Environmental Management Plan

Semestral Report
January 2012

ARM: Water Supply and Sanitation Project – Water Supply System Rehabilitation In Charentsavan Town, Solak and Argel Villages of Kotayk Marz

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

APPENDIX

Contract No. L2363-ICB 1-15

Part D – Special Conditions of the Contract

SUB-PROJECT X – CHARENTSAVAN RESIDENTIAL AREAS

PACKAGE X – WATER SUPPLY SYSTEM RAHABILITATION IN CHARENTSAVAN TOWN, SOLAK AND ARGEL VILLAGES OF KOTAYK MARZ

ENVIRONMENTAL MANAGEMENT PLAN

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According to the Environmental policy (November, 2002) of Asia Development Bank (ADB), the main part of Charentsavan Subproject - X refers to B category which means that the total environmental assessment is not required. The subproject does not also require the Environmental expertise based on "Environmental Impact Assessment" law of the RA current legislation (Novenber 20, 1995), and, proceeding from it - the statutory requirements, the RA Government Regulation N-139, March 30, 1999, "Established standards of designed activities subjected to Environmental Expertise".

Only one DRR, 300 m^3 capacity, in Solak village and the waterline with the diameter of ö500mÙ and length of L=700m in the area of "Maqravan's" springs**, designed in the Subproject scope, shall be subjected to the environmental expertise, for which a special environmental assessment report (EAR) is submitted.**

1. INTRODUCTION

To prevent the environmental man-made impact and maintain biosphere equilibrium as well as harmony between human activity and nature it is essential to estimate accurately and completely the environmental impact of each design activity. Environmental assessment of activities should involve the direct and indirect anticipated impact and its description, as it is considered to be the basis for working out compulsory measures either to prevent or, at least, mitigate it.

This very assessment report has been worked out for Rehabilitation Subproject of water supply and drainage systems in Charentsavan town as well as Solak and Argel villages of Kotayk Marz, the design of which was drawn up in terms of the joint contract between JINJ and HGSN LTDs .

Water supply systems rehabilitation involves restoration of water distribution systems, DRRs and sewage lines of Charentsavan town as well as Solak and Argel villages.

The environmental impact shall be foreseen in the process of the implementation of construction works and further operation and maintenance of water supply systems as well as during probable demounting and demolishing.

The impact during construction works implementation may involve vegetation damage, soil erosion, air pollution as well as soil and water resources pollution by lubricants, domestic and construction waste. At exploitation phase the environmental impact may occur due to break-down of some appurtenances of water supply system.

The positive effect on the environment depends on more effective and balanced use of water resources.

Mostly, the social and economic effect of water supply system rehabilitation can be considered positive: elimination of drinking and sewage water mixing, minimization of contamination threat, prevention and elimination of infectious diseases agents' penetration into drinking water, prolongation of water deliver hours, provision of regular water use, effective water consumption.

Beneath, the description of anticipated environmental impacts is brought as well as necessary measures on their mitigation at different phases of water supply system rehabilitation.

- *Design phase*

Water systems design works have been performed by JINJ and HGSN LTD joint company. The design documents include articles describing climatic conditions, relief, native soil types, vegetation and hydrology, as well as requirements for getting consents from RA Environmental and other Ministries. They include appropriate environmental and social Parts. The design package involves this very subproject "Environmental management plan" (EMP). The Project Consultant shall follow RA environmental and social legislation appropriate statements as well as ADB directions and strategy mentioned in the Contract.

- *Construction phase*

Generally, the Building Contractor shall follow the activities described in EMP, for example, to minimize the emissions of dust as well as noise nearby the populated areas, etc.

- *Operation phase*

The exploitation shall be implemented in terms of water supply system operational codes and norms.

To mitigate the environmental impact during construction and at performance phase, the environmental management plan EMP has been worked out, where the list of required measures are given (Appendix A).

2. SCOPE OF WORK

2.1. Description of the existing water supply systems

Charentsavan town

Water supply of Charentsavan town is carried out through Makravan- Abovyan water conduit and the Alapars springs - 50 l/sec. The population of the town makes 22-24 thousand men. The manufactories, practically, are not operating. The town is supplied with 80-100 l/day water for 15-20 hours a day. Its 30% has even 24-hour water supply, it should be said, that in the past it was supplied with water only for 5-6 hours a day. In the south part of the town there are two 2000 m^3 capacity and two 600 m^3 capacity DRRs, which are isolated and are in good condition. There are also two 2000 m^3 capacity DRRs which once were operating, supplying water for manufactories from the Solak d=500 mm water conduit. A short section of the Charentsavan pipeline needs repairing. If necessary, the town can be supplied with water from Solak and Gyumush springs.

Solak village

Currently Solak village is fed from the water pump, which is in Hrazdan's gorge. There is one DRR in Solak village, which doesn't have protective sanitation zone. The village water supply system is deteriorated which causes great water leakages.

Argel village

The village DRR of 100 m^3 capacity is in half-destroyed condition. Some sections of internal water distribution and sewage systems of the village are deteriorated. In the water distribution system there is 960 m long, 200 mm diameter asbestos-cement pipeline operating.

Maqravan's springs

There are three water pumps in the area of Maqravan's springs.

The water pump N2 supplies water to the towns Abovyan-Charentsavan, Hrazdan, Tsaghkadzor and Gagarin.

The water pump N3 to the town Hrazdan.

The water pump N4 to the towns Abovyan-Charentsavan.

2.2. Suggestions on rehabilitation and main works

Charentsavan town

The anticipated works are the following:

- Construction of polyethylene pipelines in the distribution system, which total length makes 0.495 km, from which
  - 0.24 km of de110 diameter
  - 0.255 km of de63 diameter.

Solak village

The anticipated works are as follows:

1. repair of water supply systems (about 8 km total length),
2. construction of one new 300 cub. m capacity DRR,
3. construction of 160 mm diameter water conduit from the DRR up to the main canal,
4. construction of protective sanitation zone for the DRR located in the village.

Argel village

The anticipated works are as follows:

1. complete replacement of 960 m long, 200 mm diameter asbestos-cement pipeline with 160 mm diameter plastic pipes,

2. repair of internal system 100 and 50 mm diameter water lines laying plastic pipes,
3. repair of sewage line by replacing 167 m 250 mm diameter section (laying plastic pipes).

Maqravan's springs

The anticipated works are as follows:

Combination of water pumps of two basic towns Abovyan-Charentsavan and Hrazdan-Tsaghkadzor-Gagarin in the area of "Maqravan's" springs.

1. construction of water pump
2. construcion of new waterline from the steel conduit with the length of L=780m and ∅500mm in diameter.

3. ENVIRONMENTAL BASELINE CONDITIONS

Kotayk Marx is characterized by relatively mild climate. The air maximal temperature is 30-34^{o}C, and minimal -34-38^{o}C. The wind speed is 30 m/sec.

The native vegetation cover and flora types of Kotayk Marsz are: Common Tansy (*Tanacetum vulgare*), Marsh-mallow, Armenian Marsh-mallow (*Althaea officinalis, A. armeniaca*), Field Pansy *Viola arvensis*), Primrose macrosepalous (*Primula macrocalyx*), Common Valerian (*Valeriana officinalis*), Armenian Everlasting (*Helichrysum armenium*), Motherwort (*Leonurus cardiaca*), Field Rest-harrow (*Ononis arvensis*):

Charentsavan town

Geological structure: Upper Pliocene-eopliocene basalts, andesites, dacites, perlites, rhyolites, obsidians, tuff-breccias, travertins.

There are the following *soil types*: brown, carbonate, steppificated.

Soil ablation rate makes 25 – 45%.

Vegetation: steppe, gramineous, *motley*-gramineous, Festuca valesiaca Gaudin, F. ovina l. Koeleria albovil, Domin, K.cristala (L), Bothriochrloa ischaemum.

Solak village

Forest vegetation: oak woods, including: *Quercus macranthera Fisch. Et Mey ex Hohen., Q. Boissieri Beut., Q. Araxina (Trautv) Grossh.*

There are the following *soil types:* wood, brown, carbonate, steppificated.

Geological structure: Neo-Pleistocene basalts, lydite, dacites, upper-Cretaceous conglomerates, sand stones, marls, lime stones, radiolarites,tuff-breccias, basalts, spilites diabases.

Argel village

The native vegetation cover types are: wormwood-ephemer, including *Artemisia fragrans Willd., Kochiaprostrata (L.) Schrad., Capparis spinosa Willd., Ceratoides papposa Botsch. Et Ikonn., Atraphaxis spinosa L., Rhamnus pallasii Fisch. Et Mey., Tanacetum argyrophyllum (C.Koch) Tzvel., Poa bulbosa L. Bromus, Aegilops, Eremopyrum, Alyssum, Aeluropus littoralis (Gouan) Parl.*

There are the following *soil types:* dark chestnut, gravel-stone, in some places carbonate, indurated.

Geological structure: Upper Pliocene-eopliocene basalts, andesites, dacites, perlites, rhyolites, obsidians (vanadites), perlites, tuff-breccias, travertins.

Nature special reservations (state reservations and their main objests of conservation)

In different periods, within the area of Kotayk Marz and its surroundings, there have been established a number of specially protected areas to provide conservation of natural ecosystem of the area, its components, plant and animal species, their natural development, reproduction and steady use:

“Erebuni” reservation

“Arzakan-Meghradzor” game reservation

“Banksi sochu” game reservation

“Hankavan jrabanakan” game reservation

The abovementioned protected areas are at a considerable distance from the sites where the anticipated works are to be carried out, thus, they will not undergone any impact.

4. ENVIRONMENTAL AND SOCIAL IMPACT

Both positive and negative effects on the environment and human health are anticipated during implementation of this subproject.

The mentioned beneath positive effects on human social setting and health are anticipated as a result of works of water supply and drainage systems rehabilitation within these communities:

- minimization of water contamination threat,
- provision of high quality drinking water,
- prevention, exclusion of penetration of infectious disease agents into drinking water
- dwellers' health improvement,
- due to leakage reduction - prolongation of water deliver hours, provision of regular water use,
- effective water consumption due to implementation of water accounting system

Conservation of water resources, as a result of economic use, is also considered to be one of the important positive environmental effects.

The preliminary study of the environment (PSE) has discovered that there will be no irretrievable negative effect on the relief, flora and fauna of Solak and Argel villages as a result of repair works of water purification station.

The probable negative impact mainly relates to the construction works, thus, they are bounded and short-term. To minimize or prevent the negative effect, some mitigating measures have been anticipated as well as Environmental management and monitoring plan (EMP) has been worked out which shall be followed by Builder as well as Supervising and Inspecting units.

Both the Environmental management plan (EMP) and monitoring plan are considered environmental assessment documents and are included in the working designs.

Based on the preliminary assessment it is possible to foreseen the negative effects:

- Air pollution caused by earth and construction works machines operation
- Noise
- Demolition and overloading of motor roads and sidewalks
- Soil erosion and ablation processes activation
- Environment pollution by construction and domestic waste
- Earth and water resources pollution by fuel and lubricants

The subproject implementation will have positive social effects. It will directly affect the village dwellers' welfare as well as the environment providing steady and safety water supply and water resources economic use.

5. MEASURES TO MITIGATE FOR ENVIRONMENTAL AND SOCIAL IMPACTS

The anticipated environmental impact depends on the atmospheric emissions and building waste at the implementation of construction works.
The construction works include earth works, mounting of engineering substructures: new water supply systems, etc.

5.1. Atmospheric impact during construction

At digging-loading works as well as construction machinery operation, emissions of inorganic dust arise.

At the operation of transportation means and construction machinery, the diesel fuel combustion causes emission of volatile and other compounds.

The anticipated emissions are not voluminous, they are temporary and will not impact the environmental.

5.2. Water resources

The impact of water resource is induced by water supply augmentation, but, it will be implemented at the expense of leakage minimization and distribution systems reconstruction. Correspondingly, there will be no new water resources involved and water balance of the district will not change.

5.3. Earth resource

During construction works, the impact depends on the earth mass excavation and storing.

The most part of earth mass will be used for backfilling. The rest part of it will be used for site leveling. The excess earth, according to the agreement signed by the community administration, will be transported to the place assigned by the community.

5.4. Noise

During construction works, the noise caused by operating machinery must be in the limits of sanitation norms.

To prevent soil erosion and ablation processes, the measures shall be undertaken to maintain the gradients on the inclined water line slopes, minimizing the ditches as much as possible, as well as minimizing the period of leaving the pits, for water measuring and regulating junctions, open.

Upon completion of construction works, all construction sites shall be scavenged and brought to their initial state:

- to restore the asphalt-concrete pavement in the busy streets which have been in good condition,

- to restore the ground layer in the streets with deteriorated and half-broken asphalt-concrete pavement as well as earth pavement.

To avoid **pollution of earth and water resources** by fuels and lubricants, the latter shall be stored on the insulated surface, on the areas which are far from the earth and water resources, to provide special platforms for these materials use and further to take them away in the appropriate areas or to the places assigned for recycling.

To prevent the environment **from construction and domestic waste** pollution, they shall be transported to the communities' trash dump – having the consent of community officials or trash-dump exploiter beforehand.

To prevent **water and earth resources** from chlorine contamination, the works on flushing the water distribution system by chlorine as well disinfection shall be organized according to the calculations. Appropriate technical facilities shall be provided. Upon the pipes flushing, the chlorine shall be removed by the outflow towards shallow water body or land area according to the designed regime.

Water quality change – The environmental monitoring plant shall include also control of water quality and chlorine residue content.

To minimize **dust emission impact during the construction works**, the construction site shall be watered regularly; and to prevent **noise** impact the night works in the populated areas shall be restricted as well as noisy machinery and equipment use shall be avoided, if necessary, silencers shall be used**.**

To minimize the trouble inflicted to the population by **roads demolishing and overloading**, a safe area shall be provided for trucks; the construction and domestic waste shall not be piled and burnt on the construction site; the construction shall be carried out according to its phases; the population shall be appropriately informed about the construction works; necessary road signboards shall be placed, as well as by-pass roads and fences shall be provided.

To prevent the **accidents both to the dwellers or workers** during construction, the construction site shall be fenced, the entrance of unentitled persons shall be controlled, the warning signboards shall be placed in dangerous places, the maintenance of equipment shall be regularly carried out by skilled specialists, as well as regular safety audits, first aid and safety classes shall be organized for the builders.

To provide the community participation in the subproject works, that will minimize the trouble caused by construction works.

5. ENVIRONMENTAL MANAGEMENT

To implement the suggested mitigating measures, the arrangement responsibilities are allocated between the following entities:

- ***Executive entities responsible for measures implementation.***

1. For this special task the executive entity (JINJ and HGSN LTD joint company), at the design phase, shall provide all necessary agreements and consents from state and local authorities before allocation of construction works in terms of the bid.

- if necessary, the community head's/council's decision/ written consent on land allotment during implementation of construction works,

- consent of State Board of historical-culture heritage protection in case there is an impact anticipated by the design.

2. At the construction phase the executive entities (Construction Contractors) are in charge of factual implementation of mitigating measures designed by EMP as well as getting the consents and agreements relating to the implementation of construction works. They are as follows:

- local authorities' consent on domestic and construction waste allocation in the predetermined places,

- consent of the state board of historical-cultural heritage protection in case of coming across some historical-cultural or ancient monuments during the implementation of construction works.

3. Before starting construction works, if necessary, the following consents and certificates shall be obtained from ADB/PMU:

- cadastre certificate on land allotment,

- if necessary, water use consent.

- ***Entities, which are in charge of supervising the design executors to carry them out EMP measures.***

1. "ArmWS" CC/ ADB PMU environmentalist is in charge of carrying out the anticipated by EMP measures and works successively, accurately, safely and on time. The abovementioned expert shall regularly goes on check-up trips at construction sites to provide the appropriate implementation of works and impact mitigating measures. During the trips, due to the check-up paper, the probable shortcomings will be eliminated as well as violations of mitigating measures implementation by construction companies will be revealed.

"ArmWS" CC/ ADB PMU has also a right to demand and check whether the consents are available and valid for the current time (not expired), whether all impact mitigating measures are completely carried out as it is designed by EMP as well as according to ADB environmental directions and RA Environmental and social legislation.

1. JINJ and HGSN LTD joint company shall also carry out supervision of execution of mitigating measures during the construction period. The environmentalist shall go on check-up trips to control the EMP.

- ***State monitoring executing entities which are in charge of EMP implementation level supervision as well as effectiveness of mitigating measures***

State entities which shall carry out monitoring are:

- State Inspection of the RA Ministry of Environment
- State Epidemiological Inspection of the RA Ministry of Health
- If necessary, Board of historical-cultural heritage protection of RA Ministry of Culture

RA Local authorities

RA Ministry of transportation and communications.

The sums of money assigned for implementation of impact mitigating measures, included in EMP, are included into working design.

The implementation of environmental mitigating measures will start as regular - going on check-up trips to the construction sites. With the help of worked out on this purpose check-up paper the violations and shortcomings will be eliminated.

In case of failing the implementation of mitigating measures or their violation, after reprimand and warning the next financial payment will be ceased unless the certified violation is completely eliminated.

Appendix A.

Appendix A

ENVIRONMENTAL MANAGEMENT AND MONITORING PLAN

Works and possible impacts	Proposed mitigating measures	Monitoring	Responsible bodies
Construction			
1. Air pollution, noise, traffic congestion – Dust and noise during the construction works – Disturbance to population because of overloaded roads	- 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

2. Environmental pollution – 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	- 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. - Implementation of chlorine discharge to surface water body or land area after washing the pipes, according to the regime planned under the design.	Daily inspection of construction contract and maintenance	Constructor, Consultant, PIU

Works and possible impacts	**Proposed mitigating measures**	**Monitoring**	**Responsible bodies**
Health and Safety – Hazards for Workers and the population	- 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

¸³ßï³ÛÇÝ ³Ûó»ñÇ ëïáõ·³Ã»ñÃÇÏ
Field visits checklist

ÀÝ¹Ñ³Ýáõñ ï»Õ»Ï³ïíáõ-ÃÛáõÝ **General information**	²ÙÇë/ ³Ùë³ÃÇí D/M/Y			
	ºÝÃ³Íñ³·Çñ / Subproject			
	î»Õ³Ï³ÛáõÙ/ Location			
	ÞÇÝ³ñ³ñ³Ï³Ý Ï³½Ù³Ï»ñåáõÃÛáõÝ Constriction contractor			
	Ø³ñ½/Marz			
Ü³Ë³·ÍáõÙ **Design**				
²ÝÑñ³Å»ßï ÃáõÛÉïíáõÃÛáõÝÝ»ñ **Required permissions**	µÝ³å³Ñå³Ý³Ï³Ý ÷áñÓ. »½ñ³Ï³óáõÃÛáõÝ/ EEC	**²Ûá Yes**	**àã No**	**à/Î N/A**
	ÑáÕ³Ñ³ïÏ³óÙ³Ý ·ñ³íáñ Ñ³Ù³Ó³ÛÝáõÃáõÝ /writen consent on land acquisition	**²Ûá Yes**	**àã No**	**à/Î N/A**
	å³ïÙ³Ùß³ÏáõÃ³ÛÇÝ ÷áñÓ³ùÝÝáõÃÛ³Ý »½ñ³Ï³óáõÃÛáõÝ / assessment of impact on cultural heritage	**²Ûá Yes**	**àã No**	**à/Î N/A**
ÞÇÝ³ñ³ñáõÃÛáõÝ **Constriction**				
²ÝÑñ³Å»ßï ÃáõÛÉïíáõÃÛáõÝ-Ý»ñ **Required permissions**	ßÇÝ. Ã³÷áÝÝ»ñÇ ï»Õ³¹ñÙ³Ý ·ñ³íáñ Ñ³Ù³Ó³ÛÝáõÃÛáõÝ /written consent on disposal of construction waste	**²Ûá Yes**	**àã No**	**à/Î N/A**
	³Ýëå³ë»ÉÇáñ»Ý Ñ³ÛïÝ³µ»ñÙ³Ý ¹»åùáõÙ å³ïÙ- Ùß³Ï. Ñ³Ù³Ó³ÛÝáõÃÛáõÝ/ written consent in case of sudden discovery of cultural heritage	**²Ûá Yes**	**àã No**	**à/Î N/A**
Ð³ë³ñ³ÏáõÃÛ³Ý Çñ³½»ÏáõÙ **Public awereness**				
	ßÇÝ. ³ßË³ï³ÝùÝ»ñÇ í»ñ³µ»ñÛ³É µÝ³ÏãáõÃÛ³Ý Ñ³Ù³å³ï³ëË³Ý Çñ³½»ÏáõÙ Ñ³Ù³Ó³ÛÝ Ý³Ë³·ÍÇÝ/ awareness of population regarding construction works according to the project design	**²Ûá Yes**	**àã No**	**à/Î N/A**
	Ñ³Ù³ÛÝùÇ Ù³ëÝ³ÏóáõÃÛáõÝ ßÇÝ³ñ³ñ³Ï³Ý ³ßË³ï³ÝùÝ»ñÇÝ Ñ³Ù³Ó³ÛÝ Ý³Ë³·ÍÇÝ/ community's participation in construction works	**²Ûá Yes**	**àã No**	**à/Î N/A**

	according to the project design			
²Ýíï³Ý·áõÃÛáõÝ Safety				
´³ÝíáñÝ»ñÇ ³Ýíï³Ý·áõ-ÃÛáõÝ Safety of workers	µ³ÝíáñÝ»ñÇ ³Ýíï³Ý·áõÃÛ³Ý Ñ³Ý¹»ñÓ³ÝùÇ ³éÏ³ÛáõÃÛáõÝ /³Ï³Ýç³Ï³ÉÝ»ñ, ßÝã³¹ÇÙ³Ï/ availability of safety uniforms (earflaps,mask)	**²Ûá Yes**	**àã No**	**à/Î N/A**
	ßÇÝ³ñ³ñáõÃÛ³Ý Ù»ç Ý»ñ³éí³Í ï»ËÝÇÏ³Ï³Ý ÙÇçáóÝ»ñÇ å³ñµ»ñ³Ï³Ý ½ÝáõÙÝ»ñ` ³Ýíï³Ý·áõÃÛáõÝÁ ³åáÑáí»Éáõ Ýå³ï³Ïáí / regular study of equipment used for construction for safety matter	**²Ûá Yes**	**àã No**	**à/Î N/A**
´Ý³ÏãáõÃÛ³Ý ³Ýíï³Ý·áõ-ÃÛáõÝ Safety of population	»ñÃ¨»ÏáõÃÛ³Ý ë³ÑÙ³Ý³÷³ÏÙ³Ý ï³Ù Ë³ËïÙ³Ý Å³Ù³Ý³Ï Ñ³Ù³å³ï³ëË³Ý ×³Ý³å³ñÑ³ÛÇÝ ÝßÝ³ÝÝ»ñÇ Ï³Ù å³ïÝ»ßÝ»ñÇ ï»Õ³¹ñáõÙ, ßñç³ÝóÇ Ï³½Ù³Ï»ñåáõÙ / Installation of road signs or fences, organization of a bypass during interrupted or limited traffic	**²Ûá Yes**	**àã No**	**à/Î N/A**
ÞÇÝ³ñ³ñáõÃÛ³Ý ÇÑ³Ï³Ý³óÙ³Ý Å³Ù³Ý³Ï Ï³é³í³ñÙ³Ý ÙÇçáó³éáõÙÝ»ñ Management measures during construction				
ÞÇÝ. Ññ³å³ñ³ÏÇ/ï»Õ³ÝùÇ ß³Ñ³·áñÍáõÙ Operation on area/construction site	ÞÇÝ Ññ³å³ñ³ÏÇ/ï»Õ³ÝùÇ å³ñµ»ñ³µ³ñ çñáõÙ/ regular sprinkling to area/construction site	**²Ûá Yes**	**àã No**	**à/Î N/A**
	Ø»ù»Ý³Ý»ñÇ Ñ³Ù³ñ ³å³Ñáí ï³ñ³ÍùÇ ³éÏ³ÛáõÃÛáõÝ ßÇÝ. Ññ³å³ñ³ÏáõÙ/ availability of safe place at the construction site for vehicles	**²Ûá Yes**	**àã No**	**à/Î N/A**
	ÚáõÕ»ñÇ ¨ ùëáõÏÝ»ñÇ Ñ³Ù³å³ï³ëË³Ý å³Ñ»ëïÝ»ñÇ ³éÏ³ÛáõÃÛáõÝ ßÇÝ. Ññ³å³ñ³ÏáõÙ/ availability of storagefor oils and lubricants at the appropriate part of the construction site	**²Ûá Yes**	**àã No**	**à/Î N/A**
ú¹Ç Å³Ù³Ý³Ï³íáñ ³Õïáïáõ Ù Temporary air pollution/dust				
	ßÇÝ³ÝÛáõÃ ï»Õ³÷áËáÕ µ»éÝ³ï³ñÝ»ñÇ íñ³ Í³ÍÏÇ û·ï³·áñÍáõÙ/ use of cover for the vehicle transporting construction waste	**²Ûá Yes**	**àã No**	**à/Î N/A**
	ßÇÝ³ñ³ñáõÃÛ³Ý ï³ñ³ÍùÇ ËáÝ³í»óáõÙ çñÇ ßÇÃáí/ moisturing of the construction site by water	**²Ûá Yes**	**àã No**	**à/Î N/A**
ÐáÕÇ ¿éá½Ç³ Soil erosion				

	½³éÇí³ñ ï»Õ»ñáõÙ ÑáÕÇ ¿ñá½Ç³ÛÇ Ï³ÝË³ñ·»ÉÙ³Ý ÙÇçáó³éáõÙÝ»ñÇ Çñ³Ï³Ý³óáõÙ Áëï Ý³Ë³·ÍÇ/ soil erosion prevention measures at the slope places according to the project design	**²Ûá Yes**	**àã No**	**à/Î N/A**
	÷áëáñ³ÏÝ»ñÇ Å³Ù³Ý³ÏÇÝ Ñ»ïÉÇóù/ timely coverage of holes by soil	**²Ûá Yes**	**àã No**	**à/Î N/A**
	ßÇÝ. ³ßË³ï³ÝùÝ»ñÇ ³í³ñïÇó Ñ»ïá íÝ³ëí³Í Ù³Ï»ñ»ëÝ»ñÇ í»ñ³Ýáñá·áõÙ Áëï Ý³Ë³·ÍÇ/ repair of damaged surface after completion of construction works	**²Ûá Yes**	**àã No**	**à/Î N/A**
<u>æñÇ ³Õïáïáõ Ù</u> <u>Water pollution</u>				
	çñÇ ³Õïáïáõ Ù ùë³ÝÛáõÃ»ñáí ¨ í³é»É³ÝÛáõÃ»ñáí/ water pollution caused by fuel and lubricants	**²Ûá Yes**	**àã No**	**à/Î N/A**
	ËáÕáí³ÏÝ»ñÇ Éí³óáõÙÇó Ñ»ïá ùÉáñÇ ³ñï³Ñáëù Ñ³Ùå³ï³ëË³Ý Ý³Ë³·íáí Ý³Ë³ï»ëí³Í é»ÅÇÙÇ/Leakage of chlorine after wash up of the pipes according to the scheduled regime.	**²Ûá Yes**	**àã No**	**à/Î N/A**
<u>²ÕÙáõÏ µÝ³Ï³í³Ûñ»ñÇ ï³ñ³ÍùÇÝ Ùáï</u> <u>Noise close to settlements</u>				
	³ßË³ï³ÝùÝ»ñÇ Çñ³Ï³Ý³óáõÙ ë³ÑÙ³Ýí³Í ³ßË³ï³Ýù³ÛÇÝ Å³Ù»ñÇÝ, Ñ³Ï³é³Ï ¹»åùáõÙ ë³ÑÙ³Ýí³Í Ï³ñ·áí/ implementation of the works during working hours, otherwise in projected manner	**²Ûá Yes**	**àã No**	**à/Î N/A**
<u>ÞÇÝ³ñ³ñ³Ï³Ý ¨ Ï»Ýó³Õ³ÛÇÝ Ã³÷áÝÝ»ñÇ ï»Õ³¹ñáõÙ</u> <u>Construction west disposal</u>				
	ßÇÝ³ñ³ñ³Ï³Ý ¨ Ï»Ýó³Õ³ÛÇÝ ³ÕµÇ ï»Õ³÷áËáõÙ ¨ ï»Õ³¹ñáõÙ Ñ³Ù³ÛÝùÇ Ñ³Ù³å³ï³ëË³Ý ³Õµ³í³ÛñáõÙ/transportation and disposal of construction and consumer waste in appropriate community landfill	**²Ûá Yes**	**àã No**	**à/Î N/A**
<u>Þ³Ñ³·áñÍáõÙ</u> <u>Operation</u>				
ÊÙ»Éáõ çñÇ ³Õïáïáõ Ù Drinking water pollution	ØÝ³óáñ¹³ÛÇÝ ùÉáñÇ ù³Ý³ÏÇ Ñ³Ù³å³ï³ëË³ÝáõÙ ËÙ»Éáõ áñ³ÏÇ çñÇ ÝáñÙ»ñÇÝ/Correspondence of balance quantity of residual chlorine to the quality of potable water	**²Ûá Yes**	**àã No**	**à/Î N/A**