

Environmental Management Plan (Draft)

July 2018

MON: Proposed Additional Financing for Southeast Gobi Urban and Border Town Development Project

Prepared by the Ministry of Construction and Urban Development of Mongolia for the Asian Development Bank

CURRENCY EQUIVALENTS

(as of 20 July 2018)

Currency Unit	–	togrog (MNT)
MNT1.00	=	\$0.000406
\$1.00	=	MNT2,463.00

ABBREVIATIONS

ADB	-	Asian Development Bank (ADB)
BOD	-	biological oxygen demand
CEMP	-	Construction EMP
COD	-	Chemical oxygen demand
DEIA	-	Detailed Environmental Impact Assessment
DMF	-	Design and Monitoring Framework
EA	-	executing agency
EHS	-	Environmental, Health and Safety
EIA	-	Environmental Impact Assessment
EMP	-	Environmental Management Plan
GRM	-	Grievance Redress Mechanism
IEE	-	Initial Environmental Examination
IEM	-	Independent environmental monitor
IFAS	-	Integrated Fixed Film Activated Sludge
LEIC	-	loan implementation environment consultant
MCUD	-	Ministry of Construction and Urban Development
MNET	-	Ministry of Nature Environment and Tourism
MNS	-	Mongolian National Standards
MNT	-	Mongolian tugrik
O&M	-	Operations and Maintenance
PCU	-	Public Complaints Unit
PMIS	-	management and implementation support
PMU	-	Project management unit
PPE	-	Personal Protective Equipment
PSC	-	Project Steering Committee
PSG	-	PUSO Support Group
PUSO	-	Public Utility Service Organization
SCADA	-	Supervisory control and data acquisition
SGUBTD	-	South Gobi Urban and Border Town Development
SPS	-	Safeguard Policy Statement
WWTP	-	wastewater treatment plants

WEIGHTS AND MEASURES

°F	-	Degrees Fahrenheit
°C	-	Degrees Celsius
dBA	–	A-weighted Decibel
km	–	Kilometer
km ²	–	Square kilometer
LAeq	–	Equivalent Continuous Level 'A weighting' - 'A'- weighting is correction by factors that weight sound

		to correlate with the sensitivity of the human ear to sounds at different frequencies
m	–	Meter
PM10	–	Particulate Matter 10 micrometers or less
PM2.5	–	Particulate Matter 2.5 micrometers or less
µg/m ³	–	Microgram per cubic meter

GLOSSARY

<i>aimag</i>	–	Provincial country division
<i>soum</i>	–	Sub-district division
<i>Bag or bagh</i>	–	Third level administrative subdivision e.g. sub-district

NOTE

- (i) In this report, "\$" refers to US dollars

This environmental management plan is a document of the borrower. The views expressed herein do not necessarily represent those of ADB's Board of Directors, Management, or staff, and may be preliminary in nature. Your attention is directed to the ["terms of use"](#) section on ADB's website.

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

TABLE OF CONTENTS

I.	ENVIRONMENTAL MANAGEMENT PLAN.....	1
II.	EMP RESPONSIBILITIES AND MITIGATION MEASURES.....	4
A.	MITIGATION MEASURES	7
B.	MONITORING PLAN	20
III.	REPORTING AND IMPLEMENTATION	26
A.	REPORTING.....	26
B.	TRAINING, CAPACITY BUILDING AND AWARENESS	28
C.	EMP IMPLEMENTATION COSTS	29
D.	MECHANISM FOR FEEDBACK AND ADJUSTMENT	29
E.	CONCLUSION.....	29

APPENDIXES

APPENDIX 1 CONSULTATION / INTERVIEW FORM.....	31
APPENDIX 2 PARTICULAR CONDITIONS FOR BIDDING.....	33

TABLES

Table 1: EMP Implementation Responsibilities	4
Table 2: EMP Mitigation Measures	8
Table 3: Project Readiness Indicators	21
Table 4: Environmental Quality Monitoring	23
Table 5: EMP Compliance Monitoring.....	25
Table 6: Affected People Monitoring	26
Table 7: Environmental Safeguards Reporting	27
Table 8: EMP Training.....	29
Table 9: EMP Costs.....	29

FIGURES

Figure 1: Implementation Arrangements.....	7
--	---

I. Environmental Management Plan

A. Introduction & Objectives

1. This environmental management plan (EMP) in line with ADB's SPS 2009. It covers all phases of implementation from preparation to operation. The objective of the EMP is to ensure the monitoring of environmental impacts and implementation of environmental mitigation measures. Relevant parts of the EMP will be incorporated into the bidding documents for the each site.
2. This document incorporates the mitigation measures and monitoring requirements of the domestic Detailed Environmental Impact Assessment (DEIA), conducted according to the requirements of Mongolian law.

B. Implementing Organizations and Their Responsibilities

3. The framework for implementation of the environmental management plan (EMP) for the project is described here. It will be reconfirmed at the detailed designs stage and any necessary changes incorporated into the final documents. The key institutions, organisations and stakeholders relevant to environmental safeguards are set out below. A summary of the key functions for project implementation and environmental safeguards is presented Table 1 for ease of reference. The structure of project implementation arrangements are shown in Figure 1.
4. **Executing Agency.** The Ministry of Construction and Urban Development (MCUD) is the executing agency (EA) for the SGUBTD Project (Grant 0204-MON) as well as the first Additional Financing Project, and this Second Additional Financing project. The EA has overall responsibility for the project and therefore is ultimately responsible for ensuring the implementation of the mitigation in the EMP and for ensuring compliance with loan covenants. The EA will provide overall policy, guidance and direction, is responsible for project coordination and liaison with ADB and Overall project implementation and guidance and oversight for PMU.
5. **A Project Steering Committee (PSC)** has been established for the SGUBTD project, which will provide overall policy guidance on the project and have full powers to take decisions on matters relating to the project execution. The PSC meets quarterly to review project performance and take decisions on major issues regarding project implementation.
6. **Project management unit (PMU).** The existing project management unit established for the SGUBTD project under MCUD will manage the First and Second Additional Financing components and will provide guidance of the day-to-day activities of the project and assistance to PUSOs. The role includes, but is not limited to: (i) coordinating the tendering process including overseeing incorporation of EMP clauses into the bidding documents; (iii) ensuring the procurement of environmentally responsible contractors; (iv) ensuring that DEIA approvals by Ministry of Nature Environment and Tourism (MNET) have been secured prior to the awarding of civil works contracts; (v) supervising project construction (with support of PMIS resident engineers); and (vi) Annual EMP monitoring reporting to ADB.

7. **Loan implementation environment consultants (LIEC).** The PMU will procure the services of additional project management and implementation support (PMIS) consultants including one international and one national environment consultants (LIEC) to provide support in (i) updating the IEE and EMP as required, and providing training on EMP supervision to PUSOs and contractors; (ii) setting up environmental management and internal monitoring systems at PUSO and civil works contracts level; (iii) review tender and contractor documents to ensure all required environmental specifications have been included, update as required; (iv) prepare environmental supervision checklists for monthly supervision of the EMP by the PUSO Support Group, and review contractor-EMPs to confirm compliance with the project EMP; (v) Support PMU to establish grievance redress mechanisms (GRMs) and providing training; (vi) regular EMP and implementation monitoring in compliance with the monitoring plan; (vii) coordinate public consultation prior to and during construction, and at project completion stage; (viii) preparing annual EMP progress reports to ADB; and (ix) identifying environment-related implementation issues and necessary corrective actions.
8. **Resident engineer.** The Resident Engineer will be engaged by the PMIS and will also support/supervise the PSG with regards to EMP implementation and monitoring.
9. **PUSO Support Group (PSG).** Each water supply and sewerage entity is known as a Public Urban Services Organization (PUSO). PUSO will establish a PUSO Support Group (PSG) to handle the day-to-day activities under the project. PSG will nominate one staff member to be responsible for the daily implementation of the EMP with the support from the site supervision engineer. Under the guidance of the PMIS (resident engineers and the LIEC), the PSGs will be responsible for the local supervision of EMP implementation, including (i) setting up and coordinating the local grievance redress mechanism (GRM); (ii) monitoring contractors to ensure adherence to the project EMP and the contractor EMPs; (iii) preparing quarterly reports on project EMP implementation to the PMU; and (iv) coordinating consultation with local stakeholders as required, informing them of imminent construction works, updating them on the latest project development activities, GRM, etc.; as defined in the monitoring program.
10. **Civil works contractors.** Contractors will be required to formulate contractor EMPs (or site EMPs) and adhere to the mitigation measures set out in the EMP, as part of the bidding documents. The contractor EMPs will be renewed on a yearly basis, submitted to the PUSO Support Group for review, and to aimag environment protection authorities for approval. The contractors will provide monthly reports on EMP Mitigation and Health and Safety including any incidents or accidents. During construction the contractor will appoint an Environment Health and Safety (EHS) officer to be responsible for EMP mitigation measure implementation.
11. **Independent environment monitor (IEM).** The PMU will also procure the services of an independent environment monitor (IEM). The IEM will conduct independent EMP implementation verification and environment quality monitoring during project construction and operation (until the PCR is issued). The IEM will (i) conduct at least two site visits to each construction site (5 aimags) during the construction period to assess the project's compliance with the project EMP and the domestic EIAs; (ii) conduct environment quality monitoring covering air quality, noise, construction wastewater quality at each construction site in compliance with the monitoring plan; (iii) assess the contractors', PUSOs', PMIS, and PMU's compliance with their respective EMP implementation responsibilities as defined in the PAM; and (iv) prepare independent EMP

monitoring reports for the PMU. The reports should highlight good practices, identify problems encountered, define recommendations for actions to be taken to resolve problems or improve environment management performance of various stakeholders. The reports will be sent to ADB and the PMIS team directly by the IEM. The IEM will be fully independent and not associated with anyone or any organization related to the project.

II. EMP Implementation Responsibilities and Mitigation Measures

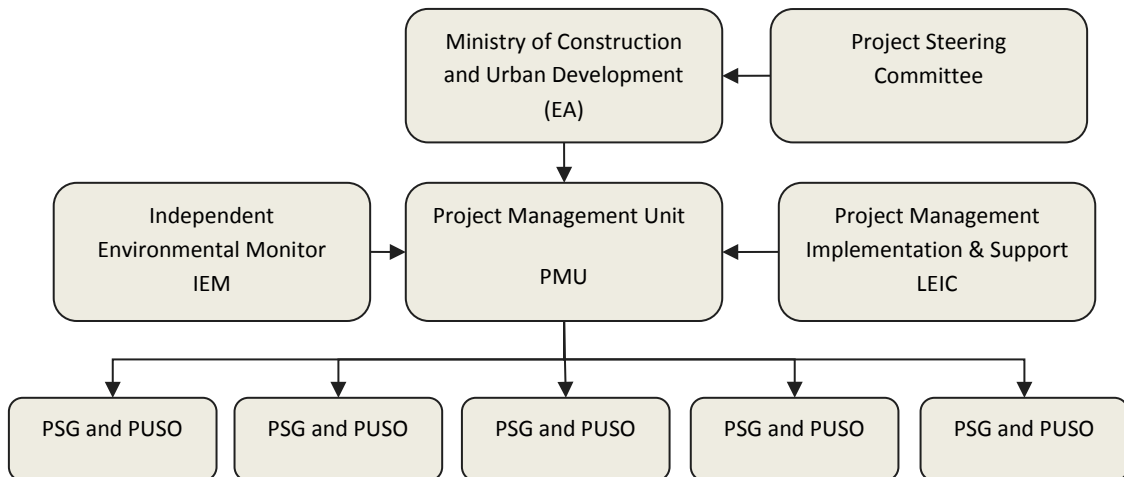
Table 1: EMP Implementation Responsibilities

Project Stage and Environmental Responsibility					
Responsible Entity	Project Preparation	Engineering Detailed Design	Tendering & Pre-construction	Construction	Operation
Executing Agency	Ministry of Construction and Urban Development responsible for ensuring the implementation of the mitigation in the EMP and for ensuring compliance with loan covenants				
PMU		Update IEE/EMP if needed	Engage PMIS & Independent Environmental Monitor	Identify markets for sludge and effluent reuse as early as possible	
		Review updated EMP	Coordinating the tendering process including overseeing incorporation of EMP clauses into the bidding documents and review (with LEIC) of Contractor Responses including EMPs	Supervising project construction (with support of PMIS resident engineers)	
		Confirm that mitigation measures have been included in engineering detail design	ensuring the procurement of environmentally responsible contractors and approve CEMP	Reporting to ADB	
			ensuring that DEIA approvals by MNET have been secured prior to the awarding of civil works contracts		
Establish GRM					
PPTA Consultants	Provide technical assistance				
	Prepare IEE and EMP and align with DEIA				
PMIS		Engage LEIC and Resident Engineer			
LIEC		Update IEE/EMP if needed – include detailed sludge management plan for operational phase with PUSO	Providing training on EMP supervision to PUSOs and contractors	coordinate public consultation	Organize, prior to project completion report (PCR) mission, a survey to assess community satisfaction with
			setting up environmental management and internal monitoring systems at PUSO and civil works contracts level	preparing annual EMP progress reports	

Project Stage and Environmental Responsibility					
Responsible Entity	Project Preparation	Engineering Detailed Design	Tendering & Pre-construction	Construction	Operation
		Undertake Environmental Compliance Audit using template in IEE	review tender and contractor documents including EMP responses by contractors.	identifying environment-related implementation issues and necessary corrective actions Check decommissioning process for existing facilities and confirm environmental legacy issues and any corrective action	project implementation and EMP implementation performance. Draft environment sections of the PCR.
			review contractor Construction EMPs	training on EMP supervision to PUSOs and contractors	
			establishing grievance redress mechanisms		
			regular EMP and implementation monitoring		
			coordinate public consultation	Organize, prior to project completion report (PCR) mission, a survey to assess community satisfaction with project implementation and EMP implementation performance. Draft environment sections of the PCR.	
Independent environment monitor				conduct site visits to each construction site to assess the EMP compliance conduct environment quality monitoring assess the contractors', PUSOs', PMIS, and PMU's compliance with their respective EMP implementation responsibilities	

Project Stage and Environmental Responsibility					
Responsible Entity	Project Preparation	Engineering Detailed Design	Tendering & Pre-construction	Construction	Operation
				prepare independent EMP monitoring reports for the PMU	
Contractor			Provision of Construction EMPs and environmental track record in bid response	Ensure sufficient funding and human resources for proper and timely implementation of required mitigation and monitoring measures in the EMP throughout the construction phase	
				Appoint an environment, health and safety (EHS) officer to oversee EMP implementation related to environment, occupational health and safety on construction site	
				Ensure health and safety	
				Implement mitigation measures	
				Act as a local entry point for the project GRM	
Operator				Testing prior to commissioning to ensure discharge standards can be met Identify options for sludge reuse	Ensure proper operation of project facilities according to design standards & monitoring
					Allocation of budget for O&M

Figure 1: Implementation Arrangements



A. Mitigation Measures

12. lists the potential environmental issues and impacts during the preconstruction, construction and operation phases of the project, as identified by the DEIAs and the IEE, as well as corresponding mitigation measures designed to minimize the impacts to acceptable levels.
13. The mitigation measures include specific Construction EMP sub-plans for a number of key activities which will also require the contractor to develop appropriate maps to ensure all stakeholders are clear on where activities will take place.

Table 2: EMP Mitigation Measures

Sub-Project Activity	Environmental Impact / Issue	Mitigation measures	Implemented by	Supervised by	Cost (\$)
Pre-Construction Phase					
Disclosure and engagement of community	No community impacts	1. Initiate Information Disclosure and Grievance Redress Mechanism of IEE		PMU	Nil
GRM	Dissemination	2. Erect sign boards with project details and GRM procedures/contact details at the entrance to each construction site	Contractor	GRM	Included in bid price
Final Design	Permafrost	3. Before Final Design is complete, undertake geo-technical survey for presence/absence of permafrost at WWTP sites and sewer pipeline trenches. 4. If permafrost spots are found, implement engineering solutions considering land subsidence in the design and/or special construction method to deal with permafrost	Contractor	PMU	Included in bid price
IEE and EMP Updated	All	5. Update IEE and EMP to reflect final detailed design and integrate further necessary environmental protection measures		PMU	Included in PMIS contract
Construction EMP (CEMP)	All	6. The contractor(s) will develop a Construction EMP that includes individual management sub-plans for: A. Spoil and Borrow Site Management; B. Solid and Liquid Waste Management; C. Community and Occupational Health and Safety and Emergency Response; D. Construction Workers Camp Management (if required). E. Method Statement for well drilling. 7. The CEMP will include a map of each construction site, showing as a minimum: • All residential receptors within 300m • Access routes and material haul roads which have approval from aimag authorities	Contractor	PMU	Included in bid price

Sub-Project Activity	Environmental Impact / Issue	Mitigation measures	Implemented by	Supervised by	Cost (\$)
		<ul style="list-style-type: none"> Storage areas for waste and storage area for chemicals such as fuels, Concrete mixing location Stockpile storage areas (on & off site) First aid kit and equipment used in emergency response, Location of worker camps (if required) and All borrow sites. 			
Obtain and activate permits and licenses	Prevent or minimize environmental impacts	8. Contractors to comply with all statutory requirements set out by Government for use of construction equipment and plant	Contractor	PMU	Included in bid price
Construction EMP (CEMP) Approvals	All	9. Approval of CEMP including site maps as required by CEMP. 10. Confirm aimag authorities approve all haul routes and location of construction worker camp (if required).	PMU	EA	Nil
Collaborative Workplan	Service continuity	11. Work Plan / Activity scheduling to ensure continual wastewater treatment service is provided in all cities during construction and commissioning of the new sites.	PUSO and contractor	EA	Nil
		CONSTRUCTION PHASE			
Implementation of Spoil and Borrow Site Management Sub-Plan A	Soil Resources and land	12. Site specific Spoil and Borrow Site Management Plan A will be developed and approved by the relevant aimag authority and PMU. The Plan will include as a minimum, the following measures <ul style="list-style-type: none"> Measures to prevent spoil being disposed of on fertile pasture land. A map of all borrow sites will be developed and maintained with copies held by the Contractor and PMU – the map will show residential receptors (permanent or temporary) within 300m of the borrow sites and haul roads; Definition of measures to rehabilitate the borrow sites will be detailed and will include contouring of the slopes within 	Contractor	PSG, LIEC, IEM	Included in bid price

Sub-Project Activity	Environmental Impact / Issue	Mitigation measures	Implemented by	Supervised by	Cost (\$)
		<p>each borrow site and replanting sites with native species;</p> <ul style="list-style-type: none"> • Retention of topsoil - top soil present on construction sites will be removed and stockpiled in a labelled area for use on rehabilitation of the site post-construction or rehabilitation of borrow sites. • Criteria for spoil disposal including levels of contamination and location for spoil disposal (to be approved by aimag authorities). • No disposal of spoil or dredged material on agriculturally productive land or within 50 m of a water course; <p>13. Good construction practice will be engaged to minimize soil erosion. Practices will include:</p> <ul style="list-style-type: none"> • Minimizing the area of soil clearance; • Construction in the should be mainly restricted to the dry season where possible • Cover soil stockpiles; • Use of temporary berms or other appropriate temporary drainage provisions at construction sites to prevent water eroding cut faces, stockpiles and other exposed areas of soil. <p>14. Soil contamination will be minimized through sound management of liquid chemicals, fuels and other fluids which can contaminate soil. Measures include:</p> <ul style="list-style-type: none"> • Storing chemicals/hazardous products and waste on impermeable surfaces in secure, covered areas with clear labeling of containers and with a tray or bund to contain leaks; 			

Sub-Project Activity	Environmental Impact / Issue	Mitigation measures	Implemented by	Supervised by	Cost (\$)
		<ul style="list-style-type: none"> • Establish emergency preparedness and response plan which includes response to spills. • Provide spill cleanup measures and equipment at each construction site • Conduct training in emergency spill response procedures • Ensure fuel is stored in a bunded tank and vehicle refueling takes place on hard standing away from sensitive receptors, such as surface water. 			
Implementation of Solid and Liquid Waste Management Sub-Plan B	Resource use and natural resource contamination	<p>Measures to be included in the management sub-plan will include measure to explain how the contractor will:</p> <p>15. Follow the waste hierarchy and demonstrate how waste will be prevented and recycled and will show effective management of materials on site through good house-keeping and work planning</p> <p>16. Clear arrangements for storage and transportation of all hazardous and non-hazardous waste to an authorised and approved disposal point (approved by aimag authorities).</p> <p>17. Recyclables to be separated at source and given/sold to recycler (plastic, metal, card, paper as a minimum)</p> <p>18. All solid waste to be stored in containers with lids.</p> <p>19. Prohibit burning of waste at all times;</p> <p>20. Provide all vehicles/drivers with plastic bags for waste collection and prevent any unauthorized waste disposal.</p>	Contractor	PSG, LIEC, IEM	Included in bid price
Implementation Occupational Health and Safety and Emergency Response Sub-Plan C	Human health and safety	<p>21. Occupational H&S measures to be included in the management sub-plan will include:</p> <ul style="list-style-type: none"> • Assurance that all workers are equipped with, and use Personal Protective Equipment (PPE). 	Contractor	PSG, LIEC, IEM	Included in bid price

Sub-Project Activity	Environmental Impact / Issue	Mitigation measures	Implemented by	Supervised by	Cost (\$)
		<ul style="list-style-type: none"> • Specifications for the PPE to be used on site and the contractors' approach to enforcement of its use by workers • Sufficient signage giving occupational health and safety warnings and information disclosure within all construction sites – sub-plan to include example warnings. • Details of worker education/training and awareness seminars for construction hazards will be given. A construction site safety program will be developed and distributed to workers. • Details of daily toolbox meetings (safety briefings) • Details of the site accident record book which will be maintained where all major or minor accidents and incidents are recorded with actions taken. • Details of a Health and Safety qualified engineer and adequate first aid who/which will be on site. 			

Sub-Project Activity	Environmental Impact / Issue	Mitigation measures	Implemented by	Supervised by	Cost (\$)
		<ul style="list-style-type: none"> • Provision will be made for safety precautions when using 220 to 240V Electric Power tools if the workers are likely to be working within wet or flooded environments. <p>22. The Emergency Response Plan will set out detailed Preventative Measures for all types of incidents covered in the Emergency Plan. This will include:</p> <ul style="list-style-type: none"> • Prevention of Injury and Accidents – to include Personal Protective Equipment requirements for construction workers, training requirements • Prevention of Spillage - All construction fluids such as oils, and fuels will be stored on hard standing with sealed drainage with a capacity of 110% of the largest fuel container, will include procedures on refuelling and maintaining vehicles. • Prevention of Fire – to include measures for Ignition Sources including prevention of smoking on construction site, management of flammable materials and liquid. • Other Incidents – prevention measures relevant to other issues considered relevant by the contractor <p>23. The Contractor will develop Emergency Response Procedures prior to construction. The procedures will cover actions to be taken in case of:</p> <ul style="list-style-type: none"> • Worker injury (e.g. construction or traffic accident) • Spillage (e.g. fuel spillage) • Fire (e.g. fuel or chemicals storage area); and • Any other incidents anticipated by the contractor. 			

Sub-Project Activity	Environmental Impact / Issue	Mitigation measures	Implemented by	Supervised by	Cost (\$)
Implementation of Construction Workers Camp Management Sub-Plan D	Contamination of water, soil, waste production and social issues	<p>24. [if required] If a camp for construction workers is required the contractor will set out a management plan which includes:</p> <ul style="list-style-type: none"> • A map showing camp lay out, welfare facilities, and first aid kit locations. • Accommodation facilities including pit latrines for male and female workers, adequate drainage to prevent flooding, security including a no weapons policy and waste disposal areas. • Discharge of sewage and wastewater to existing WWTP and siting pit latrines minimum of 200m from any groundwater borehole or surface water source • Schedule of HIV Aids education awareness to be given to workers. • Training on relevant laws for foreign labor (including hunting, fishing and traffic rules); • Plan of how camp areas will be restored to original condition after construction completed. <p>25. If a construction camp is not required, the contractor will not require a Management Plan but will:</p> <ul style="list-style-type: none"> • Provide adequate waste disposal facilities including garbage cans for workers. • Provide welfare facilities including water for washing, drinking and include facilities for male and female workers • Provide toilets for male and female construction workers with a cleaning schedule <p>26. The contractor will give priority to local labor force and retain evidence for inspection of how local labor recruitment efforts were undertaken</p>	Contractor	PSG, LIEC, IEM	Included in bid price

Sub-Project Activity	Environmental Impact / Issue	Mitigation measures	Implemented by	Supervised by	Cost (\$)
Civil works and material movement	Air quality	<p>27. The contractor will implement the following mitigation measures:</p> <ul style="list-style-type: none"> • Stockpiles management. Temporary stockpiles will be protected to reduce dust emissions. If a stockpile is within 150m of human receptors (such as during trench excavation), additional precautions must be taken including using a reusable stockpile cover to prevent wind lifting and dispersing. • Construction site management: Water will be sprayed on construction sites and material handling routes where fugitive dust is generated, if the dominant wind direction is towards a residential area. • Transport of materials: Trucks carrying loose construction materials will be covered with tarpaulins. • Construction vehicles and machinery: Maintained to a high standard to minimize emissions (note that local standards do not exist for vehicle emissions). • Manufacturing plants: Plants for the production of concrete or asphalt will be located at least 500 m from the nearest dwelling and located downwind 	Contractor	PSG, LIEC, IEM	Included in bid price

Sub-Project Activity	Environmental Impact / Issue	Mitigation measures	Implemented by	Supervised by	Cost (\$)
Civil works and material movement	Noise	<p>28. The contractor will implement the following mitigation measures:</p> <ul style="list-style-type: none"> • Operate high-noise activities between 8am-9pm which will exceed the WHO noise standards for night time only and reach an agreement with nearby businesses and residents regarding the timing of heavy machinery work, to avoid any unnecessary disturbances; • Provide advance warning to businesses and residents on timing of noisy activities. Seek suggestions from community members to reduce noise annoyance • Vehicles transporting construction materials or wastes will not use their horn when passing through or nearby sensitive locations, such as residential communities, schools and health care facilities • Ensure noise monitoring is undertaken at construction site boundaries and near sensitive receptors, especially in Murun (residential area) 	Contractor	PSG, LIEC, IEM	Included in bid price
Civil works	Surface Water Quality	<p>29. The contractor will implement the following mitigation measures:</p> <ul style="list-style-type: none"> • Adherence to all Construction EMP sub-plans which impact on water quality • Establish a Water Protection Zone buffer 300m from the water edge at Chinggis, Bulgan and Murun where rivers are present within 0.5-1.5 km from the site. • No construction activities will take place in the water protection zone; this includes material storage, vehicle washing, waste storage, machinery repairs, latrines 	Contractor	PSG, LIEC, IEM	Included in bid price

Sub-Project Activity	Environmental Impact / Issue	Mitigation measures	Implemented by	Supervised by	Cost (\$)
Civil works and material movement	Community H&S	<p>30. The contractor will implement the following mitigation measures:</p> <ul style="list-style-type: none"> • Appropriate fencing/protective barriers, / buffer zones and /or signs as required will be provided around all construction sites including barriers where needed on access roads. • Appropriate fencing/protective barriers if required, to prevent access by members of the public and livestock to any borrow site excavations • Warning signs if mud is likely on asphalt public roads. Mud will be removed at the end of each day. Other spillages on public roads will be removed immediately. • Signage and speed controls if public roads are to be affected by construction traffic e.g. on haul roads • Adherence to speed restrictions at all times for all vehicles. • All construction sites and damage to roads including haul roads, will be rehabilitated after construction and any grassland impacted will be reseeded with native species. 	Contractor	PSG, LIEC, IEM	Included in bid price
Existing facility decommissioning	Water and Soil quality	<p>31. Mineralised sludge will be disposed of to the appropriate aimag landfill site or retained on site to support growth of vegetation if the sludge beds if appropriate</p> <p>32. Wastewater in any ponds will be drained via the wastewater treatment plant with any residual water left to evaporate.</p>	Contractor	PSG, LIEC, IEM	Included in bid price
		OPERATION PHASE			
All operations (operation and maintenance (O&M))	Water quality, odor, soil quality	<p>33. As part of O&M manual, the operator will provide clear methods and procedures for all aspects of the WWTP operation, including the following key issues:</p> <ul style="list-style-type: none"> • all stages of wastewater treatment 	Operator	State inspection Agency / MNET	Included in O&M Budget

Sub-Project Activity	Environmental Impact / Issue	Mitigation measures	Implemented by	Supervised by	Cost (\$)
		<ul style="list-style-type: none"> • all stages of septic tank/pit latrine vacuuming, transport and evacuation at reception facilities • sludge management and options for sludge reuse • preventative maintenance & inspection program for all site plant and machinery (include: key spare parts, power supply maintenance, inspections program) • environmental analysis program and procedures (effluent, sludge, water analysis) • solid waste management (containment, storage, transport, disposal) • disposal of screenings, grit and sand; and • other aspects appropriate to the site operation 			
Use of sodium hypochlorite and other hazardous chemicals	Occupational H&S	<p>34. The operator will implement the following measures:</p> <ul style="list-style-type: none"> • Do not keep the container sealed and handle and open container with care. <ul style="list-style-type: none"> • Ensure adequate ventilation • Use personal protective equipment; avoid contact with the skin and the eyes. • Do not breathe vapours or spray mist; use respirator with appropriate filter if vapours or aerosol are released. • Emergency eye wash fountains and emergency showers should be available in the immediate vicinity. • Hygiene measures: Keep away from food, drink and animal feed stuffs, smoking, eating and drinking should be prohibited in the application and storage area, wash hands before breaks and at the end of workday, take off all contaminated clothing immediately. • Ensure clear labelling of hazardous materials and relevant warning signs 	Operator	State inspection / Agency / MNET	Included in O&M Budget

Sub-Project Activity	Environmental Impact / Issue	Mitigation measures	Implemented by	Supervised by	Cost (\$)
All operations	Site based H&S	<p>35. The operator will develop site specific H&S procedures which will ensure the operator will</p> <ul style="list-style-type: none"> • Develop and implement a comprehensive H&S training programme • Undertake risk assessments for high risk processes and roles and appropriate mitigation measures • Use of appropriate PPE including measures to enforce its use and PPE for specific situations including handling chemicals; • Electrical safety testing of WWTP equipment prior to use • Undertake health assessments (annual medical) for workers and analysis of results to identify trends • Emergency Procedures – actions required under emergency situations including worker accident, fire, chemical spill and other measures as required by the operator. • Give access to first aid and appropriate health and safety information for all staff. 	Operator	State inspection / Agency / MNET	Included in O&M Budget
WWTP Operation and Sludge Management	Odor	<p>36. The operator will mitigate odor nuisance through</p> <ul style="list-style-type: none"> • Quarterly meetings with residents and / or their representatives to identify odor or nuisance issues and implement corrective actions; • Movement of any sludge materials off site on days of low wind speed • Develop and implement boundary odor monitoring procedures and record the results. Reference procedures may include those developed by the Environment Agency (UK) or EPA (USA). 	Operator	State inspection / Agency / MNET	Included in O&M Budget

Sub-Project Activity	Environmental Impact / Issue	Mitigation measures	Implemented by	Supervised by	Cost (\$)
		<ul style="list-style-type: none"> • A buffer zone will be set up around the WWTP in accordance with Article 4.20 of the Construction Norms and Standards: 40-01-14 (150m buffer). • No households are located within the buffer zone of the treatment plants. 			

B. Monitoring Plan

14. The project monitoring conducted under the EMP includes:

- **Project readiness monitoring.** Monitoring to check progress on project readiness and close gaps through corrective actions.
- **Environmental quality monitoring.** To be conducted by the IEM appointed by the PMU, involving the collection and analyses of air quality, noise and water quality data at designated monitoring locations for assessing compliance with applicable environmental quality and emission standards during construction.
- **EMP compliance monitoring.** To be conducted by the PSG to verify EMP compliance during project implementation.
- **Affected People monitoring (consultation).** This is to be conducted by the PSG via consulting affected people on the impacts during construction.
- **Operational monitoring.** This is required as part of the operations of the sub-project and will be undertaken by the PUSO.

1. Project Readiness Monitoring

15. Before construction, the Project Management Implementation Support (PMIS) consultants will monitor the project's readiness on environmental management based on a set of indicators (Table 3) and report it to ADB and PMU. This assessment will formally demonstrate that environmental commitments are being carried out and environmental management systems are in place before construction starts, or suggest corrective actions to ensure that all requirements are met.

Table 3: Project Readiness Indicators

Indicator	Criteria	Are the Criteria met?	If No, What Corrective action is needed?	Date for Corrective Action Completion
		Yes/No		
1. EMP update	EMP updated after detailed design & approved by ADB	Y/N		
2. Compliance with loan covenants	The borrower complies with loan covenants related to project design and environmental management	Y/N		
3. Public involvement effectiveness	Meaningful consultation completed	Y/N		
	GRM established with entry points	Y/N		
4. Environmental supervision and monitoring in place	Recruitment of external staff as set out in the Institutional Arrangements for this EMP	Y/N		
	Nomination of government staff for PMU roles as set out in the Institutional Arrangements for this EMP	Y/N		
5. Bidding documents and contracts with environmental safeguards	Bidding documents and contracts incorporate the environmental activities and mitigation measures required by this EMP	Y/N		
	Bidding documents and contracts incorporate the Particular Conditions for bidding (see Appendix 2))	Y/N		
6. EMP financial support	The required funds have been set aside for EMP implementation including training and capacity building	Y/N		

ADB = Asian Development Bank, EMP = Environmental Management Plan, GRM = grievance redress mechanism, PMU = project management unit.

2. Environmental quality monitoring

During construction, the impact on the sensitive environmental receptors will be monitored and compared against the relevant national standard, as shown in:

16. The construction environmental baseline will be established by monitoring the same locations before construction, as during construction. The construction environmental baseline will be sampled not more than one month before the start of construction.
17. Prior to and during commissioning of the WWTPs, a series of tests will be conducted to ensure proper functioning of the WWTPs and ability to achieve Mongolian discharge standard.
18. During operation, the PUSO will be expected to maintain an adequate budget to ensure environmental monitoring (in particular effluent) can be undertaken as per national requirements. A Supervisory Control and Data Acquisition (SCADA) software system including wastewater quality monitoring devices for real-time monitoring of key parameters (COD, BOD, NH₄-N, phosphorus and suspended solids) will be installed at the WWTPs. Daily check, repair and maintenance procedures will be instituted for all wastewater treatment steps (see O&M Procedures in Mitigation Measures).
19. The effluent from the WWTPs will be monitored to ensure compliance with effluent standards (MNS 4943:2011) by the PUSOs.

Table 4: Environmental Quality Monitoring

Environmental Indicators	Location	Method & Frequency	Responsibility		Analysis cost / unit or sample*
			Supervision	Implementation	\$ USD
Pre-Construction Environmental Baseline					
Air Quality	Nearest residential receptors (2 locations)	1 day (24-hr) once Means in accordance with national standard Parameters: PM ₁₀ , CO ₂ , NO ₂ , SO _x	PMU	IEM	\$10
Noise	Nearest residential receptor (2 locations)	1 day (24-hr) once Means in accordance with national standard	PMU	IEM	\$10
Surface Water Quality	Downstream at nearest water body to construction sites - two samples (Monitor when construction active)	Once Means in accordance with national standard Parameters: SS, pH, dissolved oxygen, COD, BOD, faecal coliforms (according to laboratory capabilities).	PMU	IEM	\$40
Construction Phase					
Air Quality	Nearest residential receptors (2 locations) (Monitor only when construction activities occur within 250 m)	1 day (24-hr) twice during construction (minimum) Means in accordance with national standard Parameters: PM ₁₀ , CO ₂ , NO ₂ , SO _x	PMU	IEM	\$10
Noise	Nearest residential receptor (2 locations) (Monitor only when construction activities occur within 250 m)	1 day (24-hr) twice during construction (minimum) Means in accordance with national standard	PMU	IEM	\$10
Surface Water Quality	Downstream at nearest water body to construction sites - two samples (Monitor when construction active)	Twice during construction (minimum) Means in accordance with national standard Parameters: SS, pH, dissolved oxygen, COD, BOD, faecal coliforms (according to laboratory capabilities).	PMU	IEM	\$40
Post-construction site inspection	Each construction site.	Performance checked against the management plans submitted before construction	LIEC	PSG	\$50
Operations Phase					

Environmental Indicators	Location	Method & Frequency	Responsibility		Analysis cost / unit or sample*
			Supervision	Implementation	\$ USD
WWTP effluent quality	Effluent outfall (after IFAS works)	Automated monitoring, (SCADA software) WWTP effluent point Parameters: COD, BOD, TP, (online); NH4-N, SS, EC, pH (parameters of MNS 4943:2011)	Aimag Central Laboratory of Environment – Quarterly	PUSO Laboratory - weekly	Included in operator costs
Air quality (noise, odors)	At boundaries of WWTPs, effluent point, sludge beds.	Boundary odor monitoring, dB(A), H2S, NH3, dust	Aimag Central Laboratory of Environment – Quarterly		
Sludge quality	Sludge drying beds	Parameters: Heavy metals, ammonia, nitrate, phosphorous, faecal coliforms (according to laboratory capabilities in aimags) Quarterly	Aimag Central Laboratory of Environment – Quarterly		
Surface Water	At the point after disinfection facility and Receiving Water Body 50m upstream, 200m downstream	Parameters: Temperature, DO, SS, NH3N, TN, TP, BOD5, COD Cr, sulfate, nitrate, chloride, oils (according to laboratory capabilities in aimags). Analysis Monthly according to: 1. MNS3934:1986 Chemical analyses for reserving and transporting industrial and drinking water, 2. MNS /ISO/ 5667-11:2000 Water quality. Sampling, Chapter 11: Guidelines for water sampling from underground water, 3. MNS 5667-10:2001. Water quality, Sampling/ Chapter 2: Sampling of waste water	Aimag Central Laboratory of Environment		
*Prices for laboratory analysis only. Cost for IEM is included as a separate budget item.					

3. EMP Compliance Monitoring

20. In order for the EMP to be effective, all its mitigation measures must be monitored to ensure they are implemented. Note this applies to construction only; during operation, it is the responsibility of the appropriate ministry or its line department to ensure monitoring of operational facilities is completed. The costs for this monitoring are included in the project budget for the PSG and Contractor. Table 5 sets out the EMP issues that will be monitored monthly by the PSG during internal monitoring/supervision. During construction, the PUSO Support Groups will be responsible for conducting internal environmental monitoring (consisting mainly of visual site inspection). The groups will be supported the resident engineers and the LIEC of the PMIS. Supervision results will be reported through the resident engineers' quarterly reports to the PMU.

Table 5: EMP Compliance Monitoring

Environmental Indicators	Location	Method & Frequency	Responsibility*
			* With support from LEIC when mobilized
Air Quality	Civil works sites	Monthly checking against mitigation measures specified in this EMP on site (visual inspection required)	PSG
Noise	Civil works sites	Monthly checking against mitigation measures specified in this EMP on site (visual inspection required)	PSG
Flora	Civil works sites	Monthly checking against mitigation measures specified in this EMP on site (visual inspection required)	PSG
Soil and land resources	Implementation site of Spoil and Borrow Site Management Sub-Plan A	Monthly checking against mitigation measures specified in this EMP on site (visual inspection required)	PSG
Resource use and natural resource contamination	Implementation site of Solid and Liquid Waste Management Sub-Plan B	Monthly checking against mitigation measures specified in this EMP on site (visual inspection required)	PSG
Human health and safety	Implementation of Community and Occupational Health and Safety and Emergency Response Sub-Plan C	Monthly checking against mitigation measures specified in this EMP on site (visual inspection required)	PSG
Contamination of water, soil, waste production and social issues	Implementation of Construction Workers Management Sub-Plan D	Monthly checking against mitigation measures specified in this EMP on site (visual inspection required)	PSG

4. Affected People Monitoring

21. The PSG, supported by the LIEC will undertake monitoring through consultation on the impacts of the construction on affected people.

Table 6: Affected People Monitoring

Environmental Indicators	Location	Method & Frequency	Responsibility
			Monitored By
Community Issues <ul style="list-style-type: none"> • Environmental impacts of civil works (e.g., solid & liquid waste, erosion, pollution). • Any unforeseen impacts caused by accidentally e.g. through spillages • Civil nuisance (e.g., noise, disrupted business & farming activity, social issues, community health and safety). • Impaired use of access roads (e.g. traffic issues and access). • GRM and its procedures & key contacts 	Civil works sites, borrow sites and haul roads	Consultation interview with Affected People Using the form in Appendix 1 4-6 weeks after construction starts then every 2 months until end of construction	PSG/LIEC

III. Reporting and Implementation

A. Reporting

22. Environmental monitoring and inspection activities and findings will be documented for purposes of reporting, record keeping, verifying, referring and evaluating the environmental performance of the Project. The documentation shall also be used as basis in correcting and enhancing further environmental mitigation and monitoring measures. Environmental monitoring reports will be prepared as shown in Table 7.

Table 7: Environmental Safeguards Reporting

Report	Frequency	From	To
EMP Implementation Progress and Monitoring Results	Quarterly	PSG	PMU, LIEC, IAs
EMP Progress and H&S Issues	Monthly	Contractor	PMU
Independent environment monitoring report results	Twice during construction period	IEM	PMU, ADB
Project Progress Reports (including EMP section and Adherence to Environmental Covenants/Conditions)	Quarterly	PMU	ADB
Full Project EMP Progress Report	Annual	PMU /LIEC	ADB

23. **EMP Implementation Progress and Monitoring Results.** Monthly internal progress reports will be prepared by the onsite supervision engineers of the PMIS (on behalf of the PUSO and the PSG) during construction, submitted to the PMU and LIEC. These monthly reports will include; (a) physical progress of the component; (b) mitigation measures implemented; (c) grievances received, resolved, closed and/or directed to other mechanisms; (d) emergencies responded to; and (e) corrective actions taken.
24. **EMP Progress and H&S Issues.** The contractor will prepare a monthly report highlighting any issues with EMP implementation and will record any health and safety incidents on the construction site. EMP issues will include (a) areas where potential compliance cannot be adhered to in the forthcoming month; (b) areas where the EMP was not adhered to in the previous month (c) proposed alternative mitigation measures for the future month if compliance cannot be met.
25. **Independent environment monitoring report.** Environmental impact monitoring reports will be prepared by the IEM contracted by the PMU to report on the results of environmental quality monitoring as specified in the EMP. Two reports will be prepared for each project site during the construction and commissioning stages. The reports will include the analysis results and assessment of compliance/non-compliance with the EMP, Mongolian and international standards
26. **Annual EMP progress reports,** by the LIEC (on behalf of PMU) to be submitted to ADB and MNET to comply with environmental agreement in the loan and Mongolian Law on EIA.

B. Training, Capacity Building and Awareness

27. To ensure effective implementation of the EMP, the capacity of the PMU, PUSOs, contractors will be strengthened, and all parties involved in implementing mitigation measures and monitoring of environmental performance must have an understanding of the goals, methods, and the best practices of project environmental management. The aimag environmental department and the LIEC will offer training specific to their roles for aimag cities under the project. The main training emphasis will be to ensure that the contractors, supervision engineers, PSGs and PUSOs understand their role and the importance of environmentally sound practices and are able to undertake all construction and operation with the appropriate environmental safeguards.
28. The training program also addresses long-term capacity building and awareness raising needs, i.e. for the operational phase of the WWTPs. Training and awareness raising campaigns will be provided by qualified operation and maintenance experts and the PMIS consultants
29. Training Needs Assessments will be conducted by the LIEC to tailor the training for maximum impact. The trainer will include in their program a before/after assessment to evaluate the success of the training. Training will be provided throughout the implementation of the project and the training program is summarized in Table 8.

Table 8: EMP Training

Subject Area	Participants	Training Provided by:	Frequency	Cost
EMP requirements	PMU, PUSOs, supervision engineers, contractors	LIEC	Twice - Once prior to, and once after the first year of project construction	\$5000
Grievance redress mechanism (GRM)	PMU, PSGs, PUSOs, supervision engineers, contractors, aimag and bagh representatives	LIEC	Twice - Once prior to, and once after the first year of project construction	\$1000
Health and Safety Training	PMU, PUSOs, supervision engineers, contractors	LIEC	Twice - Once prior to, and once after the first year of project construction	\$3000
WWTP Operation	Included in Project Output B2: institutional reform and capacity development			

C. EMP Implementation Costs

30. The environmental management (including supervision, mitigation, monitoring and training) requiring a specific budget outside the civil works contracts are shown in Table 9.

Table 9: EMP Costs (construction)

Item	Cost \$ USD
Loan Implementation Environment Consultant (5 pm international, 18 pm national), including traveling and per diem	160,000
Independent Environment Monitor (10 pm national)	35,000
Resident engineers (at PUSOs) for weekly EMP supervision	200,000
Environmental quality analyses	5,000
EMP training	8,000
Total	\$ 408,000

D. Mechanism for Feedback and Adjustment

31. Based on environmental monitoring reports, the PMU and PSGs with the assistance from the LIEC will decide whether (i) further mitigation measures are required as corrective actions, or (ii) some improvements are required for environmental management practices.
32. The effectiveness of mitigation measures and monitoring plans will be evaluated by a feedback reporting system. Adjustment to the EMP will be made, if necessary. The PMU will play a critical role in the feedback and adjustment mechanism with the support from the LIEC.
33. The need to update and adjust the EMP will be reviewed when there are design changes, changes in construction methods and program, negative environmental monitoring results or inappropriate monitoring locations, and ineffective or inadequate mitigation measures. Based on environmental monitoring and reporting systems in place, the PMU and PSGs with the support of the LIEC will assess whether further mitigation measures are required as corrective action, or improvement in environmental management practices are required. The PMU will inform ADB promptly on any changes to the project and needed adjustments to the EMP. The updated EMP will be submitted to ADB for review and approval, and will be disclosed on the ADB project website.

E. Conclusion

34. The EMP, if implemented as directed, will mitigate impacts on the natural environment and affected people to an acceptable level. The key parties for mitigation measure implementation are the construction contractors and the operators. The implementation of this EMP will be closely monitored and reported on by the relevant stakeholders in the project.
35. The most significant long term environmental impacts from the project will arise from facility operation, rather than construction. As a result, there is a training and capacity building component to the project which is essential for ensuring the investment is both financially and environmentally sustainable and beneficial.
36. A robust Grievance Redress Mechanism will be established, as outlined in the IEE. It will ensure that all unplanned impacts which cause grievances for affected people are managed swiftly and a satisfactory outcome brought about.
37. Overall, the project is anticipated to bring environmental benefits to the populations of the project cities. It will serve to improve the current sewage management situation and will provide long term environmental improvements.

APPENDIX 1: Consultation / Interview Form

Date of Interview		Interviewer Name	
Interview Site: <i>Where is the interview held? In school, on the road, in shop</i>		Stakeholder Name & Status: <i>Full name, status business owner, school teacher, resident etc.</i>	
Construction Site & Date Construction Started <i>Which site/borrow sit/haul road, GPS location if available</i>		Has this stakeholder been interviewed before? <i>Yes (when were they interviewed) No</i>	

Interview Discussion Points:

1. NOISE	Record of Discussion
Before the project started, was the person disturbed by noise? If yes, explain how and when. <i>Where did the noise come from? E.g. traffic, machinery, people, music When did it disturb the person? E.g. all day, at night, intermittently</i>	
During the construction, is the person disturbed by noise from the project? If yes, explain how and when. <i>What type of noise and where did the noise come from? All day, at night, intermittently?</i>	
If noise from construction is a problem, what changes does the person suggest are made?	
2. AIR QUALITY	Record of Discussion
Before the project started, was the person affected by air pollution or dust? If yes, explain how and when. <i>Where did the pollution or dust come from? E.g. traffic, machinery, construction, burning garbage, cooking stoves When was the dust or pollution a problem? E.g. all day, at night, intermittently</i>	
During the project, is the person disturbed by dust or pollution? If yes, explain how and when. <i>What type of noise and where did the noise come from? E.g. increased traffic congestion, construction machinery, construction workers, burning construction garbage etc When did it disturb the person? E.g. all day, at night, intermittently</i>	
If dust or air pollution from the construction is a problem, what changes does the person suggest are made?	
3. VEGETATION AND LAND USE	Record of Discussion
Before the project started, what was the vegetation like in the project area? <i>E.g. pasture land, trees, shrubs.</i>	

During the project, has the person found the vegetation situation has changed? If yes, explain how and when.	
If impact on vegetation is unacceptable, what changes does the person suggest are made?	
4 COMMUNITY SAFETY	Record of Discussion
Before the project started, can you describe the community safety situation in the project area? <i>E.g. no problems, some accidents, difficulty crossing the roads</i>	
During the project, has the person found the community safety situation has changed? If yes, explain how and when. <i>Slower traffic so easier to cross the roads, construction vehicles are making a crossing harder / easier, more accidents / less accidents, construction site dangers</i>	
If change in road safety is unacceptable, what changes does the person suggest are made?	
5. WATER QUALITY	Record of Discussion
Before the project started, was the person affected by poor water quality? If yes, explain how and when. <i>Ground water ? Surface Water ? which Water source ? How was it polluted ?</i>	
During the project, is the person affected by water pollution? If yes, explain how and when. <i>Ground water ? Surface Water ? which Water source ? How is quality being affected ?</i>	
If water quality from the construction is a problem, what changes does the person suggest are made?	
6. ACCESS	Record of Discussion
During the project, is the person affected by reduced access to their business, home or land ? Access to what is limited, and how ?	
If access limitations are not acceptable, please suggest changes which can be made ?	
7. OTHER ISSUES	Record of Discussion
Any other issues about the construction sites that the person wants to discuss? <i>E.g. wastewater concerns, waste disposal, Other concerns, labour force,</i>	

APPENDIX 2: Particular Conditions for Bidding

38. The following clauses shall be added to the Bidding Document, 'Particular Conditions' in relation to the Environmental Safeguards for the Project:
39. The contractor will undertake to develop and submit to the PMU for approval, a site specific Construction Environmental Management Plan with the following management sub-plans:
 - Spoil and Borrow Site Management;
 - Solid and Liquid Waste Management;
 - Community and Occupational Health and Safety and Emergency Response;
 - Construction Workers' Camp Management (if required).
40. The management sub-plans will be sufficiently detailed as to allow a clear understanding of the approach the contractor will take to mitigate environmental impacts during construction. The contractor will adhere to the management sub-plans at all times unless prior agreement has been given by the PMU under extenuating circumstances.
41. The Contractor will commit to enabling the project staff or consultants tasked with monitoring, full access to all information and data required in order that the Environmental Management Plan can be fully monitored.