Environmental Monitoring Report

Bi-Annual Report
Project Number: 41193-015, 41193-019, and 39265-022
January to June 2015

MON: Western Regional Road Corridor Development Project

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ENVIRONMENTAL MONITORING REPORT

BI-ANNUAL REPORT, 2015.

WESTERN REGIONAL ROAD CORRIDOR DEVELOPMENT PROJECT

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ABBREVIATIONS

MRT – Ministry of Road and Transportation

ADB – Asian Development Bank

MEGD – Ministry of Environment and Green Development

EIA- Environmental Impact Assessment

DEIA- Detailed Environmental Impact Assessment

EMP- Environmental Management Plan

EPP- Environmental Protection Plan

EMR-Environmental Monitoring Report

PIU – Project Implementation Unit

COMO – Community Outreach Monitoring Officers

HSE – Health, safety and environment

1. INTRODUCTION

1.1 ABOUT THE REPORT

This bi-annual report is aimed to summarize all the environmental related works and activities carried out by the Project Implementation Unit, Project Contractor, the Supervision Party and their environmental stuffs and consultants. It also provides evaluation for implementation of the Environmental Monitoring Plan for the Western Regional Road Corridor Development Project in the first half of 2015 construction season.

Within this report we have visited following main aspects to provide evaluation on how the Project is been implementing its environmental goals in each aspect: Baseline Environmental Condition; Environmental requirements and responsibilities; Implementation of the Environmental monitoring plan; Environmental protection and mitigation measures; Community relation and redress grievance.

This report is prepared by the Environmental Monitoring Consultant of the Project with inputs from Contractor. The consultant has visited the Project area 2 times in the 1st half of the year. During the trip, the consultant has worked at the environmentally sensitive points, construction camps and nearby soum centers to have necessary observations, measurements, interviews and meetings. The consultant has organized meetings with local governments and residents to determine the degree of impact on their lives and find out existing problems.

The Contractor CJJC has hired local professional firm to conduct soil, water, noise and dust monitoring activities for the Project and submitted monthly Environmental Monitoring Reports to PIU.

1.2 BRIEF INTRODUCTION TO THE PROJECT

The Government of Mongolia has received a grant and loan from Asian Development Bank to support the construction of several section along 748km road from Yarant at the border of People's Republic of China through Khovd and Ulgii to Ulaanbaishint at the border of Russian Federation under the Western Regional Road Corridor Development Program.

The first package (110.8 km from Temeen Khuzuu to Baga Ulaan Pass) of Phase I is being implemented under Grant 0107. Jiangsu Jianda Co., Ltd was selected as the road construction contractor while Construction Supervision Company is KCI LLC.

The road is part of the Asian Highway network, Route 4 (AH4, 6,024 km), as shown in Figure 2, and is a designated Central Asian Regional Economic Cooperation Corridor 4a, which links Novosibirsk city of Russia with Karachi seaport in Pakistan.

The road has opened to traffic on October 22 after approval by the State Committee.

Package I road construction is nearing completion with actual progress rate of 93.99 as of May 31, 2015. All the pavement works are completed last year and minor outstanding works are estimated to be completed by August 31, 2015.

CW1-1 section of the Package II has actual progress rate of 94.39 as of May 31, 2015. Minor outstanding works will be completed by June 30, 2015.

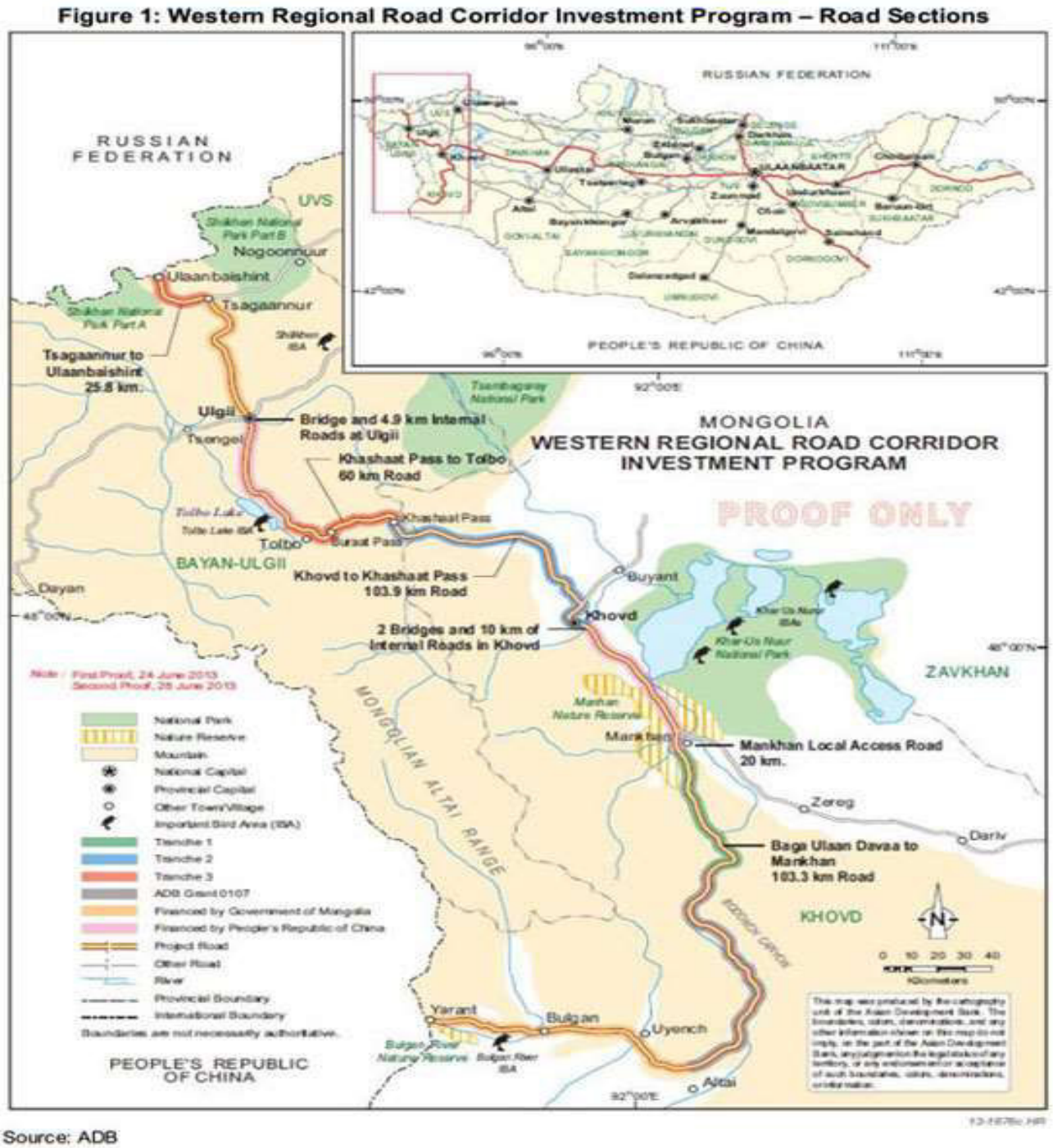
CW1-2 section has actual progress rate of 69.23 as of May 31, 2015. Most of the pavement works are completed last year except for a small section in Khavchig canyon. The remaining works are estimated to be completed by October 30, 2015.

CW1-3 section of the Package II has actual progress rate of 97.52 as of May 31, 2015. Minor outstanding works will be completed by June 30, 2015.

Table 1: Phases of the development of roads

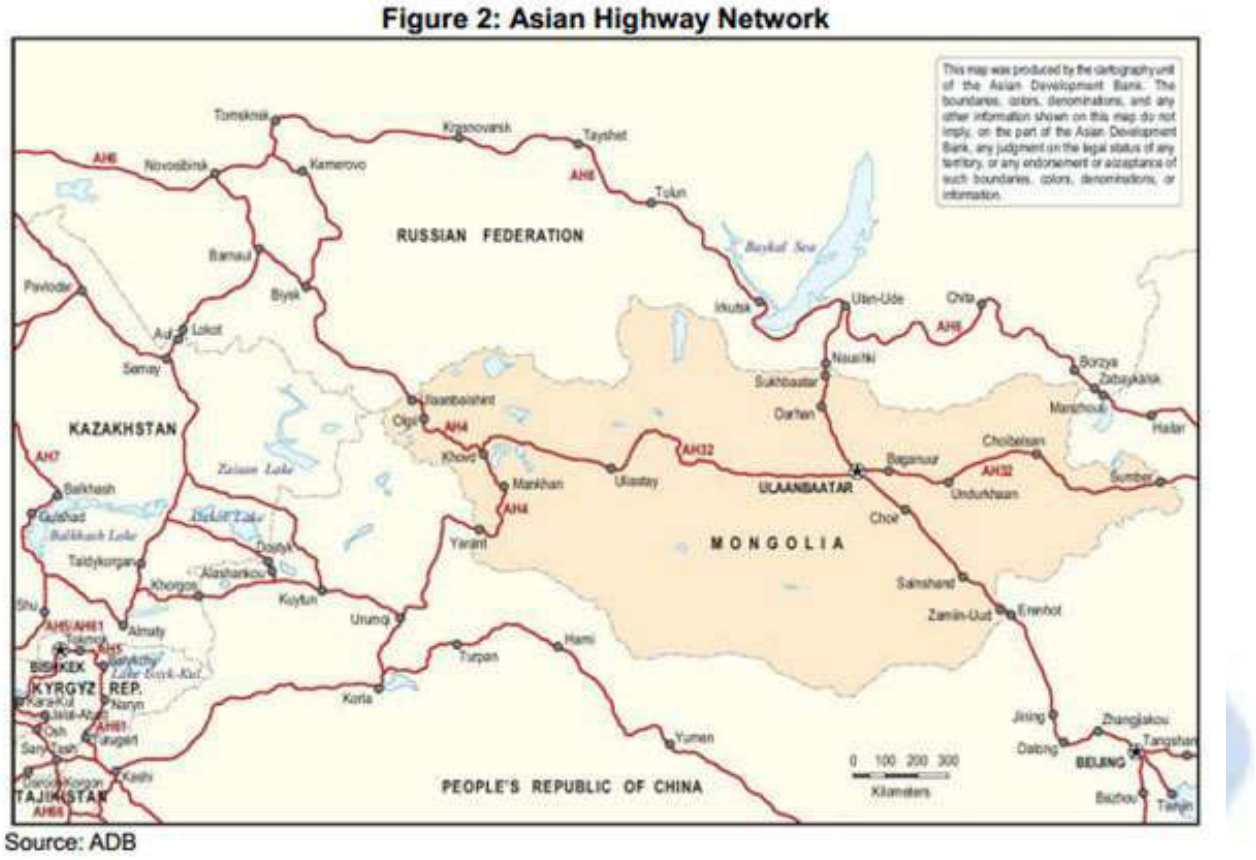
Road section	Description	Length, km
Package 1	Temeen Huzuu-Baga Ulaan pass	110.8
Package 2	Baga Ulaan pass to Mankhan soum	103.3
Package 3	Mankhan –Khovd	85.3
Package 5	Ulgii-Khashaat	60

Figure 1: Project location



Source: ADB

Figure 2: Asian Highway network



1.3 Baseline Environmental Condition

The project area is located within the Altay-Sayan eco-region that includes Mongolia, China, Russia and Kazakhstan. The Altai Mountains in Mongolia's Western region stretch approximately 1500 km. The region is relatively high altitude, with the project area elevations ranging from 1400m to 2600m. The area is characterized by dry steppe and steppe. The proposed project alignment will primarily follow existing roads that pass through mountain areas, hills, valleys and plains which are largely dry with sparse vegetation.

Monthly mean precipitation and snow cover data for the project area shows that the area is relatively dry and that winter snow is at its deepest in January for both the Khovd and Bayan-Ulgii provinces. This demonstrates a short construction period to the contractors as the months without snow cover are limited.

Figure 3: Natural scenery along the road corridor

The project area has continental, cold and dry climate with harsh winters. During the period from late October to mid-March the ground is covered with snow. The snow cover prevents deep soil freezing, acts as a water source for herdsmen, wild and domestic animals during the winter, and causes spring floods in the rivers and streams.

The surface water resources in the project area are characterized by rivers, streams, springs and lakes. A complex area of lakes, marshes, and ponds is in the project area such as the Depression of the Great Lakes.

A significant land use in the corridor is for grazing livestock. The livestock in the area are dominated by large herds of goat and sheep as well as cattle and camels. The vegetation on which the livestock graze includes sparse grassland close to water bodies.

The habitat in the project area has been highly modified and degraded by human activity, not least by the existing multi-track earth road network. Sparse vegetation near the corridor is heavily grazed

by livestock. The project area does not encroach upon any recognized critical habitat or legally protected area.

Bodonch canyon which serves as the main tunnel between the northern and southern parts of the Altay mountain, is 90 km long valley along the Package 1 road starting from the Baga Ulaan Pass all the way to Altay soum center. Bodonch river which is considered an environmentally sensitive area flows through the Bodonch canyon.

Figure 4: Khavchig Canyon

2. ENVIRONMENTAL PROTECTION AND MANAGEMENT

2.1 Environmental responsibilities

Environmental duties and responsibilities for the Contractor and its construction activities are stated in the Contract signed between the ADB, MRT and the CJJC. On hand, all the construction activities shall meet ADB's rules and standards regarding environmental protection, and on the other hand, it shall obey the Environmental Laws and regulations of Mongolia.

Environmental management and planning comes from the following main documents:

- Environmental and Social Impact Assessment for the Project

❖ Environmental Management Plan

The Detailed Environmental Impact Assessment for the Western Regional Road Corridor Development project was conducted by "Eco-Altay" Co., Ltd and was approved by the Ministry of Environment and Green Development in 2009. Within the DEIA report, potential negative environmental impacts from the Project activities were identified with 7 main aspects: air quality, soil cover, fauna, flora, surface water, socio-economy and health. Mitigation measures and each impact were determined and included in the Environmental Protection Plan. Frequency and scope of periodic monitoring activities were defined in the Environmental Monitoring Plan.

The Contractor is responsible for obtaining necessary permission from the local soum Governments on using quarry and borrow pits and drilling water wells.

In the Western Regional Road Corridor Development Project case, the Contractor is responsible for the implementing the actions defined in the EMP while the Project Implementation Unit is responsible for supervising the implementation works and preparation of quarterly reports to MRT and ADB. The contractor fulfill its environmental duties by hiring a local environmental consulting firm to conduct the monthly environmental monitoring activities for them.

In addition, necessary funding and expenses related to implementation of the Environmental Management Plan and report preparation are allocated and included in work contracts and the construction supervision contracts.

The environmental mitigation measures identified in the EMP shall be included in detailed engineering designs, works and other contracts for the project. The environmental protection, monitoring and construction workers' health and safety provisions shall be incorporated in both of the labor and the construction supervision contract.

2.2 Objectives of the Environmental Management Plan

The main objectives of an Environmental Management Plan are:

1. Ensure that environmental requirements specified in the contract documents are adequately performed.
2. Carry out construction and supportive activities in compliance with all relevant Government laws, rules and regulations including environmental laws in force.

3. Managing construction works and operations to avoid or at least minimize negative impacts on the environment.
4. Implement environmental and mitigation measures specified in the contract documents.
5. Develop action plan for implementing mitigation measures where and when needed
6. Provide safeguard to all workers from any hazard associated with the construction operations and ensure protection of their health
7. Ensure protection of the health and welfare of road side communities by minimizing nuisance including pollution.
8. Observe the laws and other environmental regulations of the country and liaise with the Engineer and statutory authorities for the smooth and efficient operation to complete the Project.

2.3 Key Environmental Issues

Following environmental issues arise during the road construction work:

1. During the construction over rivers and streams, a temporary reduction in water quality might occur because of increased turbidity and suspended sediment from uncontrolled run-off from the construction sites.
2. Springs along the road alignment need to be protected. There are a couple of springs in the Khavchig canyon that are a drinking water source to local herds people.
3. Dust will be generated and mobilized by construction activities. Dust generation mostly affect people living close to the construction sites.
4. Noise disturbance might occur to people who reside nearby the road alignment.
5. The herdsmen in the project area might encounter access problem to their pasture lands.
6. Since the Project area has a shortage in water resources, the local Government and residents are very sensetive to water sources, especially availability of water wells.
7. The area has permafrost which cause engineering challenges and potential changes to local hydrology.
8. Increased traffic and noise levels might have impact on wildlife migration.
9. Waste disposal from construction camps
10. Borrow pits and quarries are used at some points along the road.

All of the impacts mentioned above are projected as temporary impacts that could be reduced or avoided with a proper implementation of mitigation measures. There will be no residual impacts as long as the Environmental Management Plan is implemented properly.

2.4. Environmental supervision

The construction supervisor – Korea Consultants International Co., Ltd has implemented daily, filed supervision on environmental protection works and compliance of environmental requirements and standards. Environmental compliance sheets and checklists in the Appendix A are the main tools for the field supervisors for their daily inspection works. Results of their environmental inspection works are included in the Monthly Reports provided by the KCI Co., Ltd.

2.5 Landscape and soil resources

Package 1:

Completion of a paved road has helped to improve the environment as it provides an alternative to currently driving through multiple unimproved earth tracks, which has contributed to land degradation.

The Contractor operated 3 quarries for producing aggregates for cement and asphalt concrete, graded crushed stone base course material located around STA.12 on the right 2 km away from Altay soum center, at STA.54 on right and STA.92 up to June 2014. 2 quarries located at STA.12 and STA.92 were closed operation in July, 2014 and the other quarry located at STA.54 was closed in September, 2014.

The Contractor had received permission on operation for 6 borrow pits for embankment material, 16 borrow pits for sub-base material and 3 borrow pits for gravel shoulder material from the local administration. 20 borrow points were closed and completed technical rehabilitation in 2014. After rehabilitation is completed, the borrow points were handed over to the local administrations. Altay and Must soum environmental inspection teams paid visits to the rehabilitated sites and issued a Letter of Acceptance in October, 2014.

The Contractor is still using 5 borrow pits this year that are located at STA. 26.5, STA 31.16, STA.53, STA.74 and STA.98 respectively. These borrow points will be rehabilitated in August.

Figure 5: Rehabilitated borrow pit, Tsagduultiin am, STA.54, Package 1.

Since it's one of the biggest river canyons in Asia with beautiful natural scenery, the Bodonch canyon has a very promising future outlook to be developed as tourist destination and sports area. Adventure tourism, hiking are the possible tourism opportunities while international bicycle and rock climbing tournaments are possible sports events.

Figure 6: Innovative rehabilitation: A tourist point, STA.25, Package 1

Package 2:

There are 24 borrow pits for embankment work have approved by the local Government of Mankhan and Must soums at the beginning of May and June 2013 respectively that have been closed operation and rehabilitated in October 2014.

There are 10 borrow pits for sub-base material have approved by the local Government of Mankhan and Must soums. All 10 borrow pits had been closed operation and rehabilitation works are completed in October 2014. 13 borrow pits for gravel shoulder material are under operation for gravel shoulder work started from May 2014. 12 of the borrow pits were closed operation and rehabilitation works are completed in October 2014. The only borrow pit still under operation is located at STA.41.

The quarry for production of aggregates for base course, cement and asphalt concrete located at STA.54 on the right 0.5 km away from the project road alignment is operating from beginning of April 2014. The quarry site had been closed in October 2014.

After rehabilitation is completed, the borrow points were handed over to the local administrations. Altay and Must soum environmental inspection teams paid visits to the rehabilitated sites and issued a Letter of Acceptance in October, 2014.

Figure 7: Rehabilitated borrow point along the Package 2 road.

The borrow points are located at STA.53, STA.58 and STA.64 respectively are under operation in 2015 and will be rehabilitated this year.

2.6 Waste disposal

Following measures have been taken to ensure effectiveness of environmentally appropriate systems of collecting, transporting and depositing of wastes:

- Wastes from camp activities are delivered to the appointed spoil pits and dumpsites.

Figure 8: Designated waste collection point at the Main Camp.

- Wastes coming from workers' accommodation are deposited in designated places within the campsite before burning or delivery to the approved local dumpsite. Garbage containers with adequate lids/covers are provided in such places around the campsite and well maintained.
- Some road construction wastage has been removed from the construction site to the designated location in accordance with the related regulations on waste removal.

2.7 Water resources

Package1:

The Package 1 road crosses Bodonch river at several points. There are 12 bridges being built over the river crossing points. In Bodonch canyon, to make proper construction of road damn, the river diverged. Since the Bodonch river is very important to livelihood of local people, our contractor and its engineers have been paying a great attention to the Bodonch river. The contractor has dig water wells around each of its campsites along the road.

Figure 9: A culvert constructed under the road embankment

Figure 10: Bodonch river

Package 2:

- The road crosses 2 springs in the Khavchig canyon: Ehen Us and Dund Us. Water source protection actions have been planned for the springs. Since the springs are very important to

livelihood of local people, the contractor and its engineers have been paying a great attention to the river.

Figure 11: Spring "Ehen us" in Khavchig Canyon

The Contractor has obtained approval on water well usage from the Mankhan soum Government at 2 points: Khar ergiin huudas in Botgon bagh with coordinates of N4711143 E09214301 and at the western side of 5 Ovoo camp with coordinates of N4701471 E09223203.

Figure 12: Tsahiriin river nearby Package 2 main camp

Water protection activities:

- Construction of culvert for the Dund Us spring.
- Installed septic tanks and sock well to treat waste water and sewerage water at campsites
- Construction of locally acceptable drainage system to treat surface water from camp sites and workshops
- Supplying the site employees with fresh drinking water. Well water has been tested regularly and the test results conform to the drinking water standard.
- Concrete mixer trucks are not allowed to be washed at the water stream.
- Fuel storage areas at the campsites are secured by concrete slab to protect leakage of fuel and spillage.
- Bitumen storage area is under good security to ensure no adverse impacts or contamination of ground water.
- The campsite yard is covered with crushed stone together with concrete path, the access roads including drainage lines is kept neat and clean by spraying water regularly to control the dust.

Figure 13: A culver constructed to protect Dund Us springin the Khavchig canyon

2.8. Flood occurrences.

A heavy raining and a big flood occurred in Bodonch canyon between June 28 and July 3. Environmental Monitoring Consultant E.Hasar and hydrologist P.Batima have worked in Khovd province between July 23 and 27. The objective of the site visit was to meet with key stakeholders to review and discuss current design, conditions and options for improving flood resilience and emergency response and identify the critical hydraulic locations within the Bodonch Canyon. They have met with key personnel of the relating agencies such as hydrological engineer and Bodonch river observer of the Department of Meteorology of Khovd province, Administration offices of Bodonch river basin and Khar Us lake, CJJS and KCI engineers and supervisors at Package 1 and gathered necessary information and data. They also visited damage sites in Bodonch canyon for observation and measurement.

The maximum flood flow measured on June 29th was 33 m3/sec. The highest value of flood flow registered in the Bodonch canyon is 53 m3/sec during the flood occurred in 1987. The Bodonch river is meandering river thus very unstable for erosion banks which may result in destruction of productive land, bridges, bridge approaches, and control works. In this sense all sinuosity place is hydraulically critical area. But if take the damages of slope protection work or grouted stone pitching the section from STA.15+400 to STA 17+ is the most critical places.

Figure 14: Flood damage site at the end point of the Bodonch canyon, STA.15+400

2.9 Health and Safety

Specific tasks implemented within the Health and Safety Plan:

- Appointment of Health and Safety manager for the entire project as well as Health and safety engineers at Package 1 sites. They are in responsible for ensuring that all construction sites, camps, sub-camps and workshops are complied with the Technical Specification Requirements for Health and Safety.
- Designating an ambulance vehicle, equipped with basic first-aid kits in case of emergency accidents.
- Establishing emergency response plan in case of emergency situation occurs
- Training for construction and camp staffs on work safety
- Regular safety meetings at construction site and other work places
- Setting up requirements on wearing safety reflective vests, proper work boots, hard hats,

rubber boots, safety gloves, goggles etc. at work places.

- First-aid kits deployed in the main camps, sub-camps, workshops and quarry sites.
- Installation of temporary traffic signs, arrangement of temporary drainage and diversion

Health and safety engineers carry our following works on daily basis:

- Checking up workplace arrangements and identify risks
- Checking up the Health and safety principles, determine actions to be taken to improve the work place safety
- Dress inspection before the construction workers go out to workplace
- Checking the abnormal status and risk factors for the heavy machineries and equipment and determine preventive measures
- Fill in the Health and Safety checklist sheet regularly
- If any risks are found, inform it to field supervisors and recommend appropriate mitigation measures

2.10 Noise prevention

Noise and air pollution at the construction sites were minimized through proper maintenance of equipment & vehicles in accordance with the relevant standards. Precautionary measures implemented were:

1) Workers who are regularly working at active operational points where noise level could be high are required to wear earmuffs which will protect them from harmful and long exposures to noise originating from construction machinery. Compressor and crushing operators shall wear his earmuffs while working.
2) Noise level at the vehicles and construction machinery are monitored regularly with particular attention to silencers and mufflers to maintain noise levels within the specified limits.
3) There are no places near equipment having noise levels that exceed 90 decibels at site.

2.11 Dust prevention

- Embankment sections – spraying water by water truck regularly

Figure 15: Water spray truck at Shar Khargana valley, Package 2

- Around campsite - spraying water by water truck regularly
- Traffic passage and access roads- Since it is very difficult practically for the Contractor to control the whole passage of traffic, the Contractor is able to send water spray trucks to the active operational sites only.
- Crushing plant –spraying water by nozzle connected to water tank while working.
- Asphalt plant to reduce smoke emission –Dust collector equipped to the plant is working properly.

2.12 Campsite environment

- Ditches were constructed on both sides of the camps to prevent the camps from being damaged by the rain stream. Maintenance and repairing of the side ditches were conducted through regular cleaning and trimming.
- Sealed septic tanks are set for toilet outside of the camp by burying the pipes underground.
- A dedicated personnel is employed to take care of indoor cleaning for accommodation and offices. The cleaning items are provided by the contractor once a month for engineers to make the thorough cleaning, including bedcover washing, floor and furniture cleaning.
- The campsite yard is covered with crushed stone together with concrete path, the access roads including drainage lines is kept neat and clean by spraying water regularly to control the dust.

3. ENVIRONMENTAL MONITORING

3.1. Methodology

Since controlling the negative impacts from the road construction activities are essential for the Project, the Environmental Monitoring Plan was designed to ensure prevention and regular control of the adverse impacts on the environment and protection of the health and welfare of construction workers and road side communities. The Contractor has appointed dedicated personnel to ensure a proper implementation of the monitoring plan.

The Contractor hired a local professional firm carried out monthly monitoring tests and sampling activities for soil, water and air quality in May and June. Considering the construction season is relatively short in Mongolia, we setup a higher frequency of monitoring activity (once every month starting from May to October). All of the monitoring activities were conducted in accordance with relating laws, regulations and standards of Mongolia.

The monitoring team has identified 17 monitoring spots along the road, around the workers' camp and mixing plants and other environmentally sensitive spots. The monitoring team has undertaken field monitoring activities in May and June during which the dust and noise levels were measured with devices Dust Trak and VoltCraft, taken soil and water samples were taken at the selected monitoring spots. Test analysis for soil and water samples were conducted at the Laboratory of National Geographic Academy in Ulaanbaatar.

Figure 16: Noise and dust measurement device used for monitoring

3.2 Environmental Monitoring Budget

Table 2: Environmental monitoring costs for Package 1.

Monitoring indicators	Location of monitoring	Costs in 2015 1st half	Cost details	Standards
1. Air quality monitoring Dust measurments (PM10)	At 10 points along the road, mixing plant, workers camp and borrow pits	4,900$	245$ at each point x 10 points x 2 times = 4,900$	MNS:4585-98 MNS:3384 MNS:4048 MNS:5885 : 2008
2. Water quality monitoring Chemical and heavy metals analysis	Take water samples at 10 spots	6,080$	380$ at each sample x 8 samples x 2 times = 6,080 $	MNS: 3934 MNS: 5667
3. Noise monitoring maximum allowed level by decibels	At 10 spots along the road, worker's camp and mixing plant	1,200$	60$ at each spot x 10 spots x 2 times = 1200 $	MNS: 0012-1-009:1995
4. Work place condition, safety & hygiene	At all applicable places	2,000$	2 times 2000$	Health law, Hygiene rules, Occupational health and safety procedures
5. Soil quality monitoring Chemical and heavy metals analysis	At 10 spots along the road and mixing plant	7,600$	380$ at each spot x 10 samples x 2 times = 7,600 $	MNS: 5850:2008
6. Flora monitoring Species and density	Along the road corridor	2000$	2000$ per year	Guidelines for field survey
7. Fauna monitoring Species, population and migration	Along the road corridor	2000$	2000$ per year	Guidelines for field survey
Total		**23,780$**	**23,780$**	

Table 3: Environmental monitoring costs for CW1-1 section of Package 2

Monitoring indicators	Location of monitoring	Costs in 2015 1st half	Cost details	Standards
1. Air quality monitoring Dust measurments (PM10)	At 2 points along the road, mixing plant, workers camp and borrow pits	1,160$	290$ at each point x 2 points x 2 times = 1,160$	MNS:4585-98 MNS:3384 MNS:4048 MNS:5885 : 2008

2. Water quality monitoring Chemical and heavy metals analysis	Take water samples at 2 spots	1,320$	330$ at each sample x 2 samples x 2 times = 1,320 $2	MNS: 3934 MNS: 5667
3. Noise monitoring maximum allowed level by decibels	At 2 spots along the road, worker's camp and mixing plant	200$	50$ at each spot x 2 spots x 2 times = 200 $	MNS: 0012-1-009:1995
4. Work place condition, safety & hygiene	At all applicable places	380$	2 times 380$	Health law, Hygiene rules, Occupational health and safety procedures
5. Soil quality monitoring Chemical and heavy metals analysis	At 2 spots along the road and mixing plant	1,280$ each month	320$ at each spot x 2 samples x times = 1,280 $2	MNS: 5850:2008
6. Flora monitoring Species and density	Along the road corridor	500$	500$ per year	Guidelines for field survey
7. Fauna monitoring Species, population and migration	Along the road corridor	500$	500$ per year	Guidelines for field survey
Total		**4,840$**	**4,840$**	

Table 4: Environmental Monitoring Costs for CW1-2 section of Package 2.

Monitoring indicators	Location of monitoring	Costs in 2015 1st half	Cost details	Standards
1. Air quality monitoring Dust measurments (PM10)	At 3 points along the road, mixing plant, workers camp and borrow pits	1,740$	290$ at each point x 3 points x times = 1,740$	MNS:4585-98 MNS:3384 MNS:4048 MNS:5885 : 2008
2. Water quality monitoring Chemical and heavy metals analysis	Take water samples at 3 spots	1,980$	330$ at each sample x 3 samples x 2 times = 1,740 $2	MNS: 3934 MNS: 5667
3. Noise monitoring maximum allowed level by decibels	At 3 spots along the road, worker's camp and mixing plant	300$	50$ at each spot x 3 spots x 2 times = 300 $	MNS: 0012-1-009:1995

4. Work place condition, safety & hygiene	At all applicable places	390$	2 times 390$	Health law, Hygiene rules, Occupational health and safety procedures
5. Soil quality monitoring Chemical and heavy metals analysis	At 3 spots along the road and mixing plant	1,920$	320$ at each spot x 3 samples x 2 times = 1,920 $	MNS: 5850:2008
6. Flora monitoring Species and density	Along the road corridor	500$	500$ per year	Guidelines for field survey
7. Fauna monitoring Species, population and migration	Along the road corridor	500$	500$ per year	Guidelines for field survey
Total		**6,830$**	**20,000$**	

Table 5: Environmental Monitoring Costs for CW1-3 section of Package 2.

Monitoring indicators	Location of monitoring	Costs in 2015 1st half	Cost details	Standards
1. Air quality monitoring Dust measurments (PM10)	At 2 points along the road, mixing plant, workers camp and borrow pits	1,160$	290$ at each point x 2 points x 2 times = 1,160$	MNS:4585-98 MNS:3384 MNS:4048 MNS:5885 : 2008
2. Water quality monitoring Chemical and heavy metals analysis	Take water samples at 2 spots	1,320$	330$ at each sample x 2 samples x 2 times = 1,320 $2	MNS: 3934 MNS: 5667
3. Noise monitoring maximum allowed level by decibels	At 2 spots along the road, worker's camp and mixing plant	200$	50$ at each spot x 2 spots x 2 times = 200 $	MNS: 0012-1-009:1995
4. Work place condition, safety & hygiene	At all applicable places	380$	2 times 380$	Health law, Hygiene rules, Occupational health and safety procedures
5. Soil quality monitoring Chemical and heavy metals analysis	At 2 spots along the road and mixing plant	1,280$ each month	320$ at each spot x 2 samples x times = 1,280 $2	MNS: 5850:2008
6. Flora monitoring	Along the road corridor	500$	500$ per year	Guidelines for field survey

Species and density				
7. Fauna monitoring Species, population and migration	Along the road corridor	500$	500$ per year	Guidelines for field survey
Total		**4,840$**	**4,840$**	

3.3 Monitoring results

This sections includes field survey results, laboratory test results for the samples taken at the monitoring spots and expert analysis.

3.3.1. Wildlife movement survey

Our consultant B.Buuveibaatar has conducted wildlife movement survey along the road corridor between June 10 and June 20. Based on his observation and findings, Buuveibaatar has prepared a report and submitted to PIU earlier this month.

Practically, construction of a paved road could have a number of impacts on surrounding wildlife by limiting the possible migration and movement routes, increasing illegal hunting practices and dividing their natural habitat. In the case of WRRCD Project, the most obvious impact receptors are local herds people and their livestock and 5 rare species: Saiga, Gazelle, Ovis ammon, Capra sibirica and Uncia uncia.

Based on his observation, interviews with local people and previous survey reports, Buuveibaatar has determined 17 points where the Project could consider having wildlife cross.

For the Package 1 section of the Project road, he suggested 6 wildlife cross points, 1 point nearby temeen Khuzuu, 4 points in Bodonch canyon and 1 point nearby Baga Ulaan Pass.

For the Package 2 and Package 3 sections, he suggested 5 cross points, 1 point nearby Urtiin bridge, 1 point nearby 5 Ovoo, another cross point at Shar Khargana valley and 2 other cross points saiga between the mount Yamaatiin Ulaan and lake Khar Us.

Besides these 11 suggested cross points for the Package 1,2,3, Altay soum administration has requested to have livestock movement cross at 4 points. These suggested 4 points were determined

by joint survey by the local administration and the contractor. The contractor has started construction of cross point slopes in May.

3.3.2. Soil quality monitoring

Table 6: Results of Heavy metals analysis on soil, May

Name of the monitoring spot	Depth sm	Content of heavy metals mg/kg				
		Cr	Pb	Cd	Ni	Zn
Package 1 Main Camp	0-30	31.6	5.1	0.03	32.2	87.9
Camp 23	0-30	22.9	4.4	0.86	25.6	57.3
Camp 28	0-30	45.4	2.1	0.047	34.3	66.8
Quarry at Tsagduultiin am	0-30	37	12.4	0.06	49.1	99.8
Maanit stone bridge	0-30	24.5	4.7	0.27	21.7	51.3
Bodonch bridge	0-30	22.2	4.6	0.061	22.3	52.7
Khujirt camp	0-30	37.3	2.3	0.088	29	69.9
Quarry at Khujirt	0-30	33.3	4.8	0.34	12.5	84.6
Bodonch valley	0-30	13.8	5.2	0.069	15.8	35
Baga Ulaan Pass	0-30	14.5	9.7	0.017	14.9	60.2
Urtiin camp	0-30	21.6	8.9	0.031	19.8	74
Urtiin bridge	0-30	22.4	10.8	0.59	28.6	65.8
5 ovoo quarry	0-30	44.3	19	0.019	40.5	93
Package 2 Main Camp	0-30	122	5.6	0.011	41.1	68.2
Khavchig canyon	0-30	18.7	9.8	0.078	52.8	83.5
Maanit camp	0-30	45.4	7.6	0.009	52.1	81.3
Shar Khargana valley	0-30	13.2	6.2	0.055	22.3	47.6
Mongolian Standard (MNS 5850 : 2008)		**150**	**100**	**3**	**150**	**300**

Table 7: Results of Heavy metals analysis on soil, June

Name of the monitoring spot	Depth sm	Content of heavy metals mg/kg				
		Cr	Pb	Cd	Ni	Zn
Package 1 Main Camp	0-30	37.3	5.5	0.02	31.9	86.1
Camp 23	0-30	24.5	5.2	0.75	26.8	58.6
Camp 28	0-30	42.6	2.3	0.05	32.7	62.5
Quarry at Tsagduultiin am	0-30	36.6	10.8	0.08	46.8	99.7

Maanit stone bridge	0-30	23.8	4.6	0.22	21.8	53
Bodonch bridge	0-30	21.9	4.2	0.06	20.5	50.9
Khujirt camp	0-30	36.3	3.1	0.09	27.9	66.8
Quarry at Khujirt	0-30	29.7	5	0.32	13.6	85.1
Bodonch valley	0-30	14.1	4.3	0.07	15.2	32.9
Baga Ulaan Pass	0-30	14.3	9.2	0.2	15	58.7
Urtiin camp	0-30	22.5	8.5	0.03	18.4	73.1
Urtiin bridge	0-30	20.9	10.6	0.63	26.3	65.3
5 ovoo quarry	0-30	43.7	18.9	0.021	42.7	88.2
Package 2 Main Camp	0-30	87.3	5.2	0.01	39.3	67.1
Khavchig canyon	0-30	18.6	10.1	0.08	47.5	83.6
Maanit camp	0-30	45.1	7.8	0.01	53.1	82.8
Shar Khargana valley	0-30	12.8	6.3	0.06	22.8	43
Mongolian Standard (MNS 5850 : 2008)		**150**	**100**	**3**	**150**	**300**

The monitoring team has chosen 17 monitoring spots for soil sampling along the alignment. Environmentally sensitive points such as quarries, workers camp and river basins are chosen as monitoring spots. In the heavy metals analysis, contents of heavy metals in the soil samples were within the standard levels in all test results. The monitoring team was closely watching indicative figures on heavy metals analysis at each spot by comparing them on monthly basis. There were no substantial changes in the indicative figures. Therefore, based on the laboratory test analysis, it can be concluded that the soil cover in the Project area is free of any contamination.

3.3.3 Water quality monitoring

Table 8: Water Chemical analysis, May 1

Parameters	***Bodonch River 1***	***Khujirt camp, well***	***Bodonch Bridge***	***Camp 28, well***	***Package 1 Main camp, kitchen***	**Measuring unit**	**Drinking Water Standard (MNS 900:2005)**
Turbidity	0.11	0	0.15	0	0	**mg/l**	**1.5**
Mineralization	152.6	129.1	157.6	128.9	468.5	**mg/l**	**1000**
Reaction	7.12	6.84	7.39	7.65	7.92	**pH**	**6.5-8.5**

EC:	0.11	0.12	0.19	0.18	0.33	**dS/m**	
Hardness:	2.6	2.1	2.8	2.45	4.6	**mg/l**	**7.0**
CO_3^{2-}	2.4	1.6	1.8	2.1	1.2	**mg/l**	
HCO_3^-	74.3	80.7	113.5	118	117.1	**mg/l**	
Cl^-	16.8	12.7	23.1	22.5	55	**mg/l**	**350**
SO_4^{2-}	21.4	14.3	26.1	32.2	87.3	**mg/l**	**500**
Ca^{2+}	36.3	28.7	32.3	30.7	57.8	**mg/l**	**100**
Mg^{2+}	4.6	9.1	12.4	6.9	19.2	**mg/l**	**30**
Na^+	13	11.1	10.2	16.1	44.5	**mg/l**	**200**
K^+	1.2	1.5	1.5	1.8	2.9	**mg/l**	

Table 9: Water Chemical analysis, May 2

Parameters	***Bodonch River 2***	***Bodonch River 3***	***Khujirt camp, kitchen***	***Camp 28, kitchen***	***Well near Altay soum center***	**Measuring unit**	**Drinking Water Standard (MNS 900:2005)**
Turbidity	0	0.08	0	0	0.1	**mg/l**	**1.5**
Mineralization	173.9	207.8	214.5	256.8	243.9	**mg/l**	**1000**
Reaction	7.87	7.51	7.92	8.14	7.73	**pH**	**6.5-8.5**

EC:	0.27	0.25	0.29	0.39	0.28	**dS/m**	
Hardness:	2.22	2.31	2.96	3.61	3.05	**mg/l**	**7.0**
CO_3^{2-}	3.12	2.11	1.96	2.32	2.8	**mg/l**	
HCO_3^-	112.1	119.7	124.6	154.1	123.8	**mg/l**	
Cl^-	17.5	16.1	25	20.3	18.7	**mg/l**	**350**
SO_4^{2-}	21.9	30.1	73.2	67.8	34.5	**mg/l**	**500**
Ca^{2+}	28.4	29.6	39.1	45.8	27.6	**mg/l**	**100**
Mg^{2+}	7.9	7.6	12.1	13.5	9.8	**mg/l**	**30**
Na^+	7.2	8.3	15.4	19.1	10.3	**mg/l**	**200**
K^+	1.4	1.4	1.9	2.7	1.5	**mg/l**	

Table 10: Water Chemical analysis, May 3

Parameters	***Urtiin camp, kitchen***	***Urtiin well***	***Tsahir river***	***5 Ovoo quarry, well***	***Package 2 main camp kitchen***	***Maanit kitchen***	***Maanit camp well***	**Measuring unit**	**Drinking Water Standard (MNS 900:2005)**
Turbidity	0	0	0	0	0	0	0	**mg/l**	**1.5**
Mineralization	829	805	692	701	729	495	542	**mg/l**	**1000**

Reaction	7.11	7.24	7.11	7.34	7.51	7.31	6.42	**pH**	**6.5-8.5**
EC:	0.6	0.4	0.75	0.76	0.82	0.53	0.68	**dS/m**	
Hardness:	6.12	7.05	6.45	6.98	6.32	6.19	6.85	**mg/l**	**7.0**
CO_3^{2-}	0	0	0	0	0	4.2	3.9	**mg/l**	
HCO_3^-	291	289	169	227.1	160	241	175	**mg/l**	
Cl^-	73.2	81.9	115	52.3	97.2	48.8	82.5	**mg/l**	**350**
SO_4^{2-}	187.2	200.6	246	219.6	265.7	201.2	217.1	**mg/l**	**500**
Ca^{2+}	71.9	77.1	97.9	73.4	93.5	69.9	85	**mg/l**	**100**
Mg^{2+}	28.3	29.1	29.8	30	11.3	21.1	29.2	**mg/l**	**30**
Na^+	103.2	106.3	50	48.2	46.7	25.3	26.9	**mg/l**	**200**
K^+	3.8	4.1	4.1	4.5	4.6	2.2	3.6	**mg/l**	

Table 11: Water Chemical analysis, June 1

Parameters	***Bodonch River 1***	***Khujirt camp, well***	***Bodonch Bridge***	***Camp 28, well***	***Package 1 Main camp, kitchen***	**Measuring unit**	**Drinking Water Standard (MNS 900:2005)**
Turbidity	0	0	0	0	0	**mg/l**	**1.5**
Mineralization	156.1	133.5	162.5	127.8	322.9	**mg/l**	**1000**

Reaction	6.86	6.21	7.26	7.63	7.75	**pH**	**6.5-8.5**
EC:	0.12	0.11	0.16	0.17	0.29	**dS/m**	
Hardness:	2.9	2.3	2.2	2.5	4.8	**mg/l**	**7.0**
CO_3^{2-}	2.2	1.5	1.8	1.9	1.3	**mg/l**	
HCO_3^-	74.1	79.6	112.1	117	110.8	**mg/l**	
Cl^-	13.3	17.5	21	23.6	53	**mg/l**	**350**
SO_4^{2-}	29.7	18.6	25.8	30	89.7	**mg/l**	**500**
Ca^{2+}	36.2	28.5	31.1	29.4	57.5	**mg/l**	**100**
Mg^{2+}	4.8	9.4	10.9	5.6	28.1	**mg/l**	**30**
Na^+	12.6	10.8	10.3	16.5	47.5	**mg/l**	**200**
K^+	1.3	1.4	1.4	1.7	2.3	**mg/l**	

Table 12: Water Chemical analysis, June 2

Parameters	***Bodonch River 2***	***Bodonch River 3***	***Khujirt camp, kitchen***	***Camp 28, kitchen***	***Well near Altay soum center***	**Measuring unit**	**Drinking Water Standard (MNS 900:2005)**
Turbidity	0	0	0	0	0	**mg/l**	**1.5**
Mineralization	192.7	199.4	206.5	257	233.9	**mg/l**	**1000**
Reaction	6.83	7.12	7.96	8.1	7.72	**pH**	**6.5-8.5**

EC:	0.21	0.23	0.32	0.34	0.29	**dS/m**	
Hardness:	2.21	2.35	2.92	3.64	2.93	**mg/l**	**7.0**
CO_3^{2-}	3.16	2.13	1.97	2.16	2.75	**mg/l**	
HCO_3^-	111.7	117.5	124.3	150.6	124	**mg/l**	
Cl^-	18.2	16.1	24.8	20.2	19.7	**mg/l**	**350**
SO_4^{2-}	22	33.8	75.1	67.5	33.2	**mg/l**	**500**
Ca^{2+}	28.2	29.3	37.3	42.1	28	**mg/l**	**100**
Mg^{2+}	7.8	8.6	11.5	12.1	9.3	**mg/l**	**30**
Na^+	10.3	8.4	16.5	19.6	10.1	**mg/l**	**200**
K^+	1.6	1.5	1.8	2.2	1.6	**mg/l**	

Table 13: Water Chemical analysis, June 3

Parameter	***Urtiin camp, kitchen water***	***Urtiin camp, well***	***Tsahiriin river***	***5 Ovoo quarry, well water***	***Package 2 Main camp, kitchen***	***Maanit camp, kitchen***	***Maanit camp, well***	**Measuring unit**	**Drinking Water Standard (MNS 900:2005)**
Turbidity	0	0	0.03	0.02	0	0	0	**mg/l**	**1.5**
Mineralization	769	763	699	713	716	422	512	**mg/l**	**1000**

Reaction	6.9	7.3	7.08	7.21	7.52	6.98	6.49	**pH**	**6.5-8.5**
EC:	0.8	0.5	0.64	0.72	0.85	0.58	0.63	**dS/m**	
Hardness:	6.18	6.19	6.51	6.82	6.15	6.17	6.36	**mg/l**	**7.0**
CO_3^{2-}	3.6	3.5	3.1	2.8	4.1	4.3	3.8	**mg/l**	
HCO_3^-	288	284	162	229	155	239	177	**mg/l**	
Cl^-	77.9	82.1	116	53.7	99.9	42.4	82.4	**mg/l**	**350**
SO_4^{2-}	198.2	200.5	242.1	217.8	256.8	213.7	232.3	**mg/l**	**500**
Ca^{2+}	73.4	75.6	91.2	79.8	92.3	69.8	84	**mg/l**	**100**
Mg^{2+}	28.5	28.2	29	27.8	14.6	21.4	29.3	**mg/l**	**30**
Na^+	105.8	103.1	48.9	48.8	45.1	25.1	27.9	**mg/l**	**200**
K^+	3.7	3.2	4	3.8	3.7	2.1	3.9	**mg/l**	

Table 14: Water Heavy metals analysis, Package 1

Name of the monitoring spot	**Month of testing**	**Content of heavy metals (mg/l)**				
		Cr	**Pb**	**Cd**	**Ni**	**Zn**
Bodonch river, Maanit stone bridge	May	0.02	0	0.001	0.01	0.1
Bodonch river, Maanit stone bridge	June	0.01	0	0.002	0	0.05
Drinking water standard of Mongolia (MNS 900:2005)		0.05	0.01	0.003	0.02	5

Table 15: Water Heavy metals analysis, Package 2, CW1-1

Sampling point	Month of sampling	Content of heavy metals (mg/l)				
		Cr	Pb	Cd	Ni	Zn
Urtiin camp kitchen water	May	0.02	0.01	0.001	0.02	0.06
Urtiin camp kitchen water	June	0.03	0.01	0.003	0.01	0.08
Drinking Water Standard (MNS 900:2005)		**0.05**	**0.01**	**0.003**	**0.02**	**5**

Table 16: Water Heavy metals analysis, Package 2, CW1-2

Sampling point	Month of sampling	Content of heavy metals (mg/l)				
		Cr	Pb	Cd	Ni	Zn
Khavchig canyon	May	0.02	0	0.001	0.01	0.03
Khavchig canyon	June	0.02	0.01	0.002	0.01	0.02
Drinking Water Standard (MNS 900:2005)		**0.05**	**0.01**	**0.003**	**0.02**	**5**

Table 17: Water Heavy metals analysis, Package 2, CW1-3

Name of the monitoring spot	Month of testing	Content of heavy metals (mg/l)				
		Cr	Pb	Cd	Ni	Zn
Maanit camp, kitchen water	May	0.02	0	0.001	0.01	0.03
Maanit camp, kitchen water	June	0.01	0	0.001	0.02	0.06
Drinking water standard of Mongolia (MNS 900:2005)		0.05	0.01	0.003	0.02	5

The monitoring team specialists have taken water samples at the environmentally sensitive points such as Bodonch river, Tsahiriin river and wells nearby construction camps that are used for drinking to ensure workers' health protection.

The monthly heavy metals analysis shows no sign of contamination in the river water. Thus, it can be concluded that Bodonch and Tsahiriin rivers were free of heavy metal contamination during the construction period. All of the indicating figures representing Pb, Zn, Cd, Cr and Ni contents were

within or near to the standard level. In comparing the indicative figures on monthly basis, there were no substantial changes that could lead to a concern.

Laboratory test results for the water samples from the well and kitchen show that all the indicators are within the allowed level of Drinking Water Standard of Mongolia, thus could be used for human drinking. However, since magnum content and hardness indicators are relatively high in the water samples, all of the well and kitchen waters are recommended for drinking usage only after fully boiling.

3.3.4 Dust measurement

The monitoring team has chosen 17 points around construction camps, quarries, mixing plants and the most actively operating construction points where dust generation could be relatively high. Monitoring team specialists have conducted dust concentration levels for one hour during active operation time. Average dust concentration level per hour is shown in the below table. The maximum allowed level of dust concentration is 0.1 mg/m3 according Mongolian Standard on Ambient Air Quality.

Figure 17: Dust measurement

Measured dust concentration levels were maintained well below the standard level at all 17 monitoring spots during. The measured dust levels were relatively higher at 2 points, namely 5 Ovoo quarry and Khujirt quarry, where mixing plant and concrete plants are operating. Overall, dust levels have been reduced significantly along the road corridor compared to year 2014 because the road construction is nearing its completion and the road is opened to traffic.

Table 18: Measured dust concentration levels at the monitoring spots.

Monitoring Spot No.	Name of the monitoring spot	Average dust concentration level /per hour/, mg/m3		Standard level
		May	June	mg/m3
1	Package 1 Main Camp	0.038	0.059	
2	STA. 23	0.036	0.033	
3	STA. 28	0.041	0.029	
4	Tsagduultiin am	0.042	0.031	
5	Maanit stone bridge	0.038	0.027	
6	Bodonch bridge	0.032	0.031	
7	Khujirt	0.041	0.042	
8	Khujirtiin am	0.067	0.083	
9	Bodonch valley	0.027	0.023	0.1
10	Baga Ulaan Pass	0.033	0.028	
11	Urtiin am	0.038	0.031	
12	Urtiin bridge	0.041	0.033	
13	5 ovoo	0.043	0.081	
14	Package 2 Main Camp	0.029	0.035	
15	Khavchig canyon	0.065	0.076	
16	Maanitiin uzuur	0.029	0.027	
17	Shar Khargana valley	0.033	0.023	

3.3.5 Noise measurement

The monitoring spots chosen for noise measurement were the same as dust measurement spots, noise disturbance could be highest at those spots given the heavy workload, traffic of trucks and active operation. Maximum allowed level of noise during day time is 90 decibels according to the Mongolian Standard on Ambient Air Quality. At all 17 monitoring spots, the noise levels were maintained within the allowed level during the construction season.

Table 19: Measured noise level at the monitoring spots

Monitoring Spot No.	Name of the monitoring spot	Measured noise level /dB/		Standard level
		May	June	dB
1	Package 1 Main Camp	23.6	45.8	
2	STA. 23	37.9	25.1	
3	STA. 28	33.6	26.9	
4	Tsagduultiin am	34.9	29.2	
5	Maanit stone bridge	27.1	19.4	
6	Bodonch bridge	30.5	20.6	
7	Khujirt	42	52.3	
8	Khujirtiin am	33.7	58.2	
9	Bodonch valley	28.2	24.8	90
10	Baga Ulaan Pass	23.5	18.1	
11	Urtiin am	39.1	22.3	
12	Urtiin bridge	28.7	21.9	
13	5 ovoo	33.2	66.9	
14	Package 2 Main Camp	24.8	25	
15	Khavchig canyon	46.3	71.1	
16	Maanitiin uzuur	22.5	24.1	
17	Shar Khargana valley	28.3	19.7	

3.4. COMMUNITY WORK

The Environmental Monitoring Consultant has established a strong relations with state inspection officers and local soum ang bagh Governors in Altay, Must and Mankhan soums and maintained regular communication through monthly meetings and joint field inspections. During monthly meetings, the monitoring consultant had presented Project progress, environmental protection activities while receiving their opinions and requests that were reported to the Project Leader later. Most of the requests were regarding spring protection and traffic control points. According to local local, about 30 excess weight trucks (platform trucks with load capacity of 100 metric tons) passes along the road everyday which leads to road damages. Livestock theft practices tend to increase this year because there is no traffic control point along the road.

According to requirements from the newly established Uyench-Bodonch River Basin Administration Bureau, the contractor has applied for "Water Usage Inspection and Permission". During a meeting with the bureau, they expressed their willingness to support the Project.

Within its social responsibility to support local communities, the Contractor China Jiangsu Jianda Construction Co.,Ltd has hired local residents of Altay soum to help executing the road embankment cleaning and vegetation works in May and June. Daily labor rate is 30,000 MNT per person. During an interview with the residents hired for the Project, they expressed gratitude and are happy for their contribution. In total, about 70 local residents from the Must and Altay soums were hired for this cleaning and vegation works.

Figure 18: Local residents workingfor the Project, Bodonch canyon.

Within the project "Support nutrition for households in poverty" which is aimed at enhance nutrition and food consumption for households in poverty through community engagement, we are planning to provide small greenhouse and relating necessary tools to 30 households in Mankhan, Must and Altay soums. Mr.Adilbish is the coordinator for this project.

4. CONCLUSION

The Project has demonstrated a satisfactory level of environmental due diligence in the first half of 2015. The environmental protection measures and environmental compliance monitoring and reporting as set out in the Contract fulfilled within required budget and time scales. Impact mitigation measures and environmental protection actions on each specific fields such as air quality, soil, water, health and safety were implemented successfully.

Soil, water and air quality monitoring activities have been held in May and June and environmental protection and impact mitigation measures as well as health and safety plans were implemented as per requirements in the EMP. The contractor has hired local professional organizations such as National Geographic Academy and Institute of Meteorology of Khovd province to carry out the field monitoring actions for them. Monthly environmental monitoring reports that include the results of monthly monitoring works and laboratory test analysis were submitted.

The results of the monthly monitoring works and laboratory test showed that soil, water and air quality parameters were within the maximum allowed levels of relevant Mongolian Standards. The comparative analysis made on the results of monthly measurements shows there were no substantial fluctuations in the parameters and significant degree of impact.

The possible negative impacts from the construction activities identified in EIA report were reduced to an acceptable level. During the monitoring period, there were temporary impacts such as dust arising, noise disturbance and damaged landscape (quarries and borrow pits) occurred, but those impacts were controlled and minimized successfully. There will be no residual impacts.

Important points for the remaining period and work closure for Package 1 and Package 2:

1. The contractor shall continue its monthly monitoring activities on soil, water and air quality. It will ensure that the Project impacts are maintained under control.
2. The Project stakeholders need to make decisions on wildlife cross points.
3. Need to develop a flood protection measure for Bodonch canyon for the upcoming years. According to scientists, high precipitation period has began in 2008 and heavy flood occurred every year since the road contruction began in 2011.
4. In the Package 2 section, Ehen us springs shall be protected with special attention during asphalt works in 2015.
5. Since both Package 1 and Package sections will have work closures in 2015, completion of rehabilitation works is of importance. Altogether, there are 8 borrow points under operation where rehabilitation will be completed later this year.
6. Traffic control points need to be established as soon as possible. Constant movement of heavy duty platform trucks with load capacity of 100 metric tons are causing road damages. There are several points and sections where the road pavement is broken due to excess weight trucks in section CW1-1. Establishment of traffic control points are also essential to prevention from illegal hunting and livestock theft practices.

7. Water wells used for workers' camp need to be handed-over to the local soum administrations with its technical passports.
8. Implementation of the project "Support nutrition for households in poverty" in the 3 soums: Must, Altay and Mankhan.
9. Proper removal of construction and campsite wastes before work closure. 3 main methods for the waste removal are: landfilling, burying and disposing to local waste collection points.

S.E.C

APPENDIX A.

Table 20: Compliance Checklist on Environmental Protection Measures

No	Place	Concern issue	Recommended measures	Implementation status
1	Road Construction site	Use of Safety tools (goggles, gloves, dress, helmet, shoes, etc. by the Construction workers/ engineers.	Availability of safety tools at the camp and at the construction site.	Implemented
		Temporary Sign and Signals for construction works	Important signals like Line marker post, STA. post, Aerial markers, Intermediate aerial markers, Warning signs and Identification signs etc. should be made available along the road.	Implemented
2.	Construction camp	Water supply	• Arrangement for elevated service reservoir / tank. • Availability of taps in bathroom, toilet, kitchen and dining space • Ensure drinking water quality through tests as per WHO standards	Implemented
		Sanitation	• Provision of water closet and flushing system in toilet and bathroom • Effluent transportation arrangement into septic tank for treatment and disposal through soak pits.	Implemented
		Kitchen and dining environment.	Provision of adequate ventilation, fixing of hand basins and cleanliness	Implemented

No	Place	Concern issue	Recommended measures	Implementation status
		Drainage at the camp	Provision of storm water drainage to nearby drain/stream outside the camp area.	Implemented
			Avoid stagnation of water inside the camp.	Implemented
		Solid waste	Placement of waste collection bins (one for two rooms), and Immediate modernization of waste disposal dig with cover and proper handling at the camp.	Implemented
		First aid facilities,	Physician for facilitating round the clock service	Implemented
		Workshop	• Structure modification with raised impervious platform and shed/roof. • Collection of drips on tray and storing in drum for re-use or safe disposal • Soaking arrangement with dry sands in case of accidental spillage and disposal in deep pit away from water body	Implemented.
		Stock pile	Maintenance of stockpile height at a maximum of 4 meter	Implemented
3.	Quarry/Borrow pits.	• Material collection • Compliance with Environmental Law, 2006.	• Preparation of a plan for required and available quantity supported by survey data and profiling of the river at the material collection point • Collect permission from NEPA, M/O Mines and local authority (if any) for extraction of stone from riverbed.	Implemented
4.	Unplanned Hill cutting,	Unplanned hill cutting and disposal of spoil earth and debris materials will lead to	• Maintain necessary slope to the hill cutting area and staged disposal of spoil earth from hill cutting with adequate	Implemented

No	Place	Concern issue	Recommended measures	Implementation status
		erosion of the hill and will deposit the eroded soil on the road site.	• Protection measures to prevent all kinds of soil movement on the constructed road, valleys, agricultural lands, and river/stream courses.	
5.	Crusher Plant at site.	Dust pollution at the site resulting different diseases of the residence of the camp	• Regular spray water at the dust area and the entire internal road, inside the camps. • Arrangement for water sprinkler throughout the crushing time, wearing of masks, goggles, etc., and regular health checking of the crusher equipment operators/workers at the site.	Implemented
6.	Camp, Offices	Fire-fighting equipment should be placed at the camp and office	Immediate placement of fire-fighting equipment so that it can visible and in case of any emergency, it can be utilized.	Implemented
7.	Transport and equipment movement at the camp.	Excessive dust polluting surrounding environment of the camp and sound pollution due to transport movement in the camp.	Equipment meeting environmental standard in respect of sound should be used in the camp and construction area.	Implemented
8;.	Tree plantation at the road, camp and at the offices.	For the better environment it is required to plant tree along the road side, camp, offices etc.	Tree plantation along the road, at the camp and at the offices should be implemented immediately	Implemented
9.	Storage and use of chemicals, fuel and lubricant at the camp and at the offices.	Soil pollution for spilled out from the vehicles, bituminous drum etc. at the camp and at the offices.	Strict chemical and solid waste handling and storage practices should be followed.	Implemented

No	Place	Concern issue	Recommended measures	Implementation status
10.	Construction workers related Impact at the camp and at the construction sites.	• Unhygienic and littered environment around the camp, • Exposure to hazards, transmission of diseases among workers, water-borne diseases to workers.	The local workers should be oriented to hygienic disposal of solid waste, hazardous materials, and proper handling methods. And also should be provided regular health inspections and vaccination among the workers.	Implemented
11.	Traffic Signal	Without traffic signal accident may be happened	Signal Man should be provided at the construction site.	Implemented
12.	Accommodation in the camp	According to size of the room accommodation of the workers should be provided.	Accommodation of the workers should have enough space and should be cleaned on daily basis.	Implemented
13.	Environmental officer	In absence of environmental officer contractors activities will may not going on as environment friendly.	Immediate placement of environmental officer.	Implemented

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