

Environmental Monitoring and Evaluation Report

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Kyrgyz Republic: CAREC Regional Road Corridor Improvement Project (Sarytash-Karamyk Road)

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TABLE OF CONTENTS

1.0	BACKGROUND AND INTRODUCTION	3
1.1	ENVIRONMENTAL ASSESSMENT (EA)	3
1.2	MITIGATION	3
1.3	COMPENSATION	4
1.4	MONITORING	4
2.0	ENVIRONMENTAL MANAGEMENT PROVISIONS IN THE CONTRACTOR'S EMP VERSUS FIELD OBSERVATIONS	4
2.1	FIELD OBSERVATIONS DURING FIRST FIELD INSPECTION	7
2.1.1	Air Quality:	7
2.1.2	Water Quality	7
2.1.3	Fuel and Chemical storage	7
2.1.4	Waste Management	7
2.1.5	Inappropriate Signage	8
2.1.6	Soil erosion	8
2.2	REPORTING OF INDICATORS AS PER GOOD ENVIRONMENTAL PRACTICE	9
	APPENDIX 1 - AMBIENT AIR QUALITY STANDARDS IN THE KYRGYZ REPUBLIC	12
	APPENDIX 2 - AMBIENT OUTDOOR NOISE STANDARDS IN THE KYRGYZ REPUBLIC	13
	APPENDIX 3 – SAMPLE PHOTOS FROM SECOND SITE VISIT	14

ENVIRONMENTAL MONITORING AND EVALUATION REPORT
SARYTASH-KARAMYK ROAD
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1.0 Background and Introduction

There is a growing awareness that road development projects could have major environmental impacts, and the **Sarytash-Karamyk** Road is no exception. Some of the major environmental impacts of road projects include damage to sensitive ecosystems, loss of productive agricultural lands, resettlement of affected communities, permanent disruption of local economic activities, demographic changes, accelerated urbanization and the introduction of disease.

Road projects are generally intended to improve the economic and social welfare of people. Increased road capacity and improved pavements can reduce travel times and lower the costs of vehicle use, while increasing access to markets, jobs, education and health services and reducing transport costs for both freight and passengers.

For all the positive aspects of road projects, they may also have significant negative impacts on nearby communities and the natural environment. People and properties may be in the direct path of road works and affected in a major way. People may also be indirectly affected by road projects, through the disruption of livelihood, loss of accustomed travel paths and community linkages, increases in respiratory problems due to air pollution, loss of access to resource products (medicinal plants, wild fruit trees, grazing areas for cattle etc.) and injury from road accidents.

Disturbance to the natural environment may include soil erosion, changes to streams and underground water, and interference with animal and plant life. Temporary impacts during construction are also common and require specific mitigation to minimize them, e.g. keeping dust levels down during road pavement preparation through the use of water browsers to minimize health and safety impacts to nearby communities.

Failure to identify potential impacts may result in delays and cost increases later in the project's development. Neglecting to account for impacts may also cause the road designers to adopt solutions that compromise the environment. Poor environmental management has been shown to produce negative public perception of road projects, creating additional for those projects still to come. The following are some measures undertaken to minimize/eliminate such negative impacts:

1.1 Environmental Assessment (EA)

An EA is not aimed solely at identifying the negative impacts of a project in the context of the area it is being planned in, but also optimizes the positive effects of the project. Just as good road project planning, management and execution requires well trained professional transportation engineers, technically credible and environmentally sensitive, road EA's require experienced environmental professionals supporting the engineering team. Such personnel should be brought into the project development process at a very early stage.

1.2 Mitigation

Mitigation is the lessening of negative environmental impacts through: (a) changes in the design, construction practices, maintenance, and operation of the road; and (b) additional actions taken to protect the biophysical and social environment, as well as the individuals who have been impacted adversely by a project. Some aspects of mitigation can be incorporated into project design and can largely resolve the threat of impacts before construction begins. However many measures require a ongoing

implementation plan to ensure that proposed actions are carried out at the correct times, that environmental measures such as grass planting and slope protection are maintained and that prompt remedial actions are taken when the initial measures are not fully successful.

1.3 Compensation

Compensation should be considered if steps to reduce impacts are not possible or sufficient. Compensation can be material (reconstruction of homes or natural environment), financial (compensation for loss of property), or a combination of both.

1.4 Monitoring

The implementation of mitigative measures is often the weakest link in the environmental management process. Any EA study needs to identify plans for works supervisors (design and supervising engineers), future environmental monitoring and evaluation studies. Once implemented these should ensure the full implementation of the mitigation measures.

While an EA and a mitigation plan have been conducted for the **Sarytash-Karamyk** Road, the need for periodic monitoring to ensure compliance with the mitigation plan is necessary. The report at hand presents the findings of an environmental monitoring visit to the project site undertaken by the TERA international and national environmental experts in October 2010. The findings of the assessment were compared against the main components of the Contractor's environmental management and monitoring plan, and the mitigation action per good practice. Those findings are presented, along with recommendations in the following sections.

2.0 Environmental Management Provisions in the Contractor's EMP versus Field Observations

At the beginning of the project, the conditions to be implemented and applied by the Contractor (China Road and Bridge- CRBC) to avoid adverse impacts on the environment and communities in the vicinity of the Site caused by the Project are summarized in Matrix 1 below.

Valued Environmental Component	Mitigative Measures to be Implemented by CRBC
Air Quality	<ul style="list-style-type: none"> • Adhere to Kyrgyz Government's pollution control guidelines and standards (see Appendix); • Prohibit the open burning of waste or materials; • Ensure that construction equipment will be maintained to a good standard and fitted with pollution control devices. • Discourage the idling of engines; • Prohibit the use of equipment and machinery that causes excessive pollution (i.e. visible smoke) at the Site; • Ensure that all vehicles transporting potentially dust-producing material will not be overloaded, will be provided with adequate tail-boards and side-boards; • Not permit the operation of hot-mix, asphalt, aggregate or concrete plant in close proximity of populated settlements nor within 500m of sensitive uses • Locate material stockpiles in sheltered areas and cover them with tarpaulins or other such suitable covering to prevent material becoming airborne; • Undertake regular watering/spraying of the project road, especially in the vicinity of the villages/settlements, and any roads being used for haulage of materials during the dry season; • Prepare, and submit to the Engineer for approval, a dust suppression plan. • Undertake periodic air quality monitoring
Water Quality	<ul style="list-style-type: none"> • Prevent interference with natural water flow in rivers, water courses or streams within or adjacent to work sites, • Protect water courses, rivers, streams, lakes, drains, canals and ditches within and adjacent to the Site from pollution • Ensure that any temporary constructions are located at least 50m from water courses, • Include sediment controls such as silt fences, coffer dams and silt barriers • Not permit the discharge of sediment laden construction water or material • Store hydro-carbons, petroleum products to be used in bitumen mixes, and other chemicals in secure and impermeable containers or tanks located away from surface waters. • Equip construction work camps and site offices with sanitary latrines that do not pollute surface waters; • Engage a suitable qualified organization to undertake a baseline and water quality monitoring as required by the Contract. • Give priority to locating material stock-piles, borrow pits and construction camps on unused land and non-agricultural land. • Monitor embankments during construction for signs of erosion; • Not permit random and uncontrolled tipping of spoil and re-vegetate exposed areas including; • As per the requirements of the Contract only licensed quarrying operations will be used for material sources. • Locate borrow areas outside the right-of-way; • Restore all borrow pits, following the completion of works, in full compliance with all applicable standards and specifications;

<p>Noise and Vibration</p>	<ul style="list-style-type: none"> • Ensure all equipment, especially exhaust systems, be maintained in good working order and that regular equipment maintenance will be undertaken; • Prepare a schedule of operations that will be approved by the Engineer. The schedule will establish the days and hours of work for each construction activity and identify the types of equipment to be used; • Prohibit any construction activities between 10pm and 6am in settlements or close to sensitive receptors such as hospitals and schools; • Consult with the community in respect of construction activities and potential noise and vibration impacts. • Use blasting mats to reduce noise during blasting operations; • Undertake a baseline and monitoring of levels of noises and vibrations. • CRBC will engage a suitable qualified organization to undertake a baseline and noise and vibration monitoring as required by the Contract. Monitoring will be conducted in at least two sites per village along the road and other sites as required by the Engineer.
<p>Fuel and Chemicals Storage</p>	<ul style="list-style-type: none"> • Strictly control filling and refuelling, and subject the same formal procedures to avoid leakage or spills; • Store all inflammable and chemical agents in waterproof and secure tanks, • Ensure that the contents of any drums, tanks or vessels are clearly marked; • Ensure that all fuel valves and trigger guns will be located so as to avoid interference and vandalism, • Take all necessary measures to ensure that no contaminated discharges enter any drain or watercourses;
<p>Waste Management</p>	<ul style="list-style-type: none"> • Prohibit the discharge of polluted or hazardous materials or chemicals to the ground or water sources; • Store liquids in tanks or drums that are not able to spill or discharge to water courses or streams; • Construct temporary treatment and drainage systems to collect and discharge liquid wastes. • Prohibit the dumping of unsanitary material, waste-water, chemicals, soil, waste oil and chemicals, fuel, lubricating oil etc. • Construct and rehabilitate all temporary drainage systems and take all measurements to prevent flooding or damage associated with flushing during work activities; and • Ensure that construction workers and staff are aware of, and comply with, the provisions of HSEMP and the Contract in respect of liquid and solid waste management.
<p>Revegetation and Landscaping</p>	<p>CRBC will be responsible for landscaping and re-vegetation of the Site as per the requirements of the Contract, especially the provisions of Section 8.6 of Bidding Documents Volume II Section 6a.</p>

2.1 Field Observations during First Field Inspection

In April 2011, the local Environmental Expert visited the project site and conducted an inspection for the main facilities as it relates to the environmental management aspects presented in the original CRBC plan.

The visit coincided with the period when the CRBC staff Team 1 and Team 2 had just commenced their works for the season. Some of the workers had just recently arrived to the Site and were at the stage of the preparations for the forthcoming works. Thus, the national Environment Expert had an opportunity to fix the “Baseline” conditions that can be used for judgment concerning the environmental and sanitary conditions at the Project site afterwards.

During the visit of the Team 1, site the National consultant found minor non-compliances to the regulations provided at the Project EMMP. They are described below at the appropriate sections of the report.

The following observations were made as per the various environmental components.

2.1.1 Air Quality:

On the prohibition of the use of equipment and machinery that causes excessive pollution (i.e. visible smoke) at the Site.

The generator operating at the bridge causes excessive pollution (visible smoke). See Pictures 1 and 2 in the Appendix.

2.1.2 Water Quality

On latrines to be available at the camps, and are provided with septic tanks.

Latrines are not maintained in clean conditions. At the Team 2 site, the responsible personnel tried to improve the toilet conditions. The latrines are provided with septic tank and currently maintained in more or less acceptable conditions. But latrines at the Team 1 site are in an unsatisfactory condition. It does not have any septic tank and seems to have remained un-cleaned since the last working season (See picture 3 in Appendix).

Signs of oil spillage were observed in many places of the Site. Only one of them is provided with a concrete base to prevent water and soil pollution. In other places, there are no protection measures undertaken (See picture 4 in Appendix).

2.1.3 Fuel and Chemical storage

On control over filling and refueling practices at the site

Weak control over filling and refueling practices at the site was observed; a great number of oil spots can be observed at several locations at the site. There is a lack of proper bases made. For example, the National Expert observed that the staff seems to try undertaking measures of protection using plastic covers instead of cement bases.

The area of the Team 1 is widely polluted by the oily and other similar substances, especially around bitumen tanks and barrels with oil. In the future, wide-ranging works on ground clean-up should be provided. (See Pictures 6 and 7 in Appendix)

2.1.4 Waste Management

On waste disposal problems from solid waste generated during construction activity or wastes generated in construction camps.

There is dumping of unsanitary materials, wastewater, food and solid waste, especially in the worker camps.

Detailed and accurate information for site plan(s) for each camp and project office is not available. Also maps showing the location on the site of collection, treatment and discharge systems, lavatory and storage of unsanitary materials are also not available (See Pictures 8 through 10 in Appendix)

2.1.5 Inappropriate Signage

The conclusions made during the previous inspections remain valid for the traffic control and advisory signs at critical locations are still below standard. The signage used is inadequate and constitutes a hazard to traffic and people especially at night. The Contractor is required to replace those and to ensure that vandalism and/or removal of such signs is eliminated. (See Pictures 11 through 14 in Appendix)

2.1.6 Soil erosion

The areas cleared from the top soil had to be restored when construction works are completed. In so doing, the top soil had to be kept in piles covered by protective coating. This coating will not allow weathering and any other lost of the top soil that can further be used for re-vegetation of the cleared areas. During the inspection, the National Expert found that a significant amount of top soil taken from the areas around the bridge at Kyzyl-Suu river bank is disposed without any protective coverage and undergoes gradual destruction. The Contractor should collect the top soil in a pile before it is fully destroyed and provide a protective coating for them. (See Pictures 15 through 18 in Appendix)

The observations made by the National Expert were delivered to the CRBC representatives and they were requested to rectify all non compliant practices.

2.2 Reporting of Indicators as Per Good Environmental Practice

The following Matrix is a guide on the environmental indicators that are to be provided by the Contractor. It had been submitted to the Contractor in 2008, however, it has not been totally satisfied. The Contractor shall periodically provide those indicators in regular report to be reviewed by the National Expert, and verified by the International Expert during his visits in 2011.

Potential Impact	Mitigation Action Per IEE & Good Practice	M&E Indicators
Erosion or sedimentation caused during clearing or earthworks	Utilization of sediment measures such as silt fences to trap sediment before it enters waterways	Linear length of silt fences installed Areas of vegetation undertaken
	Undertake progressive re-vegetation of cleared areas	
	Avoid clearing activities during the rainy season where possible	
Soil erosion, land slide or rock fall	Undertake progressive re-vegetation of cleared areas	Liner length of embankments treated Volume of excavation materials re-used Volumes of gabion baskets installed
	Embankments in areas of steep slopes to be stepped	
	Side slopes of cuttings and embankments designed to reflect soil strength etc	
	Re-use excavated material wherever possible	
	Rip-rap, retaining structures, gabion baskets etc to be used wherever necessary for slope and river-bank protection	
Soil contamination from spillage of oil or other chemical substances	Store chemicals in secure area/compound, with concrete floor and weatherproof roof	Number and frequency of storage facilities along the length of the alignment and proximity to camp sites
	Ensure construction plant are maintained in good condition and any leaks are quickly repaired	Response time to leaks and maintenance programs of plants
Air pollution from dust or exhaust emissions (CO, Nox, Sox, etc)	Implement dust suppression measures including watering of exposed surfaces	Frequency of watering activities as per the construction schedule Proportion of covered truck trips and frequency of replacing covers Maintenance frequency of construction equipment including preventative maintenance
	Cover all trucks carrying dispersible materials to or from the site	
	Minimize size and duration of cleared areas	
	Ensure all construction vehicles and equipment are well maintained	
Clearing of vegetated area	Undertake progressive re-vegetation of cleared areas with fast-growing, native species Avoid the felling of road-side trees wherever possible	Areas of vegetation undertaken
Exploitation of local resources incl. poaching of fauna	Poaching of fauna or felling trees that are not required to be cleared or removed by the project within the project areas will be forbidden Contractor will impose sanctions on any worker poaching fauna or felling trees	Locations and specifications of access roads Re-vegetation activities undertaken Frequency of tree protection

	unnecessary for the project works	measures (e.g., fencing) installed Training and awareness activities for workers relevant to the subject
Noise emissions from construction equipment	Ensure all construction vehicles and equipment are well maintained	Vehicle and equipment maintenance programs
	As far as possible limit noisy construction activities to day time hours in the vicinity of houses and hospitals and to night time hours in the vicinity of schools	Construction schedules in the vicinity of habitats and small communities
	Fresh concrete and asphalt mixing stations must not located nearby residential areas, schools and hospitals	Site maps of asphalt mixing relative to nearby communities and minimum distances from various resources to be continuously provided
	Inform nearby community of schedule and duration of construction works	Communication plan and meeting logs with community representatives
	Provide workers with noise abatement equipment (ear-muffs etc	Frequency and quantity of gear and equipment dispersed to employees and staff
Changes to road safety / traffic movements, property access	Install signage and lighting in vicinity of works on road	List of signage installed along the alignment
	Install temporary access to affected properties	List and maps of access roads opened
	Reinstate good quality permanent access to affected properties on completion of construction works	
	Notify nearby community of schedule and duration of construction works	Communication plans and meetings with community representatives
	As far as practical, limit construction vehicle movements to main transport routes and avoid movements in peak hours	
Waste disposal problems from solid waste generated during construction activity or wastes generated in construction camps	Prepare and implement "waste management plan"	Waste management plan for various sites
	Train construction workers in appropriate waste disposal methods	Inventory of liquid storage sites and equipment
	Remove waste regularly from site for disposal to landfill	Plans of drainage and disposal systems installed
	Install waste collection and temporary storage facilities in construction camps	
	Wastewater systems from construction camps must not discharge into water bodies which are use for water supplies for domestic and industrial purposes	
Disrupts commercial activities on roadside	Install temporary access to affected Properties	Number of access facilities installed for this purpose
	Reinstate good quality permanent access to affected properties on completion of construction works	
	Notify nearby community of schedule and	Communication plan and

	duration of construction works	meetings with community leaders
Construction workers cause social disruption or sanitation/health conditions	Ensure construction camps maintained in clean/hygienic conditions, implement "waste management plan"	Monthly logs of inspections on hygiene of construction camps
	Train workers on appropriate interactions with local community and institute awareness program about sanitation and communicable diseases. Implement HIV awareness and prevention campaign (incl. HIV in the Workplace training for workers)	Training programs and numbers of trainees trained on the subject
	Consult with local authorities to plan construction worker housing arrangements	
Visual and landscape impacts	Implement low maintenance landscaping along roadside	Landscaping plans and inventories of plantings put it
Employment or livelihood benefits from employment of local people	Maximize the number of local people involved in the construction works	Numbers of employees hired locally in the various job descriptions for them
Risks to public or cost construction worker health or safety	Provide safety equipment to workers and train them in its use	Monthly reports of the health and safety units
	Secure construction site and restrict access by local community	
Interference with existing infrastructure	Consult with subproject engineering staff to minimize physical impacts on public infrastructure and disruption to services	Meeting minutes and correspondence with the relevant utilities
Water afflux in depressions along the road	Provide proper cleaning to remove silt from the channels and maintain the channeling on the permanent basis in future	Number and locations of temporary drainage facilities installed Program of cleaning activities of water drainage facilities
	Provide better conditions for water drainage in the areas where usually the water afflux occur	

Appendix 1 - Ambient Air Quality Standards in the Kyrgyz Republic

Pollutant	Maximum Permissible (mg/m ³)	Average Daily Concentration (mg/m ³)
Particulate Material:		
With silica content > 70%	0.15	0.05
70 - 20% (cement, coal, clay, etc.)	0.3	0.1
< 20 % (dolomite, etc.)	0.5	0.15
Cement dust (Calcium oxide > 60% and silica >20%)	0.5	0.05
Sulfur Dioxide SO ₂	0.5	0.05
Carbon monoxide	5	3
Nitrogen Dioxide NO ₂	0.085	0.04
Nitrogen Oxide NO	0.40	0.06
Lead (Pb) and compounds (except tetra ethyl)	-	0.0003
Lead sulphurous (in terms of Pb)	-	0.0017

Source: Kyrgyz Agency on Hydrometeorology

To avoid adverse impacts from noise and vibration CRBC will:

Appendix 2 - Ambient Outdoor Noise Standards in the Kyrgyz Republic

Activity Category ¹	L_{eq} ²	L_{max} ³	Description of Activity Category
8	Day = 45	Day = 60	Areas immediately adjacent to hospitals and sanatoriums
	Night = 35	Night = 50	
9	Day = 55	Day = 70	Areas immediately adjacent to dwellings, polyclinics, dispensaries, rest homes, holiday hotels, libraries, schools, etc
	Night = 45	Night = 60	
10	Day = 60	Day = 75	Areas immediately adjacent to hotels and dormitories
	Night = 50	Night = 65	
11	35	50	Recreational areas in hospitals and sanatoriums
12	45	60	Rest areas at the territories of micro-districts and building estates, rest houses, sanatoriums, schools, homes for the aged, etc

Source: Information Publishing Center of Goskomsanepidnadzor (Russian Federation, 1994)

¹ Activity Categories 1 to 7 relate to indoor standards. The standards provide for allowable noise levels to be reduced in "green areas" or other designated sensitive areas.

² L_{eq} = the sound level equivalent, the L_{eq} represents the level of steady sound which, when averaged over the sampling period, is equivalent in energy to the fluctuating sound level over the same period.

³ L_{Max} = maximum sound level.

Appendix 3 – Sample Photos from Second Site Visit



Picture 1.



Picture 2.



Picture 3.



Picture 4.



Picture 5.



Picture 6.



Picture 7.



Picture 8.



Picture 9.



Picture 10.



Picture 11.



Picture 12.



Picture 13.



Picture 14.



Picture 15.



Picture 16.



Picture 17.



Picture 18.