

Environmental Management Plan

Semestral Report
January 2012

ARM: Water Supply and Sanitation Project – Improvement of Water and Sanitation Systems of Villages Odzun, Tsater and Deghdzavan

Prepared by Armenian Water and Sewerage Company for the Republic of Armenia and the Asian Development Bank.

APPENDIX

CONTRACT No. WSSP-07/4-01

Part D –Special conditions of the contract

SUB-PROJECT XXIII - SETTLEMENTS OF ALAVERDI REGION

PACKAGE XXIII.1 – IMPROVEMENT OF WATER AND SANITATION SYSTEMS OF VILLAGES ODZUN, TSATER AND DEGHDZAVAN

ENVIRONMENTAL MANAGEMENT PLAN



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LIST OF ABBREVIATIONS

RA	MNP - Republic of Armenia Ministry of Nature Protection
RA	MH - Republic of Armenia Ministry of Health
RA	MTA - Republic of Armenia Ministry for Territorial Administration
RA	MC - Republic of Armenia Ministry of Culture
LSGA	– Local Self-governing authorities
EIA	- Environmental Impact Assessment
AWSC/ADB PMU	-“Armwatersewerage” /Asian Development Bank Project Management Unit
EMP	Environmental Management Plan
IEE	Initial Environmental Examination
DD	Detailed design

According to the ADB Environmental policy (November 2002), the sub-project is ranked to Category B, which does not require a full/large scale EIA. The sub-project does not require also Conclusion of Environmental Expert Examination, in accordance with the RA legislation - RA Law on Environmental Expert Examination (20 November 1995) and RA Government's Decision on limit sizes of planned activities subject to Environmental Expert Examination (N-193, 30 March 1999).

1. INTRODUCTION

This report has been developed for the sub-project on improvement of water supply and wastewater systems of villages Odzun, Tsater and Deghdzavan. The sub-project design was implemented by JINJ Ltd and HGSN joint venture. Rehabilitation of water supply and wastewater systems includes construction of water supply distribution network lines and buried valve nodes, reconstruction of inlet lines of private houses, replacement of some segments of water main.

Adverse environmental impacts can be both in the course of construction implementation and during further operation of water supply systems. The impacts during construction can be cutting of vegetation, land erosion, air pollution, as well as land and water resources pollution with lubricants, chlorine, and household and construction waste, environment pollution with household wastewater. In the operation stage the adverse environmental impacts reduce and are related to improper implementation of operation rules.

One of the essential positive environmental impacts is water resources protection, water loss reduction and sustainable use, as well as prevention of environment pollution with household wastewater and epidemics.

Social and economic impact of water systems improvement are mainly positive - excluding mixing of drinking, irrigation, and sewerage water, reduction of water pollution hazard, preventing, excluding penetration of infectious disease viruses into drinking water; increasing duration of water supply to population, providing sustainable water use, reasonable water consumption. Improvement of wastewater system will have positive impact on the environment, water and land resources and human health.

Below the description of possible adverse impacts during various stage of the project implementation is provided, as well as the proposed mitigating measures.

- *Design stage*

Design works have been implemented by JINJ Ltd. and HGSN Ltd. joint venture, which was selected as Consultant for ADB funded “Water supply and sanitation project”. The design documents include items on climatic conditions, relief, soil types, hydrology, vegetation types and the requirements for obtaining the required permits from the Ministry of Nature Protection, other ministries and from the community leader. The documents include also appropriate environmental and social parts. The design package includes also the Environmental Management Plan (EMP) of this package. The project Consultant shall

follow the corresponding provisions of RA environmental and social legislation, as well as ADB's guidelines and strategies, mentioned in the Contract.

- *Construction stage*

In general, during the construction stage the Contractor must follow the measures provided in the EMP, such as to reduce to minimum the noise and dust from the construction site.

- *Operation stage*

The operation must be implemented in accordance with the operation rules and standards.

To reduce adverse environmental impacts during the construction and operation stages, EMP has been developed, which represents the list of the required measures (Appendix A).

2. PROJECT DESCRIPTION

2.1. Description of the existing water supply system

Village Odzun. Presently water supply to the village is implemented through Lori-Berd and Agarak water mains by gravity, which emerge from Lori Berd and Agarak spring intakes.

Both water mains pass through the southern part of the village, at a certain distance from each other. Agarak water main ends up at the ending part of the village Odzun, and the Lori-Berd water main branches into two water mains, which are laid parallel to each other. One of these mains is disconnected at the branching point and also blanked off at the end of the village with the purpose of using that part of the main as a distributing pipeline for water supply distribution network. In recent years also a steel pipeline was constructed, through which water from Agarak water main is given to the above mentioned distributing pipeline, as well as distribution network with total length of about 6.7 km. Presently, a part of the village Odzun, the distribution network of which was constructed in recent years, is fed from the above mentioned distribution pipeline at the expense of AWSC, while the feeding of the other part of the village is implemented from both Agarak and Lori-Berd water mains.

The other lines of the distribution network have been constructed by residents, with pipes of different diameters and materials.

Chlorination of these systems is implemented in the chlorination system located nearby village Karmir Agheg, where ALLDOS chlorinating equipment is installed.

Village Tsater Water supply to this village too is implemented from the Lori-Bard and Agarak water mains by gravity. Water supply to Tsater is implemented through two main pipelines. One of the pipelines, constructed earlier than the other one, is fed from the Agarak water main, through which water is supplied to the 80.0m³ capacity circular storage reservoir

of the village located at the 1220.0m absolute elevation. The second pipeline, which was constructed in the 1990s, is fed from the Lori-Bred water main and supplies water to the 200.0m³ capacity rectangular storage reservoir located in the southern part of the village at 1245.0m absolute elevation. The village has two more supply pipelines from asbestos-cement and steel. Presently water supply to the village is mainly implemented through the system fed from the Agarak water main; however, the elevations of this pipeline and the DRR allow providing water supply to the lower located parts of the village.

Actually, through the system fed from the Lori-Berd water main it is possible to provide water supply to the whole village. However, because of not correct selection of the route of the pipeline feeding the 200.0m³ DRR and the connection junction, supplying water to the DRR is not always possible. During the year period when the water flow increases in the springs and therefore a certain pressure is available at the point of connection with the Lori-Berd water main, it is possible to supply an insignificant amount of water to the DRR.

The existing water supply network of the village includes about 12.0km long 50-100mm pipelines (water main and distribution network). The network is implemented from steel and asbestos-cement pipes.

Village Deghdzavan The population of Deghdzavan community is 335. The average maximum water demand makes 1 l/sec, the maximum demand of daily maximum makes 3.5 l/sec.

Some sections of pipeline feeding Deghdzavan are dismantled as a result of which Deghdzavan community does not get water. In the past borehole N39 provided the community with water.

W=2x125m³ capacity DRRs of the village need to be completely rehabilitated.

In 2005 a pipeline Dp=100mm, È=300m over the irrigating canal was constructed from DRR to the village. Some emergency sections were repaired.

The internal water supply net is realized with D=50-100mm dimension steel pipes with 2km total length. It is necessary to design street waterlines for some sections of newly developing districts.

According to the agreement gained between the Client, Consultant and administrations of the villages Odzun, Tsater and Deghdzavan, independent on the diameter and importance of the water line passing through the given street, upon completion of the construction:

2.2. Description of the proposed rehabilitation works

The purpose of this project is to rehabilitate Odzun and Tsater villages' drinking water supply system and provide the villages' population with safe drinking water, improve water distribution and metering systems.

Village Odzun. According to the data, received from the village administration, the number of population is 5800, as of 01.01.2011. Taking into consideration future development growth (by 2025) by 0.8% of annual growth, the number of design population will be 6485.

The water demand rate is assumed as 200L/ day per capita including leakage.

The average hourly flow of the maximum daily water demand of the whole village is
 $Q_{av.h.} = 19.5 \text{ L/sec.}$

Within the framework of the project it is planned to construct new water lines, feeding of which will be implemented from the Lori-Berd water main's distribution pipeline segment, since in the future it is planned to implement the supply to the whole village from the same pipeline, decommissioning the Agarak water main.

Under the present design it is planned to construct in the village Odzun about 14.2 km long de40-de110 diameter PE water lines of the distribution network and 29 buried valve nodes. Besides, it is also planned to fundamentally reconstruct 849 individual houses inlet lines and to construct water metering chambers.

Village Tsater According to the data, received from the village administration, the number of population in the village is 443, as of 01.01.2011. Taking into consideration future development growth (by 2025) by 0.8% of annual growth, the number of design population will be 495.

The water demand rate is assumed as 200L/ day per capita including leakage.

The average hourly flow of the maximum daily water demand of the whole village is
 $Q_{av.h.} = 1.5 \text{ L/sec.}$

Within the framework of this design it is planned to replace the route of a segment of the existing steel Ø100 water pipeline, by-passing the upper located part and for by-passing the $1 \times 200 \text{ m}^3$ capacity DRR in case of emergency, it is planned to construct an intermediate water line. It is planned also to construct distribution and air removal chambers.

Within the framework of this project it is planned to construct about 3.0km long de40-de110mm polyethylene water lines of distribution network, as well as DN32-DN100 mm 9 buried valve nodes.

It is planned also to fundamentally reconstruct 151 individual houses inlet lines and to construct water metering chambers.

Deghzavan village

1. Construction of new pumping station in the area of Haghtanak village DRRs for water supply of Deghzavan village

- Construction of a new building for the pumping station.
- Installation of two pumping units ($H=11\text{ m}$, $Q=2\text{ l/sec}$, $N_{el}=4\text{ kW}$), one of them is spare.

2. Construction of Haghtanak-Deghzavan new conduite $\bar{E}=6750\text{ m}$, $D_p=75\text{ mm}$.

3. Rehabilitation of Deghzavan village DRRs

- Cleaning of the interior surface of $W=2 \times 125\text{ m}^3$ capacity DRRs from accumulated sludge.
- Inforcement of the joints of the walls and bottom with monolith r/concrete wrapper.
- Filling the existing cracks with reinforced fine plaster,
- Cleaning the r/concrete constructive parts of DRR inspection holes, valve well stone walls from deteriorated concrete and covering it with protective plaster and soil layer.
- Reconstruction of valve well,
- Replacement of technological pipelines and valves.
- Bringing the DRR area into order (fencing and sodding).

4. Rehabilitation of water supply internal net work with

-- $D_p=50\text{ mm}$ diameter, $\bar{E}=230\text{ m}$ total length,

5. Construction of valve junctions -2 pieces,

6. Construction of buried valve junctions – 2 pieces,

7. Construction of entrance pipelines to individual houses -50 lm,

8. Construction of water metering junctions for individual houses - 5 pieces.

1. In Odzun village the surfaces of the excavated trenches in streets with normal asphalt concrete cover are to be rehabilitated with asphalt-concrete layer, and the trenches in streets with deteriorated asphalt-concrete cover are to be rehabilitated with gravel layer impregnated with bitumen.

2. In Tsater village the surfaces of the excavated trenches in streets with asphalt concrete cover are to be rehabilitated with soil layer.

Table 1. Works planned in Odzun and Tsater villages

Planned works (construction, reconstruction, repair)				
Residential area	Water lines L,km	Private house connections	Buried valve nodes	Chambers
Odzun	5.4	300	17	
Tsater	3.0	151	9	3
Deghdzavan				

3. DESCRIPTION OF ENVIRONMENT BASELINE CONDITIONS

3.1. The geographical location and climate of the settlements

Villages Odzun, Tsater and Deghdzavan are located in the northern part of the Lori Marz, at 170km (Odzun) and 180km (Tsater) distances from Yerevan. From geomorphologic point of view it is located in Debed river basin.

The Lori marz involves the whole basin of river Debed and has mountainous relief. It is notable for its relatively wet climate. In mid and higher altitude zones the climate is temperate, with long and cold winters. There is a stable snow cover each year. Summers are warm, relatively humid.

The region under study is located in the II climatic zone and is characterized by relatively moderate summer and winter.:

Average annual air temperature is 9.1°C.

Absolute maximum air temperature is 37°C:

Absolute minimum air temperature is 24°C.

Average annual precipitation is 593 mm.

Snow cover thickness is 60 cm.

Maximum soil frost depth is 50cm.

Southern and northern, north-western winds with are predominant. Once in 10 years winds with 25m/sec velocity and once in 20 years – with 28m/sec velocity are possible.

From geomorphologic point of view, the area is located on the left-bank lava plateau of river Debed. The lava plateau is represented by basalt and andesite-basalt flows, which stretch along the river, passing sometimes to the left and sometimes to the right slopes, and sometimes covering both. Its width gradually increases, reaching 2.5 km.

The area relief is plain, characterized with hilly-wavy forms with small inclination to Debed. The hydro geological conditions are conditioned by the geological structure of the area, filled up with volcanic, volcanic-sedimentary rocks, where groundwaters are related to the rock fractures and have small discharge.

In the southern lower located parts of Odzun there are local accumulations of groundwater related to loose-fragmental, delluvial-proluvial sediments.

Local accumulations of groundwater are present only in the southern lower located parts of Tsater, related to loose-fragmental, delluvial-prolluvial sediments at 3.0-3.5m depths.

In general, the area is not rich with ground and underground water, since the Debed river canyon is rather deep; near Tumanyan railway station its depth reaches 350 m and its serves as a natural drain.

From seismotectonic point of view the area is located within the folded zone of Armenia. The area is considered one of the most seismically active zones of the Republic.

According to the RACC II – 6.02.2006, the area belongs to the II seismic zone, with 0,3g-0,4g background acceleration.

Among dangerous physical-geological processes are extensive surface washing by surface waters, erosion volcanic weathering and destruction.

3.2. Environmental examination

In the geological structure of the area the groups of volcanic rocks of Upper Eocene age take part: andesite-basalts covered by layers of Quaternary age alluvial, eluvial, deluvial-proluvial, deluvial formations - clay, sand, fragmental soils.

From hydro-geological point of view the area is included in the region of fracture waters of various eruptive rocks.

Underground waters are related to both volcanic and alluvial rocks, belong to fractural cavity, porous-cavity, partially terrain water types. Groundwaters linked to volcanic rocks, according to the published literature, are located at 10.0-15.0m depth, and those linked to alluvial rocks – at 3.0-8m depths that can generate significant flow.

The area is notable for its rich and special biodiversity, high value of geological and landscape complexes and their separate components, unique natural and historical-cultural monuments, health and recreation resources.

Flora: Odzun and Tsater communities are located within Lori floristic region that is notable for a series of peculiarities. First of all the plant community characteristic for the region is notable. At the same time, along with steppe, valley formations, tragacanth plants here also forests are represented with dominating *Quercus* and *Fagus*. There are also wild *Pyrus*, *Malus*, *Prunus*, as well as bushes of *Rosa* on cliffs. In the field of Lori there are crop plants and valley-steppe communities, in north-east – *Juniperus* forests. In the steppe zone there are *Prangos ferulaceae*, *Goebelia alopecuroides*, *Cirsium ciliatum*, In alpine and sub-alpine valleys there are *Gentiana ciliate*, *G. cruciata*, *Glechoma hederaceae*, *Platango major*. In the higher-mountainous zone there are sub-Alpine and Alpine valley communities. In forests there are *Urtica dioica*, *U.urens*, *Lotus corniculatus*, *Cephalaria transsylvanica*, *Centaureum erythraea*.

In general, there occur 6 endemic species in Lori floristic region, there are also around 50 rare and endangered species.

Fauna. In the regions under study the animal species are diverse. Among mammals are wolf, fox, rabbit, jackal, hedgehog, squirrel, etc. Among birds are Accipiter gentilis, wild duck, Perdix perdix, Alauda arvensis, Coturnix coturnix, Dendrocopos, etc. Among reptiles is Caucasian grass snake. There are many insects here.

4. ENVIRONMENTAL AND SOCIAL IMPACT

During implementation of this sub-project there will be possible adverse and positive impacts on environment and human health.

Among the positive impacts as a result of project designed works (Sisian town currently functioning water supply system distribution network's water lines construction and reconstruction, individual houses inlet lines fundamental reconstruction, water metering chambers construction), the following positive impacts on community social condition and health are anticipated:

- water loss reduction,
 - increasing duration of water supply to population, providing sustainable water use,
 - reduction of water pollution hazard, providing high drinking water quality;
 - preventing, excluding penetration of infectious disease viruses into drinking water;
 - improvement of health condition of population;
- reasonable water consumption through introduction of water metering system.

As a significant positive impact also water resources protection against depletion is to be mentioned as a result of their save use.

Initial environmental examination (IEE) has identified that in the area of water supply system improvement in Sisian town no adverse impact is anticipated in the landscapes, flora and fauna.

Possible adverse impacts are mainly related to the construction and are limited and short-term. To prevent them mitigation measures have been planned and environmental management and monitoring plan has been developed; the constructor, supervising authorities shall follow the plan.

EMP and monitoring plan are environmental assessment document and are included in working drawings.

Based on the initial assessment, the following adverse impacts can be expected:

- Air pollution,
- Noise,
- Traffic congestion,
- Soil erosion and sediment transport,
- Environment pollution with household and construction waste,
- Land and water resources pollution with fuels and lubricants,
- Land and water resources pollution with chlorine.

The sub-project implementation will also have positive social results. It will immediately improve the life quality of the project-involved sites and the surrounding environment by providing sustainable and reliable water supply and safe use of water resources for about 17 thousand people.

5. MEASURES TO MITIGATE FOR ENVIRONMENTAL AND SOCIAL IMPACTS

To prevent soil erosion and sediment transport, the following is to be implemented: in inclined sites of the water line route implement measures for retaining the inclinations to prevent soil erosion and sediment transport; minimize the time during which trench and pit excavations for regulation and metering nodes are open

During the discussion of «Preliminary Design» as well as ToR clarification period there were held special discussions at «ArmWaterSewerage» Ltd yerevan office regarding the quality of cover to be rehabilitated at the streets with asphalt-concrete cover, after water lines construction is over. Asphalt-concrete cover rehabilitation works are planned at Israyeltan street (300 m²) and at Sisakan street (100 m²).

To exclude **land and water resources pollution with fuels and lubricants**, the latter must be stored on a sealed surface, away from water resources, plan use of special tanks for their collection, which will then be removed to special sites envisaged for re-treatment.

To exclude **land and water resources pollution with chlorine**, organize works for washing the water supply distribution network with chlorine, according to technical calculations. Provide appropriate technical means; implement chlorine discharge to surface water body or land area after washing the pipes, according to the regime planned under the design.

To prevent **environment pollution with construction and household waste**, remove construction waste to corresponding landfill of the community, having in advance a contract agreement with the community heads or landfill operators.

Water quality change – Environmental monitoring plan must include also control over water quality and residual chlorine level.

To reduce **dust during the construction works**, the construction site and roads are to be regularly watered, and to prevent **noise**, night work in residential areas is to be limited, and usage of machines/equipment with extra noise is to be avoided; installation of silencers if needed.

To reduce **disturbance to population because of overloaded roads** safe area for trucks is to be provided; waste on the construction site must not be accumulated and burnt, construction should be implemented in stages, adequate notice of construction activities must be given to the population, effective road signs, diversions or barricades are to be provided.

To prevent hazards for workers and the population during the construction, the following must be implemented: install fencing around construction site; control access of unauthorized persons to site; place warning signs in dangerous places; carry out regular examination of equipment by highly qualified staff, as well as make regular safety audits; provide first aid and safety training to construction staff.

Provide community participation in subproject design, which will minimize disruption to community social activities

To provide drinking water quality in Sisian town, AWSC will implement planned sampling of water pumped from Shaki reservoirs, checking all the parameters required by the Ministry of Health. Water quality monitoring is carried out also by State Hygienic and Epidemiological Surveillance Inspectorate, according to "Drinking Water. Requirements to the Centralized Water Supply System's Water Quality"; Quality Control № 2-III-A"2-1 sanitary rules and norms" (registered on 28.12.2002), document, which establishes the requirements to the drinking water quality, as well as the rules for quality control of water produced and supplied to residential area through water supply systems.

In general, Shaki intakes water meets the requirements to the drinking water quality established by the RA Ministry of Health. However water disinfecting is required and since it is made by chlorinating, the monitoring of residual chlorine in drinking water is also very important.

6. ENVIRONMENTAL MONITORING MANAGEMENT

The organizational obligations for the proposed mitigating measures are distributed among the following agencies:

- ***Executive agencies, which are responsible for implementation of the measure.***

1. For this special task the executive agency (JINJ Ltd. and HGSN Ltd. joint venture) must provide in the design stage obtaining of all the required agreements and permits from corresponding state and local authorities, before tendering the construction works;

- Conclusion of environmental expert examination (if needed);

- Decision of town and village administrations related to land allotment during the construction works (if needed);

- Agreement of the State Agency for Protection of Historical and Cultural Monuments, if impact is envisaged by the design.

2. The executive agencies in the construction stage (construction contractors) will be responsible for physical implementation of mitigating measures planned under the EMP, as well as for obtaining of all permits and agreements required during the construction implementation. Those are:

- Agreements from the local self-governing authorities for the sites allotted for transportation of wastes and construction garbage,

- Agreement of the State Agency for Protection of Historical and Cultural Monuments, if unexpectedly historical and cultural or archaeological monuments are discovered during the construction implementation.

3. Before commencement of the construction, the following permits and certificates must be obtained from ADB/PMU, if needed:

- Cadastre certificate on the land allotment;

- Water use permit, if needed.

- ***Controlling agencies, which are responsible for controlling the executive units to provide implementation of the EMP measures by the latter***

1. AWS CJSC/ADP PIU environmental specialists will be responsible for in time, due and reliable implementation of the works and measures in the order under the EMP. The mentioned specialists will regularly visit the construction sites to provide due implementation of the measures aimed at mitigation of work impact. During the visits the possible gaps will be identified through the check list and the infringements in implementation of mitigating measures will be discovered.

The AWS CJSC/ADP PIU has the right also to require and check whether all permits are available and valid, all the measures and monitoring part under the EMP are implemented during the construction, in accordance with ADB guidelines and the RA environmental and social legislation.

2. JINJ Ltd. and HGSN Ltd. joint venture will also implement control of implementation of mitigating measures during the construction. The environmental specialist shall make visits to control the EMP implementation.

- ***State monitoring agencies, which are responsible for observing the extent and efficiency of EMP implementation and making corrections in the project, if needed.***

The state monitoring agencies are as follows:

- State Environmental Agency of the Ministry of Nature Protection,
- State Epidemiological Agency of the Ministry of Health,
- The State Agency for Protection of Historical and Cultural Monuments, if needed,
- The RA local self-governance bodies,
- The RA Ministry of Transport and Communication.

The amounts envisaged for implementation of environmental measures included in the EMP are included in the detailed design.

Implementation of mitigating measures for environmental impacts will be controlled regularly through visits to the construction sites. With the help of the specially developed check list the gaps and drawbacks will be discovered.

In case of not implementing or infringing the implementation of the mitigating measures, after warning, the next payment will be terminated until the infringement is completely eliminated.

Appendix A

ENVIRONMENTAL MANAGEMENT AND MONITORING PLAN

Works and possible impacts	Proposed mitigating measures	Monitoring	Responsible bodies
Construction			
<p><i>1. Air pollution, noise, traffic congestion</i></p> <ul style="list-style-type: none"> – Dust and noise during the construction works – Disturbance to population because of overloaded roads 	<ul style="list-style-type: none"> - Install fencing around construction site - regularly water the construction site and roads, - limit night work in residential areas, - Avoid usage of machines/equipment with extra noise; installation of silencers if needed, - Provide safe area for trucks, - Do not accumulate and burn waste on the construction site, - Carry out construction in stages, give adequate notice of construction activities to the population, - Provide effective road signs, diversions or barricades, - Provide community participation in subproject design, which will minimize disruption to community social activities 	Daily site inspection	Constructor, Consultant, PIU
<p><i>2. Environmental pollution</i></p> <ul style="list-style-type: none"> – Soil erosion and sediment transport – Environment pollution with construction waste – Land and water resources pollution with fuels and lubricants – Land and water resources pollution with chlorine 	<ul style="list-style-type: none"> - In inclined sites of the water line route implement measures for retaining the inclinations to prevent soil erosion and sediment transport, - Minimize the time during which trench and pit excavations for regulation and metering nodes are open - Rehabilitate disturbed surfaces as soon as possible after completion of construction activity, according to the design - Store oil, fuels and lubricants on a sealed surface, away from water resources, - Remove construction waste to corresponding landfill of the community, having in advance a contract agreement with the community heads or landfill operators, - Organize works for washing the water supply distribution network with chlorine, according to technical calculations. Provide appropriate technical means. 	Daily inspection of construction contract and maintenance	Constructor, Consultant, PIU

	- Implementation of chlorine discharge to surface water body or land area after washing the pipes, according to the regime planned under the design.		
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Works and possible impacts	Proposed mitigating measures	Monitoring	Responsible bodies
<i>Health and Safety</i> – Hazards for Workers and the population	<ul style="list-style-type: none"> - Install fencing around construction site - Control access of unauthorized persons to site - Place warning signs in dangerous places - Carry out regular examination of equipment by highly qualified staff, as well as make regular safety audits, - Provide first aid and safety training to construction staff 	Daily inspection throughout construction stage. Monthly inspection of accident reports and complaints register	Constructor, Consultant, PIU, Population

Appendix B

FIELD VISITS CHECKLIST

ÁŸ¹Ń³Ÿáõñ İ»Ö»İ³İáõ-ÂŮáõŸ General information	²ÙÇë/ ³Ùë³ÃÇí D/M/Y			
	°ŸÃÍñ³·Çñ / Subproject			
	î»Ö³İ³ŮáõÙ/ Location			
	ƁÇŸ³ñ³İ³Ÿ İ³½Ù³İ»ñááõÂŮáõŸ Constriction contractor			
	Ø³ñ½/Marz			
Ü³Ë³.İáõÙ Design				
²ŸŃñ³Ã»İİ ÃáõŮÉİíáõÂŮáõŸ-Ÿ»ñ Required permissions	μŸ³á³Ńá³Ÿ³Ÿ ÷áñÓ. »½ñ³İ³óáõÂŮáõŸ/ EEC	²Ůá Yes	àã No	à/İ N/A
	ŃáÖ³Ń³İ³óÙ³Ÿ ·ñ³íáñ Ń³Ù³Ó³ŮŸáõÂŮáõŸ /written consent on land acquisition	²Ůá Yes	àã No	à/İ N/A
	â³İÙ³Ùİ³İáõÂŮáõŸ ÷áñÓ³ŸŸáõÂŮáõŸ »½ñ³İ³óáõÂŮáõŸ / assessment of impact on cultural heritage	²Ůá Yes	àã No	à/İ N/A
ƁÇŸ³ñ³ñáõÂŮáõŸ Constriction				
²ŸŃñ³Ã»İİ ÃáõŮÉİíáõÂŮáõŸ-Ÿ»ñ Required permissions	İÇŸ. Ã³÷áŸŸ»ñÇ İ»Ö³İñŮ³Ÿ ·ñ³íáñ Ń³Ù³Ó³ŮŸáõÂŮáõŸ /written consent on disposal of construction waste	²Ůá Yes	àã No	à/İ N/A
	³Ÿëâ³ë»ËÇáñ»Ÿ Ń³ŮİŸ³μ»ñŮ³Ÿ ¹»âùáõÙ â³İÙ- Ùİ³İ. Ń³Ù³Ó³ŮŸáõÂŮáõŸ/ written consent in case of sudden discovery of cultural heritage	²Ůá Yes	àã No	à/İ N/A
Đ³ë³ñ³İáõÂŮ³Ÿ Çñ³½»İáõÙ Public awereness				
	İÇŸ. ³İË³İŸŸ»ñÇ Í»ñ³μ»ñŮ³Ë μŸ³İááõÂŮ³Ÿ Ń³Ù³â³İË³Ÿ Çñ³½»İáõÙ Ń³Ù³Ó³ŮŸ Ÿ³Ë³.İÇŸ/ awareness of population regarding construction works according to the project design	²Ůá Yes	àã No	à/İ N/A
	Ń³Ù³ŮŸŮÇ Ù³ëŸİóáõÂŮáõŸ İÇŸ³ñ³İ³Ÿ ³İË³İŸŸ»ñÇ Ń³Ù³Ó³ŮŸ Ÿ³Ë³.İÇŸ/ community's participation in construction works according to the project design	²Ůá Yes	àã No	à/İ N/A
²ŸİİŸ-áõÂŮáõŸ Safety				

<p>«³ÝíáñÝ»ñÇ ³Ýí³Ý-áõ- ³ÁúáõÝ Safety of workers</p>	<p>µ³ÝíáñÝ»ñÇ ³Ýí³Ý-áõ-³Áú³Ý Ñ³Ý¹»ñÓ³ÝùÇ ³éí³Úáõ³ÁúáõÝ /³í³ÝÇ³í³ÉÝ»ñ, ßÝ³Ç³Ú³í/ availability of safety uniforms (earflaps,mask)</p>	<p>²Úá Yes</p>	<p>àã No</p>	<p>à/í N/A</p>
	<p>ßÇÝ³ñ³ñáõ³Áú³Ý Ò³Ý³»ñ³éí³í³»ÉÝÇí³Ý ÚÇÇáóÝ»ñÇ ³ñµ»ñ³í³Ý ½ÝáõÚÝ»ñ³ ³Ýí³Ý-áõ-³ÁúáõÝÁ³ááÑáí»Éáõ Ýá³íáí / regular study of equipment used for construction for safety matter</p>	<p>²Úá Yes</p>	<p>àã No</p>	<p>à/í N/A</p>
<p>Ýíááõ³Áú³Ý ³Ýí³Ý-áõ-³ÁúáõÝ Safety of population</p>	<p>»ñ³»³íáõ³Áú³Ý ³ñ³Ú³Ý³Ç³í³Ú³Ý³ Ë³Ë³Ú³Ý ³Á³Ú³Ý³í³ Ñ³Ú³á³í³Ë³Ý³ ×³Ý³á³ñ³Ú³ÇÝ ÝßÝÝ»ñÇ í³Ú³ á³íÝ»ßÝ»ñÇ í³Ö³íáõÚ, ßñÇÝóÇ í³½Ú³í³»ñááõÚ / Installation of road signs or fences, organization of a bypass during interrupted or limited traffic</p>	<p>²Úá Yes</p>	<p>àã No</p>	<p>à/í N/A</p>
<p><u>ßÇÝ³ñ³ñáõ³Áú³Ý Çñ³í³Ý³óÚ³Ý Á³Ú³Ý³í³ í³é³í³ñ³Ú³Ý ÚÇÇáó³éáõÚÝ»ñ</u> <u>Management measures during construction</u></p>				
<p>ßÇÝ. Ññ³á³ñ³í³Ç/í³Ö³ÝùÇ ß³Ñ³-áñíáõÚ Operation on area/construction site</p>	<p>ßÇÝ Ññ³á³ñ³í³Ç/í³Ö³ÝùÇ á³ñµ»ñ³µ³ñ³ çñáõÚ/ regular sprinkling to area/construction site</p>	<p>²Úá Yes</p>	<p>àã No</p>	<p>à/í N/A</p>
	<p>Ø»Ú»Ý³Ý»ñÇ Ñ³Ú³ñ³ á³á³Ñáí³ í³ñ³í³ùÇ ³éí³Úáõ³ÁúáõÝ ßÇÝ. Ññ³á³ñ³íáõÚ/ availability of safe place at the construction site for vehicles</p>	<p>²Úá Yes</p>	<p>àã No</p>	<p>à/í N/A</p>
	<p>ÚáõÖ»ñÇ³ ùéáõíÝ»ñÇ Ñ³Ú³á³í³Ë³Ý³ á³Ñ»éíÝ»ñÇ³ ³éí³Úáõ³ÁúáõÝ ßÇÝ. Ññ³á³ñ³íáõÚ/ availability of storagefor oils and lubricants at the appropriate part of the construction site</p>	<p>²Úá Yes</p>	<p>àã No</p>	<p>à/í N/A</p>
<p><u>ú¹Ç Á³Ú³Ý³í³íáñ³ ³ÖíáíáõÚ</u> <u>Temporary air pollution/dust</u></p>				
	<p>ßÇÝ³ÝÚáõÁ³ í³Ö³-áÉáÖ µ³éÝ³í³ñÝ»ñÇ íñ³ í³í³Ç ù³-í³-áñíáõÚ/ use of cover for the vehicle transporting construction waste</p>	<p>²Úá Yes</p>	<p>àã No</p>	<p>à/í N/A</p>
	<p>ßÇÝ³ñ³ñáõ³Áú³Ý³ í³ñ³í³ùÇ ÉáÝ³í³óáõÚ çñÇ ßÇÁáí/ moisturing of the construction site by water</p>	<p>²Úá Yes</p>	<p>àã No</p>	<p>à/í N/A</p>
<p><u>ÐáÖÇ³ ¿éá½Ç³</u> <u>Soil erosion</u></p>				
	<p>½³éÇí³ñ³ í³Ö³ñáõÚ ÑáÖÇ³ ¿éá½Ç³ÚÇ í³ÝÉ³ñ³»ÉÚ³Ý ÚÇÇáó³éáõÚÝ»ñÇ Çñ³í³Ý³óáõÚ Áëí³Ý³Ë³-í³Ç/ soil erosion prevention measures at the slope places according to the project design</p>	<p>²Úá Yes</p>	<p>àã No</p>	<p>à/í N/A</p>
	<p>÷áéáñ³íÝ»ñÇ Á³Ú³Ý³í³ÇÝ Ñ³íÉÇóù/ timely coverage of holes by soil</p>	<p>²Úá Yes</p>	<p>àã No</p>	<p>à/í N/A</p>
	<p>ßÇÝ. ³ßÉ³í³ÝÚÝ»ñÇ³ ³í³ñ³í³ó³ Ñ³íá³ íÝ³éí³ Ú³í³»ñ³éÝ»ñÇ³ í³»ñ³Ýáñá-áõÚ Áëí³Ý³Ë³-í³Ç/ repair of damaged surface after completion of construction works</p>	<p>²Úá Yes</p>	<p>àã No</p>	<p>à/í N/A</p>

<u>æñÇ ³ÖíáíáõÙ</u> <u>Water pollution</u>				
	çñÇ ³ÖíáíáõÙ ùè³YUáõÃ»ñái " í³é»É³YUáõÃ»ñái/ water pollution caused by fuel and lubricants	²Úá Yes	àã No	à/í N/A
	ÉáÖáí³ÍY»ñÇ Éí³óáõÙÇó Ñ»íá ùÉáñÇ ³ñí³Ñáèù Ñ³Úá³í³èÉ³Y Ý³É³.Íáí Ý³É³í»èí³í é»ÄÇÙÇ/Leakage of chlorine after wash up of the pipes according to the scheduled regime.	²Úá Yes	àã No	à/í N/A
<u>²ÖÙáõí µÝ³í³³Ùñ»ñÇ í³ñ³íùÇÝ Ùáí</u> <u>Noise close to settlements</u>				
	³ßÉ³í³YùY»ñÇ Çñ³í³Y³óáõÙ è³ÑÙ³Ýí³í ³ßÉ³í³Yù³ÙÇÝ Á³Ù»ñÇÝ, Ñ³í³é³í ¹»áùáõÙ è³ÑÙ³Ýí³í Íñ.ái/ implementation of the works during working hours, otherwise in projected manner	²Úá Yes	àã No	à/í N/A
<u>µÇÝ³ñ³ñ³í³Y " Í»Yó³Ö³ÙÇÝ Á³÷áÝY»ñÇ í»Ö³¹ñáõÙ</u> <u>Construction west disposal</u>				
	ßÇÝ³ñ³ñ³í³Y " Í»Yó³Ö³ÙÇÝ ³ÖµÇ í»Ö³÷áÉáõÙ " í»Ö³¹ñáõÙ Ñ³Ú³ÙÝùÇ Ñ³Ú³á³í³èÉ³Y ³Öµ³í³ÙñáõÙ/transportation and disposal of construction and consumer waste in appropriate community landfill	²Úá Yes	àã No	à/í N/A
<u>µ³Ñ³.áñíáõÙ</u> <u>Operation</u>				
ÉÙ»Éáõ çñÇ ³ÖíáíáõÙ Drinking water pollution	ØY³óáñ¹³ÙÇÝ ùÉáñÇ ùÝ³íÇ Ñ³Ú³á³í³èÉ³YáõÙ ÉÙ»Éáõ áñ³íÇ çñÇ ÝáñÙ»ñÇÝ/Correspondence of balance quantity of residual chlorine to the quality of potable water	²Úá Yes	àã No	à/í N/A