

# Environmental Management Plan (for contractors)

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Project No.: 45007-009  
March 2020

## MON: Ulaanbaatar Urban Services and Ger Areas Development Investment Program (Tranche 3)

Prepared by the Municipal Government of Ulaanbaatar for the Asian Development Bank.

### **CURRENCY EQUIVALENTS**

(as of 23 March 2020)

Currency unit	–	togrog (MNT)
MNT1.00	=	\$0.00036
\$1.00	=	MNT2,767.5

### **WEIGHTS AND MEASURES**

°C	–	degree Celsius
dB	–	decibel
km	–	kilometre
m	–	meter
m <sup>2</sup>	–	square meter
Q	–	quarter

### **ABBREVIATIONS**

ADB	–	Asian Development Bank
DEIA	–	Domestic Detailed Environmental Impact Assessment
EHS		Environment, Health
EIA	–	Environmental Impact Assessment
EMP	–	Environmental Management Plan
GADIP	–	Ulaanbaatar Urban Services and Ger Areas Development Investment Program
GEIA	–	General Environmental Impact Assessment
GHG	–	Greenhouse Gas
GRM	–	Grievance Redress Mechanism
H&S	–	Health and Safety
IEE	–	Initial Environmental Examination
MET	–	Ministry of Environment and Tourism
MUB	–	Municipal Authority of Ulaanbaatar city
NO <sup>2</sup>	–	Nitrogen Dioxide
PIS	–	Project Implementation Support
PMO	–	Project Management Office
SO <sup>2</sup>	–	Sulphur Dioxide
SPS	–	ADB Safeguard Policy Statement
TSP	–	total suspended particulate
UB	–	Ulaanbaatar
USUG	–	Ulaanbaatar Water and Sewerage Authority
WHO	–	World Health Organization

**NOTE{S}**

- (i) In this report, "\$" refers to United States dollars.

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# **ENVIRONMENTAL MANAGEMENT PLAN**

## **(for contractors)**

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**MON: Ulaanbaatar Urban Services and Ger Areas  
Development Investment Program - Tranche 3**

Prepared for the Asian Development Bank.

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## **A. Introduction**

1. This environmental management plan (EMP) is prepared for the Tranche 3 phase of the Ger Area Development Investment Program which covers Sharkhad and Tolgoit subcenters. Components of tranche 3 are summarized in Appendix 1.
2. **Environment safeguards classification by the Asian Development Bank (ADB).** According to the requirement of ADB's Safeguard Policy Statement (SPS, 2009), the Project is categorized as "B" for environment since the adverse environmental impacts are manageable and can be minimized through implementation of mitigation measures specified in this EMP.
3. **Mongolian safeguards requirements.** The Law on Environmental Impact Assessment (2012) requires environment impact screening (general environmental impact assessment [General EIA]) for both subcenters. Project activities include construction and expansion of utility pipelines and construction of social buildings (please refer to Table 1 below). These activities will require an environmental impact screening (General EIA) by the Province/Aimag Department of Nature and Environment. All interventions must comply with the Mongolian laws, regulations and standards including those related to environment, health and safety.
4. **ADB safeguards Standards.** During the design, construction, and operation of the project the borrower/client will apply pollution prevention and control technologies and practices consistent with international good practice, as reflected in internationally recognized standards such as the World Bank Group's Environment, Health and Safety (EHS) Guidelines. These standards contain performance levels and measures that are normally acceptable and applicable to projects. When host country regulations differ from these levels and measures, the borrower/client will achieve whichever is more stringent. If less stringent levels or measures are appropriate in view of specific project circumstances, the borrower/client will provide full and detailed justification for any proposed alternatives that are consistent with the requirements presented in this document. The Mongolian standards and the corresponding World Bank EHS guidelines in presented Annexure 4.
5. **Purpose of the Environmental Management Plan (EMP).**<sup>1</sup> The EMP has been prepared to define the procedure to be followed by the MUB, the Project Management Office (PMO), the construction companies, detailed design and supervision consultants, the engineers and the environmental safeguards specialist of the PMO for the avoidance or mitigation of adverse environmental effects that may arise out of construction works of facilities in relation to the Project.
6. Proposed mitigation measures will be incorporated into tender documents, construction contracts, and Environmental Management Plans. Both Contractors and PMO will implement the measures and their effectiveness will be evaluated on the basis of the results of the environmental monitoring to determine whether to continue them or to make improvements.

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1 This EMP is disclosed as appendix to the project administration manual (PAM) on [www.adb.org](http://www.adb.org).

7. The Bid Documents for the potential Contractor(s) shall contain two sections relating to environmental issues, firstly a basic clause indicating that the Contractor will be responsible for following the requirements of this IEE/EMP and that he should prepare his own Site-specific EMP (SEMP) for the Project. Secondly, the EMP of the IEE shall be repeated in its entirety as an Annex to the Bid Documents so as the bidder is aware of his environmental requirements under the Project (both Pre-construction, Detailed Design and Construction) and help him put costs to his proposal (such as costs for noise monitoring, etc.).
8. The EMP requires civil works contractors to plan for the construction projects, including issues such as work scheduling, consultation with and notification to potentially affected people. This EMP follows the Government of Mongolia (GoM)'s regulations relevant to this Project, as well as ADB's SPS (2009). This EMP will be included as a separate annex in civil work contracts. The MUB, through the PMO and assisted by its environment safeguard specialist, will be responsible for ensuring contractors' compliance with the EMP.
9. The contractor's site-specific EMP's must be prepared and submitted within 30 days of the contract award and pre-construction and Construction cannot commence until the SEMP is approved by the PMO and the Engineer.
10. Throughout the Construction phase, the Contractor must employ an on-site environment specialist (OES) to update the SEMP and to oversee and report on the operation throughout the contract period. The OES should be full-time member of contractor's staff.

### B. Components of Tranche 3

11. The Tranche 3 will be implemented in two subcenters in Ulaanbaatar city ger area: Sharkhad and Tolgoit. The Components of Tranche 3 are summarized in below table.

**Table 1. Tranche 3 components<sup>2</sup>**

Facilities <sup>3</sup>		Sharkhad project area	Tolgoit project area
Project Area		ADB project area: 124 hectares The subcenter area: 507 hectares	ADB project area: 153.4 hectares The subcenter area: 737 hectares
Project Area Population		ADB project area: 8,939 The subcenter area: 32,395	ADB project area: 6,860 The subcenter area: 18,545
Quantities of the Proposed Infrastructure	Road	Main road: Length 2.92 km, width 24.7 m Local road: Length 5.96 km, width 14.7 m Total length: 8.87 km	Main road: Length 1.53 km, width 24.7 m Local road: Length 6.16 km, width 14.7 m Total length: 7.69 km 5 small bridges with total length of 160 m
	Heating	✓ Heating Supply Pipelines L = 6.62 km, diameter (D2x150~350 mm) ✓ Heat distribution substation (Nos.) = 3 Nos.	✓ Heating Supply Pipelines L = 4.31 km, diameter (D2x150~700 mm) ✓ Heat distribution substation (Nos.) = 7 Nos.
	Water	Water supply pipelines: diameter D150~400 mm, L = 7.95 Km New water reserve with capacity V = 2x1,000 m <sup>3</sup> New pump station with capacity Q = 6,000 m <sup>3</sup> /day	Water supply pipelines: diameter D150~300 mm, L = 2.9 Km Expansion of existing water supply pipelines: diameter D150~250 mm, L=941 m New pump station with capacity Q=4,600 m <sup>3</sup> /day
	Sewage	Sewage pipeline: diameter D200~300 mm, L = 3.85 Km	Sewage pipeline: diameter D200~300 mm, L = 6.56 Km
	Flood protection		Flood control reinforced concrete channel: width 1-4 m, total length: 3.12 km Sediment retention pond: 2 Nos.
	Power supply	Electricity switch gears: capacity of 10 kV each - 2 Nos. Closed type substations with transformer of 2x630 kVA power – 10 sets Electricity transmission line with 10 kV capacity: L=20 km	Electricity switch gears: capacity of 10 kV each - 1 Nos. Closed type substations with transformer of 2x630 kVA power – 8 sets Electricity transmission line with 10 kV capacity: L = 15 km
	Telecommu	Telecommunication's service and data center /3 storied	Telecommunication's service and data center /3

<sup>2</sup> The proposed infrastructure for Tranche 3 follows the Ulaanbaatar City Master Plan 2030.

<sup>3</sup> Heating and water demand estimations are based on projected population densification and increase by 2030



	<b>nication</b>	building with 1,008 m <sup>2</sup> size/ -1 pcs Fiber optic cable: L = 5.5 km Primary duct (4+0), L5T type manhole /medium/: L = 8.85 km Primary duct (9+0), M1 type manhole /large/: L = 1 km Tower: 1 Nos. with height 25-30 m	storied building with 1,008 m <sup>2</sup> size/ -2 pcs Fiber optic cable: L = 4.1 km Primary duct (4+0), L5T type manhole /medium/: L = 8.7 km Primary duct (9+0), M1 type manhole /large/: L = 0.5 km Tower: 1 Nos. with height 25-30 m
	<b>Social Facilities</b>	<ul style="list-style-type: none"> <li>✓ 1 Kindergarten (230 Children)- 12,190 m<sup>2</sup></li> <li>✓ 1 Sport Complex, - 20,013.5 m<sup>2</sup> or 15,430.6 m<sup>2</sup> (2 options)</li> <li>✓ 1 Community Development Center - 10,203 m<sup>2</sup></li> <li>✓ 1 Business Incubator - 7,542.8 m<sup>2</sup></li> <li>✓ 1 Urban Park / Green Belt - 16,432.5 m<sup>2</sup></li> </ul>	<ul style="list-style-type: none"> <li>✓ 1 Kindergarten (240 Children)- 12,720 m<sup>2</sup></li> <li>✓ 1 Community Development Center - 4,609 m<sup>2</sup></li> <li>✓ 1 Business Incubator - 4,695 m<sup>2</sup></li> <li>✓ 1 Urban Park/ Green Belt - 9,324 m<sup>2</sup> and 12,432 m<sup>2</sup></li> <li>✓ 1 primary health center with 50 beds</li> </ul>

### C. Summary of Potential Impacts

12. The environmental impacts management matrix has been prepared for the project that discusses the anticipated impacts, monitoring requirements, and development of mitigation measures with respect to the following stages: (i) pre-construction, (ii) construction, and (iii) operation and maintenance (Table 2 below).
13. The short-term construction disturbances include noise, dust, reduced access, increased traffic and risk of traffic accidents, worker and public safety, and local soil erosion & surface water sedimentation, and generation of solid, liquid and medical waste. These short-term impacts can be managed and mitigated following to the measures provided in this EMP.
14. Resettlement and compensation will be addressed by the separate Land Acquisition & Resettlement Plan (LARP) for Tranche 3.

**Table 2. Summary Analysis of Positive and Adverse Impacts**

1	Project Activities	Positive Impacts (Type)
<b>A</b>	<b>Construction</b>	
i	Employment	Employment opportunity to local population. (Temporary)
<b>B</b>	<b>Operation</b>	
i	Socio -economic impact	Households and businesses in the subcenters will be connected to centralized water supply heating and sewage pipelines and provided with improved waste management facilities and road networks that will help to improve quality of life for the local community. Reduced use of coal burning stoves and open toilet pits will help to improve air quality and soil quality.
2	Project Activities	Adverse Impacts (Type)
<b>A</b>	<b>Pre-Construction</b>	
i	Land acquisition	Resettlement will be required for the new roads, and some of the new buildings and the new social service facilities.
ii	Temporary use of land	The mobilization of construction equipment and construction materials will require space for storage and parking of construction vehicles and equipment, construction material storage yards, disposal sites
iii	Type and scale of insulation of pipelines	The design must lead to introduction of energy efficiency elements and conforms to national standard requirements.
iv	Flood risks	The project design must ensure the existing drainage network, to which the new tertiary network will connect, is not flooded with silt and sediment from the upstream excavation and earthworks activities.
v	Linked facilities	The PMO must confirm from concerned authorities of various linked facilities such as landfills to accept solid waste, underground utilities such as heating pipes, sewage drainage, water pipeline etc. The detailed design and supervision consultant under PMO shall do the due diligence from design stage to construction stage.
i	Influx of workers	Health & safety of workers at site may pose risks; concentration of labor force creates un-hygienic condition and sanitation hazard (Temporary).

ii	Construction equipment / materials	Equipment installations may create noise; carrying of construction materials may create traffic congestion; cutting/filling, stockpiling of construction material and traffic movement may create dust emission, improper management of construction debris and solid waste may pose risk to the workers, nearby businesses and residents (Temporary).
iii	Vehicle and pedestrian traffic	More congestion near construction sites; increased number of vehicles on local roads will result in increased wear and tear of local roads thus reducing lifespan of affected roads; pedestrians to exercise care with increase of vehicular traffic on the adjacent roads and increase of exhaust emission from vehicles (Temporary).
iv	Community H&S	Increased movement of construction vehicles transporting construction materials, earthworks and other construction activities might lead to community health and safety concerns including traffic and pedestrian safety concerns. Suitable construction timing which aims to reduce disturbance on local communities.
v	Waste generation	Domestic and construction waste (including inert materials) will be generated during the construction period.
C	<b>Operation</b>	
i	Increased traffic	Improved/expanded and new roads might lead to increased vehicle accidents, and increased GHG production
ii	Water supply and sewerage networks	Concern failure of the pipelines leading to leakage or mass spills
iii	Heated water supply	Concern failure and rupture of a pipeline at, or between the 20+ heating line substations in the subcenters
iv	Waste generation	Medical waste will be generated from the primary health center during its operation.

**Table 3. Summary of Adverse Impacts on Key Environmental Parameters**

#	Environmental parameters	Impact Degree	Reason	Proposed Mitigation Measures
1	Air Quality	Medium	Dust emission from the construction activity and emission of air pollutants from vehicles transporting construction material at site	Regular sprinkling of water, proper handling of excavated soil, construction material, banned substances/VOCs etc.
2	Water Quality	Low	The project will require small quantity of water for construction. No hazardous effluent is envisaged to be discharged during construction	The required water will be sourced from tankers by the construction company or from nearby wells in the subcenters.
3	Soil quality	Low	Soil erosion due to movement of construction trucks and soil pollution due to oil spills	Construction company will implement Spill management plan and affected land sites will be restored at the end of construction period.
4	Noise level	Medium	The construction activity may lead to noise pollution during concreting – steel cutting, bending, casting using vibrators, operation of mechanised	Noise monitoring will be done at regular intervals. If any night construction activity that is noise intensive is undertaken, staff and

#	Environmental parameters	Impact Degree	Reason	Proposed Mitigation Measures
			equipment and drills etc. that will affect the local community	neighborhood must be consulted to determine suitable timings.
5	Land acquisition	High	Land acquisition and resettlement is required to provide sufficient space for the project to construct new roads and social buildings and utility pipelines.	A detailed LARP was prepared for Tranche 3. Affected households will be consulted, surveyed, negotiated and resettled in proper manner following to the ADB SPS Guidelines and relevant domestic regulations.
6	Community health and safety	Medium	Increased movement of construction vehicles transporting construction materials, earthworks and other construction activities might lead to community health and safety concerns including traffic and pedestrian safety concerns. Suitable construction timing which aims to reduce disturbance on local communities.	The construction company will mitigate community health and safety impacts and risks following to EMP measures. All construction workforce including drivers will be trained in prior to commencement of construction works. A Traffic Safety Plan will also be implemented by the construction company. Construction activities will be stopped during night time between 20:00pm – 08:00am. Transportation of construction materials to the Sharkhad subcenters is recommended to be made on Mondays when the automobile market is closed.
7	Occupational Health and Safety	Medium	Various construction activities, such as cutting, welding, working at heights, connection of electric devices and loading and unloading of construction materials etc., might cause accidents or injuries to construction workers.	The civil works contractors are required to: i). have an internal H&S manuals and norms that meet relevant domestic regulation and standards; ii). enforce their internal H&S manuals at all workplaces; iii). Have a full-time on-site H&S staff/engineer to ensure compliance of H&S manuals; iv). Provide all construction workers with personal protective items including helmets, protective clothes and boots, glasses, gloves and masks; v). Organize H&S training for all construction workers at the beginning and during the construction season; vi). Worksite safety pre-cautions including erection of signs or boards warning of hazards at all workplaces; vii). Have Emergency Response plan which clearly defines procedures to be followed by workers and the management in case of emergency, hazard prevention measures,

#	Environmental parameters	Impact Degree	Reason	Proposed Mitigation Measures
				reporting system and important contacts.
8	Waste generation	Low	Domestic and construction waste will be generated during the construction period. Domestic waste will be generated from the social buildings during the operation period. Medical waste will be generated from the primary health center during its operation.	The construction company will implement Waste Management Plan throughout construction period following to the EMP. Operational entities will sign waste removal agreement with relevant district urban service agencies. The primary health center will sign medical waste removal agreement with the licensed agency – Element LLC which operates medical waste handling facility nearby UB city.
9	Operational impacts	Low	Improved infrastructure and new roads will lead to increased traffic emission and traffic safety concerns. Connection to the centralized water supply and waste water might lead to increased water consumption and waste water generation in the project areas.	Traffic Department of MUB will ensure that traffic signs, speed bumps and pedestrian crossings are provided in the area. USUG <sup>4</sup> will be responsible operational efficiency for water supply and waste water infrastructure for the areas.

#### ***D. Stakeholder Engagement***

15. The stakeholder consultation program that was developed within this IEE will be continued throughout the pre-construction, construction and operation phases of the Tranche 3. Community wide awareness campaigns will be included in support of the consultations.

16. The public and stakeholder concerns of both subcenters are emission of noise and dust and traffic safety during period construction period. Disrupted and unsafe pedestrian movement through the ger area streets is also a concern which is critical for daily transport of water to the homestead. These issues plus any others should be reviewed during follow-up consultations that should be scheduled during the:

- ❖ Pre-construction / detailed design phase;
- ❖ During construction phase; and
- ❖ During operation phase.

#### ***E. Institutional Arrangements and Responsibilities***

17. The Municipality of Ulaanbaatar (MUB) which is the executing agency (EA) for Tranche 3 will take overall responsibility for successful implementation of the EMP with assistance from a Project Steering Committee (PSC) established for Tranche 3. Internal support of MUB will be from the Subcenter Redevelopment Authority (SRA) established under jurisdiction of Vice

<sup>4</sup> USUG – Ulaanbaatar city Urban Water Affairs and Management Authority.

Mayor as a city-owned enterprise for Urban Development.

18. The Project Management Office (PMO) of MUB will manage directly the successful completion of the EMP with its Environmental Safeguard Staff (ESS). The Ulaanbaatar Water and Sewage Authority (USUG) will provide required technical assistance to the PMO for the EMP. The Project Units (PU) within the SRA will assist the PMO with the EMP at the subcenter level. A licensed Mongolian Institute & Laboratory will be retained to conduct all required analyses of monitoring samples collected for the Monitoring Plan of the EMP.
19. Externally, support for implementation of the EMP by the PMO/MUB will be provided by an international Project Implementation Support Team (PIS) which will include EMP compliance monitoring and reporting. The construction package contractors will be responsible for implanting the EMP through their own contractor EMPs (CEMP) that they develop from the EMP as part of their bid documents.
20. Major and minor responsibilities of institutions and personnel for environmental management of Project 3 are further defined below.
21. As an implementation agency, the Municipality of Ulaanbaatar (MUB) is responsible for obtaining General impact assessment (GEIA) from Ministry of Environment and Tourism (MET) which is required for the Project to proceed with conducting domestic DEIA.
22. Project Steering Committee (PSC) is responsible for; (i) deciding on environmental management matters that require action from senior management; and (ii) ensuring allocation and timely disbursement of adequate resources for monitoring EMP implementation, and required environmental monitoring of Environmental Monitoring Plan by the implementing agency.
23. Subcenter Re-development Authority (SRA) is a special purpose institute who is responsible for facilitating, coordinating, and managing the re-development and densification process in Ulaanbaatar city. It will assist in realizing Subcenter Development Plans (SD's) and ensure strict application of the development plan, principles, land use ratios, construction standards; and supervise private sector participation in the construction of residential units/compounds, in accordance with community needs and expectations, and private sector interests. The SRA will also: (i) facilitate the necessary inputs and/or assistance from the subcenter khoroos, communities and concerned private sector to meet environmental safeguard obligations; and (ii) firm up collaboration with subcenter khoroos in consultations and information disclosure, environmental monitoring, and implementation/observance of the grievance redress mechanism (GRM).
24. Ulaanbaatar Water and Sewerage Authority (USUG) is the sub-implementing agency, responsible for: (i) providing technical assistance and support to the PMO in EMP implementation; (ii) operations of completed water and sewerage structures, observing the Program GRM, and implementing environmental mitigation and monitoring measures

Project EMP.

25. Program Management Office (PMO) will be responsible for undertaking and managing daily activities of Tranche 3. Its Environmental Safeguard Staff (ESS) will coordinate and supervise EMP implementation, including but not limited to: (a) update the EMP after the detail project design is available; (b) oversee incorporation of EMP recommendations into the contractor design/bid documents, and ensure procurement of environmentally responsible contractors; (c) ensure that domestic DEIA prepared and approved by MET prior to awarding of civil works contracts; (d) establish baseline ambient air quality, noise & vibration levels, ground- & surface water quality & baseline statistics on incidence of diseases, road accidents and crimes occurring at night in the unlit roads in affected khoroos; (e) establish and coordinate grievance redress mechanism (GRM); (f) review and clear the Contractor's site-specific EMPs; (g) monitor contractor activities to ensure compliance to the EMP; (h) prepare monthly reports on EMP implementation to the PMO; (i) conduct consultation meetings with local stakeholders as required, informing them of imminent construction works, and updating stakeholders on latest project development activities, GRM, etc.; and (j) support training conducted by environmental specialist (ESS) of the Project Implementation Support Team (PIS) (see below), EMP compliance reviews, annual reporting, etc. Project Units (PUs) under the SRA are responsible for assisting the SRA and PMO in environmental management at the sub-center level, particularly in consultations and information disclosure, IEC campaign, environmental monitoring, and implementation of Project grievance redress mechanism (GRM).
26. Contractors will develop, implement, and (internally) monitor implementation of their Contractor's site specific EMPs (SEMP) that are fully responsive the Project EMP, adhere to the clauses the PMO and PIS-ES establish for incorporation into bidding procedures: (a) a list of environmental management requirements to be budgeted by the bidders in their proposals; (b) environmental clauses for contractual terms and conditions; and (c) the full EMP in Mongolian.
27. Affected Khoroos through their designated counterpart with PMO will actively participate in: (a) public disclosure of Project 3 IEE, EMP and EMRs, (b) the community awareness program on health and safety impacts of Tranche 3 implementation; (c) establishment of health and safety baseline data prior to construction; (d) review EMRs & results of environmental monitoring by Contractors, and (e) ensure necessary corrective actions are taken for reported environmental/social non-conformities that are confirmed as being caused by Contractor negligence;
28. Project Implementation Support (PIS) Team , and the Environmental Specialist (PIS-ES), is responsible for imparting technical advice, guidance, and "hands-on training" to the PMO and SRA, particularly its ESS, in EMP implementation of Tranche 3. The PIS-ES will support the PMO, the PMO-ESS, SRA, and USUG with (a) project preparation; (b) training, (c) yearly environmental progress & EMP compliance monitoring; (d) annual EMP monitoring and

progress reporting; (e) identifying environment-related implementation issues & necessary corrective actions; (f) undertaking site visits as required; and (g) conduct baseline monitoring prior to construction, and quarterly environmental monitoring during construction and operation phases in accordance with the Monitoring Plan of this EMP. The PIS 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.

29. Asian Development Bank (ADB) is responsible for reviewing relevant documents for clearance purposes, and conducting periodic review missions to review, amongst other things, the environmental aspects of Tranche 3. For example, clearance will be required for the updated EMP at detailed design phase of Tranche 3, and subsequent environmental monitoring reports (EMR) during implementation phase of Tranche 3.

**Table 4. Responsibilities and Roles for Implementation of EMP**

Phases of Tranche 3	Environmental Responsibilities/ Tasks	Responsible Agencies
<b>Project Preparation</b>	Obtain GEIA from MET	PMO
	Conduct IEE in accordance with ADB SPS (2009)	PMO through its consultants
	Organize Public Consultation at Tranche 3 subcenters	
	Review and approval of IEE	ADB
<b>Detailed Design</b>	Conduct domestic DEIA	PMO by hiring a local licensed firm
	Review and approval of DEIA reports by MET	
	Incorporation of environmental mitigation measures in Detailed Design works and bidding documents	Design Institutes
	Update EMP to meet detailed design	PMO through PIS (in this case CS01: DMEC Engineering)
	Review and approval of updated EMP	ADB
	Provide updated EMP to Design Institutes	PMO
<b>Civil Works Bidding</b>	Incorporate mitigation measures and EMP clauses in bidding documents, civil work contracts	PMO, SRA & tendering consultants
	Review bidding documents and confirm project readiness	ADB, PIS
<b>Pre-construction</b>	Prepare site-specific EMP's (SEMP)	Civil works contractors
	Review and approval of SEMP's	PMO, PIS
	Obtain necessary permits (i.e. waste disposal, use of borrow pit, water use and worker's camp etc.) from relevant authorities	Civil works contractors
<b>Construction</b>	Organize EMP trainings for contractors and supervision consultants	PMO-ESS
	Implementation of EMP measures	Civil works contractors
	Conduct quarterly environmental monitoring for air, soil and water quality	
	Ensure monthly progress reports include EHS sections	
	Implement GRM and solve and record grievances	PMO-ESS
	Conduct regular site inspections	



Phases of Tranche 3	Environmental Responsibilities/ Tasks	Responsible Agencies
	Conduct trainings	
	Support PIS in preparing annual EMP monitoring and progress report	
	Coordination of environmental tasks the civil works contractors, PIS and MET	
	Prepare annual EMR and submit to ADB	
	Conduct external environmental monitoring on quarterly basis	PIS
	Conduct site inspection periodically	
	Collect and integrate EMP implementation reports from civil works contractor	
	Prepare and submit annual EMP compliance report to MET	
	Prepare annual EMP for next construction season and approval by MET	
	Provide comprehensive technical support to PMO on environmental management	
	Organize Review Missions, review and approval of annual EMP and annual EMR reports	ADB
Operation	Conduct EMP compliance review and prepare EMP monitoring and progress reports until PCR is issued	PMO
	Implementation of mitigation measures proposed in EMP	SRA
	Conduct periodic environmental monitoring	PIS
	Review and approval of EMR report	ADB

#### ***F. Institutional capacity and training needs***

30. The PIS-ES will develop and deliver training courses to the PMO/MUB and implementing agencies. The purpose of the course(s) is to strengthen the ability of the project owner and implementing agencies to oversee implementation of the EMP by construction contractors, and Institutes.
31. Training on the implementation of an EMP should address two thematic areas. The first area should be principles environmental management focused on the potential impacts of Tranche 3 subcomponents on the natural and social environment. The second area should be environmental safeguard requirements of the ADB and GoM with specific reference to the EMP.
32. Two approaches to training should be: 1) classroom coursework; and 2) “learning by doing” from work on the implementation of the Project 2 EMP with coaching assistance provided by the environmental specialist of the ES/PIS. On the job training begins with updating of the EMP to meet the detailed subproject designs as assisted by the PIS. Classroom training should be given by the ES of the PIS, and focus on two thematic areas defined above.

33. Indicative training course topics are as follows. The ES/PIS in collaboration with the PMO would develop the number of courses that would be need to address these topics, and the number of venues in which courses would be delivered. It is anticipated that courses would be delivered in UB.

**Table 5. Training Program -Summary of training needs**

Training topic:	Summary of training purpose and content	Recipients/ Participants #	Frequency or target date	Estimated cost (USD)
Induction to EMP	Overview of EMP including site information, pollution risks and controls, and programs. Preparation of site specific EMPs and training on implementation to staff of construction company (s)	All PMO engineers / contractors	At beginning of project	2,000
Review of EMP, Refresher training on EMP	Review of EMP including new changes and updates to IEE/EMP.	All PMO engineers / contractors	One year after project start, or more frequently if required	
Project management and implementation	Implementation assessment the program. Principle of donor organizations' support to local beneficiaries.	All PMO Engineers /contractors	At the beginning of the project	
Training on specific pollution risks and controls				
Emergency response plan	To identify on-site “potential accident scenario” and how to plan potential emergency response actions.	All PMO Engineers /contractors	During the project implementation	3,000
Air Quality Monitoring	Ambient Air Quality, Volatile Organic Compounds (VOCs), Particulate Matter (PM), Ozone Depleting Substances (ODS), Greenhouse Gases (GHG)	All PMO Engineers /contractors	During the project implementation	
Water Conservation	Water Monitoring and Management, Process Water Reuse and Recycling, Heating Systems	All PMO Engineers /contractors	During the project implementation	
Waste water and Ambient Water Quality	Liquid Effluent Quality, Discharge to Surface Water, Discharge to Sanitary Sewer Systems, Land Application of Treated Effluent, Septic Systems, Wastewater Management	All PMO Engineers /contractors	During the project implementation	
Hazardous Materials Management	General Hazardous Materials Management, Hazard Assessment, Management Actions	All PMO Engineers /contractors	During the project implementation	
Fire safety	Fire, and Explosion Prevention, Control Measures,	All PMO Engineers /contractors	During the project implementation	
Occupational Safety, Health and Safety	Occupational Health and Safety Emergency Preparedness and Response, Community Involvement and Awareness	All PMO Engineers /contractors	During the project implementation	

Training topic:	Summary of training purpose and content	Recipients/ Participants #	Frequency or target date	Estimated cost (USD)
Waste Management	General Waste Management, Waste Management Planning, Recycling and Reuse, Treatment and Disposal, Waste Storage, Transportation, Treatment and Disposal, Commercial or Government Waste Contractors, Health Care Waste	All PMO Engineers /contractors	During the project implementation	
Climate change and adaptation (applicable to eligible projects under the Program)	Climate change perspectives due to snow, flooding, zuds in Mongolia and their impacts during construction and operations	All PMO Engineers /contractors	During the project implementation	
Good engineering and construction practices as mitigation measures	Sound construction practices.	All PMO Engineers /contractors	During the project implementation	
<b>Total cost of training:</b>				<b>5,000</b>

### ***G. Mitigation Measures Plan***

34. The EMP is structured by the three development phases of Tranche 3: pre-construction; construction; and post construction or operational phase. The EMP addresses the environmental issues and concerns raised at the stakeholder consultation meetings.
35. The EMP combines construction phase impacts that are common to all subcomponents, for which, single mitigation measures are prescribed. In this way common mitigation measures are not re-stated numerous times. However, impacts and required mitigations that are specific to a subcomponent are identified. Or, common mitigations that are particularly important to an environmental or cultural component of a subcenter are underscored (**Appendix 2**).
36. The EMP identifies potential impacts, required mitigations, responsible parties, location, timing, and indicative costs. The EMP by design is comprehensive in order for the plan to be updated easily to meet the final detailed designs of Tranche 3.

### ***H. Environmental Monitoring Plan***

37. To ensure that project would not be generating a negative impact to the overall environment quality, an Environmental Monitoring Plan (EMoP) was prepared. The monitoring activities of the project include site supervision, verification of permits, monitoring of water quality, soil, noise and air. Monitoring of the quality of water, soil, air and noise during the construction stage is a responsibility of civil works contractors. PMO will hire a professional firm to conduct external environmental monitoring during the construction phase. Environmental good practices include noise abatement, maintaining hygienic conditions, maintenance of fire and safety equipment etc. Monitoring report should be prepared once in six months with the corrective action plan for the problem areas.

38. The environmental monitoring plan is to be utilized for measuring compliance with the EMP during the project implementation. The main objective of environmental monitoring is:
- to evaluate the performance of construction company in mitigating negative impacts vs. the proposed measures in the EMP;
  - to provide information on unanticipated adverse impacts or sudden change in impact; to determine if any impacts are irreversible in nature which required remedial measures and monitoring;
  - to suggest improvement in environmental mitigation measures, if required.
39. The environmental monitoring plan (EMoP) is provided in below Table. The monitoring plan is structured by the three phases (pre-construction, construction, post-construction operation) of Project 3 and consists of environmental indicators, sampling locations & frequency, method of data collection, responsible parties, and estimated costs.
40. Environmental quality standards and criteria for Mongolia are listed in Appendix D. The environmental standards WHO should also be consulted to supplement GOM standards if required.
41. The licensed Institute will be required to implement the environmental monitoring under the supervision and coordination of the PMO/PIS. The Institute will be responsible for the sampling and laboratory analysis of environmental parameters. The PMO and PIS-ES will coordinate monitoring work with the Institute. The PMO/PIS will also provide logistical support to the EMC where necessary for the implementation of environmental monitoring plan. The Institute will comply with Mongolian environmental sampling and analytical procedures and quality standards

### 1. Performance Monitoring

42. Performance monitoring is required to assess the overall performance of the EMP. Performance indicators which will describe the desired outcomes for Tranche 3 as measurable events to the extent possible, such as performance indicators, targets, or acceptance criteria that can be tracked over defined time periods will be designed and implemented. Once it is in place the performance monitoring shall be done by the PMO and its consultants for each component. Performance monitoring indicators are mentioned in Table below.

**Table 6. Performance Monitoring Indicators**

Major Environmental Components	Key Indicator	Performance Objectives	Data source
Pre-construction Phase			

Major Environmental Components	Key Indicator	Performance Objectives	Data source
Public Consultation & Information Disclosure	Affected communities & stakeholders in Sharkhad and Tolgoit subcenters	Meetings with stakeholders contacted during IEE preparation; new stakeholders convened for follow-up consultation; and to introduce GRM to local communities	Minutes of consultation meetings, group discussions & participant lists
Updated EMP	Reflective of Detailed Designs	Update the Tranche 3 EMP by incorporating findings and changes made during the detailed design works	EMP, Detailed Designs
Bid Documents	Environmental clauses & requirements on site-specific EMP's	EMP appended to bidding documents with clear instruction to bidders for SEMP	Bid documents including TOR and environmental clauses
Training of PMO and implementing agencies	Training plan and schedule	By end of pre-construction phase, necessary training subjects will be determined and training plan will be scheduled	Pre-construction training plan and schedule
Site-specific EMP's	Site-specific conditions at construction sites and cost implication and detailed schedule	Each civil works contractor will prepare its own site-specific EMP which is in line with the Tranche 3 IEE and EMP before commencement of construction	SEMP's
<b>Construction Phase</b>			
Sensitive receptors	Sensitive environmental and cultural resources	Unharmful or undisturbed	EMR's, local communities and khoroos
Air quality	Dust, noise, vibration, SO <sub>2</sub> , NO <sub>2</sub> , CO	Levels not to exceed pre-construction baseline levels	Monitoring by contractors & PIS
Soil quality	Contents of heavy metals, oil and grease	Levels not to exceed pre-construction baseline levels	
Surface and ground water quality	TSS, contents of heavy metals, other chemical components	Levels not to exceed pre-construction baseline levels	
Flood channels			
Hazardous materials & waste	Oil, gasoline and other hazardous waste	Rigorous program of procedures to manage and store all waste from construction camps and sites practiced	Contractor reports and EMR's

Major Environmental Components	Key Indicator	Performance Objectives	Data source
Worker and community H&S	Injury and accident cases	Enforcement of Internal H&S manuals, Traffic safety plans, Emergency Response Plan, employing full-time on-site H&S staff, compliance to domestic and ADB regulations and requirements on OHS to prevent from accidents, safety precautions at worksites, use of personal protective items by workers, H&S training for all construction workers, Traffic safety training for all drivers, provision of safe pedestrian pathways, access route or crossings for local residents and passersby.	Contractor reports, EMR's and local khoroos
Traffic safety	Frequency of disruption, traffic accidents and blocked roadway	Disruptions, stoppages or detours are managed to absolute minimum	Public inputs, contractor reports, traffic police reports
<b>Operation phase</b>			
Air quality	Emission level of pollutants	Levels not to exceed pre-construction baseline levels	Local khoroos, PIS reports
Increased traffic	Traffic accidents	No increase in accidents cases compared to pre-construction level	Traffic police reports, local khoroos
Operation of utility lines and services including heating supply pipelines	Stability of supply	Zero incidence or outage cases	US Heating Distribution Company
Waste management of new buildings	Compliance to waste management procedures	No physical pollution or nuisance on local communities	Local khoroos, PIS reports
Culvers installed under the new road at flood channels	Good condition of culverts	No blockage of flood channels with sediments	SRA reports
Operation of water supply and sewerage pipelines	Stability of supply	Now leakages or spills, zero tolerance	USUG

## 2. Reporting

43. Regular reporting on the implementation of mitigation measures, and monitoring activities during construction phase of Tranche 3 is required. PMO will be responsible for

implementing internal monitoring systems for EMP implementation and will submit annual progress reports to the Government and ADB. The reports will cover EMP implementation with attention to compliance and any needed corrective actions and progress achieved against the EMP activities and milestones on a annual basis. The annual EMR reports will include a description of implementable activities and their status; identify the responsible party involved in their implementation; and provide project management schedules and timeframes for doing so, along with their associated costs. Upcoming consultation measures will be incorporated in the EMP. A template of the Environment Monitoring Report is attached as Appendix 8, which will be submitted annually by PMO to ADB.

### ***I. Estimated Cost of EMP***

44. The main benefits of the environmental mitigation plan are (i) ensuring that environmental standards are met during design, construction, and operation of the project; (ii) providing offsets to negate project impacts especially ecological impacts. Without such expenditures, the project might generate significant environmental impacts, causing the biophysical environment in the area to deteriorate and indirectly depressing the economies of local communities.
45. The costs for implementing the EMP are primarily for environmental monitoring because the costs for implementing impact mitigation measures are included with the construction costs in contractor bid documents.
46. An estimated budget of USD \$5,000.00 is required for capacity building and training for environmental management for the civil works contractors during the pre-construction phase. Subjects of training sessions are provided in detail in Table 7.
47. The costs to implement the EMP will need to be updated by the PIS in conjunction with the PMO during the pre-construction phase.

**Table 7. Summary of EMP Costs**

Project phases and activities	Estimated Cost (USD)
<b>Pre-construction phase</b>	
Updating EMP	Included in PMO budget
Monitoring of baseline environmental parameters (air quality, noise, soil and water quality )	2,300 (shown in Table 72 above)
Capacity building trainings for contractors	5,000 (shown in Table 69 above)
<b>Construction phase</b>	
Monitoring of key environmental parameters (air quality, noise, soil and water quality )	6,400 (shown in Table 72 above)
Implementation of EMP measures	Included in construction budget

Follow-up public consultation	Included in PMO and PIS budget
<b>Operation phase</b>	
Monitoring of technical condition of facilities and traffic safety	From budget of relevant authorities
<b>Total EMP costs</b>	<b>13,700</b>



**Appendix 1. National Air Quality Standard & WHO Air Quality Standard**

Parameter	MNS 4585:2016 (mg/m3)		EHS Guidelines. World Health Organization (WHO). Air Quality Guidelines Global Update 2005)-µg/m3)	
SO2	24-hour	50	24-hour	125 (Interim target-1)
				50 (Interim target-2)
				20 (guideline)
	20 minute	450	10 minute	500 (guideline)
	1-year	20		
NO2	1-year	40	1-year	40 (guideline)
	24-hour	50	24-hour	-
	20-min	200	1-hour	200 (guideline)
PM10	1-year	50	1-year	70 (Interim target-1)
				50 (Interim target-2)
				30 (Interim target-3)
	24-hour	100	24-hour	150 (Interim target-1)
				100 (Interim target-2)
				75 (Interim target-3)
				50 (guideline)
PM2.5	1-year	25	1-year	35 (Interim target-1)
				25 (Interim target-2)
				15 (Interim target-3)
				10 (guideline)
	24-hour	50	24-hour	75 (Interim target-1)
				50 (Interim target-2)
				37.5 (Interim target-3)
				25 (guideline)
CO	Average in 1 hour	30g/m3		No standard

## Appendix 2. National Noise Standards MNS 4585:2016 & WHO Noise Standard

Receptor	MNS 4585:2007		EHS Guidelines (Guidelines for Community Noise. World Health Organization (WHO), 1999)	
Residential, Institutional, Educational	07 00 - 23 00	60 dB(A)	07 00 - 22 00	55 dB(A)
	23 00 - 07 00	45 dB(A)	22 00 - 07 00	45 dB(A)

## Appendix 3. National surface water quality standard MNS 4586:1998

Parameter	Measuring unit	MNS 4586:1998
pH		6.5-8.5
DO	mg/l	not less than 6&4
BOD	mg/l	3
NH <sub>4</sub> *N	mgN/l	0.5
NO <sub>2</sub> *N	mgN/l	0.002
NO <sub>3</sub> *N	mgN/l	9
PO <sub>4</sub> -P	mgP/l	0.1
A	mg/l	300
F	mg/l	1.5
SO <sub>4</sub>	mg/l	100
Mn	mg/l	0.1
Ni	mg/l	0.01
Cu	mg/l	0.01
Mo	mg/l	0.25
Cd	mg/l	0.005
Co	mg/l	0.01
Pb	mg/l	0.01
As	mg/l	0.01
Cr	mg/l	0.05
Cr <sub>6</sub> +	mg/l	0.01

Parameter	Measuring unit	MNS 4586:1998
Zn	mg/l	0.01
Hg	mg/l	0.1
Oil	mg/l	0.05
Phenol	mg/l	0.001
Active and washing substances	mg/l	0.1
Benzopyren	Mkg/1	0.005

There are no comparable EHS guidelines in this regard.

\* DO >6 mg/l for summer time and DO »4 mg/l for winter time

**Appendix 4. National Ground Water Quality Standard MNS 900-2005 & WHO Standards**

Parameter	MNS 900:2005		WHO Guidelines for Drinking Water Quality, Fourth Edition. 2011	
Na-	mg/l	200		None established
K-	mg/l	200		None established
Ca <sup>2+</sup>	mg/l	100		-
Mg <sup>2+</sup>	mg/l	30		-
SO <sub>4</sub> <sup>2-</sup>	mg/l	500		None established
HCO <sub>3</sub> <sup>-</sup>	mg/l	-		-
CO <sub>3</sub> <sup>2-</sup>	mg/l	-		-
Cl	mg/l	350	mg/l	5
P	mg/l	0.7-1.5		-
Br		-		None established
Test, by mark	mg/l	2		-
Color	degree	20°		None proposed
Odor	mark	2		-
pH		6.5-8.5		None established
Electric Conductivity		-		-
Y S/st				
General Minerals		1000		-
Hardness	mg-eqv/l	7		None established
Acidity potential	mB			-
Solid remains	g/l	1		-
NH <sub>4</sub>	mg/l	1.5		None established
NO <sub>3</sub>	mg/l	50	mg/l	50
NO <sub>2</sub>	mg/l	1	mg/l	3
PO <sub>4</sub>	mg/l	35		-
As	mg/l	0.01	mg/l	0.01

Parameter	MNS 900:2005		WHO Guidelines for Drinking Water Quality, Fourth Edition. 2011	
Fe	mg/l	0.3		None established
Pb	mg/l	0.03	mg/l	0.01
Ni	mg/l	0.02	mg/l	0.07
Cr	mg/l	0.05	mg/l	0.05
Cu	mg/l	0.1	mg/l	2
Zn	mg/l	5		None established
Mn	mg/l	0.1		None established
Cd	mg/l	0.003	mg/l	0.003
Hg	mg/l	0.0005	mg/l	0.006
B	mg/l	0.5	mg/l	24
Ba	mg/l	0.7	mg/l	0.7
Mo	mg/l	0.07		None established
Se	mg/l	0.01	mg/l	0.04
E coli or thermo tolerant coliform bacteria		*		Must not be detectable in any 100 ml sample

MNS 900:2005. Drinking Water Hygienic Requirement and Quality Control is the standard used for groundwater supply, which is the source for drinking water supply in Mongolia

**Appendix 5. National Soil Quality Standard MNS 5850-2008**

Parameter	MNS 5850:2008			
	Soil Mechanical Composition			Maximum Allowed Level *
	Clay	Loamy	Sandy	
Pb	100	70	50	100
Cd	3	1.5	1	3
Hg	2	1	05	2
As	6	4	2	6
Cr	150	100	60	150
Cr6+	4	3	2	4
Sn	50	40	30	50
Sr	800	700	600	800
V	150	130	100	150
Cu	100	80	60	100
Ni	150	100	60	150
Co	50	40	30	50
Zn	300	150	100	300
Mo	5	3	2	5
Se	10	8	6	10
B	25	20	15	25
F	200	150	100	200
CN	25	15	10	25

\* There are no soil quality International standards for EHS guidelines.

### Appendix 6. National Boiler Emission Standard MNS 6298:2011 & EHS Guidelines

Guideline	Parameter in mg/Nm <sup>3</sup>			
	MNS 6298:2011		EHS Guidelines *	
SO <sub>2</sub>	mg/m <sup>3</sup>	400 urban	mg/Nm <sup>3</sup>	2000
		600 remote areas		
NO <sub>x</sub>	mg/m <sup>3</sup>	450-1.100	mg/Nm <sup>3</sup>	650
		based on volatile		
PM	mg/m <sup>3</sup>	50-200	mg/Nm <sup>3</sup>	50-150

\* Small Combustible facilities Emission Guidelines (3 MWth-50 MWth) - for Boilers using solid fuel; MWth - Megawatt thermal; Nm<sup>3</sup> is at one atmospheric pressure. 0°C

### Appendix 7. National Standard on Wastewater Discharge to Effluents (MNS- 4943-2011)

No	Parameter	Measuring unit	Maximum allowance	EHS Guidelines*
1	Water temperature	C	20	
2	Hydrogen ion activity (pH)	-	6-9	6-9
3	Odor	Sense	No bad smell	
4	Suspended solids (SS)	mg/l	50	
5	Biochemical Oxygen Demand (BOD)	mg/l	20	30
6	Chemical Oxygen Demand (COD)	mg/l	50	125
7	Permanganate	mg/l	20	
8	Dissolved Salt	mg/l	100	
9	Ammonia Nitrogen (NH <sub>4</sub> -N)	mg/l	6	
10	Total Nitrogen (TN)	mg/l	15	10
11	Total Phosphorous (TP)	mg/l	1.5	2
12	Organic Phosphorous (DOP)	mg/l	0.2	
13	Hydrogen Sulphide (H <sub>2</sub> S)	mg/l	1	
14	Total Iron (Fe)	mg/l	1	
15	Aluminium (A)	mg/l	0.5	
16	Manganese (MN)	mg/l	0.5	
17	Total Chromium (Cr)	mg/l	03	
18	Chromium +6 (Cr+6)	mg/l	Not specified	

No	Parameter	Measuring unit	Maximum allowance	EHS Guidelines*
19	Total cyanide (CN)	mg/l	0.05	
20	Free cyanide (CN)	mg/l	0.05	
21	Copper (Cu)	mg/l	0.3	
22	Boron (B)	mg/l	0.3	
23	Lead (Pb)	mg/l	0.1	
24	Zinc (Zn)	mg/l	1.0	
25	Cadmium (Cd)	mg/l	0.03	
26	Antimony (Sb)	mg/l	0.05	
27	Mercury (Hg)	mg/l	0.01	
28	Molybdenum (Mo)	mg/l	0.5	
29	Total Arsenic (As)	mg/l	0.01	
30	Nickel (Ni)	mg/l	0.2	
31	Selenium (Se)	mg/l	0.02	
32	Beryllium (Be)	mg/l	0.001	
33	Cobalt (Co)	mg/l	0.02	
34	Barium (Ba)	mg/l	1.5	
35	Strontium (Sr)	mg/l	2	
36	Vanadium (V)	mg/l	0.1	
37	Uranium (U)	mg/l	0.05	
38	Mineral oil	mg/l	1	
39	Fat oil	mg/l	5	
40	Surface active agents	mg/l	2.5	
41	Phenol (C <sub>5</sub> H <sub>20</sub> H)	mg/l	0.05	
42	Trichloretilen	mg/l	0.2	
43	Tetrachloretilen	mg/l	0.1	
44	Remained chlorine (Cl)	mg/l	1	

\* Based on IFC Standards for Hospital Effluents in Annexure 2



### Appendix 8. Mitigation Measures Plan

Project Activity	Potential Impacts / issues	Proposed Mitigation Measures	Apply to	Time frame	Activity Reporting	Estimated Cost (USD)	Responsibility	
							Supervision	Implementation
A. Management of common impacts of all subcomponents for Tranche 3								
1. Pre-construction and Detailed Design Phase								
Confirmation of required resettlement & compensation	Grievance or impacts on livelihood	1. Affected households well informed prior to implementation of Tranche 3 2. Land Acquisition and Resettlement Plan to be prepared and approved by EA and ADB	All affected persons in the subcenters	Before project implemented	See LARP	See LARP	PMO/MUB	LARP committees
Disclosure & engagement of community	Community awareness	1. Public awareness campaign 2. Initiate Information Disclosure and GRM	For all construction sites	At the start of design phase	Annual EMR, Public Consultation Report	Included in PMO budget	PMO	PMO/PIS
Obtaining necessary approvals from relevant authorities	Compliance to domestic regulations	1. DEIA for Tranche 3 is prepared and approved by MET 2. Obtain necessary permits and certificates from relevant authorities.	For both subcenters: Sharkhad and Tolgoit	Before commencement of construction	As required PMO report	No additional cost	PMO/MET	PIS-ES
Preparation of Detailed Designs of Tranche 3	Minimizing negative environmental and social impacts	Work with PIS to complete detailed designs of the subcomponents in each subcenter. Ensure that following measures are undertaken: a) Identification of spill management plan and Emergency response plan for all construction sites b) Careful planning and scheduling	Project area of influence	During the design period	Detailed Design documents for Tranche 3	Included in detailed design budget	PMO	Detailed Design Consultant Team

Project Activity	Potential Impacts / issues	Proposed Mitigation Measures	Apply to	Time frame	Activity Reporting	Estimated Cost (USD)	Responsibility	
							Supervision	Implementation
		<p>of implementation of construction packages to prevent compounded (cumulative) disturbances and impacts.</p> <p>c) Ensure no disturbance or damage to cultural property and values</p> <p>d) Avoid unnecessary cutting of trees if possible</p> <p>e) Locate any required aggregate borrow pits away from human settlement with fencing and access barriers</p> <p>f) Ensure that no disruption to water supply activities of the local households from kiosks and wells</p> <p>g) No disruption to normal pedestrian and vehicle traffic along all roads in the subcenters by providing alternate deviation/temporary routes</p> <p>h) Ensure local residents, entities and merchants are informed and notified of construction activities and schedule to minimize disturbance on normal commercial activities and livelihood of households.</p> <p>i) Review measures to prevent or minimize disturbances to all ger area schools, kindergartens and social centers</p> <p>j) 110 KW power of electricity</p>						

Project Activity	Potential Impacts / issues	Proposed Mitigation Measures	Apply to	Time frame	Activity Reporting	Estimated Cost (USD)	Responsibility	
							Supervision	Implementation
		<p>transmission air-line from 3rd Thermal power plant to Bornuur sub province as well as “PRP-110” to “Geo” substations transit through south western and southern part of the the Tolgoit subcenter respectively, therefore, protection zone of these lines shall be considered during the detail design.</p> <p>k) Careful preparation of Drainage Plan which provides mitigation measures for soil water at earthwork sites for both subcenters. The detailed design consultant shall ensure that the planned roads constructed within the project shall have drainage/trenches to remove rainwater on both sides of the road.</p> <p>l) For road drainage infrastructure in Tolgoit, a more nature-based “sponge” infrastructure be utilized in place of traditional non-porous construction. This will slow down water speeds, increase the re-use of storm water to maintain green spaces with related cooling, dust control and erosion control. Maximizing use of rapidly diminishing water resources wherever possible is</p>						

Project Activity	Potential Impacts / issues	Proposed Mitigation Measures	Apply to	Time frame	Activity Reporting	Estimated Cost (USD)	Responsibility	
							Supervision	Implementation
		necessary						
Update of EMP for Tranche 3	Incorporation of more details and site-specific information	a) Review finalized alignments for all utility pipelines and new roads to minimize impact on adjacent properties and surrounding environment b) Review measures to ensure impacts on existing local drainage channels are minimized c) If any unanticipated potential impacts arise, ensure it will be included in the updated EMP d) Confirm solid waste disposal destination with relevant district authorities (Narangiin Enger for Tolgoit subcenter and Ulaanchuluut for Shakhad subcenter). e) Update mitigation measures and monitoring requirements in the EMP where necessary to meet features of the detailed designs and to protect affected sites f) Submission of updated EMP which reflects features in detailed design and cost updated to ADB for review and approval g) Contractor prepare site-specific EMP's which include mitigation measures for following aspects: i. Construction drainage ii. Soil	All construction sites and subcomponents	Before commencement of construction	Updated EMP for Tranche 3	Included in PIS budget	PMO/Design consultant	PIS-ES

Project Activity	Potential Impacts / issues	Proposed Mitigation Measures	Apply to	Time frame	Activity Reporting	Estimated Cost (USD)	Responsibility	
							Supervision	Implementation
		erosion iii. Noise and dust iv. Contaminated spoil disposal v. Solid and liquid waste management vi. Traffic safety vii. Utility and power disruption viii. Worker and community H&S ix. Site restoration plan x. Transport and storage of construction materials xi. Cultural chance finds						
Interference with drainage patterns	Temporary flooding hazards	Appropriate siting.	All construction sites and subcomponents	During the design period	Updated EMP for Tranche 3	Included in detailed design budget	PMO/PIS	Detailed Design Consultant Team
Temporary use of land	Inconvenience for local residents	The construction company shall ensure selection of temporary lands for mobilization does not infringe upon adjoining residential areas, water bodies, natural flow paths, and access roads to garages, and other amenities in the area and potentially affected households are consulted and agreed.	All sites required for storing, parking and other purposes	Before mobilization of construction equipment and workforce	Monthly contractor reports	Included in construction budget	PMO/PIS	Civil works contractor
Obtain approval on construction waste disposal site	Compliance to domestic regulations on waste disposal	Notify relevant departments of MUB and District authorities to confirm locations of borrow pits and disposal landfill sites for construction of Tranche 3 and obtain required permits.	Ulaanchuluut and Narangiin Enger landfill sites	Before commencement of construction	As required PMO report	No additional cost	PMO/MUB /District authorities	PIS-ES

Project Activity	Potential Impacts / issues	Proposed Mitigation Measures	Apply to	Time frame	Activity Reporting	Estimated Cost (USD)	Responsibility	
							Supervision	Implementation
Design the sequence of civil works	Repeated excavations	The PMO civil engineers (full time employees of PMO) will design the sequence of various civil works at different sites and make arrangements to avoid repeated excavations.	All civil works	Before commencement of construction	As required PMO	No additional cost	MUB	PMO engineers
Prepare bid documents for civil works	Inclusion of environmental requirements	Ensure the updated EMP is included in tender documents for civil works and the civil works contractors are required to prepare site specific EMP Specify in tender documents that the civil works contractor shall have experienced personnel to prepare and implement SEMP.	All subcomponents of Tranche 3	Before announcement of the bidding	All tender documents including TOR	Included in PIS budget	ADB/PMO/SRA	PIS/Tender company
Create awareness of physical cultural resources in the project area	Compliance to relevant regulations	PMO/PIS to review potential locations of physical cultural resources and prepare Chance Finds Procedure for unexpected discoveries.	For both subcenters: Sharkhad and Tolgoit	Before commencement of construction	As required PMO report	Included in construction budget	PMO/PIS	Civil works contractors
Obtain necessary permits for construction	Compliance to domestic regulations	Contractors to comply with all statutory requirements set out by domestic regulations for use of construction equipment, and operation of construction plant such as concrete batching.	For all construction sites	Before commencement of construction	As required PMO report		PMO/SRA	Civil works contractors

Project Activity	Potential Impacts / issues	Proposed Mitigation Measures	Apply to	Time frame	Activity Reporting	Estimated Cost (USD)	Responsibility	
							Supervision	Implementation
Capacity building	Awareness, understanding and preparedness	Prepare capacity building training plan and schedule for construction workforce and supervision engineers in order to ensure all construction staff has clear understanding of EMP implementation requirements. Prepare training plan for PMO/PIS-ES to ensure proper implementation of EMP and management of environmental works.	All construction workforce and relevant PMO/PIS staffs	Before commencement of construction	Training report		PMO	PIS/Contractors
Recruitment of construction workforce	Labor migration and spread of infectious diseases	Hire local UB workers as much as possible, thereby reducing number of migrant workers from other regions of the country.	Construction workforce	Throughout construction phase	Worker hiring stages in procurement plan	No additional cost	PMO	Contractors
<b>2. Construction Phase of Tranche 3</b>								
Operation of workers camps	Pollution to surrounding environment	Locate workers camp away from human settlements Provide adequate housing and waste disposal facilities such as pit latrines and trash bins A solid waste collection point shall be provided and ensure a tidy campsite Provide drainage for workers camp if necessary All campsites must be provided with kitchen, canteen and rest rooms	Any temporary worker camp or staging area	Throughout construction phase	Monthly contractor reports	Included in the construction budget	PMO/ PIS	Contractor

Project Activity	Potential Impacts / issues	Proposed Mitigation Measures	Apply to	Time frame	Activity Reporting	Estimated Cost (USD)	Responsibility	
							Supervision	Implementation
		Camp areas will be restored to original condition after construction is completed						
	Discipline related issues	Implement internal discipline rules for workers camp which prohibits alcoholic drinks and set out harmonious behavior All construction workers shall be attended at H&S training induction which includes subjects on infectious and sexually transmitting diseases						
Operation of borrow pits	Pollution and injury risks, compliance to restoration standards	Location of borrow pits shall be well planned to minimize any disturbance on settlement areas and potential impacts on environment. All borrow pits shall be located at least 500m away from surface water body, cultural heritage or forest. Obtain permission for all borrow pit locations from relevant district governor. Borrow pits shall have access barriers and warning sign or visibility fencing if necessary. Execute rehabilitation at borrow pits after completion of use according to domestic standards.	All borrow pits	Through out construction phase	Monthly contractor reports	Included in the construction budget	PMO/PIS	Contractor



Project Activity	Potential Impacts / issues	Proposed Mitigation Measures	Apply to	Time frame	Activity Reporting	Estimated Cost (USD)	Responsibility	
							Supervision	Implementation
Transport of construction materials, and storage of materials on site	Emission of dust & noise, traffic accident, waste pollution	<p>Prepare transport plan and schedule for construction materials including fabricated materials and extract materials from borrow pits</p> <p>Safe handling/storage rules to be prepared</p> <p>All transportation trucks shall be covered with tarpaulin</p> <p>Piles of aggregates at sites shall be used/or removed promptly, or covered and placed in non-traffic areas</p> <p>Stored aggregates shall be away from settlements, cultural sites and ecological receptors. Bitumen batch plants and handling areas shall be isolated from subcenters.</p>	All construction sites, vehicles and storage areas	Through out construction phase	Monthly contractor reports	Included in the construction budget	PMO/PIS	Contractor
Asphalt production and pavement works	Air pollution, soil contamination due to spills	<p>Contractors shall be trained with safety handling procedures on production, handling and application of bitumen.</p> <p>In case of spill, the contaminated soil shall be peeled off and neutralized as per Spill Management Plan. Necessary tools of spill management shall be available at asphalt production sites.</p> <p>Bitumen shall be stored in designated areas with any surface water body or human settlement nearby</p>	Asphalt production and bitumen storage sites	Through out construction phase	Monthly contractor reports	Included in the construction budget	PMO/PIS	Contractor

Project Activity	Potential Impacts / issues	Proposed Mitigation Measures	Apply to	Time frame	Activity Reporting	Estimated Cost (USD)	Responsibility	
							Supervision	Implementation
		Bitumen shall not be used as fuel Empty bitumen boxes shall be transported to approved landfill sites						
Spoil management	Contamination of soil, surface water	Spoil shall be stored in stockpiles at the approved locations only Prohibit spoil disposal on sloped surface, nearby cultural site of any sensitive receptor. Where possible, spoil shall be used for rehabilitation of borrow pits Type, volume, source and removal of spoil materials shall be recorded. Contaminated spoil materials shall be neutralized and displaced to approved landfill sites. Suspected contaminated soil must be tested before being disposed to landfill sites	All excavation areas	Throughout construction phase	Monthly contractor reports	Included in the construction budget and monitoring budget	PMO/PIS	Contractor
Generation of solid waste	Physical pollution to surrounding environment	Solid waste shall be collected and temporarily stored at a designated places protected with fencing Contract with local urban service agency to transport collected solid waste to the approved landfill sites on weekly basis Place trash bins at all construction and workplaces	All construction sites and worker camps	Throughout construction phase	Monthly contractor reports	Included in construction budget	PMO/PIS	Contractor
Generation of liquid waste	Pollution to soil and surface water	Waste water from workers camp shall be collected in designated steel tanks Sign agreement with local urban service agency to transport waste						

Project Activity	Potential Impacts / issues	Proposed Mitigation Measures	Apply to	Time frame	Activity Reporting	Estimated Cost (USD)	Responsibility	
							Supervision	Implementation
		water to centralized WWTP of UB city on monthly basis						
Generation of hazardous waste	Harm to human health and pollution to environment	Collection, storage, transport and disposal of hazardous waste such as used oil, gasoline, paint and other toxics shall follow relevant regulation of Mongolia and shall be disposed to approved places appointed by the government. Waste classification by type (e.g., hydrocarbons, batteries, paints and organic solvents) Hazardous waste must be stored above ground in closed, well labeled, ventilated plastic bins in good condition well away from construction activity areas, surface water bodies, human settlements or any other sensitive receptors.						
Dust emission from various construction activities	Dust disturbance	During dry and windy days when it's not raining and dust level goes up, it is recommended a sprinkling of water with norm 2-4 liters per square meter at the active earthwork and construction sites 3-4 times a day.  Soil stockpiles at the active earthwork sites, including trenches digging sites for utility pipelines, road construction sites and foundation work sites for the social buildings, shall be covered in order	All construction sites	Throughout construction phase	Monthly contractor reports	Included in construction budget	PMO/ Power Distribution Company	Contractor

Project Activity	Potential Impacts / issues	Proposed Mitigation Measures	Apply to	Time frame	Activity Reporting	Estimated Cost (USD)	Responsibility	
							Supervision	Implementation
		<p>to prevent from dust spread.</p> <p>Loaders of the construction trucks that transport earth materials, concrete materials shall be covered with tarpaulin in order to prevent dust spread when driving through settlement areas.</p> <p>Concrete trucks with mixing loader shall be washed out or cleaned their loaders and wheels when leaving mixing plants.</p> <p>Conduct regular site cleaning at the construction and storage sites where there might be fine dust particles, concrete crumbles and wood crumbles that might spread through the air with wind blows.</p> <p>Construction works, particularly concrete pavement, trenches digging and other earthworks, shall be stopped temporarily during windy days</p> <p>Enforce speed limit for construction vehicles on dirt roads within the subcenters</p> <p>The construction</p>						

Project Activity	Potential Impacts / issues	Proposed Mitigation Measures	Apply to	Time frame	Activity Reporting	Estimated Cost (USD)	Responsibility	
							Supervision	Implementation
		company shall ensure proper dust management is done to reduce impact due to site construction dust. The Construction company shall evaluate the volume of earthworks, and must monitor dust level within 500m using appropriate equipment and ensure comprehensive dust mitigation plan						
Noise emission from construction vehicles, machineries and	Noise disturbance	Maintain equipment and machineries in good technical condition Vehicles and machineries shall be turned off when not in use Erect noise barriers around excessively noisy activity areas	All construction sites					

Project Activity	Potential Impacts / issues	Proposed Mitigation Measures	Apply to	Time frame	Activity Reporting	Estimated Cost (USD)	Responsibility	
							Supervision	Implementation
equipment		where possible Notify surrounding community of noisy works in advance Suitable construction timing which aims to reduce disturbance on local communities will be identified. Construction activities will be stopped during night time between 20:00pm – 08:00am. Transportation of construction materials to the Sharkhad subcenters is recommended to be made on Mondays when the automobile market is closed.						
Disruption to public utility systems	Loss or disruption of water supply or electricity lines	Develop carefully a plan of days and location where outages in utilities and services will occur, or are expected Contact local utilities and services with schedule and identify possible contingency back-up plans for outages Notify affected community of planned outages in advance Plan outages during low use hours such as between 24:00 and 06:00 am.	All construction sites					
Construction site clearance	Damage or removal of trees	Prevent damage to roadside trees and train vehicles drivers and construction engineers If any trees need to be removed, notify local khoroo administration in advance and obtain approval	All construction sites	Through out construction phase	Monthly contractor reports	Included in construction budget	PMO/PIS	Contractor

Project Activity	Potential Impacts / issues	Proposed Mitigation Measures	Apply to	Time frame	Activity Reporting	Estimated Cost (USD)	Responsibility	
							Supervision	Implementation
		Marking of any vegetation to be removed prior to clearance and strict control on clearing activities to ensure minimal clearance.						
Earthworks (excavation work sites)	Soil erosion	Berms and plastic sheet fencing shall be placed around all excavation and earthwork areas Earthworks shall be conducted during dry periods Maintain a topsoil stockpile for site restoration purposes Protect exposed or cut slopes with planted vegetation and have a slope stabilization protocol ready Re-vegetate all soil exposure areas immediately after work completed	All earthwork sites	Through out construction phase	Monthly contractor reports	Included in construction budget	PMO/PIS	Contractor
Civil works	Public and worker injury, accidents and health issues	Proper fencing, protective barriers and buffer zones should be provided around all construction sites and along all roadways Sufficient signage and information disclosure Implement site-specific H&S plan Speed limit for all construction vehicles and 5 second stop rules at all junctions Drinking water for construction workforce shall be provided from reliable source. In case drinking water is supplied from nearby wells, water quality testing must be applied monthly All construction workers are	All construction site and workplaces	Through out construction phase	Monthly contractor reports	Included in construction budget	PMO/PIS	Contractor

Project Activity	Potential Impacts / issues	Proposed Mitigation Measures	Apply to	Time frame	Activity Reporting	Estimated Cost (USD)	Responsibility	
							Supervision	Implementation
		<p>required to wear personal protective clothes and items at workplaces all the time</p> <p>In case of accident or injury or illness, apply to nearest primary health care center</p> <p>Sufficient lighting shall be provided at all workplaces</p> <p>All construction sites should be examined daily to ensure unsafe conditions are removed</p> <p>Protected pedestrian sidewalks are provided around construction sites to ensure the access roads are not blocked by construction</p> <p>Demarcate additional locations where pedestrian crossings can be provided</p> <p>Provide construction road and walkway with lighting</p> <p>Safe passage to residents' houses will be provided during construction period. Detailed plan for detour and access plan shall be developed during construction stage by contractors.</p>						



Project Activity	Potential Impacts / issues	Proposed Mitigation Measures	Apply to	Time frame	Activity Reporting	Estimated Cost (USD)	Responsibility	
							Supervision	Implementation
	Potential pollution to surface and ground water resources	<p>Protective berms, plastic sheet fencing or silt curtains should be placed between all earthwork sites and any surface water bodies or wells, wherever necessary</p> <p>Erosion channels must be built around aggregate stockpile areas to contain rain-induced erosion</p> <p>Try to conduct earthworks only during dry periods</p> <p>Prohibit construction vehicles to enter Uliastai river basin in order to prevent from pollution</p> <p>No fuel recharging or machinery maintenance shall be allowed nearby Uliastai river or any ger area water wells in order to prevent from oil spills</p> <p>Prevention of throwing waste in flood channels or drainages</p> <p>Any activities that require temporary use of land shall be selected carefully to avoid crowded public places such as playground, kindergarten, middle school and PHC.</p>	All construction sites	Throughout construction phase	Monthly contractor reports	Included in construction budget	PMO/PIS	Contractor

Project Activity	Potential Impacts / issues	Proposed Mitigation Measures	Apply to	Time frame	Activity Reporting	Estimated Cost (USD)	Responsibility	
							Supervision	Implementation
	Inadequate safety performance by contractors or non-compliance	Enforcement of safety rules and implementation of the prevention measures through periodic monitoring of safety performance of the contractors by PMO, supervision engineers and external monitoring team during the pre-construction and construction phases.	All construction packages	Weekly, during the construction phase	Monthly contractor report, annual EMR	Included in PMO and supervision budgets	PIS/external monitoring team	PMO, supervision consultants
Transportation and traffic	Traffic and pedestrian safety issues, accidents	Schedule transportation activity during light traffic hours. Create adequate traffic detours, sufficient signage and warning lights. Post speed limits and construction vehicles strictly follow deviation routes appointed by the contractor. Inform local community of construction traffic areas in advance Protected pedestrian sidewalks are provided around construction sites to ensure the access roads are not blocked by construction Demarcate additional locations where pedestrian crossings can be provided Provide construction road and walkway with lighting	All construction sites and construction vehicles	Throughout construction phase	Monthly contractor reports	Included in construction budget	PMO/Supervision consultant	Contractor
Implement construction drainage sub plan	Loss of drainage and flood storage	Install culverts under the project constructed roads to allow flood flows. Manage to not allow borrow pits to be backfilled without pumping the	All areas near stream	Design and construction phases	Monthly contractor reports	Included in construction budget	PMO/Supervision consultant	Contractor

Project Activity	Potential Impacts / issues	Proposed Mitigation Measures	Apply to	Time frame	Activity Reporting	Estimated Cost (USD)	Responsibility	
							Supervision	Implementation
		water left inside the pits. Provide temporary drains or ditches for construction sites to prevent from flood events						
Chance finds	Damage to cultural property or values	In case of chance finds occur, the construction works at that spot shall be stopped immediately until further clearance Notify local district administration, PMO and Institute of Archaeology of the chance finds Work at the find site will remain stopped until PMO and relevant district authorities allow work to continue.	All earthwork sites	Throughout construction phase	Monthly contractor reports	Included in construction budget	PMO/ Supervision consultant	Contractor
Construction & excavation of flood protection channels	Sedimentation of existing primary drainage channels, disturbance to local households	Temporary earthen berms or plastic fencing need to be installed along excavation areas to contain loose soil prevent erosion of downstream main flood channels. Physical barriers such as fencing should be placed between civil work sites and adjacent households and businesses.	Along all flood prevention sites	During earthwork activities	Monthly contractor reports	Included in construction budget	PMO/ PIS	Contractor
Electrical / fire safety equipment	Sparks and fire hazard during construction	Recording of all electric fittings and fire safety devices located within secure casings	All construction sites	Throughout construction phase	Monthly contractor reports	Included in construction budget		
Use of volatile organic	Toxicity and air contamination	Use of low or no volatile organic compounds - water based non-toxic etc.			Monthly contractor reports	Included in construction		

Project Activity	Potential Impacts / issues	Proposed Mitigation Measures	Apply to	Time frame	Activity Reporting	Estimated Cost (USD)	Responsibility	
							Supervision	Implementation
compounds	n inside building					ion budget		
Oil spillage due to construction vehicles	Contamination of soil, surface water	Prepare and implement Spill management plan to ensure that all fuel, oil and chemicals are stored in 100% bundled area with impermeable floor. Ensure all vehicles in in good technical condition by frequently conducting technical inspection Ensure neutralizing tools are in place in case of oil spills	All construction vehicles	Throughout construction phase	Monthly contractor reports	Included in construction budget	PMO/ Supervision consultant	Contractor
<b>3. Operation Phase of Tranche 3</b>								
Operation of new roads	Traffic safety Increased emission of pollutants	Ensure well marked safe speed limits are enforced and installation of speed bumps at necessary locations determined by the MUB Traffic Office All vehicles that use the road are required to be in technically good condition	Along the new roads	Regularly	Annual Roads Dept. Report	Included in Operation management costs	MUB Road and Traffic Department	
	Improved infrastructure and new roads will lead to increased traffic emission and traffic safety concerns	Traffic Department of MUB will ensure that traffic signs, speed bumps and pedestrian crossings are provided in the area.						

Project Activity	Potential Impacts / issues	Proposed Mitigation Measures	Apply to	Time frame	Activity Reporting	Estimated Cost (USD)	Responsibility	
							Supervision	Implementation
Operation of new utility lines	Risk of equipment failure leading to spills, or system outages	Regular inspection and maintenance of the utility conduits, substations, pipelines and equipment.	Along all utility lines and substations	Regularly	Annual USUG report	Included in Operation management budget	USUG	
	Connection to the centralized water supply and waste water m might lead to increased water consumption and waste water generation in the project areas	USUG will be responsible operational efficiency for water supply and waste water infrastructure for the areas who will place control on water demand and supply balance.						
Operation of electrical safety systems, fire safety systems at new buildings	Electric sparks, fire and explosion	Record of all electrical switchbox located within secure casings	All new buildings	Regularly	Annual PMO report		PMO	Operation engineers
Generation of solid waste from new buildings	Physical pollution & nuisance to local	Training of personnel in proper waste management procedures. Operational entities will sign waste removal agreement with relevant		Regularly			PMO/PIS	Operation entities of new buildings

Project Activity	Potential Impacts / issues	Proposed Mitigation Measures	Apply to	Time frame	Activity Reporting	Estimated Cost (USD)	Responsibility	
							Supervision	Implementation
	community	district urban service agencies.						
Health and safety and emergency response	Lack of awareness of H&S procedure	Training of personnel on safety and emergency response in compliance with requirements by Emergency Agencies of relevant districts		Regularly				
B. Management of Impacts Specific to Subcomponents of Tranche 3								
1. Construction of New Roads								
Construction of new roads	Disruption to traffic movement, disturbance on pedestrian sidewalks	<div>1. Provide temporary and access roads and erect information boards and warning signs at construction sites</div> <div>2. Protected sidewalks for pedestrian access to their homes and service outlets</div> <div>3. Civil works must be scheduled to not disrupt the local traffic during its peak hours</div>	New roads	<div>During the construction</div> <div>between 08:00-09:00am and 17:00 – 18:00pm</div>	Monthly contractor reports	Included in construction budget	PMO/ PIS	Contractors
2. Construction of Utility Pipelines								
Construction of utility pipelines	Dust disturbance on surrounding	<div>1. Earthworks conducted with physical barriers and sound barriers</div> <div>2. Channels dug for pipelines</div>	Heating, water supply, sewerage	During the construction	Monthly contractor reports	Included in construction	PMO/ USUG	Contractors

Project Activity	Potential Impacts / issues	Proposed Mitigation Measures	Apply to	Time frame	Activity Reporting	Estimated Cost (USD)	Responsibility	
							Supervision	Implementation
	receptors, pedestrians falling in the channels, disruption to existing pipelines / cable lines	shall be protected with fencing nearby bus stations, service outlets and adjoining access roads 3. Construction works planned not to disrupt or cause damage to existing pipelines and contractors shall be well aware of alignment scheme of existing pipelines prior to commencement of construction	and power lines			budget		
<b>3. Construction of social buildings</b>								
Construction of social service buildings	Blocking of access roads, noise disturbance on neighboring households	1. Provide temporary access roads for local residents' cars and protected pedestrian sidewalks 2. All new building construction sites shall have protection fencing and noise insulation barriers such as sheet fencing	New buildings for school, kindergarten, business incubator, sports complex, social development center	During the construction	Monthly contractor reports	Included in construction budget	PMO/ PIS	Contractors
<b>4. Flood Control Measures</b>								
Construction / excavation of flood protection	Sedimentation of existing drainage channels	1. Temporary earthen berms, or plastic fencing need to be installed along excavation areas to contain loose soil	Flood channels	During the construction	Quarterly contractor reports	Included in construction	PMO/ USUG	Contractors

Project Activity	Potential Impacts / issues	Proposed Mitigation Measures	Apply to	Time frame	Activity Reporting	Estimated Cost (USD)	Responsibility	
							Supervision	Implementation
channels	Disturbance of local households	prevent erosion of downstream main flood channels. 2. Use pipelines to remove water drained from topsoil layers during the earthworks. 3. Physical barriers such as sheet fencing should be placed between civil works sites and adjacent homes and businesses.				budget		
<b>5. Management of medical waste</b>								
Operation of the primary health center at Tolgoit	Generation of medical waste that may be hazardous to human health	1. Medical waste such as syringes, bandages, etc. are collected on regular intervals by Element LLC is the sole licensee having obtained special license on handling medical waste from the Ministry of Health to collect medical waste in Mongolia. They have a medical waste facility at Ulaanbaatar city's central dumpsite called Narangiin Enger. 2. Management of medical waste by the PHC will strictly follow the "Regulation on classifying, collecting, storing, transporting, recycling and disposing of hazardous medical waste" which was adopted with Order No. A/505 of Minister of Health, December, 2017.	All medical waste of the PHC at Tolgoit	During operation period	Monthly PHC report to MOH	Included in operation budget of PHC	Health department of MUB, MOH	PHC management



### Appendix 9. Environmental Monitoring Plan

Environmental and social component	Parameters	Location	Means of monitoring / relevant standards	Frequency	Responsibility		Estimated cost (USD)	Budget source
					Supervision	Implementation		
Pre-construction phase - Update baseline environmental conditions								
Review environmental baseline	Existing sensitive areas and monitoring spots	For both subcenters	Field survey, consultation with local community	Once	PMO	PIS	\$600	PMO budget
Air quality (baseline development)	PM10, PM2.5, SO2, NO2, CO	At 2 spots in both subcenters (4 spots in total)	MNS4585:2016. Air quality. General Technical Requirements	Once	PMO/PIS	Licensed Institute	\$400	PMO budget
Noise level	Ambient noise level (dB)		MNS4585:2007. Ambient noise level. Technical requirements	Once	PMO/PIS	Licensed Institute		PMO budget
Surface water quality (baseline development)	TSS, DO, BOD, heavy metals, turbidity, hardness, oil & grease and other chemical elements	Uliastai river in Sharkhad subcenter	National water quality standards MNS5668:2006 MNS4586:1998 MNS6148:2010 MNS0900:2005	Once	PMO/PIS	Licensed Institute	\$200	PMO budget
Ground water quality (baseline development)	TSS, DO, BOD, heavy metals, turbidity, hardness, oil & grease and other chemical elements	At selected ger area wells that area close construction sites		Once	PMO/PIS	Licensed Institute	\$400	PMO budget
Soil quality (baseline development)	Heavy metals contamination analysis, oil and grease	At 2 spots in both subcenters (4 spots in total)	National soil quality standard MNS5850:2008	Once	PMO/PIS	Licensed Institute	\$400	PMO budget

Environmental Management Plan for Tranche 3 Phase of GADIP

Environmental and social component	Parameters	Location	Means of monitoring / relevant standards	Frequency	Responsibility		Estimated cost (USD)	Budget source
					Supervision	Implementation		
	Inventory of present and past land uses that could cause contaminated soil	At all excavation sites	Using field and analytical methods approved by MET	Once	PMO/PIS	Licensed Institute	\$300	PMO budget
Construction phase of all subcomponents of Tranche 3								
Air quality (baseline development)	PM10, PM2.5, SO2, NO2, CO	At 2 spots in both subcenters (4 spots in total)	MNS4585:2016. Air quality. General Technical Requirements	Quarterly during the construction period	PMO/PIS	Contractor subcontract with local licensed institutes	\$1,600	Included in construction budget
Noise level	Ambient noise level (dB)		MNS4585:2007. Ambient noise level. Technical requirements					
Surface water quality (baseline development)	TSS, DO, BOD, heavy metals, turbidity, hardness, oil & grease and other chemical elements	Uliastai river in Sharkhad subcenter	National water quality standards MNS5668:2006 MNS4586:1998 MNS6148:2010 MNS0900:2005					
Ground water quality (baseline development)	TSS, DO, BOD, heavy metals, turbidity, hardness, oil & grease and other chemical elements	At selected ger area wells that area close construction sites						
Soil quality (baseline development)	Heavy metals contamination analysis, oil and grease	At 2 spots in both subcenters (4 spots in total)					National soil quality standard MNS5850:2008	

Environmental and social component	Parameters	Location	Means of monitoring / relevant standards	Frequency	Responsibility		Estimated cost (USD)	Budget source
					Supervision	Implementation		
Waste Management	Monitoring of waste management	Workers campsites, construction sites, temporary waste collection points	Waste management plan, relevant domestic regulations	Monthly during the construction period	PMO/PIS	Contractors	\$800	Included in construction budget
Health and safety	Worker H&S monitoring: use of PPE, workplace lighting, warning signs, H&S induction, traffic safety	Workers campsites, construction sites	Health and safety standards of Mongolia					
	Community H&S monitoring: traffic rules, traffic signs, protection fencing etc.	At all construction sites						
Impact on local community	Monitoring of GRM implementation: grievance received, results of construction phase consultation, corrective actions, availability of GRM entry points	Both subcenters	GRM implementation plan in IEE	Quarterly during the construction period				
Operation phase								

Environmental Management Plan for Tranche 3 Phase of GADIP

Environmental and social component	Parameters	Location	Means of monitoring / relevant standards	Frequency	Responsibility		Estimated cost (USD)	Budget source	
					Supervision	Implementation			
Traffic safety	Incidence of traffic accidents and pedestrian injury reports	All new and existing roads in the subcenters	Community and police reporting	Continuous	PMO/Traffic Dept. of MUB	Traffic police and relevant khoroos	Included in budget of relevant authorities	Budget of relevant authorities	
Technical condition of the project facilities	Technical good condition of utility lines to ensure no spills and outage occurrence	Utility lines: hating, water supply and sewerage pipelines	Supervision engineering report	Quarterly	PMO/USUG	Supervision engineers			
	Culverts under the new roads: blocked with sedimentation	New roads			PMO/ Traffic Dept. of MUB				
Total environmental monitoring cost:							\$8,700		

## Appendix 10. Environmental Safeguard Clauses for Civil Works Contracts

**Objectives.** The main objectives of the Contractor's EMP is to define impact mitigation and monitoring measures to be carried out during the construction phase. Additionally, C-EMP sets out responsible personnel in charge of implementation of the mitigation measures and handling of daily environmental issues, environmental monitoring measures and responsible persons and the Contractor's overall control on construction activities to ensure compliance to the C-EMP.

**Requirements on C-EMP.** The C-EMP shall be prepared in line with following methodologies and project documents: i. EIA regulation which was adopted with Environmental Minister's Order No. A-05 dated 06 January, 2014; ii. The "Regulation on preparing, reviewing, approving of EMP" which was adopted with Environmental Minister's Order No. A/618 dated 29 October 2019; iii. Initial Environmental Examination (IEE) Report for Project 2; and iv. Domestic DEIA report and EMP approved by MET. A template for C-EMP is provided in Appendix 6-1.

**Reporting.** The contractor is obliged to submit following documents to the Program Management Office (PMO)

- ❖ The Contractor shall submit draft C-EMP within 10 days of contract signing and the finalized version of C-EMP within 28 days of contract signing, respectively.
- ❖ The contractor shall submit C-EMP implementation progress report within September 20<sup>th</sup> of every year during the contracted period and C-EMP completion report within 15 days after completion of the construction work.

**Contractor's environmental personnel.** The contractor is required to hire an on-site environmental specialist throughout the contracted period. The Contractor's environmental specialist shall be a qualified professional who meets criterions set out in below table. The Contractor may contract with a professional environmental firm to perform the environmental specialist's duties.

Position	Qualifications
On-site environmental specialist	<ul style="list-style-type: none"> <li>• Bachelor's degree in environmental fields</li> <li>• At least 2 years of work experience in environmental sector</li> <li>• Work experience as environmental specialist or environmental consultant in similar projects is preferred</li> <li>• In-depth knowledge of domestic environmental laws, regulations and standards</li> <li>• Previous experience in preparation of EMP and implementation report</li> </ul>

Contractor's on-site environmental specialist will perform following duties:

- ❖ Prepare C-EMP in line with the Project 2 IEE, EMP, domestic DEIA report and other relevant domestic laws, regulations and methodologies;
- ❖ Implement impact mitigation measures specified in the C-EMP at all construction sites;
- ❖ Apply and obtain necessary environment related permissions for the construction work to start and proceed with;
- ❖ Handle daily environmental issues at the the construction sites and the workers' camp sites;

- ❖ Prepare C-EMP implementation progress and completion reports and make necessary revisions in the reports in accordance with comments provided by the PMO;
- ❖ Perform other duties and tasks required by the PMO.

**Environmental compliance and responsibility.** In case the Contractor fails to perform environmental duties set out in this section (submission of C-EMP, implementation of mitigation measures and submission of C-EMP implementation reports) in timely manner, the PMO is entitled to take on following actions. These include:

- Provide deadline for improvement of environmental performance and compliance. An official letter will be delivered to the Contractor.
- An environmental inspection will be made by the PMO representatives to verify improvement of environmental work once the deadline is past. In case the Contractor fails to improve its environmental performance as required by the PMO, a penalty equals to 0.5%-1% of the total contract amount will be imposed.
- An environmental inspection will be made by the PMO representatives again 7 days after the penalty action. If the Contractor fails to improve its environmental performance again as required by the PMO, the inspection team may decide to stop construction works of the Contractor.
- If the Contractor fails to improve its environmental performance after the construction works are stopped, then the Client may consider options of contract termination.

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APPENDIX 2. ENVIRONMENTAL COMPLIANCE CHECKLIST

APPENDIX 3. PHOTOS

### **Appendix 12. Environmental Site Inspection and Monitoring Checklist**

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Note: This form is designed for use by the Project Implementation Unit (PIU) project coordinator during site inspections and monitoring and may not be exhaustive. Modifications and additions may be necessary to suit individual sub-projects and to address specific environmental issues and mitigation measures.

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Name of subcenter: \_\_\_\_\_

Location: \_\_\_\_\_

Inspection Date: \_\_\_\_\_

Inspection Time: \_\_\_\_\_

Inspector(s): \_\_\_\_\_

Inspection Item	Yes	No	N.A.	Remarks (i.e. problem observed, possible cause of nonconformity and/or proposed corrective/preventative actions)
1. Has contractor appointed a construction supervisor and is the supervisor on-site?				
2. Is information pertaining to construction disclosed at construction site (including construction period, contractor information, grievance hotline, etc.)?				
3. Are chemicals/hazardous products and waste stored on impermeable surfaces in secure, covered areas?				
4. Is there evidence of oil spillage?				
5. Are chemicals stored and labeled properly?				
6. Is construction equipment well maintained (any black smoke observed)?				
7. Is there evidence of excessive dust generation?				
8. Are there enclosures around the main dust-generating activities?				
9. Does contractor regularly consult with nearby residents to identify concerns?				
10. Is there evidence of excessive noise?				
11. Any noise mitigation measures adopted (e.g. use noise barrier / enclosure)?				
12. Is construction wastewater and domestic wastewater discharged to sewer systems (if possible), or are on-site treatment facilities (septic tank) provided?				
13. Is there any wastewater discharged to soil or surface water?				
14. Is the site kept clean and tidy (e.g. litter free, good housekeeping)?				



Inspection Item	Yes	No	N.A.	Remarks (i.e. problem observed, possible cause of nonconformity and/or proposed corrective/preventative actions)
15. Are separated labeled containers/areas provided for facilitating recycling and waste segregation?				
16. Are construction wastes/recyclable wastes and general refuse removed off site regularly?				
17. Is safe supply of clean water and an adequate number of toilets provided for workers?				
18. Is personal protection equipment provided for workers?				
19. Are clear information and warning signs placed at construction sites in view of the students and staff as well as the public?				
20. Are all construction sites made secure, discouraging access through appropriate fencing?				
21. Are disturbed areas properly re-vegetated after completion of works?				
22. Were any complaints filed with the contractor, and have staff and nearby residents raised any concerns related to the performance of contractor?				
23. Any other problems identified or observations made?				

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Date, Name and Signature of PIU staff/ consultant