise mitigation.** The potential noise impacts will be mitigated through a number of activities defined in the EMP, which will be incorporated in the bid documents and construction contracts:

- (i) Source control: Maintain all exhaust systems in good working order; undertake regular equipment maintenance;
- (ii) Locate sites for concrete-mixing and similar activities at least 500m away from sensitive areas. Disposal sites and haulage routes will be coordinated with local officials;
- (iii) Use mobile noise barriers during construction activities, especially in *ger* areas which have no inherent insulation from noise;
- (iv) Operate between 8am-6pm only and reach an agreement with nearby schools, hospitals and residents regarding the timing of heavy machinery work, to avoid any unnecessary disturbances;
- (v) Monitor noise at sensitive areas at regular intervals (as defined in the monitoring plan); and
- (vi) Seek suggestions from community members to reduce noise annoyance. Public notification of construction operations will incorporate noise considerations; information procedure of handling complaints through the Grievance Redress Mechanism will be disseminated.

2. Biological Impacts

178. **Flora and Fauna.** Field investigations and expert consultations have established that there are no threatened or endangered flora and fauna species within the project's direct area of influence. Therefore, no adverse impact on such species is likely to occur during the construction activities.

179. The project has the potential to impact on approximately 180 trees along Chinggis Avenue (T1-B) which are adjacent (4-7m) to the road (**Figure 19**). The exact number of trees to be removed could not be established at this stage of project preparation. A detailed assessment will be conducted during detailed design (see below). The trees are of low ecological value because of their urban location but may be a habitat for birds in summer.

The trees do provide a screen for the apartments adjacent to the road and provide shade for pedestrians during the summer. Overall, the removal of the trees is anticipated to have a low impact on the environment.

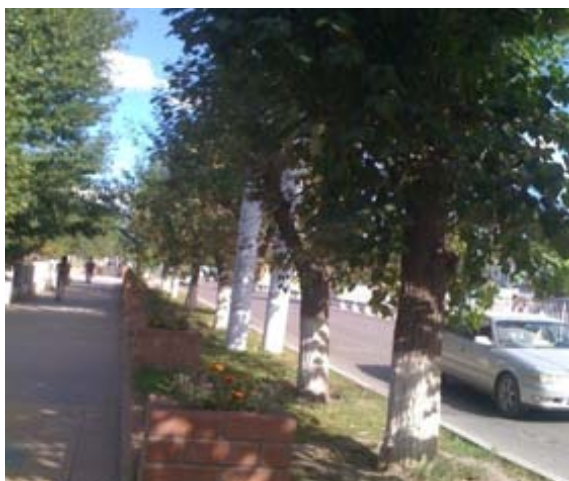


Figure 19: Trees potentially affected on Section T1-B.

180. **Mitigation of impacts on flora.** The potential impacts on flora will be mitigated through a number of activities defined in the EMP, and to be incorporated in the bid documents and construction contracts:

- (i) *Detailed assessment.* Prior to construction, conduct a detailed assessment of the trees which will need to be removed;
- (ii) *Tree removal and replanting plan.* Based on the detailed assessment, develop a tree replanting plan, to be approved by the relevant authorities. The plan should adhere to the following principles:
 - a. *Minimal tree removal.* Where possible, protect existing trees during road widening, removing only those that are absolutely necessary;
 - b. *Sound timing.* Remove trees in early spring in order to ensure no nesting birds are disturbed;
 - c. *Replacement.* For every one tree removed, replant at least two in suitable city locations after construction, in accordance with Forest Law. The selection of species, location and period of planting will be identified during detailed design;
 - d. *Monitoring and Maintenance.* Implement a tree and vegetation monitoring and maintenance plan (to be implemented by the IA).

3. Socio-economic Impacts

181. **Land acquisition, resettlement, economic displacement.** The project (Tranche 1) is classified as resettlement category B as the implementation of the project's components will not necessitate significant land acquisition and resettlement. Land acquisition and resettlement impacts include a total of 27 households with approximately 162 affected

persons³⁴ and the loss of 9012 m² of commercial land along the road in T1-A and T1-B of the North-South transport corridor. In total, 379 m² of structures will be affected. Affected kiosks along the road (**Figure 20**) may be relocated to new locations while the costs for other structures will have to be compensated, of which 5 will be partly affected and 14 deemed to have permanent impact. Expanding the Peace Bridge will not require land acquisition and will not involve physical displacement of people from housing. No tree is likely to be impacted as the location is lack of trees. No impacts are anticipated to public/community facilities, agriculture land, pastures, and crops. The BRT corridor improvements will not result in permanent impacts to any facility since improvements will be within the existed road right-of way. The temporary impact due to occupation of land for construction activities is expected to be minimal, as there is sufficient public space for construction works. Contractors will be required to avoid the temporary occupation of private land, store materials and park machinery in such a way that it does not negatively affect local businesses and residents.

182. **Economic displacement.** The impact is limited to the small commercial assets such as kiosks and shops/vendors along the existed road. Along the North-South transport corridor (T1-A and T1-B) 22 structures (17 metal kiosks in bus stations and 5 different shops/vendors) will be affected and need to be relocated. The 17 above said kiosks are made of metal and can be relocated.

183. **Measures to address resettlement, land acquisition and economic displacement** were defined in the land acquisition and resettlement plan (LARP) that was prepared for the project. The RP will be endorsed by the EA/IAs and disclosed to affected people in local language prior to approval of the project. The entitlement matrix defined in the LARP has adequate provisions for restoration of livelihood of the APs, including kiosks keepers to the owners of small food and wooden fuel shops. The basic objective behind the income and livelihood restoration activities and schemes is to restore the economic status of the affected persons enjoyed prior to the project, in line with the requirements of ADB's SPS. As a result, in addition to providing compensation and resettlement benefits, appropriate support measures have been included for income and livelihood restoration of those affected.

184. All persons losing their livelihood or places of generating income as a result of the project will be supported with short-term income and livelihood restoration assistance for subsistence. These short-term income and livelihood restoration measures will be for immediate assistance and include the following measures:

- (i) Compensation for land and other lost assets is paid in full prior to relocation;
- (ii) Temporary or short-term employment in construction activities at the project construction sites;
- (iii) To establish the income sources at other places being constructed by the project; and
- (iv) Special assistance, appropriate to vulnerable groups such as women, the elderly, and the disabled.

³⁴ Estimations made based on available data for 16 AHs that suggest the median size of AHs family as 6 members. Data about some AHs is unavailable, who were not available or not interested in taking part in census.



Figure 20: Buildings Encroaching on Chingeltei Avenue

185. **Indigenous people and gender impacts.** Indigenous people are not present in the project sites. Therefore, the ADB Policy on Indigenous Peoples is not triggered. Adverse gender impacts by the project on either men or women are not expected. With regard to land acquisition and resettlement, the project pays particular attention to ensure that women are the recipients of the compensation pertaining to their activities and to ensure that women who are de-facto household heads are clearly listed as beneficiaries of compensation and rehabilitation proceedings.

186. **Physical cultural resources.** The Southern road improvement (T1-B) is 80m from the Bogd Khan temple (winter palace). The project will cause traffic congestion, which might slightly affect the ability of people to visit this site. It is not anticipated that the project will cause any damage to the fabric of the buildings due to its distance from the construction site.

187. There is no record of important archaeological sites within the project's area of influence. Should archaeological artifacts be discovered during site works, government requirements for excavating and preserving those items will be strictly followed.

188. **Mitigation of impacts on physical cultural resources.** The potential impacts on cultural resources will be mitigated through a number of activities which are defined in the EMP:

- (i) Temporary traffic management (refer to para. 192);
- (ii) Site condition report. To mitigate any false claims, a detailed assessment of the Bogd Khan Palace will be conducted prior to start of construction to ensure that a true record of their pre-construction condition is kept. This will involve observations and photographs regarding the fabric of the buildings, the condition of the walls, roof, fittings etc. This will be done in collaboration with the caretakers of the site.
- (iii) Chance find procedures will be established for undiscovered underground cultural or historic sites that might be identified during project implementation.

189. **Risks to Occupational health and safety.** Due to its nature the construction industry is considered to be one of the most hazardous industries where a number of potentially hazardous operations and materials are used. Intensive use of heavy construction machinery, tools, and materials poses risk of physical hazards such as noise and vibration, dust, handling heavy materials and equipment, falling objects, work on slippery surfaces, fire hazards, chemical hazards such as PCBs, toxic fumes and vapors etc. There is a low likelihood that cement bonded chrysotile asbestos pipes may be exposed during the construction phase. Although asbestos poses a risk to human health, cement

bonded asbestos is one of the lowest risk forms due to the fibers being coated in a cement matrix i.e. difficult to become airborne, and white (chrysotile) fibers are the lowest risk category of asbestos fibers.

190. **Measures to ensure adequate occupational health and safety.** The civil works contractors will implement adequate precautions to protect the health and safety of construction workers. The occupational health and safety risks will be managed by applying measures in the following order of preference: avoiding, controlling, minimizing hazards, and providing adequate protective equipment. The contractors will undertake the following activities:

- (i) *Environmental, Health and Safety Officer.* An Environmental, Health and Safety Officer (EHSO) will be hired to implement and supervise the Environmental, Health, and Safety Management Plan.
- (ii) *Environmental, Health and Safety Management Plan (EHSMP).* Each contractor will prepare a HSMP for the construction workers on the basis of the EMP. It will be submitted to the PMU Safeguards Unit (PMU-SU) for review and appraisal. The detailed EHSMP will include the following provisions:
 - a. *Clean water.* Provide a clean and sufficient supply of fresh water, for construction and for all houses, camps, offices, laboratories and workshops.
 - b. *Sewage and wastewater.* Provide an adequate number of latrines and other sanitary arrangements at the site and work areas, and ensure that they are cleaned and maintained in a hygienic state.
 - c. *Solid waste.* Garbage receptacles at construction site and camps, which will be periodically cleared to prevent outbreak of diseases will be setup.
 - d. *Liquid chemical waste.* Provide receptacles in suitably bunded area for the storage of liquid waste prior to disposal. Include clear warnings with health risks. Where PCBs are discovered, the waste should be separated from other chemicals and labeled prior to incineration.
 - e. *Personal protection.* Provide personal protection equipment (PPE), such as safety boots, helmets, gloves, protective clothing, goggles, and ear protection, in accordance with relevant health and safety regulations, for workers. Where cement bonded chrysotile asbestos pipes may be exposed during the construction, PPE will also include respirators, eyewear and disposable coveralls.
 - f. *Emergency Preparedness and Response.* An emergency response plan to take actions on accidents and emergencies, including environmental and public health emergencies associated with hazardous material spills and similar events will be prepared, and submitted to the PMU-SU for review and appraisal. Emergency phone link with hospitals in Ulaanbaatar will be established. A fully equipped first-aid base in each construction camp will be organized.
 - g. *Records Management.* A Records Management System that will store and maintain easily retrievable records protected against loss or damage should be established. It will include documenting and reporting occupational accidents, diseases, and incidents. The records will be reviewed during compliance monitoring and audits.

- h. *Safety communication.* Ensure that safety, rescue and industrial health matters are given a high degree of publicity to all persons regularly or occasionally on the Site. Posters in Mongolian and Chinese drawing attention to site safety, rescue and industrial health regulations will be made or obtained from the appropriate sources and will be displayed prominently in relevant areas of the site.
- i. *Training, awareness and competence.* Train all construction workers in basic sanitation and health care issues, general health and safety matters, and on the specific hazards of their work. Implement SITs/HIV/AIDS and other communicable diseases awareness and prevention program to target the local community and construction workers.

191. **Risks to community health and safety.** Traffic congestion may worsen as construction traffic in urban areas increases during rush hours; roads and intersections along the 14 km corridor may be partially closed during the works, causing temporary inconvenience to traffic, residents, commercial operations, and institutions. Construction sites will be located close to residential and commercial urban areas, presenting a threat to public health and safety. The project may also contribute to road accidents through the use of heavy machinery on existing roads, changing road priorities, temporarily blocking pavements for pedestrians etc.

192. **Mitigation of impacts on community health and safety.** The potential impacts on community health and safety will be mitigated through a number of activities defined in the EMP. The contractors will implement the following measures:

- (i) Traffic management. A traffic control and operation plan will be prepared and it shall be approved by MUB prior to any construction. The plan shall include provisions for diverting or scheduling construction traffic to avoid morning and afternoon peak traffic hours, regulating traffic at road crossings with an emphasis on ensuring public safety through clear signs, controls and planning in advance;
- (ii) Information disclosure. Residents and businesses will be informed in advance through media of the BRT corridor, road and bridge improvement activities, given the dates and duration of expected disruption;
- (iii) Construction sites. Clear signs will be placed at construction sites in view of the public, warning people of potential dangers such as moving vehicles, hazardous materials, excavations etc and raising awareness on safety issues. Heavy machinery will not be used after day light and all such equipment will be returned to its overnight storage area/position before night. All sites will be made secure, discouraging access by members of the public through appropriate fencing whenever appropriate.

193. **Other Social Issues.** No other social risks and/or vulnerability are anticipated as a result of the project. The project construction workers will be engaged locally. Prevention and control of transmissible diseases and HIV/AIDS, and community disturbance training and sensitization will be provided to the contractors, as well as drug and human trafficking education will be provided the local communities, ensured in the loan assurances and monitored in the social action plans. Civil works contracts will stipulate priorities to (i) employ local people for works, (ii) ensure equal opportunities for women and men, (iii) pay equal wages for work of equal value, and to pay women's wages directly to them; and (iv) not employ child or forced labor. Specific targets for employment have been included in the gender action plan.

194. **Utilities provision interruption.** Construction may require relocation of municipal utilities such as power, water, communication cables. Temporary suspension of services (planned or accidental) can affect the economy, industries, businesses and residents' daily life.

195. The bridge widening is within 20 m of major district heating pipes, identified during the project preparation stage. The pipes pass across the Dond Gol river. Disruption of the pipe network through an accident during the bridge upgrade could impact on the community's health, particularly in cold seasons when uninterrupted heating is essential.

196. **Mitigation of impacts on utilities provision.** The potential impacts on utilities provision will be mitigated through a number of activities defined in the EMP, to be incorporated in the bid documents and construction contracts:

- (i) Contractors will assess construction locations in advance for potential disruption to services and identify risks before starting construction;
- (ii) If temporary disruption is unavoidable the contractor will, in collaboration with MUB, develop a plan to minimize the disruption and communicate the dates and duration in advance to all affected people.

E. Environmental Impacts and Mitigation Measures during Operation

197. The potential impacts associated with operation of the roads and BRT corridor, including Peace Bridge are presented below. Overall, improving the road safety and traffic flows will have positive environmental and social benefits for the City. However potentially negative impacts may occur during operation induced by the project, although they are not considered highly significant.

198. **Impacts on surface water quality.** During the operation of Chingeltei Avenue (T1-A) the drainage installed will create a direct pathway for run-off to the Selbe river. Water currently runs off the road and it is not directed specifically to the river but instead flows on to permeable soil areas where contamination is likely to be naturally attenuated; the run-off is likely to be contaminated with fuels, oils, debris and sediment common to road run off. While the pollution load to the Selbe river is not anticipated to be significant, a series of mitigation measures is proposed.

199. Any bridge passing over a water body may pose a risk to the environment below, should a traffic accident occur on the bridge, leading to spillages of vehicle fluids or other contaminants. This will be managed through standard modern design practices, meaning specific mitigation is not required here.

200. **Mitigation of impacts on water quality.** The potential impacts on water quality during operation will be mitigated through:

- (i) Routinely collecting and properly disposing litter and debris from sidewalks, driveways, and parking lots along Chingeltei Avenue, especially near the Selbe river;
- (ii) Cleaning the roadside catch basins before the wet season to avoid river pollution by storm water runoff flushing debris and dirty silt;
- (iii) Placing garbage bins and containers along the road network;
- (iv) Prohibiting the construction of car washing and gas stations near the Selbe river and drainage channels;

- (v) Appropriate technology (silt trap) will be employed to control the sediment and contaminant loading entering the Selbe river, as considered appropriate in the detailed engineering design stage;
- (vi) Water quality testing before, during and after construction to confirm the impact the project may or may not have on water quality in the Selbe river, downstream from T1-A.

201. **Risk of natural disasters.** The components under Tranche 1 are not anticipated to increase risks from natural disasters. The drainage system along the roads (T1-A and T1-B) will reduce the risk of local floods during heavy rainfall. Flashfloods may present a challenge for road development. The Chingeltei Avenue (T1-A) crosses one drainage channel (Figure 10) that may potentially put the project road at risk during rainstorms and heavy rainfall. While no direct physical intervention on the existing channel is foreseen at this stage of project preparation, the adequacy of the channel capacity will be critically reviewed during detailed design to ensure adequate carrying capacity.

202. **Noise and air quality.** The project is anticipated to reduce noise and air pollution along the BRT corridor and at corridor intersections by channeling traffic flows, reducing waiting times and sounding of horns, and improving road surfaces. The BRT system will further reduce noise and air pollution. The improved road surface is expected to reduce dust emissions along the road corridor. Air quality and noise monitoring during operation will be undertaken at the along the BRT corridor intersections and Chingeltei Avenue and Chinggis Avenue (T1-A and T1-B) sites to confirm this prediction. In addition, the following precautionary measures will be implemented:

- (i) No new school, hospital or other sensitive facilities will be allowed to be built within 200 m from the central line of the roads to prevent noise impacts to these facilities in the future; and
- (ii) Trees and shrubs will be planted as soon as possible after construction along the road corridor.

203. **Impacts on public health and safety.** The project will significantly improve community health and safety by (i) reducing vehicle emissions; (ii) reducing traffic bottlenecks and accident hotspots; and (iii) improve services for pedestrians. However, in that it allows traffic to travel more smoothly, an improved transport system can also locally increase the risk of serious pedestrian accidents, especially to children, if behavior does not change in response to changed traffic conditions. To address this issue, the investment component will be supplemented by grant assistance^{35, 36} aiming at (i) reducing and preventing road traffic accidents involving schoolchildren in poor *ger* areas of Ulaanbaatar; (ii) implementing effective traffic and parking management and traffic safety programs.

F. Indirect and Cumulative Impacts

204. By expanding the temporal and special dimension of the proposed project's planning horizon, it is possible to identify a number of induced and cumulative impacts. Indirect and cumulative impacts will be mainly positive. The full scale of positive indirect impacts will be achieved once all tranches of the MFF project will be implemented. These impacts have

³⁵ The project team is preparing the Proposed Grant Assistance for Mongolia: Improving Road Safety of Poor Schoolchildren in Ulaanbaatar for potential financing from the Japan Fund for Poverty Reduction.

³⁶ The project team is preparing a CDTA, which is attached to the project. The CDTA will develop MUB's capacity in the areas of urban transport planning, management, BRT operation, traffic safety, and public relations and consultations.

been discussed in previous sections of this IEE, including:

- (i) Increased public health and safety (see para. 156 and 203)
- (ii) Reduced greenhouse gas emissions (see para. 152)
- (iii) Reduced air emissions (see para. 153, 154 and 202)
- (iv) Contribution to poverty reduction and job creation (see para. 157)

205. The project will also link with the proposed ADB-MUB Ulaanbaatar Urban Development Program, which (amongst others) will improve basic services in sub-centers of three ger areas in the 10th, 12th and 16th Khorroos. The project will provide improved connection from the ger areas with a reliable and economical means of transport to the urban core, where basic social services and markets are available.

206. **Potential negative induced and cumulative impacts** were analyzed, and are described below. Overall, these impacts are considered insignificant.

207. **Cumulative impacts during construction.** The active construction of a number of sub-projects all focused along a 14 km BRT corridor will cause a magnification of environmental and social impact in the project areas in terms of traffic on the existing road network, civil works, air-borne dust, waste generation, community disturbance and safety etc. These construction impacts might be increased as a result of other infrastructure projects which might be implemented in a near future, including the World Bank's Third Urban Services Improvement Project (USIP3) and ADB's Ulaanbaatar Urban Services Development Investment Program.

208. These construction related cumulative impacts could be effectively minimized by adopting proper mitigation measures, including: (i) coordination between all project sub-components and other projects in the area of influence in terms of construction schedule, possible access road and borrow/disposal sites sharing; (ii) contractors will develop material transport plans with consultation of local road management authority and local community; (iii) enforcement of good construction management to minimize dust, noise and waste generation; (iv) education of construction workers to minimize social disturbance and cultural conflict; (v) provision of temporary access to local traffic; (vi) proper maintenance of the access roads and timely restoration/strengthening upon completion. With effective implementation of good construction management measures, these common construction-related cumulative impacts can be adequately mitigated to acceptable level. The Grievance Redress Mechanism (GRM, see Section IX) will enable potentially affected people to report any excessive disturbances during construction.

209. **Induced traffic and development.** Upgrading of existing roads has the potential to influence traffic volume and development along the roads. The road sections to be rehabilitated in the framework of Tranche 1 belong to the main North-South transport corridor. It is thus not anticipated that the rehabilitation of these roads will increase traffic flows. The same is true of the bridge expansion, which will expand to accommodate trolleybuses as opposed to additional private vehicles. Furthermore, the BRT system to be implemented under subsequent tranches is expected to absorb a significant portion of the anticipated increased traffic volume until 2030. The improved roads will not connect undeveloped and environmentally sensitive areas, and induced pressure on such areas is thus not anticipated. In contrary, the improved roads will enhance connection of *ger* areas (where most poor residents leave) with the urban core, increase the attractiveness of these *ger* areas as a permanent living space, and induce controlled intensification around sub-centers with public transport hubs, and induce development of other social services, and ultimately

increase their livability.

G. Unanticipated Impacts during Construction and Operation

210. If any unanticipated impacts become apparent during project implementation, the borrower will (i) inform and seek ADB's advice; (ii) assess the significance of such unanticipated impacts; (iii) evaluate the options available to address them; and (iv) prepare or update the IEE including EMP. ADB will help the borrower mobilize the resources required to mitigate any adverse unanticipated impacts or damage.

VII. ECONOMIC ASSESSMENT

A. Environmental Management and Mitigation Costs

211. The total project cost for Tranche 1 of the Urban Transport Development Project is estimated at \$69.9 million. ADB will contribute \$59.9 million to Tranche 1.

212. The environmental protection related cost is \$508,500 (MNT 646,926,000), or 0.84% of the total estimated project budget. The major environmental protection costs for Tranche 1 include institutional strengthening, environmental management training, protection and mitigation measures during construction and operation, and awareness raising. The estimated costs are summarized in Table 14. Excluded from the costs estimates are infrastructure costs related to environment and public health, including stormwater drainage, pedestrian crossings, safety islands etc.

213. Before construction, the PMU and IA will develop detailed responsibilities and requirements for contractors and will provide detailed cost estimates of mitigation measures and environmental monitoring in the construction contracts. The PMU will also detail the responsibilities of PMU-SU and prepare its work schedule. Environmental considerations will be incorporated into the procurement to ensure environmentally responsive procurement.

Table 14: Estimated Environmental Management Costs

Item	Cost (MNT)	Cost (\$)	Source of Fund
Training, Institutional Strengthening, Awareness Raising			
Institutional strengthening			
Safeguards Unit in PMU ³⁷	34,182,000	54,000	EA
Loan Implementation Environment Consultant ³⁸	30,384,000	24,000	EA
Environment, Health and Safety Officer ³⁹	58,236,000	46,000	Contractors
Environmental management training	13,926,000	11,000	EA
Public consultation, GRM coordination	25,320,000	20,000	EA
Mitigation and Protection Measures during Construction Phase			
Soil erosion and contamination protection (including temporary facilities for slope stabilization, retaining walls, emergency preparedness and response planning etc.)	18,990,000	15,000	Contractors
Borrow sites and spoil disposal sites management, including restoration ⁴⁰	37,980,000	30,000	Contractors
Surface water protection, including temporary wastewater treatment at construction sites and camps	25,320,000	20,000	Contractors
Dust control from construction and transportation of construction materials and wastes	37,980,000	30,000	Contractors
Emission control from vehicles and construction equipment	6,330,000	5,000	Contractors

³⁷ Assuming 6 person-months national environmental expert, 3 years implementation

³⁸ Assuming 2 person-months national environment consultant per year, 3 years implementation

³⁹ Assuming 3 EHSO, 100%, for a period of 24 months each

⁴⁰ Need for borrow sites and spoil disposal to be confirmed during detailed design

Noise control measures around construction sites	44,310,000	35,000	Contractors
Solid waste collection, storage and disposal	50,640,000	40,000	Contractors
Liquid chemical waste collection, storage and disposal	25,320,000	20,000	Contractors
Construction site safety including emergency preparedness and response, fencing, warning signs	56,970,000	45,000	Contractors
Work camp health and hygiene measures during construction	18,990,000	15,000	Contractors
Planting trees along the roads; and protection of vegetation, re-vegetation of disturbed areas	25,320,000	20,000	Contractors
Physical cultural resources protection during construction, including pre-construction assessment and documentation	5,064,000	1,500	Contractors
Temporary traffic management, including information dissemination, traffic control, temporary traffic signs	44,310,000	35,000	EA
Environmental monitoring during construction (air, water, noise)	20,256,000	16,000	EA
Mitigation and Protection Measures during Operation Phase			
Supervision and maintenance of stormwater drainage system (/yr)	12,660,000	10,000	IA
Maintenance of vegetation (/yr)	12,660,000	10,000	IA
Surface water monitoring (/yr)	7,596,000	6,000	EA, IA
Total⁴¹	646,926,000	508,500	

Source: Consultation with MNET and existing accepted ADB IEEs and EIAs for Mongolia, ITDP China engineers provided cost for noise barriers.

⁴¹ Covers construction phase and first year of operation

VIII. CONSULTATION, PARTICIPATION AND INFORMATION DISCLOSURE

A. Consultation during Project Preparation

214. Information disclosure and stakeholder consultations were conducted during the course of IEE preparation in accordance with ADB's *Safeguard Policy Statement (2009)*. The information disclosure and consultations included: (i) a stakeholder meeting attended by representatives of the affected public and other concerned stakeholders in September 2009; (ii) a public consultation meeting with potentially affected people in June 2011; (iii) informal visits to and interviews with communities and households in the project areas; and (iv) consultation of experts, government officials and NGO representatives on an individual basis. Those affected by land acquisition and resettlement were consulted throughout the process of resettlement planning and social and poverty impact studies, using a variety of public consultation techniques including questionnaire surveys, community meetings, focus group discussions, key informant interviews and household visits that were carried out by local design institutes, the PPTA consultants, and ADB missions. The total number of people consulted amounted to over 300 people.

1. Consultation of government officials, experts and NGOs

215. In the framework of IEE preparation, the PPTA consultants and ADB review missions consulted with relevant government agencies, particularly those with responsibilities for environmental protection, public health, and urban construction and planning. Relevant local and international NGOs were also consulted. **Table 15** presents a list of persons and organizations contacted individually during environmental examination. The consultees provided technical inputs to the IEE, and they gave their opinions on the project design and implementation approach. The key issue expressed by MNET was the expected loss of trees during widening of the southern part of the road (T1-B). Although it is clear that this is required if the project is to go ahead, MNET strongly suggested that trees should be replanted if possible along the road, or at the very least, nearby the project area in available open spaces.

Table 15: Experts and organizations consulted during IEE

Name	Organization	Position
Enkhtuvshin	Agency of Meteorology and Environment (AME), National air quality service	Head
Enkhmaa	Agency of Meteorology and Environment, National air quality service	Officer
Batsaihan	Ulaanbaatar City government, City Air quality service	Deputy Chairman
Tugjsuren	School of Science and Technology University (STU),	
Mijiddorj	STU, Ecology and Sustainable Development Centre	Executive director
Lkhagvasuren	AME, Central laboratory of environmental research	Director
Enkhtuya	AME, Central laboratory of environmental research	
Oyuntuya	AME, Central laboratory of environmental research	Engineer of air quality
Oyunchimeg	Department of health, City governor's office	Officer
Erdenetuya	Mongolian University of Science & Technology	Lecturer, Dept. of Vehicles
Batsukh,	MUB	General Dendrologist
Baysgalan	Information centre of the meteorological agency	Senior Officer
Odmandakh	Sukhbaator district	Officer in Charge for Infrastructure development

Enkhzaya	13th <i>Khoroo</i>	<i>Khoroo</i> Governor in Ahbator District
Adilbish	14th <i>Khoroo</i>	<i>Khoroo</i> Governor in Sukhbator District
Badam	NGO	Senior Land Management Specialist
Dr Lkhagvasuren	WWF	Conservation Director
Davaasuren	Road Department	Head of Planning
Bayrtsetseg	MNET	EIA Officer
Kharkhuu	MNET	Officer
Suvd	Ministry of Health, Social Health Institute	Officer

2. First consultation meeting

216. A public consultation meeting was held on September 23, 2009 in Ulaanbaatar City. A representative cross section of stakeholders was invited, including government officers, NGO representatives, leading academics, “Green Party” politicians and members of the general public. A presentation was made on the proposed project (for all tranches) and a question and answer session took place. In general no objections were made to the scheme. The attendees supported the project concept and confirmed the urgent need to improve Ulaanbaatar’s transport system. There was a common understanding that proposed interventions, including implementation of a BRT system along main transport corridors, as well as improvement of intersection geometry along the BRT corridor, will significantly improve the transport system.

217. Key environmental issues raised and comments made by the participants related to Tranche 1 included the following: (i) the need to improve pedestrian safety through clear segregation of motorized and non-motorized traffic and improved pedestrian system; (ii) the need to restore or increase vegetation along the transport corridor to control dust and improve air quality; (iii) the need for public education on traffic safety, especially for rural migrants; (iv) environmental monitoring should include NO_x, CO₂, PM and noise to demonstrate the project’s benefits. The project team believes that these concerns have been adequately addressed in the project design.

Table 16: Participants in IEE consultation meeting, September 2009

Name	Position, Organization
Mr. Batsaikhan	Deputy Chairman, Ulaanbaatar city government, City Air Quality Service Division
Ms. Narantsetseg	Head of PTD
Mr. Bat-Erdene	Officer of Urban Development Plan, Ulaanbaatar city government
Mr. Tugjsuren	Professor, Science and Technology University
Mr. Lkhagvasuren	AME, Central laboratory of environmental research
Ms. Oyuntuya	AME, Central laboratory of environmental research
Ms. Lodoisamba	Professor, Mongolian State University
Mr. Erdenebold	General Director, NGO “Shine ueiin manlailal”
Ms. Enkhjargal	Project officer, Ministry of Health
Ms. Undarmaa	Traffic Police Department
Ms. Dulamsuren	Officer, transport planning division, PTD
Ms. Bayarmaa	Head of NGO “Life-Future fund”
Mr. Baasanjav	Head of NGO “Sain uils”
Mr. Chagnaadorj	Head of NGO “Ariun Suvarga”

Ms. Bayarmaa	Head of NGO "Civil soviet"
Ms. Gereltsetseg	Specialist of NGO "Civil soviet"
Mr. Ganbaatar	Specialist, Green Party
Mr. Ochirjav	Sukhbaatar district
Ms. Enkhmaa	Agency of Meteorology and Environment

3. Second consultation meeting

218. A public consultation meeting was held in a local school on Chingeltei Avenue (at location T1-A) with potentially affected people and the participation of the project team on June 11th 2011 in preparation for this IEE. 59 residents from the *Khoroos* adjacent to the project roads attended the meeting, which formally includes 13th and 14th *Khoroo* of the Sukhebaator district and 18th *Khoroo* of Chingeltei District, along the BRT corridor (Table 18). The format of the consultation included a presentation on (i) the BRT project (tranches 1 to 3); (ii) Tranche 1 activities; (iii) anticipated impacts and proposed mitigation measures; (iv) the proposed Grievance Redress Mechanism; and (v) the tentative implementation timetable.

219. Following the presentation, the participants were invited to give their opinions related to the proposed project. In general the project was welcomed, and residents see the project as an opportunity to help improve two key issues in their area related to the road: (i) road safety; and (ii) localized flooding. In addition, concerns over potential resettlement and boundary issues were raised. The consultation discussion focused on existing local issues rather than objections or concerns relating to the project. **Table 17** provides a summary of the key issues and concerns raised during the consultation meeting.

Table 17: Summary of issues raised by potentially affected people along transport corridor, consultation meeting of June 2011

Aspect	Discussion Summary
Resettlement	<ul style="list-style-type: none"> Further consultation on resettlement is needed and the impact on households adjacent to the road, for example if fences need to be removed, residents should be told. A number of residents are planning to widen their compounds through moving their fences towards the road.
Flooding	<ul style="list-style-type: none"> The road should include storm water drainage in order to ensure its longevity. There are concerns over flooding and if linking the road drainage directly to the Selbe river may increase flooding in the <i>ger</i> areas if drainage is not well managed; Flood waters may give rise to contamination and pollution particularly from soil and road contaminants; The road slopes down to the area near to School 17 (near MT Gas Station) approximately 150m from the start of the project area (T1-A). Flooding in this road hollow should not be increased by the project as it is already an issue during rain events in this area.
Road Safety	<ul style="list-style-type: none"> Pedestrians are at risk from crossing the existing road. The new design should incorporate safety measures such as pedestrian bridges or similar engineering solutions. Access for the elderly and disabled must be considered as a priority; Accidents have occurred involving cars hitting houses to the lower east side of the road. This could be prevented by installing a crash barrier; Road signage along the road needs to be improved as it is contradictory in places. This should include speed limit and children crossing signs in accident hot spots e.g. around the kindergarten; and Driver education is needed, including bus drivers and microbus drivers, particularly regarding pedestrians.
Vegetation	<ul style="list-style-type: none"> Requests for vegetation in order to make the area more pleasant and improve the quality of life. The area has no trees at the moment, and a 'green separator' along the middle of the road and along sidewalks are requested;

	<ul style="list-style-type: none"> Local people should be paid by the project to take care of any vegetation planted in the area.
Access	<ul style="list-style-type: none"> Access to the road from Sukhebaator District (East side of the road) is limited because of the steep slopes. Access needs to improve and must be maintained during construction; Access is difficult when it is raining in summer as the mud is slippery because the paths are unpaved.
Project Location	<ul style="list-style-type: none"> The participants consider that the most urgent need for road widening is North of Dolon Buudal toward Shadivlan, as this is currently a two lane road.
Air Quality	<ul style="list-style-type: none"> Limited concerns for residents. The suggestion of using LNG to replace diesel was proposed.
Noise	<ul style="list-style-type: none"> No concerns expressed by residents.
Grievance Redress Mechanism	<ul style="list-style-type: none"> The GRM is supported by the participants. No special comments made.

Table 18: List of participants, public consultation meeting of June 2011

#	Name	Occupation/Role	#	Name	Occupation/Role
1	B.Irina	Resident from 14 <i>Khoroo</i>	31	Tsogzolmaa	Resident from 14 <i>Khoroo</i>
2	Ya.Irina	Resident from 14 <i>Khoroo</i>	32	Ariunjargal	Resident from 13 <i>Khoroo</i>
3	Tsetsegmaa	Resident from 14 <i>Khoroo</i>	33	Jigmeddorj	Resident from 13 <i>Khoroo</i>
4	Uranchimeg	Resident from 18 <i>Khoroo</i>	34	Rentsendorj	Resident from 13 <i>Khoroo</i>
5	Dondogdorj	Resident from 14 <i>Khoroo</i>	35	Otgonbayar	Resident from 18 <i>Khoroo</i>
6	Uurch	Resident from 18 <i>Khoroo</i>	36	Altantug	Resident from 14 <i>Khoroo</i>
7	Mergenbaatar	Resident from 13 <i>Khoroo</i>	37	Dash	Resident from 14 <i>Khoroo</i>
8	Tsedevsuren	Resident from 14 <i>Khoroo</i>	38	Burenkhuu	Resident from 18 <i>Khoroo</i>
9	Tsegeen	Resident from 18 <i>Khoroo</i>	39	Soyolmaa	Resident from 14 <i>Khoroo</i>
10	Oyunbileg	Resident from 14 <i>Khoroo</i>	40	Baatar	Resident from 13 <i>Khoroo</i>
11	Tseden	Resident from 14 <i>Khoroo</i>	41	Bold	Resident from 14 <i>Khoroo</i>
12	Nyamdorj	Resident from 14 <i>Khoroo</i>	42	Altankhundaga	Resident from 13 <i>Khoroo</i>
13	Enkhsaikhan	Resident from 14 <i>Khoroo</i>	43	Davaakhuu	Resident from 14 <i>Khoroo</i>
14	Munkhbayar	Resident from 14 <i>Khoroo</i>	44	Lkhamhuu	Governor of the 13 <i>Khoroo</i>
15	Boldbaatar	Resident from 14 <i>Khoroo</i>	45	Enkhtuya	Resident from 14 <i>Khoroo</i>
16	Gungaajantsan	Resident from 14 <i>Khoroo</i>	46	Solongo	Resident from 13 <i>Khoroo</i>
17	Ochirbat	Resident from 14 <i>Khoroo</i>	47	Tselmeg	Resident from 13 <i>Khoroo</i>
18	B.Doljinsuren	Resident from 14 <i>Khoroo</i>	48	Enkhtsatsral	Resident from 14 <i>Khoroo</i>
19	B.Tsogzol	Resident from 14 <i>Khoroo</i>	49	Bilguun	Resident from 18 <i>Khoroo</i>
20	Khash - Erdene	Resident from 14 <i>Khoroo</i>	50	Dolgor	Resident from 13 <i>Khoroo</i>

21	D.Tserendulam	Resident from 14 <i>Khoroo</i>	51	Lkhagvasuren	Resident from 13 <i>Khoroo</i>
22	Otgontsetseg	Resident from 14 <i>Khoroo</i>	52	Onon	Resident from 14 <i>Khoroo</i>
23	Bayraa	Resident from 16 <i>Khoroo</i>	53	Dejidmaa	Resident from 16 <i>Khoroo</i>
24	Ganbaatar	Resident from 14 <i>Khoroo</i>	54	Gonchigsuren	Resident from 13 <i>Khoroo</i>
25	Otgontsetseg	Resident from 14 <i>Khoroo</i>	55	Nyamdavaa	Resident from 13 <i>Khoroo</i>
26	Nonchinsuren	Resident from 13 <i>Khoroo</i>	56	Dorjgotov	Resident from 13 <i>Khoroo</i>
27	Bataa	Resident from 14 <i>Khoroo</i>	57	Sosorbaram	Resident from 14 <i>Khoroo</i>
28	Erdenesaikhan	Resident from 18 <i>Khoroo</i>	58	Altansukh	Resident from 14 <i>Khoroo</i>
29	Amgalanbaatar	Resident from 14 <i>Khoroo</i>	59	Bolor Erdene	Resident from 13 <i>Khoroo</i>
30	Odmandakh	Officer responsible for infrastructure development for the Sukhebator district Governor's Office			

4. Focus Group Discussions

220. In addition to the public consultation meeting, 20 focus group discussions were conducted with participation of the project team in August and September 2011, involving 200 people. The purpose of the FGD was, amongst others, to assess social, gender and environment impacts of the project. Related to environment, key questions related to (i) safety issues at bus stops and intersections along the BRT corridor; (ii) noise and air pollution; (iii) suggestions to improve project design.

221. Key issues raised during the FGD, and suggestions made, include:

- (i) **Noise and air pollution:** Several people complained about excessive noise and air pollution along the road. Old buses were explicitly mentioned as an important pollution source. FGD concluded that the introduction a BRT system with modern buses would help reduce air and noise pollution.
- (ii) **Pedestrian Safety:** Key issues raised included poor crossing facilities and sidewalks, inappropriate signal timing, affecting pedestrian safety.
- (iii) **Localized flooding:** Areas around existing bus stations along the BRT corridor tend to be flooded after heavy rains due to lack of drainage facilities. Consulted people requested that the project design include stormwater drainage along the road, especially at bus stations. The project will respond to this concern by providing drainage facilities along the improved sections of road.
- (iv) **Solid waste management:** FGD emphasized the need to provide solid waste collection facilities along the road, especially at bus stations.
- (v) **Tree planting:** FGD requested that trees be planted at bus stations to provide shade and reduce noise and dust from buses. Residents expressed their willingness to take care of the trees.
- (vi) **Improved business opportunities.** Residents believed that the road improvement will enhance business of shops and kiosks along the road.
- (vii) **Health and safety.** The following measures were defined to ensure community

health and safety along the project road: (i) install decelerators at critical places (schools and hospitals); (ii) install pedestrian crossings with traffic lights at critical places; (iii) consider needs to disabled people in design of pedestrian crossings and sidewalks; (iv) construction work should be supervised to ensure high quality; and (v) consider installing pedestrian bridges or tunnels at 2 critical intersections (No 25 and 27).

B. Future Consultation Program

222. Consultation with potentially affected people is inherent to the Environmental Monitoring Plan. A dialogue channel will be maintained with stakeholders throughout project implementation, by continued discussions. Such dialogue will ensure that public concerns are understood and dealt with in a timely manner. A plan for future consultation during design, construction and operation was developed, and is presented below. The form of future consultation will depend on the issues arising during project implementation. It may include questionnaires surveys, household visits and public consultation meetings.

223. **During Design.** MUB will inform the affected people of the planned project interventions and the likely disturbances through information disclosure in the local newspaper and other media outlets as appropriate such as radio bulletins. The GRM entry points (see Chapter IX) will be briefed, which will in turn ensure that information is disseminated to project affected areas. Stakeholder meetings with potentially affected people, particularly residents and business users will also be held to obtain feedback on the project proposals.

224. **During Construction.** Informal interviews with affected people will be conducted monthly according to the Environmental Monitoring Plan, see Appendix 2 (Environmental Monitoring Interview Forms). The consultation will focus on complaints about community disturbances from construction activities, such as construction noise, dust, solid waste and wastewater, as well as public concerns about ecological protection, soil erosion, flood control and economic displacement.

225. In addition there will be a **public information campaign**, as part of the project's Public Awareness Raising activities, particularly focusing on informing businesses about the planned BRT corridor improvements, including trolleybus infrastructure, which will increase traffic problems during construction. It is recommended that this is undertaken by MUB and involves the Mongolian Chamber of Commerce in order to ensure that the project collaborates with the business community in the City. This will be a significant improvement on current practice in the City. At the time of the study, a major city road (Youth Avenue) was closed for improvements without any prior warning or indication to the public on how long the road will be closed.

226. Clear public notice boards will be set at each construction site (BRT corridor and Peace Bridge) to inform the public about the purpose of the construction, the duration of disturbance, the responsible entities on-site (contractor, PMU, IA), and the project's Grievance Redress Mechanism (GRM). Contact information of relevant organizations will be disclosed on the construction site information boards. Currently no notice appears to be given in advance of road improvement activities so the public does not know the type or duration of the works.

227. **Responsibilities.** The IA, through the PMU, will be responsible for organizing the public consultations. The contractors will be required to communicate and consult with the communities in the project's area of influence, especially those near their construction sites and will need to understand and fulfill the requirements of the GRM and Health & Safety requirements in terms of displaying signboards at construction sites.

C. Information Disclosure

228. Environmental information on the project was and will be disclosed as follows:

- i) The IEE is available for review in the IA's and PMU's office;
- ii) The IEE was disclosed on ADB's project website (www.adb.org) in December 2011;
- iii) Copies of the IEE are available upon request; and
- iv) Annual reports on project's compliance with the Environmental Management Plan (EMP) will be available at www.adb.org.

IX. GRIEVANCE REDRESS MECHANISM

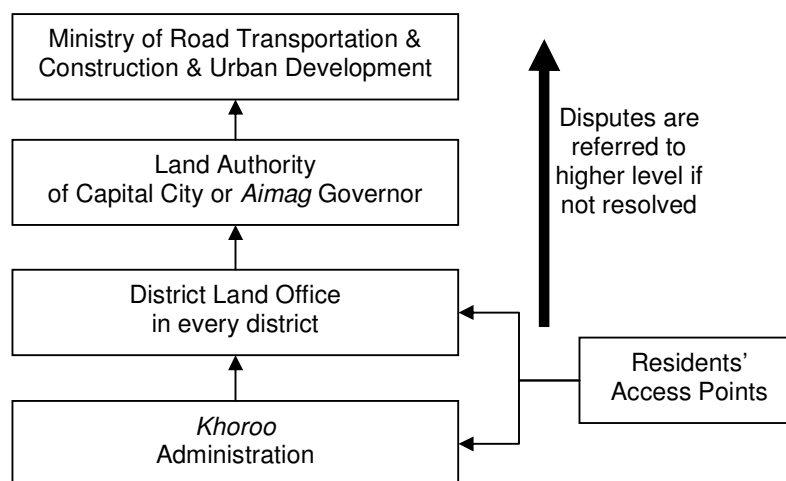
229. Residents and/or organizations affected by project activities were encouraged to participate in preparation of the IEE and EMP. Therefore, public grievances related to the project will most likely relate to environmental issues during the construction phase, as comprehensive consultations with potentially affected people conducted during project preparation confirmed their basic support to the project. In order to solve the problems timely and effectively, as well as guarantee that the project will be implemented smoothly and successfully, a Grievance Redress Mechanism (GRM) has been developed. Through the GRM, not only the grievances of potentially affected people and organizations will be recorded, but the complaints will also be addressed and solved efficiently and quickly.

A. Current Practice in Mongolia

230. **Procedure for land disputes.** With regards to land dispute, Land Law (Article 60, 'Settlement of Land Related Disputes') refers to disputes over land issues. The article states that these issues shall be settled by the *Khoroo* Governor of the administrative units, and if not solved, the dispute shall be settled by an authority of higher level, or in the court. There is currently no project grievance procedure in place preceding dispute resolution.

231. The access points for a resident with a land issue are given in Figure 21. The *Khoroo* Governor is considered very accessible for residents and people are confident in the abilities of the *Khoroo* to resolve issues. In addition, residents may also go directly to the District Land Officer.

Figure 21: Existing Access Points for Land Disputes



Source: Study Team

232. **Resolution of grievances other than land disputes.** Discussions with MUB's Road Department confirmed that although there is a structure in place to address concerns arising from road issues, the majority (if not all) disputes relate to land possession/land use, rather than complaints about construction nuisances impacting on people's lives and health. Also many complaints are raised by other Government authorities, primarily focusing on the timing of road construction. Residents rarely complain about nuisance issues or any negative environmental impacts from construction, mainly because the residents understand the benefits of road rehabilitations.

B. Proposed Grievance Redress Mechanism for the Project

233. In consultation with the project EA, the IAs, and potentially affected people, it is agreed that the EA will establish a Project Public Complaints Unit (PPCU) in the PMU's office. The PPCU will deal with environment related complaints. The PPCU will be headed by the Deputy Governor for MUB in charge of the Environment Department. The Safeguard Unit (consisting of at least one environmental and social specialist) established within the PMU will be the PPCU Deputy. The PPCU (Table 19) will also include the following members, not all of which will need to be involved for every complaint:

Table 19: Project Public Complaints Unit Members

Organization	Function/Specialty
MUB Deputy Governor	Head of PPCU
PMU Safeguards Unit	Deputy Head of PPCU
<i>Khoroo</i> Administration Representative	Local Access Point
MNET Officer	Environmental Specialist
Women's Union NGO	Gender Specialist
Ministry of Labor & Social Security Officer	Advice on Social and Labor Issues for Affected People
MUB Road Department Officer	Project Understanding and Road Engineering
Land Authority of City	Land Ownership and Disputes
Mongolian Chamber of Commerce Policy & Representative,	Business Issues and Barriers to Businesses

Source: Study Team

234. The general issues addressed by the PPCU will be managed by the PPCU Deputy, i.e. the PMU Safeguards Unit. The Deputy will liaise with the relevant specialists depending on the issue arising. The Head of PPCU will be kept informed and contribute when issues need to be resolved. The potential range of issues could be wide including any number of environmental and social issues, therefore PPCU members represent a range of view points and variety of expertise with which to serve stakeholders potentially affected by the project.

235. **GRM entry points.** In analogy to the well-established and well-understood system to resolve land disputes, the main entry point of the GRM will be the *Khoroo* administration. Complaints can also be directly addressed to the PPCU.

236. Organizational charts of the GRM, including the contact persons of the entry points and the PPCU, will be disclosed at every construction site. Phone numbers, addresses, and email addresses of all access points and the PPCU will be disclosed to the public through MUB's website (<http://www.ulaanbaatar.mn/>).

C. Types of Grievances Expected and Eligibility Assessment

237. Public grievances addressed by the GRM are likely to relate to environmental issues during the construction phase, as consultations with potentially affected people conducted during project preparation confirmed their basic support to the project. Construction-related grievances can be numerous, and managing them is the contractor's responsibility under its contract with the EA or the IAs. Grievances may include:

- *Damage to public roads due to heavy vehicle operation and transportation of heavy equipment and materials;*
- *Dust, smoke or odor emissions;*
- *Excessive traffic congestion;*
- *Construction noise and vibration;*
- *Damage to private premises;*
- *Damage to physical cultural resources*
- *Concerns over safety measures for the protection of the general public and construction workers;*
- *Excessive soil erosion;*
- *Poor disposal of waste materials;*
- *Loss of income;*
- *Loss of vegetation;*

238. Once a complaint is received and filed, the PPCU will identify if complaints are eligible. Eligible complaints include those where (i) the complaint pertains to the project; and (ii) the issues raised in the complaint fall within the scope of the issues that the GRM is authorized to address. Ineligible complaints include those where: (i) the complaint is clearly not project-related; (ii) the nature of the issue is outside the mandate of the GRM (such as issues related resettlement or to allegations of fraud or corruption); and (iii) other company or community procedures are more appropriate to address the issue. If the complaint is rejected, the complainant is informed of the decision and the reasons for rejection.

D. GRM Steps and Timeframe

239. Procedures and timeframes for the GRM are given in Figure 22. The GRM has 5 key stages:

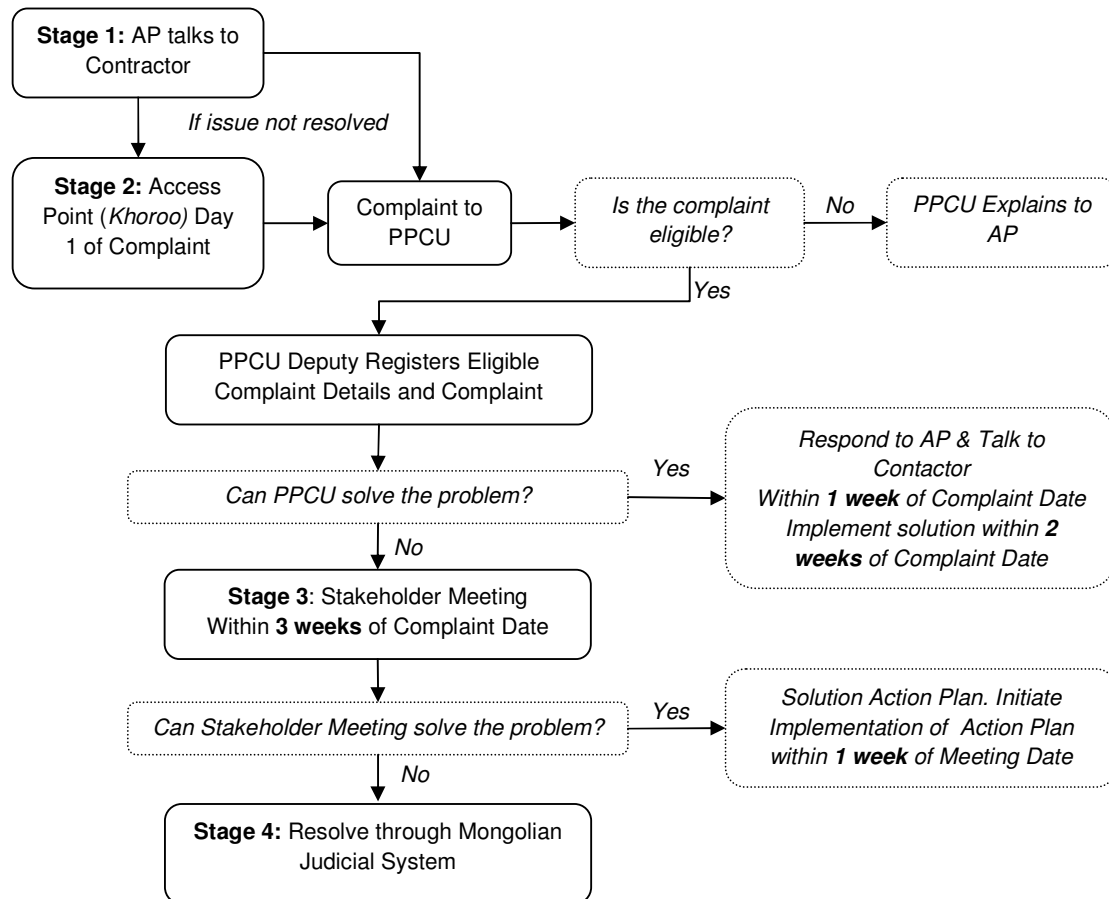
- i) **Stage 1:** If a concern arises, the affected person (AP) tries to resolve the issue of concern directly with the contractor/operator;
- ii) **Stage 2:** If no solution can be found in Stage 1, the AP will submit an oral or written complaint to the GRM Access Points (*Khoroo administration, PPCU*). For an oral complaint, the *Khoroo administration* must properly make written records. The *Khoroo administration* notes the date of complaint and passes it immediately to the PPCU Deputy for action. The PPCU Deputy will then (i) assess the eligibility of the complaint, (ii) inform the ADB project team, (iii) consult relevant members of the PPCU to identify a solution and (iv) give a clear reply within 1 week from the Complaint Date.

The reply will be *either* a solution following discussions with the AP, IA and contractor *or* Stage 3 will begin. If a solution is found, the contractors during construction and the IAs/operators during operation should implement the solution and convey the outcome to the PPCU within 1 week of the solution being identified. This means if the PPCU finds a solution, it will be implemented within 2 weeks (10 working days) from the date of complaint, allowing time for the contractor or operator to install or purchase any additional mitigation materials/equipment;

- iii) **Stage 3:** If no solution can be identified by the PPCU or if the AP is not satisfied with the suggested solution in Stage 2, the PPCU Deputy will organize a multi-stakeholder meeting to be held within three weeks of the Complaint Date. All members of the PPCU and relevant external stakeholders will be invited. The meeting should result in a solution acceptable to all, and identify responsibilities and an action plan. The contractors during construction and the IAs/operators during operation should implement the agreed solution and convey the outcome to the PPCU within one week, which will be four weeks after the Complaint Date;
- iv) **Stage 4:** If the AP is still not satisfied with the reply in Stage 3, she/he can go through local judicial proceedings.

240. The PPCU shall accept the complaints and grievances lodged by the AP free of charge. Any costs incurred should be covered by the contingency of the project. Throughout the duration of project implementation and the first three years of operation, these grievance procedures remain valid so that any affected person may deal with relevant issues.

Figure 22: GRM Process



Source: Study Team

X. ENVIRONMENTAL MANAGEMENT PLAN

A. Objective and Structure

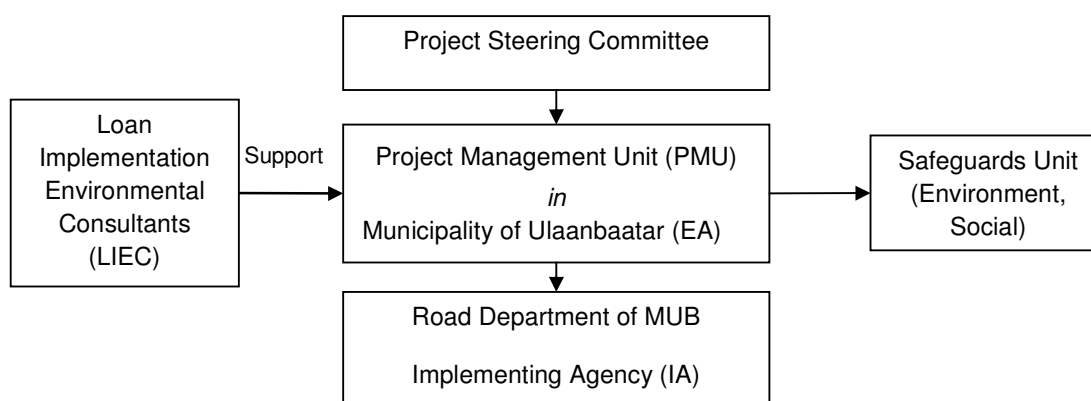
241. An Environmental Management Plan (EMP) has been developed for Tranche 1 of the proposed investment program (MFF). The EMP defines all potential impacts of the Tranche 1 components and the mitigation and protection measures with the objective of avoiding or reducing these impacts to acceptable levels, meeting international and Mongolian standards. The EMP also defines the institutional arrangements and mechanisms, the roles and responsibilities of different institutions, procedures and budgets for implementation of the EMP. The EMP seeks to ensure continuously improving environmental protection activities during preconstruction, construction, and operation in order to prevent, reduce, or mitigate adverse impacts and risks. The EMP draws on the findings of the IEE, PPTA and ADB review mission discussions and agreements with the relevant government agencies.

242. The EMP defines: (i) EMP objectives; (ii) responsibilities and authorities for EMP implementation; (iii) summary of impacts and mitigation measures; (iv) environmental monitoring and inspection plan; (v) institutional strengthening and training plan; (vi) reporting requirements; (vii) public consultation plan, (viii) cost estimates, and (ix) mechanism for feedback and adjustment. The EMP will be reviewed and updated at the end of the detailed design in order to be consistent with the final detailed design.

B. Implementing Organizations and Their Responsibilities

243. **EA, IA, PMU.** The Municipality of Ulaanbaatar (MUB) will be the executing agency (EA) for the project. MUB will ensure collaboration with its Environmental Protection department through providing the department a copy EMP following detailed design and allowing time for comment. The Road Department of MUB will be the implementing agency (IA) for Tranche 1. A project management unit (PMU) was established in MUB and will be responsible for the project implementation. The PMU will: (i) be responsible for overall management of project implementation; (ii) ensure adequate organization and agency coordination; (iii) monitor the progress of project implementation; and (iv) coordinate communication with ADB and other agencies concerned. The PMU will include a Safeguards Unit, including capacities in environmental management (**Figure 23**).

Figure 23: Responsibilities for Environmental Management



244. **Project Steering Committee (PSC).** The Government will form a PSC that will be chaired by the Mayor of Ulaanbaatar, and will comprise representatives of the Ministry of

Finance; Ministry of Roads, Transportation, Construction and Urban Development; Ministry of Nature, Environment and Tourism; Chief Architecture; and the City Traffic Police.

245. The overall responsibility of the environmental and resettlement activities lies with Executive Agency. The responsibilities include inspection, monitoring, reporting, and initiating corrective actions or mitigation measures. In the design stage, the PMU will pass the EMP to the relevant organizations responsible for detailed project design, to ensure mitigation measures are incorporated into the detailed designs. The EMP will be updated at the end of the detailed design phase, and then passed on to construction contractors.

246. **Safeguards Unit.** Under the PMU, a Safeguards Unit (covering environmental and social safeguards, 100% position) will be established. From an environmental perspective, an environmental specialist will have responsibility for day-to-day EMP implementation and supervision, and provision of reports to the PMU. Working in collaboration with the IA the responsibilities of the environmental specialist include:

- i) EMP update after detail project design;
- ii) Support the PMU and tendering companies in preparing tender documents;
- iii) Implementation and monitoring of the EMP;
- iv) Monitoring contractors to ensure adherence to the EMP;
- v) Providing overall planning and coordination and supervision of the EMP activities;
- vi) Providing budgets for EMP activities;
- vii) Coordinating the GRM (PPCU Deputy);
- viii) Monthly reporting to the PMU on progress of the implementation of the EMP;
- ix) Conducting consultation meetings with local stakeholders as required, informing them of imminent construction works, updating them on the latest project development activities, GRM, etc.
- x) Supporting the Loan Implementation Environmental Consultants in conducting training, EMP compliance reviews, annual reporting, etc.

247. **Loan Implementation Environmental Consultants (LIEC).** Under the loan implementation consultancy services, one national LIEC will support the project for two person-months per year with (i) project preparation; (ii) training, (iii) yearly environmental progress and compliance monitoring (iv) annual environmental monitoring and progress reporting; (v) identifying environment-related implementation issues and necessary corrective actions to be reflected in an action plan; and (v) undertaking site visits as required.

248. **Contractors.** Contractors will be required to appoint an Environment, Health and Safety Officer (EHSO) responsible for daily monitoring and supervision, and evaluation of mitigation measures' implementation. Each contractor will be required to develop an Environmental, Health and Safety Management Plan (EHSMP). To ensure that the contractors comply with the EMP provisions, the PMU with the help and technical support of Loan Implementation Environmental Consultants (LIEC), will prepare and provide the following specification clauses for incorporation into the bidding procedures: (i) a list of environmental management requirements to be budgeted by the bidders in their proposals; (ii) environmental clauses for contractual terms and conditions; and (iii) major items in the IEE and EMP. In addition the PMU will prepare annual environment progress reports and submit them to ADB.

249. **Licensed laboratory.** A licensed laboratory will be engaged to conduct quarterly environmental monitoring during the construction and operation phase, following the approved monitoring plan. The licensed institute will comply with Mongolian Quality Assurance/Control procedures and regulations for sampling and monitoring of environmental media, and assess compliance with Mongolian environmental quality standards for ambient air, water and noise quality.

Table 20: Environmental Responsibilities

Phase	Responsible Agencies	Environmental Responsibilities
Project Preparation	MNET	Conduct General EIA following MON procedures
	EA, PMU	Request MNET to conduct General EIA, comply with MNET instructions
	PPTA Consultants	Conduct IEE in accordance with ADB SPS 2009
	ADB	Support EA in preparing request to MNET and IEE
Detailed Design	Design institutes	Review and approve IEE, including EMP, Disclose on ADB website
	PMU, IA, LIEC	Incorporation of environmental mitigation measures in detailed designs, and bidding documents.
	ADB, MNET	Update EMP based on detailed design, if necessary
	PMU, IA, tendering company, DI	Provide final EMP to MUB's Environmental Protection Department
Tendering	LIEC, ADB	Approve updated EMP, if necessary
	EA, IA	Incorporate mitigation measures and the EMP clauses in tendering documents, civil contracts and contractors' construction management plans.
	Contractors, EHSO	Review tendering documents; confirm project's readiness
	PMU-SU	Advise on implementation of mitigation measures
Construction	Licensed laboratory	Implementation of mitigation measures and conduct internal monitoring/supervision
	LIEC	Coordinate GRM; supervise EMP implementation; conduct regular site inspections; prepare monthly EMP progress reports; conduct training; support LIEC in preparing annual environmental progress report
	ADB	Provide yearly EMPs to MUB's Environmental Protection Department
	LIEC	Conduct quarterly environmental monitoring, prepare monitoring report
Operation	PMU	Advise on the mitigation measures; provide comprehensive technical support to PMU, EA and IA for environmental management; conduct training; conduct annual EMP compliance review; prepare annual environmental progress reports.
	IA	Support PMU-SU in preparing yearly EMPs for submission to MUB's Environmental Protection Department
	Licensed laboratory	Conduct review missions; review and approve annual environmental progress reports, including disclosure
	ADB	Conduct EMP compliance review, instruct IA on environmental management requirements; prepare annual environmental progress report for first year of operation

ADB = Asia Development Bank; DI = Design Institute(s); LIEC = Loan Implementation Environmental Consultants; PMU = Project Management Unit; PMU-SU = Safeguards Unit, PMU; EA = Executive Agency; IA = Implementing Agency; MNET = Ministry of Nature, Environment and Tourism; EIA = Environmental Impact Assessment; IEE = Initial Environmental Examination; EMP = Environmental Management Plan; EHSO = Environment, Health and Safety Officer

C. Summary of Potential Impacts and Mitigation Measures

250. Potential environmental issues and impacts during the detailed design, pre-construction, construction and operation phases of Tranche 1, as identified during the Initial Environmental Examination (IEE), as well as corresponding mitigation measures designed

to minimize the impacts, are summarized in Table 21. Environmental protection and mitigation measures will (i) mitigate environmental impacts to acceptable levels, (ii) achieve compliance with national environmental regulations, and (iii) provide compensation for lost environmental resources. The mitigation measures will be incorporated into tender documents, construction contracts, and operational management plans. Design institutes, contractors, the PMU Safeguards Unit and the project implementing agency (IA) will implement these measures. MUB's Environmental Protection Department will be provided with a copy of the mitigation measures in the EMP prior to construction for approval, and yearly thereafter.

251. The effectiveness of these measures will be evaluated based on the results of the environmental monitoring and inspection to determine whether they should be continued or improvements should be made. Improvements need to be confirmed through stipulated environmental management procedures.

252. A resettlement plan (RP) has been prepared to ensure that the affected persons will be made better off or at least not worse off because of the project. Details of the required actions are given in the RP.

Table 21: Summary of Protection and Mitigation Measures

Issue	Mitigation or Safeguard Measures	Location	Who Implements	Who Supervises/ Approves
Detailed Design and Construction Preparation Phase				
Institutional strengthening	• Appoint one environment officer at PMU to be responsible for coordination of GRM and EMP implementation (PMU-SU).	-	PMU	EA, ADB
	• Contract licensed laboratory to conduct quarterly air, noise and surface water monitoring	-	PMU, PMU-SU	EA
	• Hire Loan Implementation Environmental Consultants (LIEC) under loan implementation consultancy services	-	EA, PMU	ADB
	• Appoint Environment, Health and Safety Officer (EHSO) for each construction site	Construction sites	Contractors	PMU-SU
Design of culverts and drainage	• Reexamine existing culverts of drainage channels, confirm adequacy of the flow capability of the culverts. • Assess requirement for stormwater drainage pre-treatment prior to discharge to Selbe River. Design pre-treatment system if necessary	T1-A, T1-B	DI	PMU, LIEC
Groundwater Protection	• Conduct detailed groundwater resources assessment to assess potential impact of piling, if used.	Peace Bridge	DI	MNET, LIEC
Earthwork, spoil management	• Optimize and quantify required earthwork and balance between cutting and filling. • If relevant, identify suitable borrow pits and spoil disposal sites, develop borrow pit and spoil disposal site management plan, and get approval from MNET.	All Tranche 1 construction sites	DI	MNET, LIEC
Tree planting and re-vegetation plan	• Conduct detailed assessment of trees and vegetation that will need to be removed. • Develop a tree removal and replanting plan, including vegetation protection (fencing) and construction site re-vegetation plan	T1-B, T1-A	DI	MUB Dendrologist, EA
EMP update	• Review and update EMP after detailed design • Supply to MUB's Environmental Protection Department	-	PMU-SU	LIEC, ADB, MNET
Bidding documents and contractors'	• Include environmental provisions in the RFPs. • Include environmental section in the TOR for bidders. • Include environmental clauses for contractors in reference to	-	PMU, Tendering Agency, LIEC	EA, ADB

Issue	Mitigation or Safeguard Measures	Location	Who Implements	Who Supervises/ Approves
qualifications	the EMP and monitoring plan in the construction and supply contracts.			
Grievance Redress Mechanism (GRM)	<ul style="list-style-type: none"> • Appoint a GRM coordinator prior to construction. • Establish a project public complaints center (PPCU) • Provide training to GRM coordinator and entry points (PMU-SU) • Introduce GRM to potentially affected people 	-	PMU, LIEC, PMU-SU, PPCU	EA, ADB
Environmental operation and supervision manual	<ul style="list-style-type: none"> • Contractors will be required to prepare an environmental operation and supervision manual, including an environmental, health and safety management plan, for approval by PMU and MNET. 	All Tranche 1 construction sites	Contractors	PMU, LIEC, MNET
Environmental management training	<ul style="list-style-type: none"> • LIEC or other environmental specialists provide training on implementation and supervision of EMP implementation to relevant stakeholders, following the approved training plan. 	Ulaanbaatar	LIEC, PMU-SU, environment specialists	EA, PMU, ADB
Waste storage and disposal area management	<ul style="list-style-type: none"> • Contractors will be required to submit a schedule for waste removal and disinfection of relevant waste storage areas. Relevant Hygiene and Infection Control organizations within the city government will approve the schedule. 	All Tranche 1 construction sites	Contractors	PMU, MNET
Temporary traffic management	<ul style="list-style-type: none"> • A temporary traffic control and operation plan will be prepared and approved by the MUB prior to any construction, defining: (i) Provisions for diverting or scheduling construction traffic to peak traffic hours; (ii) Regulating traffic at road crossings for pedestrians; (iii) Identify suitable road crossings for pedestrians 	Project's area of influence	DI, local traffic police	EA
Construction Phase				
Soil Erosion	<ul style="list-style-type: none"> • Soil erosion management plan to be prepared by the contractor and to be approved by the responsible authority before construction starts; • Minimizing the area of soil clearance; 	Tranche 1 road improvement sites and Peace Bridge	Contractors	PMU-SU, LIEC

Issue	Mitigation or Safeguard Measures	Location	Who Implements	Who Supervises/ Approves
	<ul style="list-style-type: none"> • Maintaining slope stability at cut faces by implementing erosion protection measures; • Construction in erosion and flood-prone areas should be mainly restricted to the dry season; • Control silt runoff and cover soil stockpiles; • Locate temporary soil stockpiles in areas where runoff will not induce sedimentation of waterways; • Properly slope and re-vegetate disturbed surfaces; and • Protect slopes on both sides of any culverts to prevent soil and water loss. 			
Soil Contamination	<ul style="list-style-type: none"> • Store chemicals/hazardous products and waste on impermeable surfaces in secure, covered areas; • Remove all construction wastes from the site to approved waste disposal sites; • Establish emergency preparedness and response plan (Spill Management Plan); • Provide spill cleanup measures and equipment at each construction site; • Conduct training in emergency spill response procedures. 	All Tranche 1 sites	Contractors	PMU-SU, LIEC
Borrow pits and spoil disposal sites (if relevant)	<ul style="list-style-type: none"> • Develop borrow pits and spoil disposal site management and restoration plans, to be approved by responsible authority; • Spoil disposal sites to be approved by MNET; • Pit restoration will follow the completion of works in full compliance with all applicable standards and specifications, and will be required before final acceptance and payment under the terms of contracts 	Borrow pits and spoil disposal sites	Contractors	MNET
Protection of Surface Water	<ul style="list-style-type: none"> • Develop and implement contingency plans for control of oil and other dangerous substances (Spill Management Plan); • Fuel storage, maintenance shop and vehicle cleaning areas must be stationed at least 300m away from the nearest water body; • Construction wastes and materials (e.g. fuel) will be properly contained during construction. Wastes will be removed from site and taken to approved disposal facilities; 	All Tranche 1 sites	Contractors	PMU-SU, LIEC

Issue	Mitigation or Safeguard Measures	Location	Who Implements	Who Supervises/ Approves
	<ul style="list-style-type: none"> • Water collection basins and sediment traps will be installed in all areas where construction equipment is washed; • Effective septic treatment and disposal systems will be installed at construction camps; and • Early installation of appropriate decontamination technology for surface water drainage outlets (T1-A). • Quarterly monitoring of surface water quality in Selbe River 	Upstream and downstream of T1-A and T1-B and Peace Bridge	Licensed laboratory	PMU-SU, LIEC
Air quality	<ul style="list-style-type: none"> • Asphalt plants and mixers will be located as far away as possible (at least 200 m downwind) from the nearest sensitive receptor (such as hospitals and schools); • Water will be sprayed on construction sites and material handling routes where fugitive dust is generated; • Effective dust suppression measures will be implemented near sensitive receptors such as schools, hospitals, or housing; • Fuel & chemicals will be covered / stored to minimize emissions; • Trucks carrying earth, sand or stone will be covered with tarps or other suitable cover to avoid spilling; • Construction vehicles and machinery will be maintained to a high standard to ensure efficient fuel-burning (note that local standards do not exist for vehicle emissions); • Quarterly air quality monitoring around construction sites. 	<p>All Tranche 1 sites</p> <p>Around construction sites</p>	<p>Contractors</p> <p>Licensed laboratory</p>	<p>PMU-SU, LIEC</p> <p>PMU-SU, LIEC</p>
Noise	<ul style="list-style-type: none"> • Locate sites for rock crushing, concrete-mixing, and similar activities at least 500m away from sensitive areas; • Use mobile noise barriers during construction activities, especially in <i>ger</i> areas which have no inherent noise insulation; • Restrict noise intensive construction activities between 8am- 	All Tranche 1 sites	Contractor	PMU-SU, LIEC

Issue	Mitigation or Safeguard Measures	Location	Who Implements	Who Supervises/ Approves
	<ul style="list-style-type: none"> • For every one tree removed, replant at least two in suitable city locations after construction; • Strip for trees/vegetation in the median of the road where space allows; • Regularly monitor health of replanted trees 			
Physical cultural resources	<ul style="list-style-type: none"> • Inform the caretakers of temple site in advance of the type and duration of impacts, including Temporary Traffic Management Plan; • Site assessment – document pre-condition of sites prior to construction (photographs) to avoid any false claims of damages induced by the project; • Do not operate machinery during culturally significant festivals; • Conduct regular meetings with site manager to confirm adequacy of protection measures • Establish chance-finds procedure for undiscovered underground cultural sites and objects 	T1-B Chinggis Road (Bogd Khan Temple) T1-B	Contractors	PMU-SU, State Professional Inspection Agency, Ministry of Education, Science and Culture
Community Health & Safety	<ul style="list-style-type: none"> • Prior to construction, inform residents through media and businesses on the forthcoming activities, including the dates and duration of expected traffic disruption; • Install signs at construction sites warning people of potential dangers; • Provide physical barrier to limit access to construction sites, whenever possible; • No use of heavy machinery after daylight. • Comply with temporary traffic control plan (see above) • Conduct regular public consultations with residents living adjacent to construction sites to identify community complaints about noise, air pollution, and other health and safety concerns, and seek suggestions from community members to mitigate nuisances. 	Local newspapers All Tranche 1 construction sites All Tranche 1 construction sites	PMU (with support of communications specialist) Contractors Contractors, PMU-SU	EA, LIEC PMU-SU, LIEC, local traffic police PMU, LIEC, PPCU
Occupational	<ul style="list-style-type: none"> • Provide a clean and sufficient supply of fresh water; 	All Tranche 1	Contractors	PMU-SU, LIEC

Issue	Mitigation or Safeguard Measures	Location	Who Implements	Who Supervises/ Approves
Health & Safety	<ul style="list-style-type: none"> • Provide an adequate number of latrines and other sanitary arrangements at the site and work areas, and ensure that they are cleaned and maintained in a hygienic state. • Provide garbage receptacles at construction site and camps, which will be periodically cleared to prevent outbreak of diseases will be setup. • Provide receptacles for liquid chemical waste in suitably bunded area for storage prior to disposal. Include clear notices and warning with health risks. • Provide personal protection equipment (PPE), such as safety boots, helmets, gloves, protective clothing, goggles, and ear protection, in accordance with relevant health and safety regulations, for workers; • Develop an emergency response plan to take actions on accidents and emergencies, including environmental and public health emergencies associated with hazardous material spills and similar events; • Establish a Records Management System to store and maintain easily retrievable records (occupational accidents, diseases, spills, etc) incidents; • Display posters in Mongolian drawing attention to site safety, rescue and industrial health regulations in relevant areas of the site; • Provide training to all construction workers in basic sanitation and health care issues, general health and safety matters, and on the specific hazards of their work. • Implement SITs/HIV/AIDS and other communicable diseases awareness and prevention program. 	construction sites and camps		
Utilities Provision	<ul style="list-style-type: none"> • Assess construction locations in advance for potential disruption to services and identify risks before starting construction; • For unavoidable disruptions dates and duration of service interruptions will be given to all Affected People in advance. 	All Tranche 1 construction sites	Contractors	PMU-SU, LIEC

Issue	Mitigation or Safeguard Measures	Location	Who Implements	Who Supervises/ Approves
Operation Phase				
Surface water quality	<ul style="list-style-type: none"> • Regularly collect and properly dispose litter and debris from sidewalks, driveways, and parking lots along Chingeltei Avenue, especially near the Selbe river; • Clean the roadside catch basins before the wet season to avoid river pollution by storm water runoff flushing debris and dirty silt; • Place garbage bins and containers along the road network; • Regularly assess issue of localized flooding at bus stations; implement corrective actions if necessary; • Prohibit the construction of car washing and gas stations near the Selbe river and drainage channels; • Conduct semi-annual water quality monitoring during first year of operation 	<p>Tranche 1 T1-A and T1-B and Peace Bridge</p> <p>Selbe (Dond Gol) river, downstream of T1-A and Peace Bridge.</p>	<p>IA</p> <p>Licensed laboratory</p>	<p>EA</p> <p>PMU-SU</p>
Noise	<ul style="list-style-type: none"> • No new school, hospital or other sensitive facilities will be allowed to be built without noise protection measures within 200 m from the central line of the roads to prevent noise impacts to these facilities in the future 	BRT North-South Corridor	EA	
Vegetation	<ul style="list-style-type: none"> • All trees and vegetation cover will be regularly monitored and properly maintained. 	T1-A and T1-B and BRT corridor	IA	EA, MUB Dendrologist

D. Environmental Monitoring and Inspection

253. An environmental monitoring and inspection program was developed and is presented in Table 22. The program considers the scope of monitoring and supervision, environmental media, monitoring parameters, time and frequency, implementing and supervising agencies. Environmental monitoring will follow the methodology provided in the national standard methods for monitoring pollutants. Other associated standards are national environmental quality standards and pollutant discharge/emission standards.

254. The results of the environmental monitoring will be used to evaluate the extent and severity of actual environmental impacts against the predicted impacts and the performance of the environmental protection measures, and compliance with the EMP and relevant regulations and standards.

255. **Environmental monitoring and inspection plan.** The monitoring and inspection plan includes the following:

- i) **Internal supervision and inspection:** Regular and frequent supervision and inspection will be undertaken by the independent Environment, Health and Safety Officer (EHSO) hired by the Contractors, and by the PMU's Safeguards Unit on a daily and bi-weekly basis, respectively;
- ii) **Environmental Quality Monitoring:** Air, surface water and noise quality monitoring will be undertaken by a licensed laboratory four times per year during construction, and twice during the first year of operation;
- iii) **Periodic EMP Compliance Monitoring:** Compliance to the project's environmental safeguard requirements, as defined in the EMP and loan covenants, will be undertaken prior to construction (to confirm the project's readiness) and annually during construction by the Loan Implementation Environmental Consultant (LIEC), with the support of the PMU-SU;
- iv) **Legal Compliance Inspections:** Compliance to construction standards legislation will be undertaken by the Specialized Controlling Agency for the National and Municipal Governments in Mongolia, as appropriate.

256. The results of environmental monitoring and inspection activities will be used to assess: (i) the extent and severity of actual environmental impacts against the predicted impacts and baseline before the project implementation; (ii) performance or effectiveness of environmental mitigation measures; (iii) trends in impacts; (iv) overall effectiveness of EMP implementation; and (v) the need for additional mitigation measures and corrective actions. Annual LIEC reporting will be provided to MUB's Environmental Protection department. The Environmental Monitoring Plan and estimated costs is shown in Table 22.

Table 22: Environmental Monitoring and Inspection Plan

Environmental Media/Issue	Location, Parameters, Monitoring Technique	Responsibility & Frequency
<i>Pre-Construction Phase</i>		
Project readiness	<ul style="list-style-type: none"> Method: Review of PMU's and contractor's readiness to implement the project based on assessment of Project Readiness Indicators (Table 23) Parameters: Table 23 	LIEC – once before construction
Surface water quality	<ul style="list-style-type: none"> Method, Location: Selbe river water quality monitoring upstream and downstream from T1-A (2 monitoring points) and Peace Bridge (2 monitoring points) Parameters: Turbidity, total suspended solids, 	Licensed laboratory – once before construction

Environmental Media/Issue	Location, Parameters, Monitoring Technique	Responsibility & Frequency
	hydrocarbons, BOD ₅ , specific conductance, pH	
Construction Phase		
Soil erosion and contamination	<ul style="list-style-type: none"> Method, Location: Visual inspection of all construction sites Parameters: (i) adequacy of soil erosion prevention measures; (ii) adequacy of soil contamination prevention techniques; (iii) evidence of excessive soil erosion or soil contamination 	EHSO - daily PMU-SU – bi-weekly LIEC - yearly
Solid and liquid waste management	<ul style="list-style-type: none"> Method, Location: Visual inspection of all construction sites Parameters: (i) adequacy of solid and liquid waste management, storage and containment system; (ii) presence of solid waste dumps, waste fires; (iii) use of MNET approved disposal sites (iv) adherence to waste removal and disinfection schedule. 	EHSO - daily PMU-SU – bi-weekly LIEC - yearly
Vegetation	<ul style="list-style-type: none"> Method, Location: Visual inspection of all construction sites Parameters: adequacy of vegetation protection measures; evidence of damage to vegetation; compliance with approved tree management plan 	EHSO - daily
Construction site health and safety	<ul style="list-style-type: none"> Method, Location: Visual inspection and interviews with construction workers and contractors at all construction sites Parameters: (i) adherence to the approved Environmental, Health and Safety Management Plan (EHSMP); (ii) performance of the EHSO; (iii) worker complaints and concerns. 	EHSO - daily PMU-SU – bi-weekly LIEC - yearly
Community health and safety	<ul style="list-style-type: none"> Method, Location: Visual inspection of all construction sites, informal interviews with nearby residents Parameters: (i) adherence to approved temporary traffic management plan; (ii) adequacy of construction site signage and fencing; (iii) adequacy of temporary noise mitigation measures; (iv) accidents involving public and workers; (v) emergencies and responses; (v) public complaints about noise, air pollution, construction site safety, localized flooding, etc. 	PMU-SU – bi-weekly LIEC - yearly
Induced traffic disturbance	<ul style="list-style-type: none"> Method, Location: Visual inspection along construction sites, informal interviews with affected people, consultation of local traffic police Parameters: (i) adequacy of, and compliance with, the approved temporary traffic control and operation plan; (ii) satisfaction of affected people. 	PMU-SU – bi-weekly LIEC - yearly
Surface water quality	<ul style="list-style-type: none"> Method, Location: Selbe (Dond Gol) river water quality monitoring upstream and downstream from T1-A (2 monitoring points) and Peace Bridge (2 monitoring points) Parameters: Turbidity, total suspended solids, hydrocarbons, BOD₅, specific conductance, pH 	Licensed laboratory – 4 times per year
Air quality	<ul style="list-style-type: none"> Method, Location: Air quality monitoring, on pavements adjacent to BRT corridor intersections, at construction site boundaries, inside boundaries of sensitive receptors (schools, hospitals) Parameters: Dust, NO_x, SO₂, CO, PM₁₀, PM_{2.5} 	Licensed laboratory – 4 times per year
Noise	<ul style="list-style-type: none"> Method, Location: Noise monitoring, on pavements adjacent to works along the BRT corridor, at construction site boundaries, inside sensitive receptors (schools, hospitals) 	Licensed laboratory – 4 times per year

Environmental Media/Issue	Location, Parameters, Monitoring Technique	Responsibility & Frequency
	<ul style="list-style-type: none"> Parameters: dB(A) 	
Interview with AP	<ul style="list-style-type: none"> Method, Location: Interview with potentially affected people (AP) adjacent to construction sites. Parameters: See Monitoring Form 1 - Stakeholder Monitoring Interviews 	PMU-SU - monthly
EMP Compliance Monitoring	<ul style="list-style-type: none"> Method, Location: Review of project's adherence with EMP and loan covenants Parameters: EMP and loan covenants 	PMU, LIEC - yearly
Construction Completion and Operation Phase		
Post-construction site inspection	<ul style="list-style-type: none"> Method, Location: Visual inspection, post-construction environmental condition assessment at each construction site. Parameters: See Monitoring Form 2 – Post Construction Environmental Condition 	PMU-SU – twice: two/one week before completion, once after completion
Vegetation	<ul style="list-style-type: none"> Method, Location: Visual inspection of replanted trees Parameters: Tree growth and health 	PMU-SU – 4 times during first year of operation
Surface water quality	<ul style="list-style-type: none"> Method, Location: Selbe river water quality monitoring upstream and downstream from T1-A (2 monitoring points) and Peace Bridge (2 monitoring points) Parameters: Turbidity, total suspended solids, hydrocarbons, BOD₅, specific conductance, pH 	Licensed laboratory – twice during first year of operation
Interview with AP	<ul style="list-style-type: none"> Method, Location: Interview with potentially affected people (AP) adjacent to completed project sites; Parameters: (i) Overall satisfaction with project outputs; (ii) concerns and complaints. 	PMU-SU – twice during first year of operation

Source: Study Team

257. **Assessment of project readiness.** Before construction, the LIEC will assess the project's readiness in terms of environmental management based on a set of indicators (Table 23), and report it to ADB and the PMO. This assessment will demonstrate that environmental commitments are being carried and environmental management systems are in place before construction starts, or suggest corrective actions to ensure that all requirements are met.

Table 23: Project Readiness Assessment Indicators

Indicator	Criteria	Assessment	
EMP update	<ul style="list-style-type: none"> The EMP was updated after detailed design, and approved by ADB and MNET (if relevant) 	Yes	No
Compliance with loan covenants	<ul style="list-style-type: none"> The borrower complies with loan covenants related to project design and environmental management planning 	Yes	No
Public involvement effectiveness	<ul style="list-style-type: none"> The completion and agreements to resettlement plans before the construction 	Yes	No
	<ul style="list-style-type: none"> Meaningful consultation completed 	Yes	No
	<ul style="list-style-type: none"> GRM established with entry points and PPCU 	Yes	No
Environmental Supervision in place	<ul style="list-style-type: none"> Safeguards Unit established within PMU 	Yes	No
Bidding documents and contracts with environmental safeguards	<ul style="list-style-type: none"> Bidding documents and contracts incorporating the environmental activities and safeguards listed as loan assurances 	Yes	No
	<ul style="list-style-type: none"> Bidding documents and contracts incorporating the impact mitigation and environmental management 	Yes	No

Indicator	Criteria	Assessment	
	provisions of the EMP		
Contractor readiness	• Environmental, Health and Safety Management Plan (EHSMP) established for construction sites	Yes	No
	• Environment, Health and Safety Officers appointed	Yes	No
	• Assessment of potential disruption to utilities services conducted	Yes	No
	• Assessment of PCB occurrence conducted and management strategy in place	Yes	No
	• Stakeholder interviews to confirm issues if services are disrupted	Yes	No
	• Site condition report for heritage site within project area	Yes	No
	• Schedule for waste removal and storage site disinfection approved	Yes	No
	• Groundwater resources assessment conducted for Peace Bridge	Yes	No
EMP financial support	• The required funds have been set aside to support the EMP implementation according to the financial plan.	Yes	No
Baseline Water Monitoring	• Selbe (Dond Gol) River water quality monitoring conducted prior to construction	Yes	No

Source: ADB Study Team

258. **Environmental monitoring and supervision cost estimates.** Costs for environmental monitoring and supervision include salaries and consultancy fees for the PMU-SU, the LIEC and the EHSO, as well as costs for the environmental monitoring performed by a licensed laboratory. The salary costs of the PMU-SU and LIEC will be covered by the EA; the salaries of the EHSO will be covered by the Contractors and budgeted in their contracts. Air, water and noise monitoring costs will amount to approximately \$20,000 over 3 years. These expenses will be covered by the IA and included in the overall project budget.

E. Institutional Strengthening and Training

259. An assessment undertaken during the PPTA showed that the EA and IA lacked expertise and capacities to ensure adequate environmental management of the project. To ensure effective implementation of the EMP and undertake the responsibilities in Table 20, the capacity of the PMU, Implementing Agencies and contractors' staff responsible for EMP implementation and supervision must be strengthened. All parties involved in implementing and supervising the EMP must have an understanding of the goals, methods, and practices of project environmental management. The project will address the lack of capacities and expertise in environmental management through (i) institutional strengthening, and (ii) training.

260. **Institutional strengthening.** The lack of capacities of the EA and PMU to coordinate environmental management will be resolved by establishing a Safeguards Unit under the PMU, comprising at least one environmental specialist and one resettlement specialist. The appointment of one national environmental consultant under the loan implementation consultancy will further strengthen the EA's and PMU's environmental management and supervision capacities, and ensure compliance with ADB's Safeguard Policy Statement (SPS 2009). The outsourcing of periodic monitoring of surface water, air and noise to a licensed laboratory will ensure adherence to QA/QC standards. The obligation of contractors to hire external Environment, Health and Safety Officers (EHSO) and to establish Environmental, Health and Safety Management Plans (EHSMP) for construction sites will help ensuring community and occupational health and safety. The

proposed institutional strengthening plan is presented in **Table 24**. It is believed that these institutional strengthening measures, combined with clearly assigned responsibilities and roles, will allow adequate environmental management.

Table 24: Proposed Institutional Strengthening Measures

Target Agencies	Institutional strengthening measures	Timing
EA, IA, PMU	<ul style="list-style-type: none"> Defining institutional arrangements for environmental management, monitoring, and supervision Defining positions and responsibilities Appointing and recruiting PMU-SU 	During project preparation
Licensed laboratory	<ul style="list-style-type: none"> Recruiting and contracting licensed laboratory for environmental monitoring before, during and after construction 	Prior to project implementation
LIEC	<ul style="list-style-type: none"> Recruiting and contracting one national LIEC for environmental management, environmental training, EMP compliance review, and reporting 	Prior to project implementation
Contractors, EHSO	<ul style="list-style-type: none"> Hire Environment, Health and Safety Officers for each construction site. Develop Environmental, Health and Safety Management Plans (EHSMP) 	Prior to project implementation

261. **Training.** The EA, PMU, IA and contractors will receive training in environmental management, environmental monitoring and supervision, mitigation planning, emergency response, public consultation and Grievance Redress Mechanism, occupational and community health and safety, and other environmental management techniques. The training topics, methods, and estimated costs for Tranche 1 are described in **Table 25**.

262. Training will mainly be facilitated by the LIEC. International training specialists will be hired where needed and appropriate. A total budget of \$11,000 was earmarked for training activities related to environmental management.

263. Training format will include workshops and seminars. In particular, due to the prevalence of construction projects in the City, on-site training will be used extensively, giving staff firsthand experience on how to identify and correct adverse environmental impacts. Of particular importance for the project is to build confidence and expertise within the Roads Department, when dealing with contractors who are not adhering to the EMP. Training in this area will need to include the steps taken to address non-compliance and penalties that could be included in project contracts.

Table 25: Training Program

Training Topic	Targeted Agencies	Timing	Duration, Costs
Environmental Laws and Regulations, Best Environmental Management Practices	IA, PMU, PMU-SU, MNET, MUB-EPD, Contractors, EHSO	Prior to project implementation	1 day, \$1,000
EMP Implementation: Roles and Responsibilities, Monitoring, Supervision and Reporting Procedures	IA, PMU, PMU-SU, MNET, Contractors, EHSO	Prior to and during project implementation	2 x 1 day, \$2,000
Grievance Redress Mechanism: Roles and Responsibilities, Procedures	IA, PPCU, PMU, GRM, Access Points, Contractors, EHSO	Prior to project implementation	1 day, \$1,000
Occupational and Community Health and Safety, Emergency Preparedness and Response	Contractors, EHSO, PMU-SU	Prior to and during project implementation	2 x 1 day, \$2,000
Pollution Control and Environmental Monitoring, Inspection and Reporting, Public Consultation	IA, PMU-SU, EHSO, Contractors	Prior to and during project implementation	2x 1 day, \$2,000
Contractor Engagement and Management, including EMP Enforcement	PMU-SU, PMU, IA	Prior to project implementation	1 day, \$1,000
Road safety for vehicles, pedestrians and road users including cyclists, traffic law enforcement	IA, local traffic police	During project implementation	2 days, \$2,000

F. Environmental Reporting

264. **Monthly compliance and progress reports.** The PMU-SU will produce brief monthly reports on EMP implementation progress and compliance for the PMU, and will report any issues immediately to the PMU. The monthly project progress report will present: (i) project implementation status and current locations for activities; (ii) environmental mitigation measures implemented; (iii) non-compliances with EMP; (iv) environmental training conducted; (v) unpredicted events or issues occurring during the reporting period and follow-up actions needed; (vi) findings of public consultation activities (informal interviews); and (vii) complaints received through the GRM process and resolutions found.

265. **Quarterly environmental monitoring reports.** The licensed laboratory will prepare concise reports presenting the results of the monitoring of surface water, air and noise, with a short assessment of compliance/non-compliance with Mongolian ambient environmental standards.

266. **Yearly environmental progress reports.** To ensure proper and timely implementation of the EMP and adherence to the agreed environmental covenants, the PMU shall submit to ADB yearly environmental progress reports, based on monthly progress reports of the PMU-SU and the quarterly reports of the licensed laboratory. The LIEC will support the PMU in developing these reports. The report should confirm the project's compliance with the EMP, local legislation such as EIA requirements, and identify any environment related implementation issues and necessary corrective actions, and reflect these in a corrective action plan. The performance of the contractors will also be reported on with respect to environmental protection and impact mitigation. The operation

and performance of the project GRM, environmental institutional strengthening and training will also be included in the quarterly environmental performance report. Table 26 summarizes the reporting requirements.

Table 26: Reporting Requirements

Report	Frequency	Purpose	From	To
Contractor's Progress Report	Weekly	Satisfy EMP	Contractor	PMU
EMP Progress and Compliance Report	Monthly	Confirm EMP Compliance or Issues	PMU-SU	PMU
Environmental Monitoring Report	Quarterly	Monitoring of air, surface water and noise	Licensed laboratory	PMU
Annual Environmental Progress Report	Annually	Adherence to Environmental Covenants	PMU, LIEC	ADB

G. Mechanisms for Feedback and Adjustment

267. Based on environmental monitoring and reporting systems in place, the PMU shall assess whether further mitigation measures are required as corrective action, or improvement in environmental management practices are required. The effectiveness of mitigation measures and monitoring plans will be evaluated by a feedback reporting system. The PMU will play a critical role in the feedback and adjustment mechanism. If the PMU identifies a substantial deviation from the EMP, or if any changes are made to the project scope that may cause significant adverse environmental impacts or increase the number of affected people, then the PMU shall immediately consult MNET and ADB to get their approval and identify EMP adjustment requirements.

XI. CONCLUSIONS

A. Project Risks and Assurances

268. The main project risks related to environment include: (i) low institutional capacity for environmental management and the possibility that the PMU and IA will fail to monitor the environmental impact and implement the EMP during the construction and operation of the project; (ii) contractors may expect, or be expected by MUB, to work 24 hours a day, which is normal practice in Ulaanbaatar; (iii) increased nuisance levels for residents and businesses along the project roads, bridge widening area and BRT corridor due to traffic congestion, noise and dust; (iv) unplanned borrow pit and spoil disposal of road components, which could result in unacceptable environmental impacts; (v) occupational and community health and safety; and (vi) changes to the Mongolian EIA legislation, in draft with MNET during the time of this IEE study

269. Mitigation measures are specified in the Environmental Management Plan in order to ensure risks are reduced to an acceptable level. The following assurances were defined and agreed upon, and will be acted up by the respective levels of government to ensure the effective implementation of the measures and mechanisms for mitigating the potential impacts and risks and for enhancing the environmental and social benefits of the project:

- i) MUB shall ensure, and cause the IA to ensure, that the preparation, design, construction, implementation, operation and decommissioning of the project comply with (a) all applicable laws and regulations of the Government of Mongolia relating to environment, health and safety; (b) ADB's Safeguard Policy Statement (2009); and (c) all measures and requirements set forth in the IEE, the EMP, and any corrective or preventative actions set forth in the Annual Environmental Monitoring and Progress Report.
- ii) The MUB shall ensure, or cause the IA to ensure, that all bidding documents and contracts for Works contain provisions that require contractors to: (a) comply with the measures relevant to the contractor set forth in the IEE, the EMP, and any corrective or preventative actions set forth in the Annual Environmental Monitoring and Progress Report; (b) make available a budget for all such environmental measures; and (c) provide the MUB with a written notice of any unanticipated environmental risks or impacts that arise during construction, implementation or operation of the project that were not considered in the IEE or the EMP. The MUB shall not award any Works contract which involves environmental impacts until the IA has incorporated the relevant provisions from the EMP into the Works contract.
- iii) MUB shall ensure, and cause the IA to ensure, that sufficient resources and personnel are provided in supervising and monitoring EMP implementation. The MUB shall do the following: (a) submit annual Environmental Monitoring and Progress Reports to ADB and disclose relevant information from such reports to affected persons promptly upon submission; (b) review any changes to the project design that may potentially cause negative environmental impacts, and in consultation with ADB, revise environmental monitoring and mitigation measures as necessary to assure full environmental compliance. MUB will provide to ADB within 60 days, justification for any proposed changes to the mitigation measures required during design, construction, and operations, if any changes to the IEE must be implemented for safety or emergency reasons; and (c) report any actual or potential breach of compliance with the measures and requirements set forth in the EMP promptly after becoming aware of the breach.
- iv) MUB shall cause the IA to (a) select borrow pits and spoil disposal sites appropriate to the scale of the required borrow soil and the spoil generated before construction commences; (b) endorse such sites as being consistent with the selection criteria set

out in the EMP, and (c) manage the sites in accordance with the EMP prescriptions.

- v) MUB shall cause to IA to (a) establish a detail inventory of the trees potentially affected by the project; (b) develop a tree management plan that complies with Law on Forests (1995); (c) submit the plan to the relevant authorities for approval; and (d) ensure adherence to the plan.
- vi) MUB shall ensure that the IEE is reviewed once the revised Law on Environmental Impact Assessment (1998, amended 2002, currently under revision) is promulgated. The MUB shall assess required changes to the IEE to comply with the amended Law, revise the IEE accordingly, and submit it to ADB for approval and disclosure.
- vii) MUB shall cause the IA to ensure that road drainage facilities constructed under the project will be designed, constructed and maintained in accordance with prescribed standards, specifications and regulations.
- viii) MUB shall cause the PMU to undertake public awareness campaigns through information disclosure, education and consultation on the project and its benefits, including but not limited to information related to the RPs, EMPs, Gender Action Plan and Social Development Action Plan under the project.
- ix) MUB will ensure that a licensed laboratory is hired to (a) conduct periodic monitoring of surface water, air and noise in accordance with the approved environmental monitoring plan defined in the EMP; and (b) submit quarterly environmental monitoring reports to MUB.
- x) MUB will cause the IA to ensure that the contractors will (a) implement an HIV/AIDS awareness and prevention training for all employees; (b) provide necessary measures to ensure the safety and health of its employees; (c) disseminate information on the risks, hazards, impacts and prevention know-how on HIV/AIDS among the staff, workers on the construction sites and the local community by means of information disclosure, education and consultation; and (d) observe local customs concerning acceptable behavior toward the local population.
- xi) MUB will cause the IA to ensure that the contractors will conduct pre-construction assessments, including detailed documentation, of the Gesar Sum temple and Bogd Khan Winter Palace, prior to construction.
- xii) MUB shall cause the PMU to ensure that the capacity-building program described in the EMP is implemented as planned.
- xiii) MUB shall ensure that no proceeds of the Loan are used to finance any activity included in the list of prohibited investment activities provided in Appendix 5 of the SPS 2009.

B. Major Environmental Impacts and Mitigation Measures

270. The principal impacts during construction will arise from increased traffic congestion which will contribute to the already slow traffic flows, and increased noise and dust. Occupational and community health and safety issues will need to be carefully addressed. The project may also require the removal of some of the 180 mature trees along T1-B. The EMP has fully addressed these potential risks and impacts through protection and mitigation measures including specifying good practices during construction, ensuring a temporary traffic management plan is in place before construction starts, defining a tree management plan, requiring contractors to develop environment, health and safety plans for construction sites, and requiring the establishment of a PMU Safeguards Unit for the duration of the project in order to coordinate the Grievance Redress Mechanism, supervise and monitor EMP implementation and adherence, and ensure communication with ADB.

271. Overall, the project is expected to have no significant adverse impact if mitigation and monitoring plans are implemented, and the environmental management and institutional capacities of the PMU and the IA are built up and strengthened through the implementation of the institutional strengthening and training plans defined in the EMP. This Tranche 1 will contribute positively towards implementing a much needed efficient public transport system in Ulaanbaatar.

C. Overall Conclusion

272. The findings of this IEE show that Tranche 1 of the Ulaanbaatar Urban Transport Development Project is not anticipated to have any significant adverse environmental impacts. Consultations indicated that the majority of the potentially affected people had a positive attitude toward the BRT project as a whole and believed it would be beneficial. Any adverse environmental impacts associated with the project will be prevented, reduced to acceptable levels, or otherwise compensated, as set out in the EMP. In addition robust environmental management systems will be introduced and institutional strengthening and personnel training will be established to ensure environmental sustainability of the project.

Appendix 1 Baseline Site Descriptions

- A Peace Bridge Improvements
- B T1-A Road Widening Chingeltei Avenue
- C T1-B Road Widening Chinggis Avenue
- D Electric Trolleybus Infrastructure and North-South BRT Corridor Improvements

A Peace Bridge Improvements

The following is a record of site visits to Peace Bridge which is to be widened on either side in order to accommodate BRT lanes under the MFF project. Where appropriate, photographs illustrate the receptors which are potentially affected by project implementation.

Peace Bridge and Surroundings

- Peace Bridge area



- Peace Bridge view to North



- Dond Gol river bed, under Peace Bridge
- District heating pipes in foreground
- Inhabited Ger on Dond Gol river bed, approximately 100m from the bridge

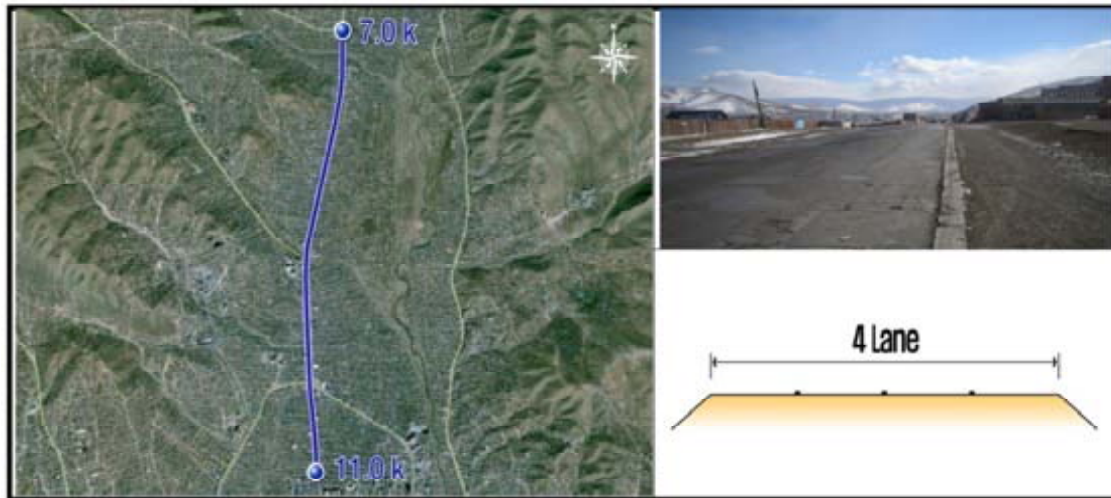


- Northern end of bridge and small businesses adjacent to the Northern end



B Road Rehabilitation and Widening Chingeltei Avenue (T1-A)

Chingeltei Avenue is to the North of the City, running through a ger area and up to an area of summer housing (gers) which are used by Ulaanbaatar residents particularly in school summer holidays. 4 km of road will be widened and rehabilitated, from MT Gas station in the South to the Dolon Buudal bus terminal in the North.



Description:

The road is currently approximately 15m wide with around 3-5m of pavement either side. The road has no existing storm water drainage, however there is a drain just South of the MT Gas Station which is the approximate start of the section to be widened. The surface is generally in a good condition but pedestrian areas are of poor quality and are encroached upon in places by buildings for informal businesses.

The road is flat, running North to South. It is on a steep slope, with unpaved roads from the West sloping down on the road and with a steep slope along the East side.

At the time of the site visits, the road was not particularly busy however it is said to be congested in summer when people move to their summer houses.

At the Northern end of the section to be widened is a bus terminal which is an important transport link for people in the ger area. This terminal was busy with buses, businesses and people.

The road is lined with either businesses or fences enclosing gers which are currently approximately 5m away from the road edge. The distance from the ger to the road varies depending on its location within the fenced compound.



Soil:

The majority of the road and sidewalks is paved, but there a considerable amount of soil washed and blown from the steep up paved ger roads, which accumulates on Chingeltei Avenue. This means the area is very dusty.

Photo: Sediment washed from a steep unpaved road to the left, onto the existing road surface.



Ecological Resources:

The environment along the road is very populated and as a result ecological resources and biodiversity is degraded. Either side of the road and throughout the gers, the area is largely devoid of vegetation.

Photo: Area has very little visible vegetation

**Water Resources:**

The area has a stormwater drainage channel running under the road, which is now primarily used for garbage disposal. The channel is said to contain water occasionally, when there is a rain event or snow melt, but this is ephemeral.

Approximately 300m from the road to the East is the Selbe river. It is a wide river bed (around 200m) but the majority of this area is dry, with a small flow of water approximately 4m wide and 20cm deep. Cars drive through the river to cross from one area to another.

Photo: Drainage channel, containing garbage

**Cultural Heritage:**

No heritage sites were identified.

Sensitive Receptors:

The area contains gers which have no noise or vibration insulation. In summer, ger dwellers spend most time outside the ger in their compound, especially children in the school holidays.

There are a number of small schools in the area and adjacent to the road is the *Khoroo* primary care clinic, which can accept overnight stays.

Approximately 150 m from the start of the road to be widened, at the opposite side of the junction, is a major hospital and a secondary school.

Photo: Ger compounds close to the road

**Socio-Economic Conditions:**

Road Safety: The ger area is a low-income area of informal housing. There are community water pipes to which people travel to collect water in large containers. These are then transported across the road, most often by women and children.

Photo: Woman crossing road having collected water at community pipe



Resettlement: The site visit showed that the road is lined with businesses. In general most buildings are along the same line, but approximately 4 or 5 stick out further than the rest.

Photo: Building sticking out further than the rest



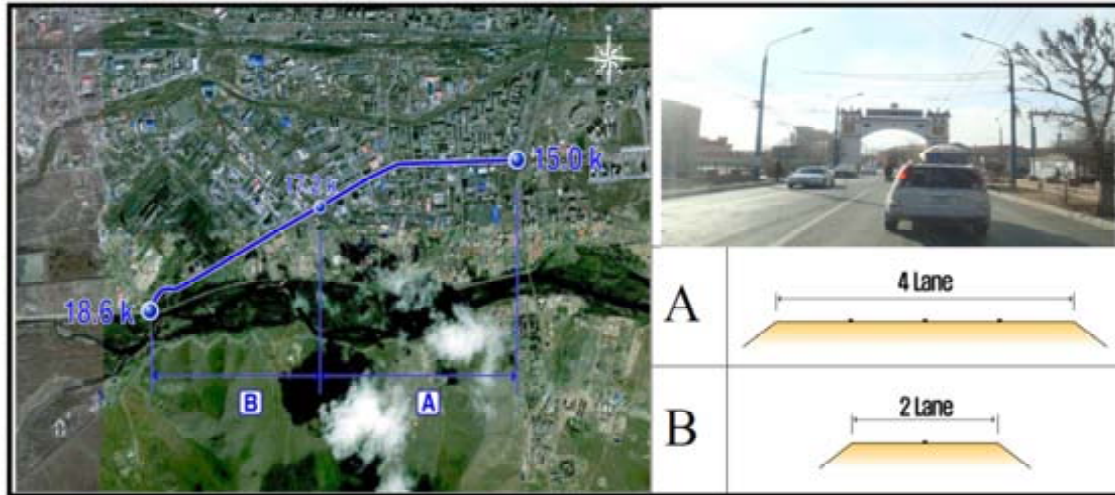
Economic conditions: The housing stock in the area appeared poor. The businesses that line the road include shoe and tyre mending as well as selling wood or coal to supply the local ger heating and cooking needs. Many of the businesses seem informal, such as buying and selling recyclables. There were a number of more formal shops, primarily grocery shops and pharmacies.

Photo: Trading recyclable materials at the road side.



C Road Rehabilitation and Widening Chinggis Avenue (T1-B)

Chinggis Avenue is to the South of the City, and crosses Peace Bridge which is currently the only major bridge crossing the Tuul River which runs from East to West at the South side of the City. 3.6 km of road will be widened, from Peace Bridge to Yarmag Bridge in the South.



Description:

The road is between 9.1 and 14.9 m wide. It runs through residential and business areas for around half its length (Section A). The remainder of the road, up to Yarmag Bridge, is primarily industrial (Section B). The road is flat with hills starting to develop in the East as the road gets closer to Yarmag Bridge.

The pedestrian areas were generally busy at the time of the site visit, particularly bus stops and the flow of traffic was constant but not congested (See Photo).



Soil:

The road and pedestrian areas are paved, but there is some exposed soil / dust in scrubland to the South of the road, near Yarmag bridge.

Ecological Resources:

The area is heavily populated and built up, with people, cars and buildings occupying most space. Observations indicated that the area is largely devoid of ecological resources. However the main ecological resource is a line of approximately 160 trees, either side of the road to the North, which provide screening and shade in summer. The trees were pollarded at the time of the visit and up to half a metre from the edge of the road.

In the South, the industrial area has scrub type vegetation along the sides of the road and up to some of the industrial units with some older trees set back from the edge of the road.

Photo: Mature trees to the North

Photo: Trees set back off the road to the South



Water Resources:

No surface water bodies or culverts were observed during the visit. The existing road does cross the Tuul river but the project component will be limited to the road section Northern of the Tuul river.

Photo: Yarmag bridge and industrial area, crossing Tuul River, viewed from South looking North.



Cultural Heritage:

Bogd Khan temple is the closest cultural site to the road. It is approximately 80m to the edge of the temple compound, South East of the road. It is a significant site on a large area of land, meaning that the temple or palace buildings are set even further back from the road. It is not visible from the road as buildings are in between the palace area and the road.

Sensitive Receptors:

The area is heavily populated and as such, pedestrians are likely to be the most sensitive receptors. During the site visit, many pedestrians were seen and particularly at bus stops. No schools, hospitals or other sensitive human receptors were observed during the visit.

Photo: Pedestrians waiting at bus stop



Socio-Economic Conditions:

Economic conditions: The Northern part of the road contains businesses, restaurants, shops etc. in addition to apartments. The Southern end is considerably different, with well spaced industrial units, such as car showrooms set away from the road.

Photo: Industrial area, with industrial units set far back from the road.

Photo: Apartments in residential area to the North



Resettlement: It is not anticipated that resettlement issues will be significant along the road. During the site visit, no hawkers or road side sales people were noted and there should not be any removal of buildings or businesses based on current designs and discussions.

Photo: Apartment Buildings set back from the road in the Northern section

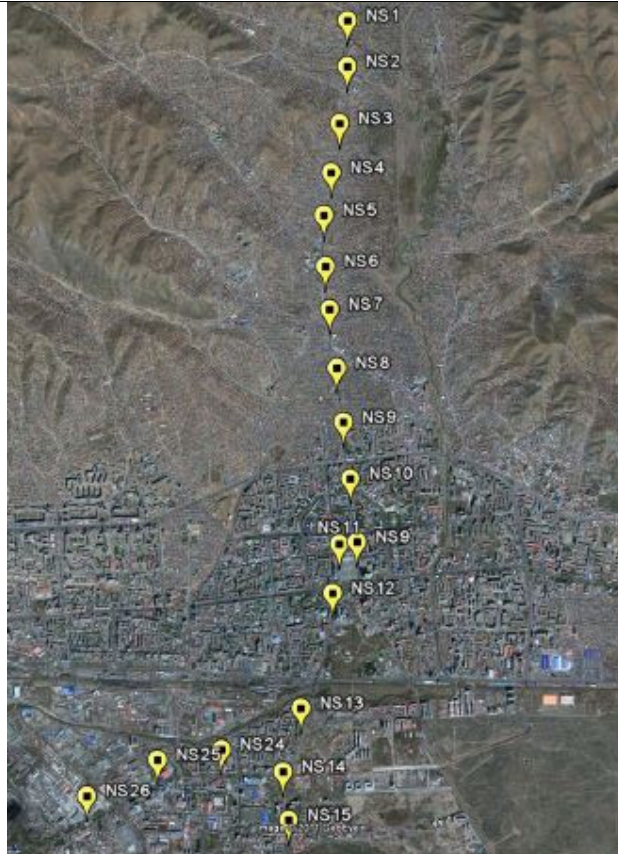


D Electric Trolleybus Infrastructure and BRT Corridor (North South) Receptors

The North –South BRT corridor improvements include installation or upgrading trolleybus electrics and improving intersection geometry and pedestrian safety along the corridor. Receptors along the Northern and Southern ends of the corridor are covered above by Road Improvements T1-A and T1-B.

BRT Corridor (North-South)

- The BRT corridor passes through a developed urban area
- The corridor passes through areas of primarily offices, businesses and some residential buildings
- The corridor's central zone (excluding T1-A and T1-B) does not contain any significant environmental resources which may be impacted on by the project
- Humans are the primary receptors along the corridor. No ecological receptors were apparent.



-
- Businesses and residential buildings on N-S corridor, around Bus Station 9 (NS9)
 - Businesses and education institutes on N-S corridor around Bus Station 10 (NS10)
 - Includes University of Mongolia and Institute of Technology
-



Appendix 2 Environmental Inspection Interview Forms

Monitoring Form 1: Stakeholder Interviews Recording Form

Date of Interview:		Interviewer Name:	
Interview Site: <i>Where is the interview held? In school, on the road, in shop</i>		Stakeholder Name & Status: <i>Full name, status is business owner, school teacher, religious leader, Khoroo resident</i>	
Construction Site & Date Construction Started <i>Which road, intersection, bus station</i>		Has this stakeholder been interviewed before? <i>Yes (when were they interviewed) No</i>	
Interview Discussion Points			
1. Noise		Record of Discussion	
Before the project started, was the person disturbed by noise? If yes, explain how and when. <i>Where did the noise come from? E.g. traffic, machinery, people, music</i> <i>When was did it disturb the person? E.g. all day, at night, intermittently</i>			
During the construction, is the person disturbed by noise from the project? If yes, explain how and when. <i>What type of noise and where did the noise come from? E.g. increased traffic congestion, construction machinery, construction workers etc</i> <i>When was did it disturb the person? E.g. all day, at night, intermittently</i>			
If noise from construction is a problem, what changes does the person suggest are made?			

Appendix 2 – Environmental Inspection Interview Forms

2. Air Quality	Record of Discussion
<p>Before the project started, was the person affected by air pollution or dust? If yes, explain how and when.</p> <p><i>Where did the pollution or dust come from? E.g. traffic, machinery, construction, burning garbage, cooking stoves</i></p> <p><i>When was the dust or pollution a problem? E.g. all day, at night, intermittently</i></p>	
<p>During the project, is the person disturbed by dust or pollution? If yes, explain how and when.</p> <p><i>What type of noise and where did the noise come from? E.g. increased traffic congestion, construction machinery, construction workers, burning construction garbage etc</i></p> <p><i>When was did it disturb the person? E.g. all day, at night, intermittently</i></p>	
<p>If dust or air pollution from the construction is a problem, what changes does the person suggest are made?</p>	
3. Traffic	Record of Discussion
<p>Before the project started, what was the traffic situation like at the site/school/house etc?</p> <p><i>E.g. congested sometimes, light traffic mostly, evening heavy traffic etc.</i></p>	
<p>During the project, has the person found the traffic situation has changed? If yes, explain how and when.</p>	
<p>If change in traffic is unacceptable, what changes does the person suggest are made?</p>	

Appendix 2 – Environmental Inspection Interview Forms

4. Road Safety	Record of Discussion
<p>Before the project started, can you describe the road safety situation at the site/school/house etc?</p> <p><i>E.g. no problems, some accidents, difficulty crossing the roads, children are okay or at risk.</i></p>	
<p>During the project, has the person found the road safety situation has changed? If yes, explain how and when.</p> <p>Slower traffic so easier to cross the roads, construction vehicles are making a crossing harder / easier, more accidents / less accidents</p>	
<p>If change in road safety is unacceptable, what changes does the person suggest are made?</p>	
5. Other Issues	Record of Discussion
<p>Any other issues about the construction sites that the person wants to discuss?</p>	

Monitoring Form 2: Construction Environmental Condition

Date of Site Visit :		Name of Monitor:	
Type of Site Check (tick)	Before Construction Ends	<input type="checkbox"/>	Post-Construction
Site Observations			
1. Condition of Site		Observations	
Garbage <i>Is there construction waste on the site? What type of waste? Is it hazardous? Where is it?</i>			
Land Condition <i>Is any disturbed land and soil properly contoured? Is it re-planted?</i>			
Contamination <i>Is any land or water at the site contaminated, with chemicals, garbage etc? Are any chemicals spills including fuel, visible?</i>			
Services & Infrastructure <i>Are any services damaged because of the construction? Are drains and culverts blocked or clean?</i> <i>Any damage to buildings, kerbs, lighting, street signs etc ?</i>			
Community Health & Safety <i>Will the site cause a health and safety risk to the community? Are there trenches or pits? Are there other hazards which may impact on health?</i>			
Other Issues			

Appendix 2 – Environmental Inspection Interview Forms

Requirements for Contractor	
Issue <i>List Issues and observations that the contractor is required to fix</i>	
Date Requirements Given to Contractor	
Date by Which Contractor Agrees to Fix Issues	

Appendix 3 General EIA issued by MNET

- 1. Scanned copy of the original document (in Mongolian)**
- 2. Unofficial English translation**



**МОНГОЛ УЛСЫН
БАЙГАЛЬ ОРЧИН,
АЯЛАЛ ЖУУЛЧЛАЛЫН ЯАМ**

15160 Улаанбаатар хот, Чингэлтэй дүүрэг,
Нэгдсэн Үндэстний гудамж 5/2, Засгийн газрын II байр,
Утас: 26-61-71, Факс: (976-51) 26-62-86,
E-mail: monenv@mail.mn, <http://www.mne.mn>

2011. 11. 26 № 6/4680 .
танай _____-ны № _____-т

**УЛААНБААТАР ХОТЫН
ЕРӨНХИЙ МЕНЕЖЕР БӨГӨӨД
ЗАХИРАГЧИЙН АЖЛЫН АЛБАНЫ
ДАРГА Ч.БАТ ТАНАА**

Улаанбаатар хотын нутагт хэрэгжүүлэх
“Улаанбаатар хотын тээврийг хөгжүүлэх 76-51MON
төсөл”-д “Байгаль орчинд нөлөөлөх байдлын
үнэлгээний тухай” хуулийн дагуу Ерөнхий үнэлгээ
хийсний үндсэн дээр уг төслийг нөхцөл,
болзолтойгоор хэрэгжүүлэх боломжтой гэж үзэв.

Ерөнхий үнэлгээний дүгнэлтийг хавсаргав.

ЕРӨНХИЙ ШИНЖЭЭН



Д.ЭНХБАТ

4205
D:/2011 on/Alban bichig A5/

БАЙГАЛЬ ОРЧИН, АЯЛАЛ ЖУУЛЧЛАЛЫН ЯАМ

БАЙГАЛЬ ОРЧИНД НӨЛӨӨЛӨХ БАЙДЛЫН
ЕРӨНХИЙ ҮНЭЛГЭЭНИЙ ДҮГНЭЛТ

2010 оны 10 дугаар сарын 26-ны өдөр

Улаанбаатар хот

Төслийн дугаар:

2011/H024

ТӨСЛИЙН ТОВЧ ТОДОРХОЙЛОЛТ

Төслийн нэр: "Улаанбаатар хотын тээврийг хөгжүүлэх төсөл"
76-51 MON

Төслийн байршил: Улаанбаатар хотын нутаг дэвсгэрт.

Төсөл хэрэгжүүлэгч: Улаанбаатар хотын Захирагчийн ажлын алба.

Төсөл хэрэгжүүлэгчийн хаяг: Улаанбаатар хотын Чингэлтэй дүүрэг,
Ц.Жигжиджавын гудамж-9, Хангарьд ордон,
Улаанбаатар хотын ерөнхий менежер бөгөөд
Захирагчийн ажлын албаны дарга Ч.Бат, утас:
315347.

Төслийн товч тодорхойлолт: Төслийн үндсэн зорилго нь

1. Нийслэлийн замын багтаамжийг нэмэгдүүлэх үүднээс замын дэд бүтэц дэх хүчин чадлын дутагдалтай хэсгүүдийг өргөтгөх
2. Замын хөдөлгөөний аюулгүй байдал, үр ашгийг нэмэгдүүлэх зорилгоор замын хөдөлгөөний зохицуулалтын арга хэмжээнүүдийг авч хэрэгжүүлэх
3. Замын хөдөлгөөн, авто зогсоол, тээврийн эрэлтийг зохицуулах бодлогуудыг боловсруулж, хэрэгжүүлэх
4. Нийтийн тээврийн тусгай замын автобусны систем байгуулах
5. Нийтийн тээврийн зохицуулалт, үйлчилгээний чанарыг сайжруулах зэрэг болно. Тус төсөл нь Улаанбаатар хотын нийтийн тээврийг хөгжүүлэхээс гадна хотын агаарын бохирдлыг бууруулахад хувь нэмэрээ оруулах юм.

Төслийн 1-р үе шатанд (2011-2013 он) (санхүүжилтийн хэмжээ ойролцоогоор 29.9 сая ам.доллар)

- (i) 20 орчим уулзварын геометрийн хэлбэр дүрс, замын хөдөлгөөний хүчин чадлыг сайжруулах;

- (ii) 3 байршилд автобусны буудал сайжруулах;
- (iii) 7.7 км орчим замыг сайжруулах (Энхтайваны гүүрээс Яармагын гүүр, МТ шатахуун түгээгүүрийн газраас Долоон буудалын чиглэлд);
- (iv) ухаалаг тээврийн систем нэвтрүүлэх (цахим тасалбар, GPS систем тулгуурласан автобусны байршил тодорхойлох систем)
- (v) төслийн удирдлага, инженерийн зураг боловсруулах

Төслийн 2-р үе шатанд (2013-2015 он) (санхүүжилтийн хэмжээ ойролцоогоор 78.0 сая ам.доллар)

- (i) Шарга морьт орчмын 10.4 км орчим замыг сайжруулах;
- (ii) Энхтайваны гүүрийг өргөтгөн сайжруулах;
- (iii) ТЗА-ны 1-р шугамыг босоо тэнхлэгийн дагуу ашиглалтад өгөх (22 км);
- (iv) ухаалаг тээврийн системийг өргөтгөх (замын хөдөлгөөний менежмент, хяналтын систем); мөн
- (v) бүтэц зохион байгуулалтыг сайжуулах, төслийн удирдлага, инженерийн зураг төсөл боловсруулах

Төслийн 3-р үе шатанд (2015-2017 он) (санхүүжилтийн хэмжээ ойролцоогоор 78.0 сая ам.доллар)

- (i) Энхтайваны өргөн чөлөөтэй паралель хэвтээ тэнхлэгийн дагуу нийт 20 км орчим замыг сайжруулах;
- (ii) ТЗА-ны 2-р шугамыг ашиглалтад өгөх (замын урт 30 км, Энхтайваны өргөн чөлөөтэй паралел); мөн
- (iii) бүтэц зохион байгуулалтыг сайжуулах, төслийн удирдлага, инженерийн зураг төсөл боловсруулах ажлуудыг хийж гүйцэтгэхээр төлөвлөсөн байна.

ЕРӨНХИЙ ҮНЭЛГЭЭНИЙ ДҮГНЭЛТ

Улаанбаатар хотын нутагт хэрэгжүүлэх "Улаанбаатар хотын тээврийн хөгжүүлэх 71-56 MON төсөл"-д Монгол Улсын Их Хурлын 1998 оны 1 дүгээр сарын 22-ны өдрийн тогтоолоор баталсан "Байгаль орчинд нөлөөлөх байдлын үнэлгээний тухай" хуулийн дагуу ерөнхий үнэлгээ хийсний үндсэн дээр уг төслийг нөхцөл, болзолтойгоор хэрэгжүүлэх боломжтой гэж үзэв.

БУСАД АСУУДАЛ

1. Дээрхи төслийг хэрэгжүүлэх үйл ажиллагаа явуулахдаа тухайн орон нутгийн Засаг захиргааны болон Байгаль орчныг хамгаалахтай холбогдсон хууль тогтоомжийг биелүүлэх талаар байгаль орчин, мэргэжлийн хяналтын байгууллагуудтай байнга хамтран ажиллах

2. Мэргэжлийн хяналтын байгууллага, тэдгээрийн ажилтнуудтай байнга хамтран ажиллах

3. Байгаль орчинд нөлөөлөх байдлын ерөнхий үнэлгээний дүгнэлтээр тогтоосон нөхцөл болзол, шаардлагыг цаг хугацаанд нь тогтмол ханган хэрэгжүүлэх, биелэлтийг холбогдох газруудад тогтоосон хугацаанд тайлагнаж байх

4. Ерөнхий үнэлгээний дүгнэлт, ажлын чиглэл, нөхцлөөс өөр үйл ажиллагаа явуулах, төслийн техник, тоног төхөөрөмж, байршил өөрчлөгдөх тохиолдолд Байгаль орчинд нөлөөлөх байдлын ерөнхий үнэлгээнд хамрагдаж дахин шийдвэр гаргуулах

5. Төслийн үйл ажиллагааг явуулахад баримтлах, зайлшгүй мөрддөг олон улсын стандарт, норм норматив, шаардлагыг судалж хэрэгжүүлэх.

5. Байгаль орчинд нөлөөлөх байдлын ерөнхий үнэлгээ хийлгэх асуудлаар төсөл хэрэгжүүлэгч хүсэлт гаргасан (Улаанбаатар хотын ерөнхий менежер бөгөөд Захирагчийн ажлын албаны дарга Ч.Батын 2011 оны 10 дугаар сарын 13-ны өдрийн 1/1131 дугаартай албан бичгээр ирүүлсэн хүсэлт).

ЕРӨНХИЙ ҮНЭЛГЭЭ ХИЙСЭН

БОАЖА-НЫ ШИНЖЭЭЧ

Г.ХОРОЛМАА

Ерөнхий үнэлгээний дүгнэлт болон нөхцөл,
болзлыг зөвшөөрч, хэрэгжүүлэх үүрэг хүлээсэн

Улаанбаатар хотын ерөнхий менежер бөгөөд
Захирагчийн ажлын албаны дарга

Ч.БАТ

БАЙГАЛЬ ОРЧИН, АЯЛАЛ ЖУУЛЧЛАЛЫН ЯАМ

Улаанбаатар хот

**Байгаль орчинд нөлөөлөх байдлын ерөнхий үнэлгээгээр тогтоосон
заавал хэрэгжүүлэх шаардлагатай нөхцөл, болзол**

Ажлын агуулга	Хугацаа	Тайлбар
1. Төслийн холбогдох бичиг баримт, зөвшөөрлийг зохих шаардлагын түвшинд боловсруулж, шаардлагатай бичиг баримтыг бүрдүүлэх	Төслийн эхэнд	Төсөл хэрэгжүүлэгч
2. Төслийн үйл ажиллагааг Олон улсын болон Монгол Улсын стандартын дагуу явуулах.	Ажил эхлэхэд	Төсөл хэрэгжүүлэгч
3. Төслийн үйл ажиллагаанаас гарах хог хаягдлыг зориулалтын цэгт хадгалж, тусгай графикийн дагуу, байгаль орчны болон эрүүл ахуй, халдвар судлалын хяналтын байгууллагаас тогтоосон цэгт зайлуулах, хог хаягдал хадгалах газарт ариутгал, халдваргүйжүүлэлт тогтмол хийж байх	Үйл ажиллагааны явцдаа тогтмол	Төсөл хэрэгжүүлэгч
4. Шатах тослох материалын үлдэгдэл хаягдал болон шатах тослох материалыг хадгалах, тээвэрлэх, түгээх, устгах үйл ажиллагааг зохих журмын дагуу зохион байгуулах	Үйл ажиллагааны явцдаа тогтмол	Төсөл хэрэгжүүлэгч
5. Төслийн үйл ажиллагааны явцад хөдөлмөр хамгааллын асуудлыг зохих шаардлагын дагуу шийдвэрлэх	Байнга	Төсөл хэрэгжүүлэгч
5. Байгаль орчныг хамгаалах талаар тусгай төлөвлөгөөг Нийслэлийн Байгаль орчныг хамгаалах газраар батлуулж, биелэлтийг нь тогтоосон хугацаанд тайлагнаж байх	Жил бүр	Төсөл хэрэгжүүлэгч
6. Зам, гүүр, барилга, троллейбусны шугам татах зэрэг ажлын явцад ажилчдын хөдөлмөр хамгааллын асуудлаар байнгын сургалт явуулах. Шугам сүлжээ татах явцад байгаль орчны стандарт шаардлагуудыг хангаж ажиллах талаар Байгаль хамгаалах төлөвлөгөөнд тусгаж ажиллах	Төслийн үйл ажиллагааны турш	Төсөл хэрэгжүүлэгч
7. Хотын нийтийн тээвэрт троллейбусны тоог нэмснээр Улаанбаатар хотын агаарын бохирдлыг хэдий хэмжээгээр бууруулж болох талаар урьдчилсан судалгаа, тайлан гаргаж холбогдох байгууллагуудад хүргүүлэх.	Төслийн эхний шатанд	Төсөл хэрэгжүүлэгч

ЗААВАЛ ХЭРЭГЖҮҮЛЭХ ШААРДЛАГАТАЙ ДЭЭР ДУРДСАН АРГА ХЭМЖЭЭГ
ЦАГ ХУГАЦААНД НЬ ХАНГАН БИЕЛҮҮЛЭЭГҮЙ ТОХИОЛДОЛД ЕРӨНХИЙ
ҮНЭЛГЭЭНИЙ ДҮГНЭЛТИЙГ ХҮЧИНГҮЙ БОЛГОЖ, "БАЙГАЛЬ ОРЧИНД НӨЛӨӨЛӨХ
БАЙДЛЫН ҮНЭЛГЭЭНИЙ ТУХАЙ" ХҮҮЛИЙН ДАГУУ ХАРИУЦЛАГА ТООЦНО.

Ерөнхий үнэлгээний дүгнэлт, заавал хэрэгжүүлэх
шаардлагатай нөхцөл, болзлыг тогтоосон:

Байгаль орчин, аялал жуулчлалын
яамны шинжээч

Г.ХОРОЛМАА

Ерөнхий үнэлгээний дүгнэлт болон нөхцөл,
болзлыг зөвшөөрч, хэрэгжүүлэх үүрэг хүлээсэн:

Улаанбаатар хотын ерөнхий менежер бөгөөд
Захирагчийн ажлын албаны дарга

Ч.БАТ

МОНГОЛ УРСНЫ
БАЙГАЛ ОРЛООН
АЖАЛ ЭХЭВЭЛЭЛЭН ХЭМ

Хувь 2 В.Эрдэнэ-Оюун
2011.10.26

Боловсруулсан:
Хувь 2 В.Эрдэнэ-Оюун
2011.10.26

Г.Хоролмаа
/51-266288/

General EIA, unofficial English translation

MINISTRY OF NATURE, ENVIRONMENT
AND TOURISM OF MONGOLIA

Government Building II, United Nations Street 5/2,
Chingeltey District, 15160 Ulaanbaatar
Tel: 26-61-71, Fax: (976-51) 26-62-86
E-mail: money@mail.mn, <http://www.mne.mn>

TO: MR. CH.BAT, HEAD OF GOVERNOR'S OFFICE OF CAPITAL CITY
AND GENERAL MANAGER OF ULAANBAATAR

On the basis of General Assessment, carried out in accordance with the Law on Environmental Impact Assessment of Mongolia, on the Urban Transport Development Project 76-51MON to be implemented in Ulaanbaatar, it is concluded that the project could be implemented on terms and conditions.

The General Assessment Conclusion is attached.

GENERAL EXPERT

D.ENKHBAT

MINISTRY OF NATURE, ENVIRONMENT AND TOURISM

GENERAL ASSESSMENT CONCLUSION ON
ENVIRONMENTAL IMPACT

Date: October 26, 2011

Ulaanbaatar

Project number: 2011/H024

PROJECT OVERVIEW

Project title: “Urban Transport Development Project”
76-51MON

Project location: Territory of Ulaanbaatar

Project implementer: Governor’s office of Capital city

Address of the implementer: Mr. Ch.Bat, Head of Governor’s office of Capital city and General
Manager of Ulaanbaatar, Khangarid Palace
Ts.Jigjidjav Street, Chingeltey District, Ulaanbaatar
Tel: 315347

Project description: Main goals of the project are:

1. Improve road bottlenecks to maximize the road network capacity;
2. Applying traffic management measures to increase traffic flow efficiency and safety;
3. Develop and implement parking, traffic, and travel demand management policies;
4. Develop a bus-rapid transit-based public transport system;
5. Improve the public transport management and quality of services. This project shall contribute to the development of public transportation as well as to the elimination of air pollution in Ulaanbaatar.

Within the 1st Phase (2011-2013) of the Project (approx. investment amount is USD 29.9 million):

1. Geometry and traffic capacity of about 20 intersections shall be improved;
2. Bus stations at three locations shall be improved;
3. About 7.7 km of a road (between the Peace and Yarmag bridges and between MT gas station and Doloon Buudal bus terminal) shall be upgraded;
4. Intelligent transport system (ITS) components (smart-card and GPS-based bus location systems) shall be introduced; and
5. Resources for project management and engineering design shall be provided.

Within the 2nd Phase (2013-2015) of the Project (approx. investment amount is USD 78.0 million):

1. About 10.4 km of road infrastructure in Sharga Morit area shall be upgraded;
2. The Peace Bridge shall be extended and upgraded;
3. The 1st BRT line along the North-South corridor (22 km) shall be constructed;

4. The ITS system (traffic management and control systems) shall be extended; and
5. Resources for institutional development, project management, and engineering design shall be provided.

Within the 3rd Phase (2015-2017) of the Project (approx. investment amount is USD 78.0 million):

1. About 20 km of road infrastructure parallel to the Peace Avenue shall be upgraded;
2. The 2nd BRT line (30 km, parallel to the Peace Avenue) shall be introduced; and
3. Resources for institutional development, project management, and engineering design shall be provided.

CONCLUSION ON GENERAL ASSESSMENT

On the basis of General Assessment, carried out in accordance with the Law on Environmental Impact Assessment of Mongolia, passed by the Parliament Resolution dated January 22, 1998, on the Urban Transport Development Project 76-51MON to be implemented in Ulaanbaatar, it is concluded that the project could be implemented on terms and conditions.

MISCELLANEOUS

1. Regular collaboration with environmental and professional inspection organizations should be extended with regard to realizing related legislations on local administration and environmental protection when implementing the project.
2. Collaboration with professional inspection organization and its staff should be extended.
3. Terms and conditions set by the General assessment on Environmental impact conclusion should be realized and reported to related organizations on time.
4. In case of running different activities and operations other than those reviewed by the General assessment, or changing the project equipments and location, General environmental impact assessment should be requested.
5. International standards, norms, normative and other requirements for running project activities should be followed.
6. The Project implementer has requested the general assessment on environmental impact (Official request No. 1/1131 sent by Mr. Ch.Bat, Head of Governor's office of Capital city and General Manager of Ulaanbaatar, dated October 31, 2011).

General assessment was conducted by:

Expert, Ministry of Nature, Environment
and Tourism

G.KHOROLMAA

General assessment terms and conditions are
accepted and to be implemented by:

Head of Governor's office of Capital city and
General Manager of Ulaanbaatar

CH.BAT

MINISTRY OF NATURE, ENVIRONMENT AND TOURISM

Ulaanbaatar

**Terms and conditions, set up by the General Environmental Impact Assessment
and to be realized mandatory**

Content	Period	Remarks
1. Related project documents and permissions must be developed at proper level and necessary documents must be obtained	At the beginning of the project	Project implementer
2. Project activities must be in compliance with the international and Mongolian standards	At the commencement	Project implementer
3. Wastes from project operations should be stored at designated points, must be removed to the point, set by the environmental, hygienic and infection control organizations according to special schedule and carry out sanitation and disinfections at waste storage area	Regularly during operations	Project implementer
4. Lubricants and their remnant storage, transport and removal must be organized in accordance with proper procedures	Regularly during operations	Project implementer
5. Occupational safety during project implementation must be addresses in accordance with proper requirements	Regularly	Project implementer
5. Special plan on environmental protection must be approved by the Capital city Environmental Protection organization and its realization must be reported within designated period	Annually	Project implementer
6. Regular training should be provided for the staff during road, bridge, construction and trolleybus line extensions. Environmental protection plan must incorporate clauses on meeting environmental requirements during line and network extensions	During project operations	Project implementer
7. Tentative research and report on how extension of trolleybus numbers could eliminate city air pollution must be formulated and submitted to related organizations.	At the first phase of the project	Project implementer

Appendix 3 – General EIA (MNET)

IN CASE THESE MANDATORY TERMS AND CONDITIONS ARE NOT REALIZED ON TIME, GENERAL ASSESSMENT CONCLUSION WILL BE INVALIDATED AND LIABILITIES SHALL BE IMPOSED AS STIPULATED IN THE LAW ON ENVIRONMENTAL IMPACT ASSESSMENT.

General assessment conclusion, mandatory terms and conditions are set by:

Expert, Ministry of Nature, Environment and Tourism

G.KHOROLMAA

General assessment terms and conditions are accepted and to be implemented by:

Head of Governor's office of Capital city and General Manager of Ulaanbaatar

CH.BAT