Initial Environmental Examination

Loan No. 3056/Grant No. 0366
December 2015

Kyrgyz Republic: CAREC Transport Corridor 3 (Bishkek–Osh Road) Improvement Project, Phase 4

Prepared by the Ministry of Transport and Communications of the Kyrgyz Republic for the Asian Development Bank. This is an updated version of the draft originally posted in December 2015 available on http://www.adb.org/projects/45169-001/documents. The IEE is a document of the Borrower.

INITIAL ENVIRONMENTAL EXAMINATION REPORT

Project Number: 45169
Loan Number: 3056/Grant Number 0366-KGZ
December 9, 2015

CAREC Transport Corridor 3 (Bishkek – Osh Road) Improvement Project, Phase 4 Engineering and construction supervision

This Initial Environmental Examination Report was prepared in 2013 by the KOCKS Consult GmbH for the Ministry of Transport and Communications of the Kyrgyz Republic and revised in 2015 on behalf of the Borrower by EPTISA Servicios De Ingenieria S.L./Eptisa Muhendislik/RAM Engineering in accordance with the Kyrgyz Republic Environmental Protection Legislation and ADB requirements

Initial Environmental Examination Report is a document of Borrower

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ABBREVIATIONS

ADB	-	Asian Development Bank
Aids	-	Acquired immune deficiency syndrome
AP	-	Affected People
CAREC	-	Central Asia Regional Economic Cooperation
CSC	-	Construction Supervision Consultant
EMP	-	Environmental Management Plan
GRM		Grievance Redress Mechanism
HIV	-	Human Immune Deficiency Virus
IPIG	-	Investment Project Implementation Group
IEE	-	Initial Environmental Examination
IPIG	-	Investment Projects Implementation Group
KM	-	Kilometer
LAR	-	Land Acquisition and Resettlement
MoTC	-	Ministry of Transport and Communication of the Kyrgyz Republic
NGO	-	Non-Governmental Organization
PAP	-	Project-Affected Person
PCU	-	Passenger Car Unit
PPTA	-	Project Preparatory Technical Assistance
RAP	-	Resettlement Action Plan
RoW	-	Right-of-Way
RP	-	Resettlement Plan
SA	-	Social Assessment
STD	-	Sexually Transmitted Disease
SSEMP	-	Site Specific Environmental Plan
TA	-	Technical Assistance
TOR	-	Terms of Reference
USD	-	United States Dollar
VAT	-	Value Added Tax
VOC	-	Vehicle Operating Cost

EXECUTIVE SUMMARY

1. The Government of the Kyrgyz Republic has requested the Asian Development Bank (ADB) to identify, formulate, and prepare an ensuing loan and/or grant for the CAREC Corridor (Bishkek-Osh) Improvement Project. This Initial Environmental Examination (IEE) has been prepared as part of the feasibility study for the project. The study covers section Bishkek to Kara Balta (45.1 km).

2. The proposed project will improve connectivity and access to markets in Kyrgyz Republic. The outcome of the project will be efficient movement of freight and passenger traffic along the Bishkek-Osh road. According to the categorization of ADB Safeguard Policy Statement, the project belongs to category “B” and doesn’t require full Environmental Impact Assessment (EIA). According to the legislation of Kyrgyz Republic the project requires State Environmental Expertise (SEE).

3. This report includes background information on Kyrgyz Republic, relevant legislation and the project area. It includes a detailed description of the proposed project and describes the current condition of the environment in the project area. Different environmentally sensitive receptors were identified and the impacts of the project have been analyzed from the perspective of the receptors. Suitable mitigation measures have been identified to reduce the anticipated impacts to the technically possible minimum and an Environmental Management Plan (EMP) has been prepared accordingly.

4. Impacts from the project are expected to be limited in magnitude and spatially. As most of the impacts are confined to the construction stage of the Project certain impacts also occur in the operational stage. These impacts are due to increased traffic volume and vehicle speed and refer to elevated levels of gaseous and noise emissions and potentially increased pedestrian vs. vehicle accidents. In addition there is an increased risk of accidents with possible spills of harmful substances. The identified impacts include (i) noise impacts, emission of pollutants to air and vibration, which is especially of high significance within the settlements alongside the Project road and where sensitive receptors are located such as schools, hospitals mosques or other, e.g. households located near the road and others like quarries, bazaar, cultural and historical properties, major conjunctions (ii) impacts on water courses and rivers (iii) impacts from aggregate sourcing at borrow sites; (iv) impacts on soil and vegetation, inclusive tree plantations alongside the Project road due to site clearance activities; (v) impacts from bridge and drainage facilities rehabilitation; (vi) impacts from asphalt plant and aggregate crushers and (vii) impacts from contractor's working camps. Impacts have been divided in to design phase, construction phase, and operation phase impacts.

5. Mitigation measures for each of the impacts have been developed and incorporated into the Environmental Management Plan (EMP). In addition the contractor will have to prepare and submit to IPIG and to the Construction Supervision Consultant a Site Specific Environmental Management Plan (SSEMP) covering the following aspects: (i) Dust management ; (ii) Layout of the work camp; (iii) Sewage disposal; (iv) Waste and oil disposal; (v) Description and layout of equipment maintenance and storage facilities; (vi) Soil management (top soil storage and reuse); (vii) Emergency response plan; and (viii) Method statement for bridge reconstruction works. The SSEMP shall be approved by the Construction Supervision Consultant.

INTRODUCTION

A. Background

6. In 2013 a feasibility study for the CAREC Corridor 3 (Bishkek-Osh Road) Improvement Project, Phase 4 (45169-002) was prepared. In late 2014 the construction supervision consultant EPTISA Servicios De Ingenieria S.L./Eptisa Muhendislik/RAM Engineering was selected to supervise the construction of this section of the road. As part of this assignment the consultant is required to revise and update the IEE and submit it to the MOTC and ADB for review and approval. A State Environmental Expertise in the State Agency for Environmental Protection and Forestry under the Government of the Kyrgyz Republic is required.

7. Background information on Kyrgyz Republic, the Project and the environment within the Project's area of influence is given below.

8. The Kyrgyz Republic is a landlocked, mountainous country with formidable geographic barriers that seriously constrain its ability to effectively participate in international trade. Its development efforts are further hampered by inadequate physical infrastructure, which is in need of investment and regular maintenance.

9. Bishkek, the capital of the Kyrgyz Republic, is the country's political and economic hub with a dense population of 840,000. The largest city after Bishkek is Osh (population 250,000), located in the Fergana valley in the south, the country's major agricultural area. These two city's gross domestic product accounts for nearly half of the nation's. Approximately 80% of the country's industry is located in these two cities.

10. The Bishkek-Osh road represents about one fourth of the core international road corridor network in the Kyrgyz Republic, and links the country to Kazakhstan in the north, Uzbekistan and Tajikistan in the south, and the People's Republic of China in the southeast. It crosses four of the seven provinces of the country and serves about 2 million people. It is the only direct surface link between the southern and northern parts of the country making it crucial for maintaining the country's social, political, and economic integrity. The Bishkek-Osh road forms part of the Central Asia Regional Economic Cooperation (CAREC) Corridor 3, which runs from the west and south Siberian region of the Russian Federation through Kazakhstan, Kyrgyz Republic, Tajikistan, Afghanistan, and Uzbekistan to the Middle East and South Asia.

11. The development of the transport sector is very important for landlocked Kyrgyz Republic as it will help ensure a cost-effective access to regional and domestic markets. It will also help generate employment and provide services throughout the country.

12. The proposed project will improve the national and regional connectivity by rehabilitating 45.1 km of crucial road section between Bishkek and Osh. The proposed project is consistent with the government's priority in upgrading key corridors as stated in its draft Medi-um-Term Development Program (2012–2014) and is included in ADB's draft Country Opera-tions Business Plan (2012–2014) for the Kyrgyz Republic.

13. The Government of the Kyrgyz Republic has requested the Asian Development Bank (ADB) to identify, formulate, and prepare an ensuing loan and/or grant for the CAREC Corridor (Bishkek-Osh) Improvement Project, Phase 4. A feasibility study suitable for ADB financing is required for the loan and/or grant. This Initial Environmental Examination (IEE) has been prepared as part of the feasibility study. The study covers the road section Bishkek to Kara Balta (45.1km).

14. The benefit of the proposed project will be improved connectivity and access to markets. The outcome of the project will be efficient movement of freight and passenger traffic along the Bishkek-Osh road. The project outputs will be:

(i) 45.1 km of rehabilitated road from Bishkek to Kara Balta,
(ii) strengthened road asset management system,
(iii) improved road safety.

15. Environmental impacts of the Bishkek – Osh road rehabilitation are minimal since most of the construction activities will take place along the existing RoW. The impacts will include among others:

(i) noise impacts, emission of pollutants to air and vibration, which is especially of high significance within the settlements alongside the Project road and where sensitive receptors are located such as schools, hospitals mosques or other,
(ii) impacts on water courses and rivers,
(iii) impacts from aggregate sourcing at borrow sites,
(iv) impacts on soil and vegetation, inclusive tree plantations alongside the Project road due to site clearance activities;
(v) impacts from bridge rehabilitation;
(vi) impacts from asphalt plant and aggregate crushersб
(vii) impacts from contractor's working camps.

16. Impacts have been divided in to design phase, construction phase, and operation phase impacts. Impacts are described in the chapter "Environmental Impacts and Mitigation Measures" and in the EMP.

17. The Bishkek – Kara Balta road section is located between km 15.9 and km 61 of the Bishkek – Osh Road. The section starts in Sokuluk rayon at road km 15.9. At the beginning the road has a 6-lane configuration which turns to a 4-lane configuration of the carriageway until km 21. The existing pavement is asphalt concrete and the paved width is between 15 and 20 m. Shoulder width ranges from 1.5 to 3.0 m. The Section proceeds westward to the outskirts of Kara Balta town, passing through a number of settlements interspersed by agricultural fields first with a 3-lane configuration of carriageway, than changing to 2-lanes. The paved width is 8 to 12 m and the shoulder width is 1.5 to 3.0 m. The villages along the road are merging into a relatively continuous ribbon along the roadway. At km 61 the Bishkek-Osh Road turns south at a roundabout, which marks the end of the road section. The terrain for entire sections can be classified as flat with altitudes ranging from 750 m to 800m.

18. Land use within the area of influence of the Bishkek - Kara Balta road section is mainly agricultural. Cultivated crops in the Bishkek to Kara Balta section are mainly wheat, feed and technical crops, different kinds of vegetables like potatoes, peppers, carrots, water melons and egg plants and fruit plantations like apple trees and apricots.

Figure 1: The Bishkek – Kara Balta road section

19. The first field surveys for the environmental investigations were done in November 2012, and over the wintertime work focused on desktop study concerning the legal framework, project description and environmental baseline data. Available literature was studied and project data, statistical data, maps and aerial photographs compiled. Extensive site surveys on the physical and biological environment were conducted in spring, March and April 2013. Based on results of conducted field survey environmental impacts were identified and suitable mitigation measures prepared. Because the Project involves the rehabilitation of an existing road and also because there are no protected areas located within the Project's area of influence occurring environmental impacts are mostly confined to the construction stage. Therefore in accordance with the ADB's Safeguard Policy Statement and Guidelines on Environmental Assessment Requirements the Project was categorized as B by ADB. The entire project was reexamined in 2014 and additional field surveys, as recommended by ADB were completed. Based on this finding and a further field inspections the IEE was fully revised.

20. Sensitive receptors were identified alongside the Project road and baseline measurements were conducted. Public consultation meetings were conducted in Voenno_Antonovka village, Sokuluk city, Belovodskye village and Poltavka village. Minutes were taken and are attached to the report.

B. Environmental Protection Legislation of Kyrgyz Republic

21. Environmental impact of the Bishkek – Osh Rehabilitation Project is regulated by a number of environmental legislative acts of the Kyrgyz Republic.

Tab. 1: Relevant Laws and Regulations on the Environmental Impacts of Road Projects

#	Legislation	Number & Year of adoption	Purpose/content
Main laws on environmental protection			
1	The Constitution of the Kyrgyz Republic	2010	Land, its mineral resources, airspace, waters, forests, flora and fauna and other natural resources are used, but at the same time are under protection.

			Everyone is obliged to take care of the environment, flora and fauna of the country.
2	The Environmental Safety Concept of KR	No.506 dtd. 23.11.2007	It establishes the basic principles of environmental policy and determines global, national and local environmental issues; priorities in the field of environmental protection at the national level as well as tools to ensure environmental safety.
3	National Sustainable Development Strategy of the Kyrgyz Republic for 2013-2017	No.11 dtd. 21.01.2013	Provides a conceptual sustainable development framework aimed to satisfy the needs of current generations and not to endanger at the same time the needs of future generations.
4	Law of KR "On Environmental Protection"	No.53 dtd. 1999	Establishes the basic principles of environmental protection and provides legal authority to establish environmental quality, designate special protected areas, promulgate rules and procedures for the use of natural resources, establish environmental monitoring and control system and reinforce procedures for overcoming emergency situations. Among the standards and norms of environmental quality authorized under this law and related to the project there are: • Standards Of Maximum Safe Concentration Of Hazardous Substances In Air, Water; • Standards Of Natural Resources Use; • Standards Of Maximum Safe Noise, Vibration Levels And Other Hazardous Physical Impacts. This law establishes the requirements for environmental examination (environmental assessment) intended by economic or other activities to prevent potential adverse environmental impacts. In addition, it prohibits financing or implementation of projects related to the use of natural resources without obtaining approval from the State Environmental Expertise.
5	Law of KR "On Environmental Impact Assessment"	No.54 dtd. 1999	Is the main law related to environmental assessment. Its task is to prevent negative impacts on human health and environment occurring as a result of economic or other activities, and to ensure compliance of these activities with environmental requirements of the country.
6	Law of KR "General technical rules and regulations for environmental safety in the Kyrgyz Republic"	No.151 dtd. 2009	Is meant to protect the environment. It determines the main provisions for technical regulation of environmental safety and establishes general requirements for ensuring environmental safety during design and operations of businesses and other facilities of all legal and physical entities.
7	Regulation on procedure for conducting environmental impact assessment in the Kyrgyz Republic	No. 60 dtd. 13.02.2015	Establishes the procedure for assessing the environmental impact of the proposed activity (hereinafter EIA). The purpose of EIA is to prevent and/or mitigate the environmental impacts of the proposed activity and other related social, economic and other consequences.
8	Regulation on Water Zones and Strips of Water Bodies	No.271 dtd.	Defines the procedure for establishing water zones and strips of water bodies protection in the Kyrgyz

	Protection in the Kyrgyz Republic	7.07. 1995	Republic, establishes a regime of economic activity and land use located in the water protection zones and strips. This law also defines responsibility for keeping them in proper shape.
9	Law of KR "On Protection of Atmospheric Air"	No.51 dtd. 1999	Governs the relations on use and protection of atmospheric air.
10	Law of KR "On Production and Consumption Waste"	No.89 dtd. 2001	Defines the national policy in production and consumption waste management. It is aimed at preventing negative impacts from production and consumption waste on the environment and human health while handling it and their maximum involvement in the economy as an additional source of raw materials.
11	Law of KR "On Protection and Use of Flora"	No.53 dtd. 2001	Establishes the legal framework for ensuring effective protection, rational use and reproduction of flora resources.
12	Law of KR "On Wildlife"	No.59 dtd. 1999	Establishes the legal relations in the context of protection, use and reproduction of wildlife.
13	Law of KR "On local self-government and local state administration"	No.101 dtd. 2011	Establishes the principles for setting-up local authorities at the level of administrative and territorial units of the Kyrgyz Republic.
Legislation on Land Acquisition			
14	The Constitution of the Kyrgyz Republic	2010	Clause 12 recognizes a diversity of forms of ownership and guarantees equal legal protection of private, state, municipal and other forms of property (Clause 12, paragraph 1). Land can be of private, municipal and other forms of ownership except for pastures, which cannot be privately owned (Clause 12, paragraph 5). Property is indefeasible. No one can be arbitrarily deprived of his property. Seizure of property by the state against the will of the owner is allowed only by court decision (Clause 12, paragraph 2). Seizure of property for public purposes specified in the law is possible by the court decision with fair and advanced compensation of property cost and other damages caused as a result of such alienation. (Clause 12, paragraph 2).
15	Civil Code	No.16 dtd. 8.05.1996 in the wording dtd. 30.05.2013	Determines that the person whose right is violated can demand full compensation for damages, unless the law or agreement consistent with the law says otherwise (Clause 14, paragraph 1). The Civil Code specifies the following losses subject to compensation: • expenses incurred or to be incurred by the person whose right is violated in connection with restoration of violated rights (Clause 14, paragraph 2); • loss or damage to property (Clause 14, paragraph 2); • lost income that would be received by the person under normal civil turnover conditions if his right was not violated (lost profits) (Clause 14,

			paragraph 2); • compensation for loss of profits along with the other costs, at least in the amount of such income, to the person loosing land, assets or livelihood.
16	Land Code	No.45 dtd. 2.06.1999 in the wording dtd. 26.05.2009	Governs land relations in the Kyrgyz Republic, basis for the origin, procedure for exercise and termination of rights to land and their registration, and also aimed to create land and market relations in state, communal and private ownership of land and efficient use and protection of land. The Land Code is the main document, which regulates land use.
17	Law of KR «On transfer (transformation) of land»	No. 145 dtd. 15.07.2013	This law is developed in accordance with the Land Code of the Kyrgyz Republic and other normative legal acts of the Kyrgyz Republic. It defines the legal basis, conditions and procedure for transfer (transformation) of land from one category to another or from one type of land to another.
18	Law «On Highways»	No.72 dtd. 2.06.1998	According to Clause 4 the public roads are owned by the state and not subject to sale and cannot be passed into private ownership. This law (Clause 27) also provides that without prior approval of the State Automobile Inspectorate and the Ministry of Transport and Communications of the Kyrgyz Republic the following is prohibited among others: • trade on the roadside; • placement of kiosks, pavilions and similar structures; and, • unauthorized use of road lands (Clause 23)
19	Regulation on valuation of assets		Valuation of assets is made based on the Provisional Rules of activities of valuators and valuation organizations (Government Resolution #537 dtd. August 21, 2003), property valuation standards (Government Resolution #217 dtd. April 3, 2006) and other national legislative provisions.
Law On Protection And Use Of Historical And Cultural Heritage			
20	The Law "On protection and use of historical and cultural heritage"	No.91 dtd. 26.07.1999	Establishes legal norms for protection and use of tangible historical and cultural heritage on the territory of the Kyrgyz Republic, which is of unique value for people. The law is mandatory for all legal entities and individuals. It defines their rights and obligations in the context of protection and use of tangible historical and cultural heritage. Historical and cultural heritage are the historical and cultural monuments associated with historical events in the life of the people, development of society and the state, material and spiritual creative works representing historical, scientific, artistic or other value.

International Conventions and Agreements

1	UN Framework Convention on Climate Change	2000	Combating global climate change and its consequences.
2	Aarhus Convention on access to information, public participation in decision-making and access to justice on environmental issues.	2001	To support the protection of human rights to a healthy environment and well-being, access to information, public participation in decision-making and access to justice on issues related to the environment.

22. Ratification of international legal acts involves implementation of international requirements into the national legislation and harmonization of the Kyrgyz legislation with the international legislation. However, this process is moving very slowly in Kyrgyzstan given that conventions are really frameworks that need to be translated into national laws, a process that is time consuming and complicated.

ADB Safeguards

23. As noted previously ADB has classified the Bishkek – Osh road as category "B" for Environmental Assessment. The categorization was carried out based on ADB's Safeguard Policy Statement (2009), and ADB Methodological Guidelines on Environmental Assessment (2003). Because the Project is environmentally categorized as B, an IEE is required. An intial step in determining a project's environment category is to prepare a Rapid Environmental Assessment (REA) screening checklist, taking into account the type, size, and location of the proposed project. A project is classified as one of the following four environmental categories:[1]

- Category A: Projects with potential for significant adverse environmental impacts. An environmental impact assessment and a summary EIA (SEIA) are required to address significant impacts.
- Category B: Projects judged to have some adverse environmental impacts, but of lesser degree and/or significance than those for category A projects. An initial environmental examination and a summary IEE are required to determine whether or not significant environmental impacts warranting an EIA are likely. If an EIA is not needed, the IEE is regarded as the final environmental assessment report.
- Category C: Projects unlikely to have adverse environmental impacts. No EIA or IEE is required, although environmental implications are still reviewed.
- Category FI: Projects are classified as category FI if they involve a credit line through a financial intermediary or an equity investment in a financial intermediary. The financial intermediary must apply an environmental management system, unless all subprojects will result in insignificant impacts.

24. Public consultation meetings on social and environmental issues were carried in June 2013 in Voenno Antonovka village, Sokuluk city, Belovodskoje village and Poltavka villlage. Minutes were taken and are attached to this report as Annex 1. The IEE report is to be submitted to the State Agency of Environmental Protection and Forestry of the Kyrgyz Republic to obtain the State Ecological Expertise (SEE) for the Project.

[1] ADB. 2003. *Environmental Assessment Guidelines*, Manila.

Environmental Standards

25. The following environmental standards are applied to the Project.

1. Air quality (some more standards are provided in the chapter on air quality):

Tab. 2: Ambient air quality standards

Pollutants	**Maximum permissible concentration (mg/m3)**	**Average daily concentration (mg/m3)**
Total suspended particulate:		
With content of silica > 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%, silica>20%)	0.5	0.05
Sulfur dioxide, SO_2	0.5	0.05
Carbon monoxide, CO	5	3
Nitrogen dioxide, NO_2	0.085	0.04
Nitrogen oxide, NO	0.40	0.06
Plumb (Pb) and compounds (except for tetraethyl)	-	0.0003
Lead sulphide (by lead)	-	0.0017

Source: Sanitary-hygienic standards SHS 2.1.6.1338-03 "Maximum permissible concentration (MPC) of pollutants in the ambient air of settlements.

2. Noise

Tab. 3: Noise Standards (dB)

Description of activity/category	Leq		Lmax	
	Day	Night	Day	Night
Areas directly adjacent to hospitals and sanatorium	45	35	60	50
Areas immediately adjacent to dwellings, polyclinics, dispensaries, rest homes, holiday hotels, libraries, schools, etc	55	45	70	60
Areas immediately adjacent to hospitals and dormitories	60	50	75	65
Recreational areas in hospitals and sanitariums	35		50	
Rest areas at the territories of micro-districts and building estates, rest houses, sanitariums, schools, homes of aged, etc	45		60	

SN (Sanitary Norms) 2.2.4/2.1.8.562-96 “Noise at workplaces, in dwelling rooms, in public buildings and at the area of residential development”.

3. Surface water

26. Standards are shown in Table 4 which are based on the Kyrgyz Water Law of 1994.

Tab. 4: Surface Water quality standards[2]

	Standard
pH	6-9
Dissolved oxygen, DO, mg/l	>4
Sulfate, S, mg/l	<250
Ammonium nitrogen, NH4-N, mg/l	<3.3
Oil and grease, mg/l	<0.05

Source: Water Law of the Kyrgyz Republic, 1995

[2] More than 1,200 items are specified according to Kyrgyz Law.

II. DESCRIPTION OF THE PROJECT

A. Overview

27. CAREC 2020 will seek to improve industrial competitiveness through improvement of vehicle operating indicators of the road and development of economic corridors via more efficient movement of freight and passenger traffic along the Bishkek-Osh road. The project aims at rehabilitating 45.1 km of road between Bishkek and Kara Balta, and to (i) provide safe and comfortable riding conditions to all road users, be they motorists, cyclists and pedestrians, optimizing the road's intended function and the level of use, (ii) provide the road at a minimum road life cycle ownership cost to the State Road Authorities (Government); and (iii) to comply with the Pavement Standards and other relevant State Road Authorities' Guidelines and/or Standards as they relate to Class I roads.

28. Conditions of the existing road (Table 5) are not up to KR Class IA-B standards (Table 7) in that road markings are very rare, traffic signs are insufficient and sometimes poorly located, and road surfaces and shoulders are usually poorly maintained. Guardrails on high embankments are only partly installed and in bad condition. Bus stops along the road are generally damaged and have no roofs. Sidewalks have not been repaired since they were constructed and are not paved in some sections.

Tab. 5: Details of road section from Bishkek to Kara Balta (Section 1)

Road Sections	Roadway Width and Length of Subsections (km)	Bus Stops	Traffic Signs	Length of Inadequate Draining (km)	Length of Sidewalks to be Reconstructed (km)	Intersections / Junctions
Section 1	4-6 lane – 12 2-3 lane – 40	98	107	2	10	205

B. Type and Category of Project

29. The Bishkek – Osh road project in the section Bishkek to Kara Balta is aimed at rehabilitating around 45.1 km of the CAREC transport corridor. The project is categorized as Category "B" for Environmental Assessment (there are only few environmentally sensitive areas along the sections and the impacts of the project are expected to be of low significance, highly local, and originating mainly from the construction activities).

C. Need for Project

30. The Bishkek-Kara Balta road section, the critical link of the Bishkek-to-Osh road is one of the most important transport corridors in Kyrgyzstan. Traffic, especially heavy vehicle volume is high and increasing (which confirms that this section of highway is the main national transport route). Considering these deficiencies, especially with regard to traffic safety and the problem of severe rutting due to high air temperatures and a poor selection of asphalt binders, as well as pavement undulation, signaling insufficient bearing capacity of the carriageway, the rehabilitation Project is urgently needed.

D. Analysis of Alternatives

31. Given the size of the country and the very limited options available and the instruction in the project ToR that road rehabilitation was the only solution to the road problem, this section has been kept to a minimum.

Alternative Solutions

32. The Bishkek-Kara Balta section of national highway M39 is extensively used with traffic volumes as high as >45,000 vehicles per 24hr period. The road is poorly marked and very

limited shoulders (most are gravel and dangerous), has a very rough surface and has the highest accident rates in the country. This section is an essential transportation link between Kirgizstan's two main cities and traffic volumes are forecasted to increase.

33. Due to difficult topography, landuse, hydrogeological formations/occurrences, i.e. mudflow conditions, and land occupancy, a new road was not considered.

34. Exploitation of the transit potential of the Kyrgyz Republic would require construction of major new lines, namely, the so called 'China – Kyrgyzstan – Uzbekistan' or 'North South' railway which would link Bishkek, Balykchy and Torugart connecting Kyrgyzstan's northern and southern regions to each other and to surrounding countries and regions including China and the Middle East; and an East West railway connecting Aral on the North South line with Osh and Uzbekistan. As well as effectively joining up the isolated sections these lines are intended to provide access to mineral resources in the center of the country. Development projects on this scale would require huge investment and would likely be prohibitive for the Kyrgyz economy. Therefore massive costs for Kyrgyzstan make these alternatives less attractive for now.

35. KR planners however feel that rail improvements are not enough to relieve the transport bottle neck and as such the major road improvement including full resurfacing of the M39 is the preferred alternative solution. Another attractive feature is that it will be completed in three years as opposed to a rail line taking at least 5-7 years.

Alternative Designs

36. Alternative designs have focused on at least 11 variables, addressing all aspects of the work. These were carefully assessed in the Feasibility Study. The 11 key factors are:

i. Geometric design standards
ii. Intersection and junction planning
iii. Road signage and markings
iv. Crash barriers
v. Parking and bus stop areas
vi. Sidewalks and shoulders
vii. Street lighting and stoplights
viii. Roadside toilet facilities
ix. Protection of utility lines
x. General road safety
xi. Bridge and culvert rehabilitation

37. As part of the FS engineers evaluated 11 design elements, including considerations of cost and technical validity, and then recommended a preferred approach for each of the elements, but no decision on a specific preference. Choosing the best design will be completed as part of the detailed design and construction drawing preparation stage.

38. Environmentally relevant design limits incorporated into this project are that there will be no alignment deviations, no work outside the existing RoW, maximum reuse of old asphalt–concrete, tree removal will be kept to a minimum and based on a tree management plan prepared by the CSC and the contractor, and a major replanting program of 5-7 year old nursery trees will start as the work progresses.

The Preferred Alternative

39. The preferred, alternative will see the construction completed in 3 years, all work undertaken within the existing road RoW and as much of the more than 1 million m^3 of asphalt concrete to be removed from the >45.1 km of a 4-6 lane highway recycle and/or reused. Further, the removal of trees will be kept to an absolute minimum as they contribute enormously to summer road temperature amelioration, shade for roadside residences and businesses and

process many thousands of tons of CO2 (at least during their growing years). In the winter these trees act as a significant windbreak, since much of the tree cover in the surrounding land has been removed.

E. Location

40. The Bishkek – Kara Balta road section is located between km 15.9 and km 61 of the Bishkek – Osh Road (Figure 2). The section starts in Sokuluk rayon at road km 15.9. At the beginning the road has a 6-lane configuration, which turns to a 4-lane configuration of the carriageway until km 21. The existing pavement is asphalt concrete and the paved width is between 15 and 20 m and a median of 2 – 4 m. Shoulder width ranges from 1.5 to 3.0 m. The Section proceeds westward to the outskirts of Kara Balta, passing through a number of smaller settlements interspersed by agricultural fields with a 3-lane configuration of carriageway, which changing to 2-lanes. The paved width is 8 to 12 m and the shoulder width is 1.5 to 3.0 m. The villages along the road are merging into a relatively continuous ribbon along the roadway. At km 61 the Bishkek-Osh Road turns south at a roundabout, which marks the end of the road section. The terrain for entire sections can be classified as flat with altitudes ranging from 750 m to 800m.

Figure 2: Central-Asian Regional Economic Cooperation Corridors

F. Size or Magnitude of Operation

41. The Project involves rehabilitation of 45.1 km road length of the Bishkek – Osh road. The construction works will be implemented mainly within the RoW of the existing road, thus keeping environmental impacts to a minimum. The Project will involve a number of associated activities such as utilization of borrow areas, operation of asphalt plants and aggregate crusher, establishment of contractor's worker camps and storage sites, etc.

42. According to the terms of reference the pavement for the road will be designed for an initial design life of 10 years with overlay options for 15 and 20 years design life.

G. Traffic Volume

43. Traffic growth forecasts have been developed with regard to the existing traffic volumes on the project road, as revealed by the traffic surveys, and anticipated national and regional economic development.

Tab. 6: Traffic count. Vehicle totals for April 2015

Location: Bishkek, km.9	**Date: 07 April, 2015, Tuesday**	**Time: from 00am to00am (24 hours)**		**Total**
Direction: Bishkek to Kara-Balta			25775	57275
Direction: Kara-Balta to Bishkek			31500	
Location: Sadovoe, km.35	Date: 08 April, 2015, Wednesday	Time: from 07am to07am (24 hours)		Total
Direction: Bishkek to Kara-Balta			8868	17327
Direction: Kara-Balta to Bishkek			8459	
Location: Poltavka, km.53	Date: 09 April, 2015, Thursday	Time: from 07am to07am (24 hours)		Total
Direction: Bishkek to Kara-Balta			5435	10602
Direction: Kara-Balta to Bishkek			5167	

44. The growth rates assumed concerning traffic increase are 7% for passengers and 4% for freight up until the Project completion year and 4% for both, passenger and freight, annual increase thereafter.

45. From the traffic observations during the reconnaissance visit it can be assumed that the first part of the Bishkek to Kara Balta road section will belong to road category I and remaining road section are assumed to be category II.

Tab. 7: Road classifications in the Kyrgyz Republic

Road Class	Volume to Capacity Ratio	Level of Service	Design Traffic Volume		Economic and Administrative Value of Road
			Passenger Car Unit (PCU)	Vehicles	
IA	0.25 – 0.40	B: high	More than 18,000	More than 9,000	Motorway of international and national significance
IB	0.25 – 0.40	B: high	More than 14,000	More than 7,000	Main international roads and national significance (not covered by category IA)
II	0.40 – 0.60	C: medium	6,000 – 14,000	3,000 – 7,000	Highways of international and national importance (not covered by category IA and IB)
III	0.40 – 0.60	C: medium	2,000 – 6,000	1,000 – 3,000	Highways of international, national and importance (not covered by category IA, IB and II)
IV	0.60 – 0.80	D: low	200 – 2,000	100 – 1,000	Provincial and local roads (not covered by category IB, II and III)
V	0.70 – 1.00	E: very low	Under 200	Under 100	Local roads with low traffic (not covered by category III and VI)

H. Proposed Schedule for Implementation

46. The schedule for the construction activities is at a preliminary stage of planning. The bid documents will be prepared on September, at which time environmental clauses in line with the

EMP will be integrated into the contract specifications. The proposal call will likely be towards the end of 2015 with construction beginning in spring 2016.

I. Detail of the Project

47. The project aims at rehabilitating 45.1 km of road between Bishkek and Kara Balta. Main aims of the project are:

(i) provide safe and comfortable riding conditions to all road users, being motor vehicles, cyclists and pedestrians, optimized for the road's intended function and the level of use,

(ii) provide low cost of ownership (i.e. minimum whole of life cost) to the State Road Authorities (Government),

(iii) to comply with the Pavement Standards and other relevant State Road Authorities' Guidelines and/or Standards.

48. Using the field surveys and traffic observations in early 2015, with a focus on road conditions, the selected option for the road rehabilitation. This will be based on technical issues with focus on where to apply (i) non-structural overlay, (ii) structural overlay, and (iii) reconstruction with/without lane widening.

49. The rehabilitation of the road will be done mainly using the existing RoW, thus keeping environmental impacts to a minimum. Bishkek to Kara Balta road section will belong to road category I.

- Shoulder width on Bishkek – Kara Balta road ranges from 1.5 to 3.0 m.
- The road embankment height in plain regions ranges from 0 to 2 m, in some places embankment is higher with a total height up to 4-6 m;
- Longitudinal gradients in wavy terrain are up to 5-7%;
- The carriageway cross fall on straight sections has been taken as 2% and shoulder slope has been taken as 4%.

50. Rehabilitation measures contain the rehabilitation/reconstruction of the road sections in respect of the above described parameters.

51. It is important to note that no additional driving lanes will be constructed within the scope of work of this project and that rehabilitation and reconstruction works are restricted to the RoW of the already existing road. Therefore environmental impacts are kept to a technically possible minimum.

52. It was found during the survey that culverts were missing in many settlements, yet they are specified in the technical certificate of the road provided by the Client. Local irrigation management offices try to claim availability of these culverts, but in fact they are absent.

53. It was found that the Bridge/Culverts are not properly constructed and maintained. Construction time scaffolding material can still be found in concrete surface. The rubber pad/bitumen sheet placed to support the beams and slab are worn out and do not exists in many places. The existing waterway and side slopes of abutment haven't been cleaned from vegetation and debris. Bridges are at the end of their economic life. Many of 204 culverts should be replaced due to the need for change of their dimensions.

54. Many of the 7 bridges on Bishkek – Kara Balta section are in poor shape and need either partial or total reconstruction. The bridge works will have potential environmental impacts that need mitigation but the impacts of culvert works can be neglected as minimal.

J. General Environmental Profile of the Project Road

55. In term of physical and biological environment there are only few environmentally significant structures along the project road section Bishkek to Kara Balta. Significant structures are the tree rows that are stretching over most parts of the road sections, and the rivers crossed by the Project road, the Sokuluk (28,3 km) and the Ak-Suu (44,65 km) rivers and several smaller seasonal watercourses.

56. The borrow areas proposed for use in the project area are existing sites located near to the road (Figure 5). In many cases the access roads to the borrow areas are unpaved and go through residential areas, which will result in serious dust problems during the long dry season.

57. At least 16 sensitive locally important sites were identified during the 2013 field investigation and verified during the 2015 survey. These are mostly schools hospitals, residential areas and businesses listed below. These sensitive sites are addressed in more detail in Alignment Sheets of this IEE. Starting from Bishkek these sites are:

1. Novopavlovka village (school, No. 2)
2. Novopavlovka village (market)
3. Voenno-Antonovka village (school, no number)
4. Voenno-Antonovka village (mosque)
5. Gavrilovka village (school, no number)
6. Shopokov city (school, No.2
7. Sokuluk village (market)
8. Sokuluk village (school No. 2)
9. Sokuluk village (dwelling houses)
10. Alexandrovka village (school No. 3)
11. Belovodskoe village (market)
12. Belovodskoe village (mosque)
13. Petrovka village (dwelling houses)
14. Poltavka village (school, no number)
15. Petropavlovka village (school, no number)
16. Novonikolaevka village (school, no number)

III. DESCRIPTION OF THE ENVIRONMENT

A. Physical Resources in Project Area

Topography

58. The topography of the Kyrgyz Republic is very diverse. It varies in elevation from 400 to 7000 m. it has several massive mountain ranges drawn mainly in a near east-west directions and several dividing intermountain valleys and depressions. The average elevation is 2750 m above sea level, the highest point is Pobeda Peak (7439 m) situated in the Central Tenir-Too at the edge of the Boz-Kyr ridge in the eastern extension of Kakshaal Too, at the border with China. The lowest point (401 m) is near Kulundy village in Leylek region of Batken oblast, in the vicinity of Tajik border.

59. A road section Bishkek-Kara-Balta is located within the relatively flat Chu Valley and traverses an area parallel to the Kyrgyz mountain range. Most of the section is at elevations ranging from approximately 750 to 800 meters above sea level.

60. To provide a reliable base for the preliminary design and quantity estimate as well as to assess impacts of rehabilitation works on resettlement and land a State Design Institute "Kyrgyzdortransproject" conducted a topographical survey (scale 1:2000). The survey included topographical details like existing roads, layout, drainage structures, buildings etc.

Soil and Geological Characteristics

61. The territory of Kyrgyz Republic is mountainous and occupies the western part of the Tien Shan range and a small part of the North Pamir.

62. The road section from Bishkek to Kara-Balta is located in the Chuy valley. It is predominantly flat and not subject to land or rockslides. It is within the 9-point Seismic Risk Zone. The section falls within a zone of landslide dispersion and accumulation with virtually no landslide risk.

63. Soil erosion is a major environmental concern throughout the Kyrgyz Republic due to seismic activity, steep slopes, the fragility of the soils and human activities such as inappropriate livestock management, the removal of protective vegetative cover and poor water management practices.

64. Soils of the road section from Bishkek to Kara-Balta are classified as northern gray common soils with low carbonate content. High salinity is one of its major characteristics. Soils in the section are highly productive and much of the area is in productive agricultural use. The erosion potential of the soils in this section is classified as low.

Climate

65. Kyrgyz Republic's location in the middle of Eurasia, its remoteness from oceans and seas and vicinity to deserts predefine formation of climate with the features of extreme continental climate, aridness and clearly defined seasons.

66. Great diversity of the country's terrain - deep roughness, various directions of mountain slopes against the sun and air flows – determines a clear vertical climatic zonation. 4 climatic zones can be observed in the Kyrgyz Republic.

67. Project areas are located in the valley-foothills belt. The valley-foothill belt (from 500—600 m to 900—1200 m) is exemplified by hot summer (up to 28°C), moderately cold and snowless winter with acute precipitation deficit. This belt has the features of subtropical climate.

68. In the project areas the average July temperature is 20-25°C, the average January temperature is -4—7°C. The maximum summer temperature is 44°C.

69. Precipitation in the project area is heavy with amounts up to 1000 mm at mid-mountain terrain of south-western slopes of the Fergana ridge, in Talas and Chuy valleys precipitation is lighter, from 250 to 500 mm.

70. Snowpack in the valley-foothills belt of south Kyrgyz Republic melts away several times in winter and reappears in case of new frosts. Snowpack is stable and rather thick at the heights of more than 1500 m. Snowpack becomes stable in late November and its thickness gets higher gradually and reaches its maximum by late January to early February. Stable snowpack melts away in March-April. Melting of stable snowpack in Chuy and Fergana valleys usually starts on the 3rd week of February.

Water Resources

71. Hydrography of the project road area consists of three permanent streams originating in the northern slopes of the Kyrgyz ridge and crossing the project road. These are the Dzhelamysh, Sokuluk and Aksu rivers belonging to the Chu river basin. The rivers scarp slopes covered with trees and shrubs. The width of riverbeds in the mountains is 10-15 m. Bottoms are composed of pebble and boulders and are deformed significantly. When coming out of the mountains, the most river flow is distributed for irrigation. As a result, for most of the year (growing season) there are no flows in the places where the rivers cross the road.

Dzhelamysh River

Sokuluk river

Ak-Suu River

72. The three natural rivers (Table 8) flow north under the road into the Chu River.

Tab. 8: Main hydrographic features of the three rivers crossing the project road

River	Watershed area, km^2	Origin distance, km	River slope, $^0/_{00}$	Average weighted watershed height, m	Freezing, %
Dzhelamysh	153	25	65	2650	4
Sokuluk	353	26	68	3110	12
Ak-Suu	426	31	60	3060	7

Source: Archive data from Kyrgyzhydromet

73. The hydrological regimes of the Dzhelamysh, Sokuluk and Ak-Suu Rivers have been recorded since 1928 and 1998, and these data are presented as the percentage of total annual streamflow in any given month (Table 9). Unfortunately more recent data are not available and since the gauging stations were located much further upstream from where the road crosses the rivers, the values provide are not really representative of conditions at the crossing points.

Tab. 9: Annual stream flow distribution as a % of the annual flow

River	Average water flow rates (m3/sec), % of the annual flow											
	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII
Dzhelamysh	4.6	4.3	4.2	5.5	8.5	13.6	17.0	15.2	8.9	6.6	6.0	5.5
Sokuluk	2.7	2.4	2.3	2.5	6.0	15.5	23.9	22.7	10.2	4.9	3.7	3.2
Ak-Suu	2.8	2.5	2.5	2.9	6.4	17.7	23.7	19.2	9.5	5.5	4.0	3.3

Source: Archive data from Kyrgyzhydromet

74. Three irrigation canals also cross the road. They are the Novo-Pavlovka flood control canal, Zhantay2 and the Krepostnoy canal. A Novo-Pavlovka village canal was used as a flood bypass canal, emptying the runoff pond located upstream of the road and the village. Currently the canal is out of operation.

75. The Zhantay canal originating in the water intake structure on the Sokuluk river (in the piedmont zone) goes through the boundary of Romanovka and Sokuluk villages. The canal is designated for passing of water to irrigate backyards and agricultural fields of villages located downwards the road. This canal has been designed also for passing of mud streams formed in the piedmont zone after rain showers. The canal capacity is about 6-8 m3/sec. However, currently the functions of the canal are significantly limited since the canal bed is silted with debris and built-up with dwelling houses.

Flood canal in Novo-Pavlovka Village

Zhantay canal in Sokuluk Village

Krepostnoy canal in Belovodskoye Village

Mudflow canal of Ak-Suu river in Petrovka V.

76. The Krepostnoy canal is located in Moscowskiy village and crosses the road at the entrance to Belovodskoe village. The canal is designated not so much for irrigation of cultivated lands owned by adjacent villages, but for discharge of mudflows formed in the piedmont zone during rain showers. The canal is densely covered with trees and shrubs and silted with debris by half, and a capacity is about 18 m3/sec. There is a bridge at the boundary of Belovodskoe and Petrovka villages providing the pass of a part of maximum flood that goes by the Ak-Suu river. The stream passes through the culvert under the railway bed located above the road, breaks down into two streams and forms a sort of the second mudflow canal of the Ak-Suu River. Maximum water discharges here can reach 20 m3/sec (Table 10).

Tab. 10: Summary of rivers and irrigation structures

#	Station, km.	Watercourse	Maximum water discharge,(m^3/sec)	Structure	Length, width
1	11 + 200	Waste canal	4	Culvert	6 x 12
2	17 + 900	Dzhelamysh River	37.6	Bridge	18 x 12
3	22 + 200	Zhantay 2 canal	18	Culvert	6 x 10
4	27 + 700	Sokuluk River	61.5	Bridge	24 x 10
5	40 + 390	Krepostnoy canal	up to 20	Culvert	6x 10
6	43 + 500	Aksu River	47.7	Bridge	23 x 10
7	44 + 100	Mudflow canal of Aksu River	up to 20	Culvert	13 x 10

Source: archive data of Kyrgyzhydromet, survey materials.

77. "The *Index of Mudflow Dangerous Rivers of Kazakhstan, Central Asia and Eastern Siberia*" describes the rivers Dzhelamysh, Sokuluk and Ak-Suu as mudflow dangerous. Occurrence of mud floods is usually connected with rainfall, but they could also occur as a result of breach of high mountain lakes *(basin of Sokuluk river, 1983, breach of the Keidy-Kuchkach glacier lake, the mudflow discharge – 210m3/sec, discharge near Sokuluk village – 67.4m3/sec).*

78. The maximum mud flood on the Ak-Suu river occurred on 30.07.1988 when its discharge rate was 64.3 m3/sec. The flood was caused by rain showers in the piedmont zone.Mudflows occur in the river basins at least once every two years, but rarely up to three times in one year.Usually such floods occur locally and do not affect strongly the rivers regime.

Air Quality

79. Air pollution levels in Kyrgyz Republic are a serious concern within the urban areas. The primary sources of air pollution in Kyrgyz Republic's cities, including Bishkek and Kara Balta are thermal power stations, cement plants, chemical industries, urban transport and mining waste. There are many small industrial, municipal and transport enterprises within the municipal area that have both routine and sporadic atmospheric emissions, but no large industrial polluters such as oil refineries or metallurgical plants.

80. Air pollution monitoring by Kyrgyzhydromet in Bishkek city is conducted intermittently at 7 stations 3 times a day. Air quality control in Chui oblast is carried out only in Kara-Balta city, in 2 stations as shortened program, once a day on a rolling basis, for 20 minutes.

Noise

81. Existing ambient noise levels within the road section from Bishkek to Kara-Balta are generally attributable to vehicular traffic, construction and quarrying operations. Residential areas are located in the vicinity of the road. Given the width of the RoW in the area, significant noise impacts to these facilities (if any) should be easily avoidable.

B. Ecological Resources in Project Area

82. The environment of the project road sections is consisted mostly of anthropogenic landscapes and settlements. There are no specially protected natural areas (SPNAs) in the immediate vicinity of the project area.

Fauna

83. Diversity of species in Kyrgyz Republic is very high. Over 500 species of vertebrates, including 83 mammals, 368 reptiles and 75 fishes are reported, along with 2,000 species of fungi and over 3,000 insect species. Losses of habitat (deforestation), competition with livestock, hunting and poaching have caused the number of animals to shrink. The most critical situation involves protecting the habitats and populations of the most valuable (both economically and scientifically) species of big mammals such as mountain goats, djeyran, mountain sheep, snow leopard, tien-shan bear, lynx and Menzbir's marmot.

84. Both road sections go mainly through settlements and agricultural fields. Biodiversity there is minimal compared to natural ecosystems and is consisted of stress tolerant (synanthropic) animal species. Mammals along the sections include Norway rat, house and field mouse, and dwarf hamster. The following wild fauna representatives are rare: tolai hare, eared hedgehog, forest dormouse, fox, in winter period — wolf.

85. Bird species in the sections are more diversified. Synanthropic species along the project roads include tree and house sparrow, Afghan starling, blackbird, great tit, magpie, blue rock pigeon, dove, and white stork can be met by a nesting place. Wildlife representatives include lark, quail, buntings, representatives of coraciiform, European chat. There are varmints in the fields, such as goshawk, sparrow hawk, common buzzard, long-legged buzzard, rough-legged buzzard, black kite, snake eagle, greater spotted eagle, common kestrel, hobby falcon. The Bazar-Korgon reservoir is the place of residence, seasonal migration and wintering for a great number of water and semi-aquatic birds, such as diving duck, duck, goose, swan, shore birds, takapu, etc.

86. Herpetofauna is represented by lake frog, green toad, Central Asian tortoise, gray gecko, Turkestan agamids, desert lidless skink, diced snake, sand boa, arrow snake, Orsini's viper.

87. The road section from Bishkek to Kara-Balta has been heavily disturbed by urban and agricultural development. The possibility of habitat for threatened or endangered wildlife species is remote.

Flora

88. Over 4,500 species of higher plants are reported to exist in Kyrgyz Republic. Steppe in the vicinity of the road section from Bishkek to Kara-Balta is covered with grasses and low shrubs such as saxaul and in some areas are covered by vast fields of wild poppies. Chiy, a common grass with whitish, cane-like reeds, is also common and used by the nomads to make decorative screens.

89. As the road section from Bishkek to Kara-Balta has been heavily disturbed by urban and agricultural development, the possibility that any habitat occurs, that is suitable for threatened or endangered plant species is low. Nearly all sidewalks along the Bishkek – Kara-Balta section are planted with windbreak, including small-leaved elm (English elm), Lombardy and white poplars. There are no any special protection zones in the vicinity of the road corridor.

Desertification

90. In December 1997, the Kyrgyz Republic joined the UN Desertification Convention, and ratified it in mid 1999. In the Convention, desertification is defined as degradation of lands in arid semi-arid, dry and semi-humid areas, which are the result of various factors, including climate change and human activities. By this definition, about 90% of agricultural lands in Kyrgyzstan can be included in the category, which can be defined as prone to desertification. Out of 10.6 million hectares of farmland most of which was used as pasture, about 74% is in a some stage of desertification.

91. In the north of the country, the average area of irrigated arable land available per capita is 0.35 – 0.2 ha and in the south it is 0.04 -0.05 ha, areas not sufficient for maintenance of the KR's food source. As a result socio-economic condition of the country have been degrading. Though the areas of actual irrigated farming land is about 1 million hectares, nearly half of it is arid, salinized, chemically degraded and polluted. Nearly 4.5 million hectares or half of the territory occupied by pastures are degraded by erosion. Soil consolidation/compaction caused by livestock overgrazing has accelerated soil erosion on pastures located on steep slopes. Wind erosion is typical for non-irrigated pastures and meadow pastures located in the lower reaches. Black humus earth is compacted during wet conditions, resulting in loss of infiltration capacity and increased erodability. Erosion is increased when cultivating meadow grass on fragile and steep slopes is cut and/or disturbed. Oftentimes such fields are plowed longitudinally, i.e. in line with the slope, which accelerates gully erosion, and land degradation. Overgrazing, which is s huge problem in the KR is causing a strong deterioration of pastures resulting in loss of agricultural productivity. Therefore, during the road reconstruction work all care must be taken to avoid creating conditions for new desertification.

92. Growth of population and focus on higher living standards induces year-to-year increasing pressure on land and water resources that form the basis of agricultural production. Most of Kyrgyz people live in rural areas and thus directly or indirectly depend on land productivity. Therefore it is very important to ensure preservation and improvement of land productivity.

C. Human and Economic Resources

Population

93. Population The Kyrgyz Republic is a sparsely populated country. The population is almost six million people (2014), of which approximately one third) live in towns and two-thirds in rural areas. The road section of the project is located in Chuiskaya Oblast. This is divided into three Rayons and the City of Bishkek. Along the project road, there are roughly 177,000 inhabitants (2015).

Tab. 11: Population along the Bishkek-Kara Balta Project Road

Oblast	**Rayon**	**Distance from the beginning of the road (km)**	**Name of settlement**	**Population: 01.01.2015 (thousand people)**
	Bishkek city	9	Ala-Too microdistrict	
Chuiskaya	Sokulukskiy	9.00 - 10.9	**Novopavlovka** (≈50 households)	18.332
		10.9 – 14.4	Voenno-Antonovka	15.067
		19.5 – 22.3	Gavrilovka	3.258
			Shopokov	9.383
		22.3 – 23.9	Romanovka	3.102
		23.9 – 29.4	**Sokuluk** (≈40 households)	13.488
	Moscowskiy	29.4 – 33.4	Alexandrovka	13.470
		33.7 – 44.2	Sadovoye	8.606
			Belovodskoye (≈80 households)	21.237
		44.2 – 52.0	Petrovka	9.253
	Zhayilskiy	52.8 – 57.5	Poltavka	4.205
			Novo-Nikolaevka	8.223
		57.5 – 60.0	Petropavlovka	2.304
		60.0 – 65.0	**Kara-Balta**	43.239
			Kalininskoye	3.701

Source: National Statistical Committee of KR, 2015

Social Infrastructure

94. The Kyrgyz Republic is one of the poorest and least industrialized countries in the Europe and Central Asia region with a GDP of $350028.4 (thousand som), low labor and social protection, a poverty level of 33.7 % (2010) and a life expectancy of 69 years (2009). However, literacy rate remains high at >99% among people aged 15 and above (2009).

Tab. 12: Key social and economic indicators (Kyrgyz Republic)

		2012	2013
1	Resident population (thousand people)	5663.1	5776.6
2	Natural population growth (thousand people)	118.7	120.7
3	Total GDP (thousand som)	310471.3	350028.4
4	% in GDP:		
5	Agriculture	16.7	15.2
6	Industry and construction	22.2	22.9
7	Services	48.0	47.6
8	GDP per capita, thousand som	58.0	64.1
9	GDP in % to a previous year	99.9	110.5

Source: NSC. Statistical book «Information Note on Food Security and Poverty of the Kyrgyz Republic»

95. Official statistics show that the spread of poverty in the country is uneven. Figure 3 shows regional disparities in poverty.

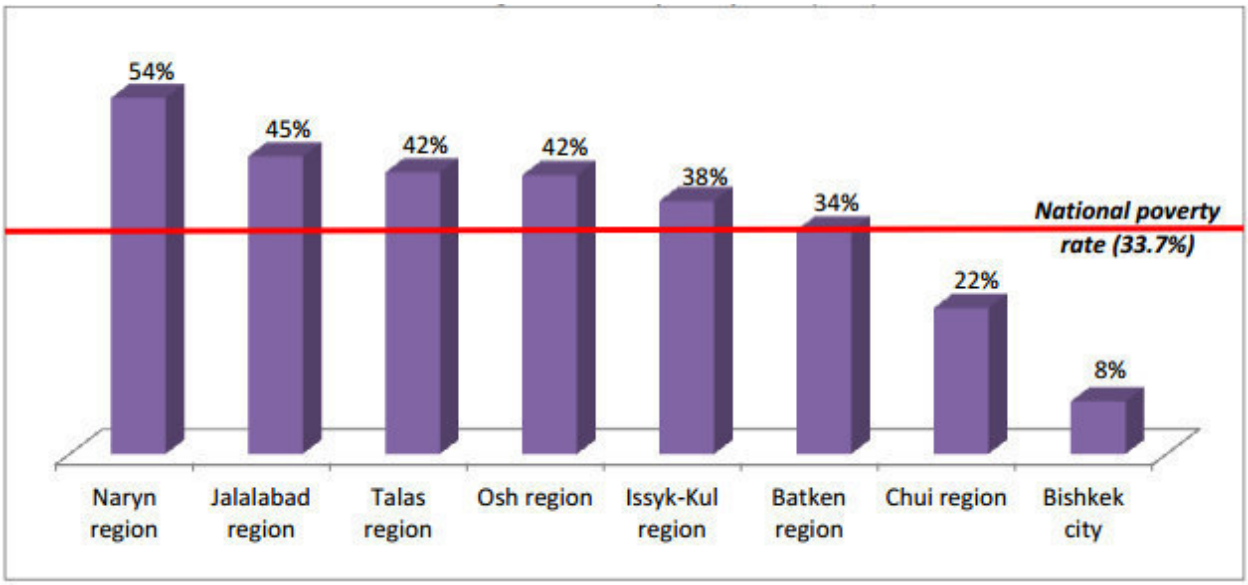

Figure 3: Regional disparities in poverty level by region in Kyrgyz Republic.

Source: Energy and communal services in Kyrgyzstan and Tajikistan: A poverty and social impact assessment.

Tab. 13: Poverty level in Chui oblast (%) in 2013[3]

	Total	Urban population	Rural population
Чуйская область	23,6	12,0	26,2

Source: NSC. Statistical Book «Living standards of the Kyrgyz Republic population in 2009-2013».

96. The 2014 data of the Integrated Household Survey in Chui Oblast showed that out of the total number of 522.067 thousand active citizens 48.8% were women and 51.2% were men. The unemployment rate was 8.4% (9,8 % for women and 7,4 % for men). Unemployment is more severe in urban areas (10,9 % and 10,0 % subsequently) than in rural areas (9,1 % and 6,1 %).

Tab. 14: Resident population by age groups in 2014 (thousand people)

	Total	Female	Male	Ration in %	
				Female	Male
Chui oblast	853.725	433.396	420.329	50.8	49.2
Under active working age	254.174	123.790	130.384	48.7	51.3
Active working age[4]	522.067	254.837	267.230	48.8	51.2
Above active working age	77.484	54.769	22.715	70.7	29.3

Source: NSC. Statistical book «Kyrgyz Republic Annual Demographic Report».

Agriculture and Industry

97. Agriculture is big employer in Kyrgyz Republic and accounts for around one quarter of the GDP. From 1995 to 2010 the share of agriculture from the GDP of Kyrgyz Republic has

[3]A poverty line of 2012 adjusted to an average annual consumer price index was used to assess a level of poverty. The poverty line indexation is made in accordance with the "Methodology for determining the poverty line" adopted by the Kyrgyz Government Resolution dtd. March 25, 2011. The cost value of total poverty line in 2013was 27 769 som/year per capita, and extreme poverty line - 16 249 som.

[4] Active working age of population covers 16-62 aged men and 16-58 aged women.

declined and the average productivity of an agricultural sector worker has increased. Table 15 shows the evolution of total labour force and the share of agricultural workers from 1997 to 2012. (Source: FAO Country Profiles)

Tab. 15: Total labour force and the share of agricultural workers in Kyrgyz Republic

Kyrgyzstan: Evolution of population and labour force size							
	Size [Millions]				Annual growth rate [%]		
	1997	2002	2007	2012	1997-2002	2002-2007	2007-2012
Total population	4.74	5.00	5.14	5.45	1.07	0.55	1.18
Agricultural population	1.31	1.24	1.15	1.08	-1.09	-1.5	-1.25
Total labour force	1.96	2.14	2.30	2.53	1.77	1.45	1.92
Labour force in agriculture	0.54	0.53	0.51	0.50	-0.37	-0.77	-0.4
Source: FAOSTAT, FAO of the UN							

Transport and Traffic accidents

98. Well-functioning transport sector is crucial to Kyrgyz Republic because of the mountainous terrain of the land locked country. It is important from many different aspects, including economic, social, and political.

99. The development of the transport sector is very important for landlocked Kyrgyz Republic as it will help ensure a cost-effective access to regional and domestic markets. It will also help generate employment and provide services throughout the country.

100. This review process clarified that there are massive improvements required regarding the road safety situation and high casualty numbers in Kyrgyz Republic. However, there are a number of initiatives that have already been undertaken in the country, including the training of local road design and traffic engineers in Accident Blackspot analysis and Road Safety Audit procedures, based on international best practice. The Traffic Police have also received training from international donors regarding enforcement procedures and use of specific equipment. A detailed Road Safety Strategy has already been produced and is currently being discussed by politicians at a high level.

101. There is a need for some practical guidance for teachers on how to pass on the road safety message to children. There is no current national guidance on the provision of road safety education and many teachers use their own methods and resources to get the message across.

102. Road traffic collision data for the project road sections was received from the Ministry of the Interior. Preliminary analysis has been carried out and has indicated the points on the route with the highest rate of crashes.

Cultural and Historical Sites

103. No historically or culturally significant sites have been identified along the road sections.

IV. ALIGNMENT SHEETS

104. The following alignment sheet provides an overview of environmentally sensitive hotspots and receptors alongside the Project road in the section Bishkek to Kara Balta with

reference to the Project chainage. The alignment sheets serve as a base for the following impact analysis.

Tab. 16: Alignment sheet

No.	Location	KM	Issue / Picture	Baseline Parameters
Section Bishkek to Kara balta				
1	Village of Novopavlovka	9 to 10.9	Settlement alongside the road, sensitive hotspot with school buildings close to road administration building, shops, and church  Market Nurlan right on the road edge.	Dust, Noise, Vibration, SO2 NOx CO Baseline measurements with moveable instruments along the Project road.
2	Novopavlovaka v.		 Secondary School No.2	
3	Voenno Antonovka village	13.1	Sensitive receptor. Secondary school of Voenno-Antonovka village  Secondary School in Voenno-Antonovka v.	Dust, Noise, vibration SO2 NOx CO

No.	Location	KM	Issue / Picture	Baseline Parameters
4	Voenno Antonovka village	14.2	Sensitive receptor.  Mosque	Dust, Noise, Vibration, SO2 NOx CO
5	Along the Project road	17	Below picture show tree plantation of Elms at km 17, right hand side of road. Nearly alongside the whole Project road tree plantations are stretching on both sides. Trees need to be newly planted for compensation. 	Number of trees to be cut, appr. 4500-7000

No.	Location	KM	Issue / Picture	Baseline Parameters
6 7	Gavrilovka Gavrilovka v.	21.7 to 23	Village of Gavrilovka and Shopokov town. Sensitive hotspot with residential houses, shops, kinder garden, schools and shops alongside the Project road.  School in Gavrilovka v.  Kinder garden in Gavrilovka v.	Dust, Noise, Vibration, SO2 NOx CO Baseline measurements with moveable instruments along the Project road.
8	Sokuluk town	25 to 30	Sensitive hotspot with administration buildings, schools, church, mosque, residential houses, shops and market adjacent to the Project road.	Dust, Noise, Vibration, SO2 NOx

No.	Location	KM	Issue / Picture	Baseline Parameters
9	Sokuluk town		 Market  Residential houses, shops	CO Baseline measurements with moveable instruments along the Project road.
10	Sokuluk town		 Secondary School No. 2	

No.	Location	KM	Issue / Picture	Baseline Parameters
11	Aleksandrovka	31.3 to 33.4	Sensitive receptors: secondary school no. 1 and 2 and mosque, wholesale market,  Secondary School No. 3	Dust, Noise, Vibration, SO2 NOx CO
12	River Crossings	28.3, 43 and 44.65	Crossings of River Sokuluk, temporary creek and River Ak-Suu, Zhalamysh river by Project road. Below picture shows relict of floodplain vegetation, e.g. willow (*Salix alba*) alongside the temporary creek at chainage km 43.	pH dissolved oxygen oil products turbidity

No.	Location	KM	Issue / Picture	Baseline Parameters
			  	total suspended solids conductivity temperature lead
13	Belovodskoe	42 to 45	Sensitive hotspot. Belodovske town with residential houses, shops, Church and Mosque, market. Commercial area with supermarket. Buisinesses are on both sides of the road.Design solution mitigates physical impact as far as technically feasible.	Dust, Noise, Vibration, SO2 NOx CO

No.	Location	KM	Issue / Picture	Baseline Parameters
			 Market	
14	Petrovka v.	50.6	Sensitive receptors. Secondary schools, houses.  Secondary School in Petrovka v.	Dust, Noise, Vibration, SO2 NOx CO
15	Jayil Rayon	48 to 60	Three secondary schools at chainage 50.6, 55 and 57, houses behind the treelines which will be cleared, monument. At km 59 Sensitive receptor secondary school of Novonikolaevka.  Tree plantations in between project road and residential houses reduce emission to residentials. Planting of new trees as compensation measures.	Quantity of felled trees, appr. 4.300-7000

No.	Location	KM	Issue / Picture	Baseline Parameters
				

V. BASELINE MEASUREMENTS

105. Baseline measurements were conducted as indicated in the above alignment sheets, in both 2013 and again in 2015.

A. Air quality Measurements

106. Measurement results will serve as monitoring reference values during the construction phase. Air quality was measured at 16 sites (Table 17) along the route, identified as being sensitive to air pollution, due to the proximity of schools, outdoor markets and other special facilities.

Tab. 17: Air Quality Sampling Stations, 2015

#	Station No (2013/2015). and Location
1	203/1 – Novopavlovka village (school #2)
2	204/2 – Novopavlovka village (market)
3	205/3 – Voenno-Antonovka village (school, no number)
4	206/4 – Voenno-Antonovka village (mosque)
5	New 5 - Gavrilovka village (kindergarten)
6	207/6- Gavrilovka village (dwelling house, 50, Frunze street)
7	New 7 – Shopocov town (school #2)
8	208/8 – Sokuluk village (market)
9	209 /9– Sokuluk village (school #2)
10	New 10 – Sokuluk village (housing estate)
11	210/11– Alexandrovka village (school #3)
12	211/12 – Belovodskoye village (market)
13	212/13 – Petrovka village (dwelling house)
14	213/14 – Poltavka village (school, no number)
15	214 /15– Petropavlovka village (school, no number)
16	215/16– Novonikolaevka village (school, no number)

107. Measurements were taken twice, first in June 2013 and again in June 2015, according to legal requirements of RD 52.04.186-89 "Air Pollution Control Manual", GOST 50820-95 “Gas-cleaning and dust-collecting facilities. Methods for determining dust level of gas-dust flow”, Operations Manual for YAVSHA 413311.012, 416143004, 413411.042 (ИБЯЛ)[5].

108. The results for 2013 (Table 18) showed that KR standards for sulfur dioxide were exceeded in all locations and for carbon monoxide at nine of the 15 sampling sites, suggesting serious air pollution, along the corridor. Interestingly TSP for both 2013 and 2015, which given the high level of traffic and commercial activity along the corridor, should be much higher, than the highest concentration measured at 0.0028 mg/m^3. These measurements suggest alpine air in a pristine environment. They are suspect and as such will be monitored carefully during the construction and into the operating period of the project. Nitrogen oxide within standard requirements for 13 of the 16 monitoring stations.

[5] Analysis method:
1) Portable gas analyzer PGA-200. Operations Manual for YAVSHA 413311.012;
2) Air Pollution Control Manual RD 52.04 186-69;
3) Suspended particular matters concentration meter (ИКВЧ-В3). Operations manual for ИБЯЛ 416143004.

Tab. 18: Existing ambient air quality within 100 meter of impact corridor measured in 2013 and 2015 (mg/m^3)

Station Number 2013/ 2015	Location Name	Chainage From Bishkek (km)	CO		NO2		SO2		TSP	
			2013	2015	2013	2015	2013	2015	2013	2015
203/1	Novopavlovka village (school)	9.9	*6.5± 1.6*	1.2± 0.24	<0.01	0.070± 0.018	*3.2± 0.8*	0.004± 0.001	<0.1	0.0016± 0.0004
204/2	Novopavlovka village (market)	11.0	3.8± 0.95	2.3± 0.46	<0.01	0.079± 0.020	*2.3± 0.6*	0.007± 0.0018	<0.1	0.0022± 0.0006
205/3	Voenno-Antonovka village (school)	13.3	*4.9± 1.2*	1.2± 0.24	<0.01	0.018± 0.0045	*1.2± 0.3*	0.002± 0.0005	<0.1	0.0023± 0.0006
206/4	Voenno-Antonovka village (mosque)	14.2	*6.2± 1.6*	1.6± 0.32	<0.01	0.041± 0.010	*1.2± 0.3*	0.002± 0.0005	<0.1	0.0024± 0.0006
no 2013/5	Gavrilovka village (kindergarten)	21.5	*6.4± 1.6*	1.0± 0.2	<0.01	0.002± 0.0005	*1.5± 0.4*	0.002± 0.0005	<0.1	0.0028± 0.0007
207/6	Gavrilovka village (dwelling house, 50, Frunze street)	20.95		1.6± 0.32		0.063± 0.016		0.003± 0.0008		0.0035± 0.0009
No 2013/7	Shopokov town (school)	22.33		1.6± 0.32		0.060± 0.015		0.006± 0.0015		0.0016± 0.0004
208/8	Sokuluk village (market)	25.6	*10.4± 2.6*	3.6± 0.72	<0.01	*0.084± 0.021*	*1.1± 0.3*	0.009± 0.002	<0.1	0.002± 0.0005
209/9	Sokuluk village (school)	27.5	*5.5± 1.4*	2.1± 0.42	<0.01	0.057± 0.014	*1.1± 0.3*	0.004± 0.001	<0.1	0.002± 0.0005
no 2013/10	Sokuluk village (housing estate)	24.92		1.5± 0.3		0.055± 0.014		0.003± 0.0008		0.0018± 0.0005
210/11	Alexandrovka village	*32.10*	*5.6± 1.4*	1.6± 0.32	<0.01	0.060± 0.015	*1.6± 0.4*	0.003± 0.0008	<0.1	0.0018± 0.0005
211/12	Belovodskoye village (market)	*43.0*	*9.9± 2.5*	4.2± 0.84	<0.01	*0.081± 0.020*	*1.1± 0.3*	0.003± 0.0008	<0.1	0.0008± 0.0002
212/13	Petrovka village (dwelling house)	51.0	2.5± 0.6	1.7± 0.34	<0.01	0.042± 0.011	*0.8± 0.2*	0.002± 0.0005	<0.1	0.0012± 0.0005
/213/14	Poltavka village (school)	55.0	2.6± 0.7	13± 0.26	<0.01	0.018± 0.005	*0.6± 0.2*	0.001± 0.0003	<0.1	0.0016± 0.0004
214/15	Petropavlovka village (school)	57.1	2.3± 0.6	1.5± 0.3	<0.01	0.040± 0.01	*0.8± 0.2*	±0.003	<0.1	0.0013± 0.0003
215/16-	Novonikolaevka village (school)	59.53	*7.3± 1.8*	1.1± 0.22	<0.01	0.030± 0.008	*1.2± 0.3*	0.002± 0.0005	<0.1	0.0014± 0.0004
Standard (MPC)			**5**	**5**	**0.085**	**0.085**	**0.5**	**0.5**	**0.5**	**0.5**

Source: Consultant Measurement via Kyrgyz National Laboratory, 2015.
Note: numbers in italics indicate KR standard exceeded

B. Water Quality Measurements

109. Surface water quality measurements were taken in July 2013 and April-May 2015. In July 2013, the water quality measurements were conducted on only one stream (Table 19) in Belovodskoe village since the rivers and channels in the places of intersection with the road had no flow as the water was taken for irrigation purposes.

110. Sampling was done according to GOST P 51592-2000 «Water. General sampling requirements», WSS 33-5.3.01-85 «Instruction on sampling for waste water analyses». Legislative requirements were observed.

Tab. 19: Water quality of the Belovodskoye Village stream

Name of ingredients	Unit of meas.	July 5, 2013 Analysis data	MPC*	Regulatory document
pH		7.71	6.5-8.5	Economic Relations Council, p.1, M.1977
Clarity	cm	0.0	-	Economic Relations Council, p.1, M.1977
Conductivity	μs/cm	383	-	Economic Relations Council, p.1, M.1977

Suspended solids	mg/l	2346	0.2 to 0.75	Economic Relations Council, p.1, M.1977
Oil and grease	mg/l	Not measured	0.3	ERD F 14.1:2:4.128-98
Copper	mg/l	<0.0006	1.0	Methodical Instructions 08-47/091
Zink	mg/l	<0.0005	1.0	Methodical Instructions 08-47/091
Cadmium	mg/l	<0.0002	0.001	Methodical Instructions 08-47/091
Lead	mg/l	<0.0002	0.01	Methodical Instructions 08-47/091

***** NR 2.1.5.1315-03, MPC of chemical substances in water bodies of public and cultural general water use, Ministry of Health Protection, Russia, Moscow, 2003.

111. As with the 2013 data, the 2015 survey (Table 20) showed that the water in the rivers remains relatively clean and meets the chemical substances MPC requirements for water bodies These waters are designated non-potable (without treatment) and used for irrigation purposes.

Tab. 20: Surface water quality monitoring data for Bishkek-Kara-Balta (km.15.9 – km.61)

Sampling location	**Date and time of sampling**	**Weather conditions**	**Coordinates**	**pH**	**BOD 5, mg /l**	**Conduc-tivity, (**µs/cm)	**Suspended solids, mg/l**	**Oil and grease, mg/l**	**Copper, mg/l**	**Zinc, mg/l**	**Cadmium, mg/l**
Orto-Suu village, km.55, pond	28.04.2015 10.50	sunny	N 42^0 42$^/$ 27,5$^{//}$ E 0,75 ^{0}50$^/$ 29.8 $^{//}$	8.72	3.0	564	6.4	0.23	<0.0006	<0.0005	<0.0002
Ak-Suu river* in front of a bridge, km.43+500	28.04.2015 11.15	sunny	N 42^0 49 $^/$49,3$^{//}$ E 0,74 ^{0} 04$^/$ 55,1 $^{//}$	8.32	0.7	383	52.8	0.04	<0.0006	<0.0005	<0.0002
Sokuluk river** in front of a bridge	28.04.2015 12.05	sunny	N 42^0 51$^/$ 22,3$^{//}$ E 0,74 ^{0}16$^/$ 36,2 $^{//}$	8.43	0.2	325	9.0	0.14	<0.0006	<0.0005	<0.0002
"Krepostnoy" narrow bridge at km.27+150	28.04.2015	dry bed	N 42^0 50$^/$ 02,0$^{//}$ E 0,74 ^{0}07 $^/$ 20,2 $^{//}$	-	-	-	-	-	-	-	-
"Zhantay"canal** Vostochnaya street km. 24+110	28.04.2015	dry bed	N 42^0 51$^/$ 52,6$^{//}$ E 0,74 ^{0}20 $^/$ 08,9 $^{//}$	-	-	-	-	-	-	-	-
Zhalamysh river* bridge at km.17+850	28.04.2015	dry bed	N 42^0 52$^/$ 10,7$^{//}$ E 0,74 ^{0}23 $^/$ 18,1 $^{//}$	-	-	-	-	-	-	-	-
Orto-Suu village, km. 55, pond	22.05.2015 09.40	sunny	N 42^0 42$^/$ 27,5$^{//}$ E 0,75 ^{0}50$^/$ 29.8 $^{//}$	8.73	2.8	511	10.6	0.03	<0.0006	<0.0005	<0.0002
Ak-Suu river* in front of a bridge	22.05.2015 09.57	sunny	N 42^0 49 $^/$49,3$^{//}$ E 0,74 ^{0} 04$^/$ 55,1 $^{//}$	8.07	1.2	299	1178.0	0.05	<0.0006	<0.0005	<0.0002

Sampling location	Date and time of sampling	Weather conditions	Coordinates	pH	BOD 5, mg /l	Conduc-tivity, (µs/cm)	Suspended solids, mg/l	Oil and grease, mg/l	Copper, mg/l	Zinc, mg/l	Cadmium, mg/l
Sokuluk river** in front of a bridge	22.05.2015 10.44	sunny	N 42^0 51$^/$ 22,3$^{//}$ E 0,74 ^{0}16$^/$ 36,2 $^{//}$	7.98	1.0	214	256.8	<0.02	<0.0006	<0.0005	<0.0002
"Zhantay" canal,** Vostochnaya street km. 24+110	22.05.2015 10.55	sunny	N 42^0 51$^/$ 52,6$^{//}$ E 0,74 ^{0}20$^/$ 08,9 $^{//}$	7.85	0.2	252	3859.2	0.08	<0.0006	<0.0005	<0.0002
Zhalamysh river * bridge at km.17+850	22.05.2015 11.06	sunny	N 42^0 52$^/$ 10,7$^{//}$ E 0,74 ^{0}23$^/$ 18,1 $^{//}$	8.03	0.6	263	809.2	<0.02	<0.0006	<0.0005	<0.0002
"Krepostnoy" narrow bridge at km.27+150	22.05.2015	dry bed	N 42^0 50$^/$ 02,0$^{//}$ E 0,74 ^{0}07$^/$ 20,2 $^{//}$	-	-	-	-	--	-	-	-
*** MPC for fishery water ponds category**				**6.5-8.5**	**3**			**0.05**	**0.001**	**0.01**	**0.005**
**** MPC for general use category**				**6.5-8.5**	**3**			**0.3**	**1**	**1**	**0.001**
Normative legal acts which were complied with while doing measurements				ERC p.1 M. 1977	MP 2-85	ERC p.1 M. 1977	ERC p.1 M. 1977	ERD F 14.1:2 :4.128 -98	MI 08-47/091	MI 08-47/091	MI 08-47/091

C. Noise Measurements

112. Existing ambient noise levels within the road section from Bishkek to Kara-Balta are generally attributable to vehicular traffic, construction and quarrying operations. All measurements taken exceed acceptable standards for both day and night; at some locations by many dBAs. Residential areas located along the road have noise levels of the road. Given the width of the RoW in the area, significant noise impacts to these facilities (if any) should be easily avoidable. Sensitive receptors concerning noise emissions are described in detail in Annex 2; including photographs.

Noise Test Results

113. Noise measurements were taken using the Oktava 101A sound level meter No. 04A445, last calibrated in Dec. 2013. All measurements were taken in compliance with SN (Sanitary Norms) 2.2.4/2.1.8.562-96 “Noise At Workplaces, In Dwelling Rooms, In Public Buildings And At The Area Of Residential Development”. The data (Table 21) clearly indicate that roadside businesses and residences (16 sensitive receptors) are exposed to noise levels far exceeding the KR standards, this is particularly true for schools and hospitals.

Tab. 21: Existing noise levels determined along the road sections

Noise sensitive sections: Sampling Station No. used on 2013 survey and again in 2015 No.		Km from Bish-kek	Traffic Volume AADT 2015?	Description of the section	Distance from carriage-way to receptor (m)	Measured Noise level, dBA.				
						2013	2015			
						Field Measurement	Aver-age	08:00 to 11:00	17:00 to 19:00	MPL
20	Novopavlovka village	9.9	41,996	School #2	33	69	70.5	71	70	**70**
19	Novopavlovka village	11.0	41,996	Market	1	62				**70**
18	Voenno-Antonovka village, school (50 m from the road)	12.86	41,996	Secondary school, backyard	50	70	61	61	61	**70**
17	Voenno-Antonovka village, mosque	14.2	41,996	Mosque	10	61	74.2	73.4	75	**70**
new	Gavrilovka village	20.8	48,558	House along the road	30		71	71	71	**70**
new	Gavrilovka village	21.5	48,558	Kindergarten	20		75.5	75	76	**70**
16	Shopokov city	22.330	48,558	School #2	20		75	75	75	**70**
new	Sokuluk city	27.150	48,558	Dwelling houses (shop “Tatyana”)	10		75	78	72	**70**
15	Sokuluk city	27.5	48,558	School	15	72	71.5	71	72	**70**
new	Sokuluk city	25.6	48,558	Multi-storied dwelling buildings	10		76.15	73.3	79	**70**
14	Alexandrovka village	30.5	22,832	School #3	80	72	60.5	61	60	**70**
new	Sadovoye village	37.4	22,832	School	10		77.75	74.5	81	**70**
13	Belovodskoye	43.0	12,507	Market	1	72				**70**
12	Belovodskoye	42.45	12,507	Dwelling house (201 Frunze St.)	10	63	77.25	80.5	74	**70**
new	Petrovka village	51	12,507	Residential district, 504 Tsentralnaya St.	8		75	78	72	**70**
11	Poltavka village	55	12,507	Secondary school	30	62	71.5	71	72	**70**
10	Petropavlovka village	57.1	12,507	Secondary school	8	58	73.5	75	72	**70**
9	Novonikolaevka village	59.550	12,507	Secondary school, Novonikolaevka	22	62	71.15	71	71.3	**70**

Noise sensitive sections: Sampling Station No. used on 2013 survey and again in 2015 No.	Km from Bish-kek	Traffic Volume AADT 2015?	Description of the section	Distance from carriage-way to receptor (m)	Measured Noise level, dBA.				
					2013	2015			
					Field Measurement	Aver-age	08:00 to 11:00	17:00 to 19:00	MPL
Areas immediately adjacent to dwelling houses, buildings, clinics, dispensaries, resorts, recreation centers, rest homes for elderly and disabled people, kindergartens, schools and other educational institutions, libraries.						Avg.: 0700 to 2300 -70 dB Avg.: 2300 to 0700 -- 60 dB			

Sources: Consultant's field measurement, 05/2015; Traffic volume data are consultant's counts and estimates.
Note: It is standard practice to add 10dBA as a night-time annoyance factor due to low ambient noise levels. The data in the table have not been adjusted.

114. The 2015 results for the 16 sampling sites show that the noise level in the project road section exceeded the MPL for every reading. It is under these conditions that the construction will take place. These high reading in no way reduce the effort needed by the contractor to minimize construction period noise. In fact a potential plan for mitigating some of the most sensitive noise sites will be discussed and actions proposed.

115. Conclusion: The results of instrumental measurements show that the noise level at the area of residential development exceeds the maximum permissible level from 3-20 dB and does not comply with the requirements of SanPiN (Sanitary Regulations and Standards) 2.1.8.562-96 "Noise at workplaces, in dwelling rooms, in public buildings and at the area of residential development". Basis: SN (Sanitary Norms) 2.2.4/2.1.8.562-96 "Noise at workplaces, in dwelling rooms, in public buildings and at the area of residential development".

D. Vibration Measurements

116. Vibration measurements were carried out by means of the following device.

Measuring device	No.	Calibration certificate		Valid until
		No.	Date	
Oktava 101B	04B361	BA06-05-8170	04.12.2012	04.12.2013

The results are depicted in the following table.

Tab. 22: Vibration Measurement Results

No.	Location	Nature of Noise						Octave-band pressure level (dB) with mean-metric frequencies (hz)									Sound level (dBA)	
		By spectrum		By temporary														
		Wideband	Tonal	Constant	Fluctuating	Intermittent	Impulsive			1,0	2,0	4,0	8,0	16,0	31,5	63		
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	20	
	Bishkek – Kara-Balta																	
9	Novonikolaevka (school), km 59	+				+					86	74	67	68	65	66	85	Actual
10	Petropavlovka (school), km 57	+				+					87	78	69	66	65	66	88	Actual
	Petropavlovka	+				+					83	80	71	72	67	66	82	Actual

11	(school), km 55																	
		+				+					80	87	65	66	65	67	93	Actual
12	Belovodskoe (Mosque)																	
		+				+					88	87	78	71	68	66	97	Actual
13	Belovodskoe (market)																	
		+				+					88	77	70	69	68	65	98	Actual
14	Aleksandrovka (school)																	
		+				+					76	70	82	87	67	66	91	Actual
15	Sokuluk (school)																	
		+				+					77	70	68	65	66	65	92	Actual
16	Sokuluk (central market)																	
		+				+					72	79	68	74	73	66	81	Actual
17	Shopokov town (school)																	
	Voenno-Antonovka (Mosque)	+				+					79	63	71	64	66	68	88	Actual
18																		
	Voenno-Antonovka (school)	+				+					74	73	75	73	71	72	90	Actual
19																		
		+				+					70	79	72	73	77	80	80	Actual
20	Novopavlovka (market)																	
		+				+					74	69	68	65	66	67	87	Actual
21	Novopavlovka (school)																	

117. Conclusion: The results of instrumental measurements show that the vibration level is not stable; vibration is not controlled for the adjacent residential area by vibration speed.

VI. ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

118. Based on the results of the conducted field surveys environmental impacts were identified and described and suitable mitigation measures prepared. Because the Project involves the rehabilitation of an existing road and since there are no protected areas located within the Project's area of influence, the occurring environmental impacts are mostly confined to the construction stage. As it was already described in the Aide Memoire of ADB Mission in May 2012 the most severe impacts result from civil work activities during construction stage. Most severe impacts refer to the human environment, particularly concerning noise emissions, emissions of pollutants and vibrations within the traversed settlements especially when the Project road runs close to sensitive receptors such as schools, hospitals, mosques, bazars or other. In summary main impact categories arise from the following activities: (i) construction works within or close to settlements result in noise impacts, emission of pollutants to air and vibration which is especially of concern when the

Project road comes close to sensitive receptors, (ii) site clearance activities result in loss of top soil and vegetation structures, (ii) aggregate sourcing, crushing of aggregates and asphalt plant operation may have severe impacts in case of unsuitable site selection or management. Additional impacts refer to (iii) impacts from bridge rehabilitation, (v) potential impacts on surface waters and potential impacts on natural habitats and biodiversity. In the following chapters the impacts are described. They have been divided in to design phase, construction phase, and operation phase impacts.

A. DESIGN PHASE

Physical Environment

119. A large number of the potentially more significant impacts can be avoided by proper planning/preparation, including basic items such as ensuring that environmental clauses are in the contract documents and that enough IEES and their EMPS have been distributed to the contractor and other relevant agencies, as well as providing adequate briefing and training on how EMPs are implemented. For that reason 10 mitigative measures have been defined in the EMP, the most important being proper distribution of the assessment documents, inclusion of environmental specifications in the tender documents, environmental safeguards training of CSC and the contractor, and the preparation of a tree cutting and management plan defining the best way to cut the thousands of adult trees, then replant and maintain new ones.

120. **Uncontrolled Borrow Area Establishment**- This activity will be avoided by requiring the contractor to follow the mandatory steps as defined by KR Regulation, namely to obtain all required permits for use of borrow pits and disposal areas from local authorities, get approval from regional departments of SAEPF under the Government of KR, prepare a «Borrow Pits Development and Restoration Plan" and pass all necessary documents to MOTC of KR to obtain a license to extract aggregate materials from the State Agency for Geology and Mineral Resources.

121. **Unmanaged waste asphalt-concrete concrete temporary storage and processing areas** - Large quantities of old asphalt pavement will need to be transported temporarily stored and much of it processed, via crushers, to be reused as road sub-base material or a fill on feeder and secondary roads. There is a concern that this asphalt may contain asbestos fibers and therefore a minimum of 24 core samples will be taken from pavement along the route and tested for asbestos fiber content. If asbestos is found all contractor staff working with the reprocessing of the asphalt will be issued protective face masks and clothing, and workers will be warned about the dangers of not wearing protective gear. Asbestos is highly carcinogenic.

122. Prior to the start of the construction, just after the contract is awarded, the contractor, working with the local authorities, will identify temporary asphalt pavement storage and processing areas, which will be at least 500m from the nearest habitation and will locate these facilities (there will likely be two) be on state-owned land or if private land is needed a negotiated rent will be established. The pavement will likely be transported in blocks by truck and dumped at these sites and piles will need to be no higher than 2.5 m. All temporary asphalt pavement storage and processing areas shall be agreed upon with the regional departments of AEPF of KR under the Government of KR.

123. **Uncontrolled establishment of Asphalt and Concrete mobile batch plants.** Pavement material will be prepared at batch plants (likely two) along the 52 km road section, where materials will be mixed, loaded onto trucks hauled to the work areas for placement. These facilities are noisy, dusty, and emit a strong odour of tar. To minimize impact on the general public these temporary sites will be located close to the road edge, but with at least

a 500m buffer zone from any residential or public recreation area. It is not known if the aggregate will be crushed at the site, but if so dust suppression equipment (standard on most modern crushers) will need to be installed on the crushing unit. The entire process of establishing a plant will be controlled by SanPiN 2.2.1/2.1.1 *Design, construction, reconstruction and operations of enterprises; planning and construction of residential sites/ and Sanitary-hygienic zones and sanitary classification of enterprises, structures and other facilities*" and *Sanitary-epidemiological rules and standards. SanPiN 2.2.1/2.1.1.006-03*.

124. **Material Haul Route Plan-** With more than 1.5 million m^3 of materials to handled mostly be truck from borrow areas, aggregate plants and to and from temporary asphalt storage areas, the routes trucks use to haul these material will greatly affect the impact on local communities. CSC will designate haul roads, preferably paved so as to minimize dust, and with a lowest density of residences as possible. The haul route plan will include road maintenance, safety and dust control. Any roads through residential areas will only be used between 07:00 and 18:00.

125. **Environmental Safeguard Implementation Training-** CSC will be required to have an environmental specialist on staff who will be fully familiar with implementation of EIAs, their EMPs and monitoring compliance with environmental clauses contained in the contract specifications. This will also apply to the contractor and any field inspectors. CSC will develop and deliver a 1/2- to 1-day briefing seminar on EMP implementation and compliance monitoring, targeting the CSC's inspectors as well as the contractor. This session needs to be completed during the preconstruction period but after the contract has been awarded. It will be mandatory attendance for the contractor.

Ecological environment

126. The main ecological impacts at the design phase of the project relate to minimizing the loss of trees along the road sections and implementing a rapid rehabilitation and landscaping plan. Plant communities are generally degraded and have been replaced by gardens, planted forest belts along the road, and cultivated or livestock grazing fields.

127. Impacts on the ecological environment are minimal since the project activities will be mainly located on the existing RoW, specially selected temporary storage sites and the rivers crossed are intermittent and regularly experience mudflows. While the water quality for the parameters measured showed no appreciable contamination, it is highly likely that bacterial levels, from sewage and animal waste, are high and that other chemicals are present. The aquatic ecosystem consists of aquatic insects and common amphibians, habituated to the intermittent flows and long dry periods.

128. There are no special protected areas or biodiversity hotspot within 500m on either side of the alignment for its entire length.

129. **Tree Management Plan-** The most obvious ecological feature along the road is the extensive shelter and shade tree belt planted along both sides of M39 for at least 30 km starting at the Bishkek end of the road. These are mature elm, poplar and black locust trees 40-60 years of age (Figure 4). Not only do they provide shade during the summer and act as a windbreak during the winter but they process thousands of tons of CO2, during photosynthesis.

130. During detailed design the inventory of trees to be removed under road rehabilitation works has been made. The number of such trees is 4,500. There has not been a complete inventory by a trained forester at this stage therefore as a first step, to be completed during the preconstruction stage, the CSC will retain a forester technician to complete a tree inventory showing all trees and marking exceptionally large and health trees on a sketch

map of the plantation. The technical, working with the CSC's environmental specialist and the road design engineers will prepare a tree management plan with the objective of minimizing tree removal. This will include defining innovative road designs that protect particularly valuable shade and shelter groves, as defined by local communities.

131. Tree losses that are unavoidable will be compensated by new plantations. Planting shall be conducted after technical works have been completed in a section of road (not waiting until the end of construction) and completing in the spring (March till April) and/or autumn (September till October) when trees have greatest chance of survival. The trees shall be planted at the spots where the tree losses have occurred and they will be planted according to the following parameters: >1.75 m height, age 5 – 7 years; Distance in between individual trees shall be 6 – 8 m; and the planted species will be *Juglans regia, Acer negundo, Ulmus carpinifolia, Populus alba, Salix alba, Robinia pseudoacacia*. Care will need to be taken to plant the 'right tree species in the right place', e.g., smaller trees under utility lines, reducing the need for heavy pruning, etc.

132. During the preconstruction period, once the inventory is complete the CSC needs to order/reserve the trees from local nurseries, since they are not readily available. CSC will advise the contractor to retain a subcontractor to implement the tree management plan and design a planting and maintenance program for the construction period and into the operating life of the road. The CSC will discuss with IPIG/MOTC the option of hiring local farmers and community organizations to undertake planting and tree maintenance on the road fronting their communities, with payment based on numbers of trees surviving each year.

133. Additional potential impacts on the trees may include compaction of soil by the roots of the tree, alteration of ground levels beside the tree (more than 30 cm), covering the soil around the tree with impervious material, release of materials that are toxic to the trees, or physical severance of the root system. Mitigation of impacts to trees can be done through refraining from storing construction material and other heavy equipment which could compact the soil near the roots, using only organic material at the tree base (drip-line) zone for potential fill, or fencing the area around the trees' 'drip lines' during construction works near the trees to be protected.

Figure 4: Elms, poplar and black locust trees lining M39

Social Environment

134. Social environmental issues arising during this stage are related to providing people friendly design features and considering uses of residents along the road. The following are the most important issues:

135. **Access management process during road access closures-** A major construction project involving the complete rebuilding of the highway, reconstruction of hundreds of large box culverts and all the bridges, will require detours , lane closures and access restrictions for local residents, e.g. intersections will be closed for some time. To minimize this inconvenience the CSC working with the Police will prepare the basics of a plan addressing how detours are established, what safeguards need to be in place, and how vehicles, pedestrians and livestock are accommodated. This framework will then be passed on to the contractor who will be required to provide details within the first 4 months on the job. The information will include staffing provisions for traffic management, consultation plan with local communities prior to work starting and sequence of rehabilitation after work is done with focus on reestablishing all weather access to at least preconstruction conditions.

136. **Livestock and Pedestrian Crossings** - Further impacts from the road may include inadequate provision for livestock and pedestrian crossings. Working with local communities, and based on information obtained during the consultations (See Annex 1) CSC will identify livestock crossing locations and decide to either provide livestock underpasses, using large three-sided box culverts, with a minimum height of 2 m and width of 5m. At grade crossings are not an option give the danger of collisions and traffic delays. Warning signs indicating danger of straying livestock will also be posted. Where traditional pastures exist, fencing will be erected. In addition, reflectors may be provided on trees in the critical sections and the road fenced near pastures. The installation of these measures will be the responsibility of the contractor, but planning will take place during the preconstruction period.

137. **Pedestrian crossings** present a special problem as the road is densely occupied by residences, commercial establishments and small industries. People will need to cross the highway which has traditionally been extremely dangerous, since there are no traffic lights and as such the movement of vehicles is erratic and at very high speed. The width of the carriageway, in some places >35m, is difficult to cross. The solution will be either traffic lights that will require vehicles to stop or pedestrian overpasses. Traffic lights present a problem due to the notoriously undisciplined driving habits of Kyrgyz drivers and the tendency to run yellow lights and disobey them totally in the evening. Traffic lights on M39 present a special danger for pedestrians and of course slow the flow of traffic.

138. CSC's design team will prepare a pedestrian management plan, defining where and what sort of crossing structures will be built. This will require consultations with communities where known crossing areas exist, where problems have occurred, and in collaboration with the police. In addition, areas where unauthorized crossing now take place fences and signs will be erected. Road medians will include high Jersey-Barriers to discourage crossing.

139. **Public Toilets**- Rest stops or toilets will not be provided under the project since there are a few petrol stations along the project road section which already have public toilets.

140. **Bus Stops** - Bus traffic, especially by the mini-buses (marshrutka) is intensive and under existing condition very dangerous as there are no clearly marked and outfitted bus stops. Those that exist are in very poor conditions and provide little in terms of passenger safety and protection from the elements. To address this gap, MOTC will develop an innovative bus stop and install a number along the road.

CONSTRUCTION PHASE

141. Nineteen potential construction period impacts are listed in the EMP tables addressing primarily the control of air and noise emissions through monitoring, proper management of earthworks, waste materials and contractor good-housekeeping practices associated with fuel and lubricant management, work camp waste disposal, and occupation health and safety practices for the contractors workforce. The following is a discussion of highlights of the details provided in the EMP

Physical Environment

(a) Air Quality, Noise and Vibration

142. Air quality impacts during construction will originate from different sources but will be temporary. Sources include construction machinery exhausts, fugitive emissions from asphalt plants, aggregate crushers, and dust generated from construction works, haul roads, exposed soils, and material stock piles.

143. Noise during construction will be significant, since all of the existing pavement will be taken up using jack hammers and similar devices mounted on excavators (noise production about 89-90dBA at 15 m from work site) is temporary and results from operating construction machines. Vibration is caused by the operation large pavement breaking machines and roller compacters. Given M39's road roughness, the high traffic with a large percentage of trucks generates vibration pluses as far as 20-30m from the carriageway. But will be greatly attenuated at 10m.

144. Air quality impacts from asphalt plant, aggregate crushers, and dust emissions have been addressed in the above sections.

145. The following mitigation measures will be implemented to by the contractor to reduce emission levels of construction equipment: (i) maintenance of construction equipment in good condition and avoiding, as much as possible, idling of engines; (ii) banning of the use of machinery or equipment that cause excessive pollution (e.g., visible smoke); (iii) the contractor should utilize construction machinery with low emission levels and iv). all construction vehicles will be shut down if not operating or left unattended for more than 3 minutes.

146. Settlements along the project road are already exposed to considerable air pollution, noise and vibration, and during construction this will intensify. Noise attenuation measures such as temporary baffles and earthworks storage areas may be placed to reduce noise at sensitive sites.

147. Negative effects of noise are mitigated by limiting construction work to 07:00 am – and 18:30 in urban areas and 06:00-to 19:00within 500 m of settlements, and by limiting hauling traffic through settlements. A limit for maximum noise of 70 dB(A) is set and strictly enforced in the vicinity of sensitive receptors within settlements. Construction stage noise monitoring is conducted as described in the EMP.

148. An air quality and noise monitoring program will be undertaken at the 13 sites listed in Table 17, with sites defined in detail in Annex 2. The survey will be conducted quarterly with air quality and noise measurements taken at the same time for 1 hour at each site, i.e., at the receptor (sensitive structure) as pictured in Annex 2. The parameters to be tested will be: CO, NO, NO2,O3,SO2, PM10, PM2.5 VOC and noise.

(b) Surface and Groundwater Water

149. **Surface Water**- The road crosses several watercourses including natural rivers, flood control ditches and irrigation canals. The potential impacts on the watercourses include siltation, change of surface hydrology increased sediment load, and pollution from construction area runoff.

150. The impacts of stockpiling of topsoil and material are mitigated by storing the material at a safe distance from nearby surface waters and by providing for long term stockpiles a grass cover. These mitigation measures prevent also the impacts of increased sediment load on surface hydrology. Settlement ponds must be implemented to places where construction activities come near the natural watercourses.

151. When construction activities are being carried out on or in the vicinity of watercourses improper handling and storage of materials (concrete, asphalt, lubricants, fuels, solvents) may pose the risk of water contamination. In addition embankments and construction materials (fill, sand, and gravel) are subject to wash out with rainwater. Oil and grease concentrations in surface waters will increase especially if oil leaks from engines are not properly controlled. Appropriate mitigation measures will be taken, such as regular maintenance of the construction equipment to prevent oil leaks, in addition chemicals and oil will be stored in secure, impermeable, and bounded areas far away from surface waters.

152. While the risk of contamination is low, as work is planned during low or no flow conditions, a limited surface water quality sampling program will be undertaken, using the exist survey data collected in June 2015 as a baseline. Since the aquatic ecosystem does not exist in these streams where they cross the road, little damage is possible, however two parameters will be monitored, namely Oil and Grease and Total Suspended Sediment. This monitoring will take place only if work is done while there is water flowing in the watercourse. The sampling will involve taking samples upstream and downstream of the worksite while construction is ongoing and once construction is finished. The sampling will take place at all water crossing when a flow present and works is being undertaken. By taking samples above and downstream of a work site, existing conditions and worksite pollution (if any) can be tracked.

153. **Groundwater** - There is a risk that groundwater, i.e. wells could be contaminated by surface runoff draining into leaking roadside wells, with well casings cracked due to construction activities. To avoid this wells within 25m of either side of the road carriageway (i.e. inside the legal RoW) will be mapped and tested for potability, as well as repaired if cracks and leaks are detected. Generally these data will be available from the Ministry of Health's potable water testing program and will be used as a baseline. Wells outside the 25m boundary will be mapped but not inspected.

(c) Topsoil Protection and Erosion

154. The impacts on soil originate from the compaction of soil, site preparation and clearance, and loss due to rain and wind-related losses due to improper storage of spoil material. Compaction can lead to degradation of the soil's usefulness, especially along the length of the alignment. To prevent soil compaction the contractor shall limit the use of heavy machinery to the existing RoW especially in the vicinity of agricultural land.

155. Site preparation and clearance includes stripping and temporary storage of topsoil. The associated impacts to site preparation and clearance activities are expected to be spatially limited to small strips alongside the already existing road. The removed topsoil will be stored for re-use and long-term stockpiles of topsoil will be protected against erosion. This will be done by, for example, seeding the stockpiles with fast growing shallow root grasses.

156. To ensure proper soil management the contractor will submit a soil management checklist to commencing operation. This checklist will include a simple listing of measures for minimizing water and wind erosion losses. As long as topsoil stockpiles remain unused, the seeded grass cover will remain in place.

(d) Contamination from Earthworks, Aggregate, Concrete and Asphalt plant

157. **Borrow Areas** - When planning to open a new borrow site, The contractor, working with the framework instruction provided as part of the mitigative measures, will proceed with getting both the extraction permit and approval of a development plan, and later on approval of borrow pit restoration plan. The Contractor shall obtain all required permits for use of borrow pits and disposal areas from local authorities, get approval from regional departments of AEPF under the Government of KR, prepare a «Borrow Pits Development and Restoration Plan" and pass all necessary documents to MOTC of KR to obtain a license to extract aggregate materials from the State Agency for Geology and Mineral Resources. The use of existing borrow or aggregated facilities will not require such actions. In case of use of private borrow pit all permits (licenses, approvals from local authorities, regional departments of AEPF under the Government of KR, etc.) are responsibility of the owner of borrow pit which should be indicated in the agreements signed between the contractor and owner of borrow pit. The contractor will need to prepare a site development plan which must provide the following information:

- capacity and operation hours of a borrow pit;
- development and extraction sequence of borrow pit;
- technique and mechanisms for stripping and excavation operations;
- operation and time schedule for borrow pit development;
- extraction method and transport plan, including route(s);
- safety rules and hours of operation;
- expected quality of extracted materials;
- topsoil storage/protection and environment protection steps; and,
- rehabilitation of disturbed lands when site is decommissioned.
- Calculation of mobile sources' emission charge.

158. To minimize dust the contractor shall develop a dust suppression program and have it approved by the CSC. The Program will ensure unpaved haul routes that go next to settlements whetted in order to suppress dust, and will also require all trucks to use covers for the load to prevent dust pollution. The air quality monitoring will keep a close record of dust (particulate matter) emissions and if needed the EPAS unit can be used to do spot monitoring of these operations in order to prove non-compliance with KR standards and EMP specifications. A location map (Fig. 5) showing the existing borrow and aggregate sites will permit the contractor to select the closest sites and limit the need for establishing new ones.

159. The following borrow areas are proposed as material sources for the Bishkek – Kara Balta section:

1) Dzhelamysh borrow area is located in a valley of the river Dzhelamysh located in the southern edge of the Chui depression. The nearest settlement, Kara-Sakal village, is immediately adjacent to the deposit from the north. Available material in the deposit is gravel and sand, the licensed area is 5.75 ha. The Dzhelamysh borrow area is located roughly 2 km south from the crossroad at km 20. Access road to the borrow area is a paved road which goes through a small residential area. Impacts of utilizing Dzhelamysh borrow area include potential dust emissions at the residential area.

2) Sokuluk borrow area is located in the riverbed of Sokuluk river, 5 km southward of Sokuluk urban village. Available material is gravel and sand with boulders. The explored area of the site is 21,000 m_2 and the depth of explored productive stratum is about 6 m. The turn off to the Sokuluk borrow area is located at km 28. The access road to the borrow area does not include significant residential areas, but the area near the intersection will require dust suppression.
3) Aksu material deposit is located about 4.0 km to the southwest of the village Belovodskoe and confined to the former floodplain and first terrace above the floodplain of the Aksu River. To use the sand in mixture for asphalt or cement concrete the sand has to be washed. The intersection to the Aksu borrow area is at km 41. The borrow area is located roughly 5 km south from the intersection. The access road is paved, but goes through the residential area of Belovodskoe. The hauling traffic through the residential area should be carried out only from 6.00 am through 9.00 pm to prevent significant disturbance to the local residents. Also wetting of the road will be necessary as there are unpaved sections near settlements along the section.
4) Kara Balta material deposit is near to the Bishkek-Dzhambul road. The deposit is confined by the irrigation canal from the east and by agriculture land from the west. Morphologically, the sand-and-gravel deposits of the Kara-Balta borrow area are confined to the bottom of the Chon-Kaindy River and to its first, second and third terraces above the floodplain. The content of clay particles ranges from 3.4% to 15.2%, therefore, sands of the Kara-Balta deposit should be washed. Kara Balta borrow area is located roughly 3 km north from Kara Balta. The access road goes through Kara Balta residential areas. Dust management plan has to address the unpaved sections which go through settlements along the way and the hauling traffic should be carried out only between 6.00 am and 9.00 pm.

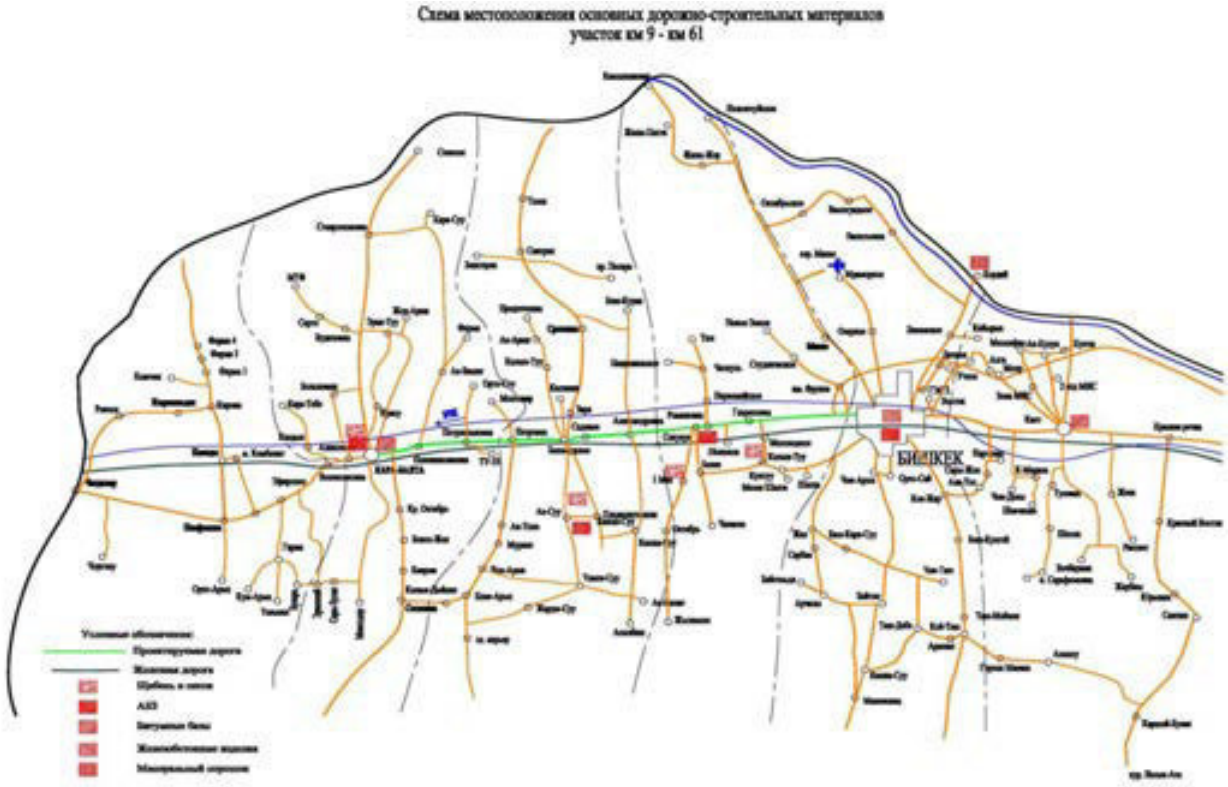

Figure 5: Existing borrow areas along the road section Bishkek – Kara Balta

160. **Asphalt, Concrete and Crushing Plant Pollution**- During the selection of a site for bitumen plant, concrete plant, stone crusher equipment, which emit pollutants, noise and transmits vibrations, the contractor will need to comply with SanPiN 2.2.1/2.1.1 and SanPiN

2.2.1/2.1.1.006-03, and establish a specific buffer zone around any such facility. In the KR this is referred to as a sanitary-hygienic zone, and is a mandatory element of any facility that affects habitats and human health. The sanitary-hygienic zone (SHZ) separates the area of an industrial site from residential areas, landscape and recreation areas, parks, and health resorts with mandatory demarcation of boundaries by using specialized information signs. The boundaries are as follows:

Class II – SHZ 500m.
Production of asphalt-concrete at fixed plants.
Production of asphalt-concrete at mobile plants.
Class III – SHZ 300m.
Production of crushed stone, gravel and sand, milling of quartz sand.
Class III – SHZ 300m.
Borrow pits of gravel, sand, and clay.
Bitumen plants
Class IV – SHZ 100m.
Concrete solution plants.

(e) Bridge/Culvert Rehabilitation

161. Bridges- The bridges along Bishkek – Kara Balta road section will require the following level of repair:

- Km11 (Partial reconstruction),
- Km17 (Rehabilitation),
- Km23 (Total reconstruction),
- Km27 (Total reconstruction),
- Km40 (Partial reconstruction),
- Km43 (Partial reconstruction), and
- Km44 (Partial reconstruction).

162. Since the water courses over which these bridges pass have only seasonal flows, one is a flood canal, another a mudflow channel the impact of bridge reconstruction will be minimal, assuming good construction practices are used and the mitigative measures related to contractor good housekeeping are strictly adhered to. These include handling of fuels and lubricants, sewage and garbage management and clearing of all debris from river channels as soon as construction is completed. Timing for total and partial reconstruction works should be during low or no flow periods, which are mid May through mid September.

163. **Culverts -** The 204 or so culverts require cleaning, but mostly repairing, reconstruction and replacement. The new or repaired culverts will have to have sufficient diameter to prevent blocking, as well as being long enough to accommodate the additional carriageway lanes. Additionally, at the detailed design stage the CSC will take into account the requests of local community on construction of additional culverts crossing the road to improve irrigation and drainage of accumulated surface waters.

164. The environmental impacts associated with this work can be minimized if culverts are rebuilt properly, i.e., properly sized and with the correct slope and downstream erosion/scour protection measures applied. If possible culvert work should take place during the dry season, since otherwise temporary bypasses will be necessary. However, a number of culverts convey irrigation water, which flows, based on a prescribed irrigation schedule. Contractors will need to liaise closely with farmers to establish times when work can take place and not harm crop development.

165. Nearly all structures will be concrete box culverts, precast, with each section set in place and sealed with a special commercially available gasket/sealant material.

(f) Recycling of Construction Materials

166. Recycled material from the existing pavement and special recycling techniques will be used in reconstruction of the pavement layers. The cost effectiveness of reconstruction measures could be enhanced greatly by the application of recycled pavement materials. Recycling options include hot mix recycling (HMR) with/without new materials and cold mixing recycling with/without new materials. Recycled material will be used to the largest extent feasible to reduce the volume of spoils that needs to be disposed of.

167. Prior to commencing the activities, the contractor will submit revised earthworks calculations (adjusted from the data provided in the bid documents), focusing on the volume of old pavement to be excavated, stored, reprocessed and reused. Steps for the disposal of the unused asphalt-pavement will be included in the submission to CSC. As indicated earlier in this chapter, core samples of the pavement must be taken and tested for asbestos fiber content.

(g) Contractor Good Housekeeping

168. Garbage and sewage and solid and liquid waste from equipment maintenance can be serious pollutants and disease vectors. The contractor will therefore need to practice good worksite and construction camp management. Inspections by the CSC environmental specialist will take place monthly and any no compliance issues such as strewn garbage, open waste pits, oil soaked ground and unsanitary washing facilities for workers, the contractor will be subject to an immediate fine and a stop-work order will be issued if clean up is not underway within 12 hours of detection. If the contractor does not act, the CSC will retain an outside firm to clean up the area and this amount will be deducted from the contract total.

(h) Occupational Health and Safety

169. For health and safety protection of workers and adjacent communities, the following shall be provided: (i) Adequate health care facilities (including first aid facilities) within construction sites; (ii) Training of all construction workers in basic sanitation and health care issues, general health and safety matters, and on the specific hazards of their work; (iii) Personal protection equipment for workers, such as safety boots, helmets, gloves, protective clothing, goggles, and ear protection in accordance with KR legislation; (iv) Clean drinking water to all workers; (v) Adequate protection to the general public, including safety barriers and marking of hazardous areas; (vi) Safe access across the construction site to people whose settlements and access are temporarily severed by road construction; (vii) Adequate drainage throughout the camps so that stagnant water bodies and puddles do not form; (viii) Sanitary latrines and garbage bins in construction site, which will be cleared when reaching capacity by the contractors to prevent outbreak of diseases.

170. Where feasible the contractor will arrange the temporary integration of waste collection from work sites into existing waste collection systems and disposal facilities of nearby communities. This shall be taken into consideration when deciding the place for the camp. The contractor will arrange for extra payment if community services are to be used.

171. The contractor shall hire a qualified health and safety expert who will provide safety training to the staff according to the requirements of the individual work place. Prior to the commencement of works, the work site personnel shall be instructed about safety rules for the handling and storage of hazardous substances (fuel, oil, lubricants, bitumen, paint etc.) and also the cleaning of the equipment. In preparation of this the contractor shall establish a

short list of materials to be used (by quality and quantity) and provide a rough concept explaining the training / briefing that shall be provided for the construction personnel.

172. The contractor shall provide information to workers, encouraging changes in individual's personal behavior and encouraging the use of preventive measures. The goal of the information is to reduce the risk of HIV / STD transmission among construction workers, camp support staff and local communities.

Ecological Environment

173. Given the project work area is within the RoW of an existing Class 1 highway, no significant ecological environmental impacts are foreseen, other the impact of the removal of thousands of mature trees, which has already been discussed in detail.

Social Environment

174. Traffic and Congestion- Traffic impacts of the road rehabilitation project will include disturbance of traffic along the road sections. Prior to commencing operations the contractor will review the material prepared by the CSC and shall submit a traffic management procedure to local traffic authorities, and provide information to the public about the scope and schedule of construction activities and expected disruptions and access restrictions. During the construction work the contractor will arrange for adequate traffic flow around construction areas, including providing traffic control staff or and diversion signaling as required.

175. Livestock and Pedestrian Crossings- in addition to planning for the movement of livestock and people once the upgraded road is open, construction period crossing arrangements are also necessary. To address this the contractor will need to develop an internal process for assisting people and livestock maneuver around work sites and across the road during the construction period. This should be available for review at any time the CSC inspector requests it.

176. Occupational Health, Safety and hygiene- Construction camps are likely have public health impacts. There will be a potential for diseases to be transmitted, exacerbated by inadequate health and safety practices. The contractor will be required to recruit a health and safety specialist to address such concerns in the work sites. The specialist shall also liaise/work with the nearby communities if mitigation of health and safety concerns arise and the CSC suggests it is necessary.

177. Mitigation measures will include (i) provision of adequate health care facilities within construction sites; (ii) a health and safety specialist, appointed by the contractor for each camp, and first aid equipment and facilities; (iii) training/orientation of all construction workers in basic sanitation and health care issues (e.g. HIV/AIDS and other sexually transmitted infections), general health and safety matters, and on the specific hazards of their work prior to commencing operation; (iv) personal protection equipment for workers, such as safety boots, helmets, gloves, protective clothing, goggles, and ear; (v) clean drinking water to all workers; (vi) adequate protection to the general public, including safety barriers and marking of hazardous areas in accordance with relevant legislation and regulations; (vii) safe access across the construction site to people whose settlements and access are temporarily severed by road construction; (viii) adequate drainage throughout the camps to ensure that disease vectors such as stagnant water bodies and puddles do not form; and (ix) Septic tank and garbage collection box will be set up at the construction sites, and will be cleared according to a weekly schedule posted by the contractor.

VII. OPERATION PHASE

A. Physical Environment

(i) Air Quality and Noise

178. Air Quality- The proposed project will result in better road condition, increased speed of vehicles, and the increase of traffic volumes along the Bishkek – Osh road. This is a function of the growth rate and vehicle ownership in the country, not the widening of the road. M39 is the only N-S highway and as such diversion from other routes, which are far worse than the existing is not likely, since vehicles will not use these alternate unpaved, unsafe roads.

179. That being said, the traffic volumes are projected to grow by 7% per year for passenger vehicles and 4% per year for trucks and buses. With this growth, which is projected to increase by 15,000 vpd, by 2020 (Table 23), will come the elimination of older more polluting vehicles from the fleet, fewer stops and starts due to better road conditions and traffic management, better engine technology and vastly more fuel efficient vehicles. Further, KR will receive better refined fuels with lower emission factors per liter used. The air quality in the project corridor airshed is significantly polluted (Table 18). These conditions can be improved by enforcement of annual inspections, especially for the small and large buses and trucks, which contribute most of the emissions. Secondly the required use of catalytic converters and other pollution abatement devices needs to enacted into law and enforced.

180. A high grade road, properly signed, with good lane markings and careful intersection management, will allow the traffic to move more smoothly thus reducing the high emission due to frequent acceleration and deceleration.

Tab. 23: Traffic projection (AADT) by sub-sections

	Bishkek-Kara-Balta			
Year	Km 08-17	Km 17- 29	Km 29-40	Km 40-61
2013	41,996	48,558	22,832	12,507
2018	49,398	57,117	26,856	14,711
2020	55,348	63,996	30,091	16,483
2030	65,103	75,276	35,395	19,389
2038	65,103	75,276	35,395	19,389

Source: Kock's Consultant's 2013 estimations

181. Road safety features such as, streetlights, traffic lights pedestrian crossings, livestock crossings and other visual means to reduce accidents will be installed along the road.

182. **Noise -**The noise survey completed in June 2015 (Table 21) showed that noise levels along the project corridor and for about 20-50m on either side of the carriageway, far exceed the KR standards for even commercial industrial land uses. Noise levels that interfere with sleep and impact schools and hospitals now exist along the road. The only real mitigative measure is to install noise barriers, along the noisiest stretches, based on further noise testing during the operating period. If the consultant's recommendation to purchase the EPAS air quality and noise analyzer, measurements can easily be completed and appropriate noise barriers designed and installed. An option could be the construction of earthen berms helping to deflect the noise. It may be possible to use the crushed asphalt as

a base for building the berms, then landscaping them with topsoil and vegetation including local drought resistant plants such as saxaul (*Haloxylon ammodendron*).

183. Therefore, noise testing will take place at the same sites used during the 2015 survey. The schedule will be during same periods as the 2015 survey, but conducted 2x/month for a six-month period during year 1 of the operating period. The resulting date will be used to determine the best noise mitigation measure.

Soils and erosion control

184. If the contractor properly implements the measures defined in the EMP for the construction period and CSC's environmental specialist completes a post-construction safeguards audit of to confirm all mitigative measures were implemented and remain operational, soils and erosion issues associated with the road should be negligible. Confirming that topsoil and planting were put in place as the work was being completed (not after the construction is completed) the tree planting was done and trees are healthy and being maintained will be essential. On the engineering site inspection of the culverts will be critical since their placement at too steep an invert slope will result in serious and chronic downstream (exit) scouring. To avoid this the invert slope should be at the same grade as the natural waterbody and a concrete pads or preferably energy dissipation installation such as large rocks and rock gabions, installed.

185. Further, culverts need to be inspected to ensure that all debris and construction materials have been removed and any stream diversion structures have been completely removed. To that end the CSC and IPIG will prepare a culvert inventory that will provide a photo of each culvert and its condition during each inspection, which should be annually and submitted to MOTC of KR. Two photos will be required, one at the upstream and a second at downstream end of each culvert.

186. MOTC will assign this work will be assigned to the contractor during the one-year warranty period, after road becomes fully operational; and after that period, taken over by MOTC's maintenance unit.

B. Ecological Environment

187. The only ecological issue that could arise during the operating period is a failure to properly maintain the large tree plantations, and also the noise attenuation berms (if these are to be built) landscaping. The local ecosystem will be significantly altered by the cutting of the trees and therefore the replanting and tree maintenance program, until the trees are at least 9-10 years old will be critical to reestablishing the pre-cutting conditions of roadside shade during the summer and windbreaks during the winter. The roadside forest, admittedly planted many decades ago, is the only mature tree assemblage within many km of the alignment. It is home to many thousands of creatures, mostly insects and birds and is an open forest-track ecosystem. It has a microclimate and huge benefits for people living under them or benefiting from their shade and shelter. Therefore, as stated many time in this IEE, cutting should be minimized to the greatest extent possible by using innovative designs that build the trees into the road structure.

C. Socio-Economic Environment

188. Air and Noise Pollution- As stated in para. 178 through 183, the existing air quality and noise levels greatly exceed national standards. These conditions will worsen somewhat during the early operating years but should be mitigated by the better, smoother operating road and technological advances introduced as the aging vehicles are replaced by newer cleaner fleet and inspections are more consistently enforced. These existing conditions

have, no doubt, already affected residents living along the road, and should improve if measures defined earlier are implemented.

189. Pedestrian and Livestock safety- At present the road provides no safety features for pedestrians or livestock. Crossing is extremely dangerous, with many accidents recorded (2013-2015 Highway Police records). Conditions for livestock are not much better and in fact more difficult since livestock need to be controlled before crossing the road. The provision of fencing and livestock underpasses, doubling as culverts will be discussed with design engineers and a mitigative measure implemented.

190. MOTC proposes to include crossing facilities for pedestrians such as advanced amber lighted signed crossing structures, repair of existing and construction of new underpasses at locations of schools, hospitals, and overpasses.

191. Resettlement - The rehabilitation of the road will be done using the existing RoW so there will be no need to demolish any residential houses. People are not living within the RoW, but operating their business and their enterprises within the RoW. Therefore there will be significant losses to businesses, markets, assets and livelihoods, which need to be compensation. The consultant is now undertaking the Land Acquisition and Resettlement plan (LARP) covering assessment of loss and compensation procedure. This will be reported in a separate report.

Benefits

192. The project will generate many benefits, and the six most important ones are listed follows:

- Better road and reduced travel time, fewer delays, better access to markets;
- Quieter road, due to smooth pavement and noise suppression actions to be taken
- Safer road, through the provision of good signage, street lighting, separate sidewalks in urban areas, pedestrian and livestock crossing facilities.

VIII. ENVIRONMENTAL PLANNING AND MANAGEMENT

A. Institutional Framework

193. The relevant institutional entities for the project include the KR's Ministry of Finance (MOF), Ministry of Transport and Communication (the EA), Investment Projects Implementation Group (IPIG) under MOTC, the State Agency of Environment Protection and Forestry (SAEPF), the State Inspection on Ecological and Technical Safety under the Government of the Kyrgyz Republic (SIETS), the Department for Disease Prevention and State Sanitation and Epidemic Control of the Ministry of Health Protection of the Kyrgyz Republic.

194. MOTC is responsible for transport sector development and is the EA for the project. MOTC has overall responsibility for planning, design, implementation, and monitoring of the project. IPIG is working under MOTC and will carry out the responsibilities assigned to MOTC.

195. MOF is the responsible government body for coordination with ADB and other donors for foreign assistance.

196. SAEPF is a leading state environmental agency responsible for the environmental policy of the country and coordination of environmental activities of other state bodies. Its functions include:

- Development of environmental policy and its implementation;
- Carrying out a state environmental expertise;
- Issuance of environmental licenses;
- Environmental monitoring;
- Delivery of environment information services.

197. SETI carries out its activity in accordance with the Law "On Procedure for inspection of business entities". SETI exercises control over compliance in established order of:

(i) environmental legislation, set rules, limits and standards of environmental management, standards for emissions and discharges of pollutants and waste disposal in the environment;
(ii) requirements of industrial safety in the construction, expansion, reconstruction, modernization, operation, conservation and liquidation of hazardous production facilities;
(iii) requirements of land legislation;
(iv) requirements for safe operation of equipment and facilities for storage and distribution of petrochemicals and gas, cranes;
(vi) requirements of safe use rules in the construction, assembling and commissioning of electrical networks and electrical equipment.

198. DDPSSEC supervises sanitary and epidemiological welfare of the population, safety of goods and products, environmental compartments and conditions, prevention of harmful impacts of environmental factors on human health. DDPSSEC establishes MPC of chemicals in the environment with regard to the human health safety.

199. There is a sector of non-governmental organizations formed in Kyrgyzstan which actively participate and sometimes lead in environmental management issues in the country.

200. Responsibilities for the implementation of the monitoring requirements of this report are summarized in Table 25 (Environmental Monitoring Plan).

201. The following measures will be taken by the Consultant and by IPIG to perform environmental compliance with the EMP and Monitoring Plan during Project implementation:

(i) The tender and contract documents will clearly set out the contractor's obligations to undertake environmental mitigation measures set out in the Environmental Management Plan.
(ii) The recommended environmental mitigation costs are included as separate items in the Bills of Quantities. This will ensure that there is specific environmental mitigation budget which will be implemented as required. During the procurement, contractors will be encouraged to include these costs in their rates and present the mitigation cost as a line item in the Bill of Quantities. There will be an identified extra payment in the contract to ensure measures are costed and carried out.
(iii) Each contractor will recruit an environmental, health and safety manager, who will be responsible for implementing the contractors' environmental responsibilities. The manager will also be responsible for health and safety aspects of work sites. Before commencing physical construction, Contractor will prepare site-specific EMPs (SEMPs), submit to Construction supervision Consultant (CSC) for endorsement and IPIG for approval.
(iv) CSC will conduct environmental monitoring and assist IPIG in implementing EMP and supervising the implementation of mitigation measures by the contractors.

B. Reporting Requirements

202. MoTC will monitor and measure the progress of implementation of the EMP. In this regard semiannual monitoring reports during construction stage will be prepared by the Construction Supervision Consultant and submitted to MoTC within 1 month after the reporting period and then disclosed at ADB and MoTC websites.

C. Environmental Management Plan

203. The EMP describes the various measures proposed under this Project, which were designed to avoid, mitigate, or compensate the adverse environmental impacts that may result from the Project. As such the EMP considers all phases of the Project cycle, namely the detailed design, construction and operational phases of the Project.

204. To ensure that the proposed mitigation measures will be carried out by the contractors during the construction stage, the design consultant will clearly set out in the tender and contract documents the contractor's obligation to undertake the respective environmental mitigation measures.

205. The EMP consists of two tables. Table 24 summarizes the environmental mitigation measures, and Table 25 provides an overview of the environmental monitoring. At the end is a statement which includes the timeframes and responsibilities for carrying out the environmental monitoring.

Tab. 24: Environmental Mitigation Measures

MITIGATION MEASURES DURING DESIGN, CONSTRUCTION AND OPERATION				
Activity	**Potential Impact**	**Mitigation measures**	**Institutional Responsibility**	
			Implement	Monitor
DETAILED DESIGN PHASE				
Road alignment in areas of tree plantations. There is a considerable number of tree losses involved. Approximately 4 500 trees need to be felled on the Bishkek to Kara Balta section.	Tree losses that cannot be prevented. Main species are *Juglans regia, Acer negundo, Ulmus carpinifolia, Populus alba, Salix alba, Robinia pseudoacacia* .	Any tree losses are compensated by new plantations. Plantations shall be conducted after technical works have been completed. Planting time shall be restricted to spring (March till April) and/or autumn (September till October). Locations for tree plantings are within the existing Right of Way (RoW) at the locations where tree losses occur. Trees to be planted shall have the following parameters: 1,5 – 2 m height, age 5 – 6 years. Distance in between individual trees shall be 6 – 8 m. Species: *Juglans regia, Acer negundo, Ulmus carpinifolia, Populus alba, Salix alba, Robinia pseudoacacia.*	Design Consultant	IPIG of MoTC
Rehabilitation and/or replacement of existing culverts, implementation of new culverts?	Potential damage to local irrigation system if new culverts should not be sufficiently dimensioned or in case that not all existing culverts should be rehabilitated in the course of the road rehabilitation.	In the course of the road rehabilitation all existing culverts will be cleaned, repaired or replaced, depending on their respective conditions. All culverts are sufficiently dimensioned in order to prevent any damages or blockages to the existing local irrigation systems.	Design Consultant	MoTC
Rehabilitation / reconstruction of 7 bridges.	Potential water erosion processes at bridge and river embankments. Reference to Photo	Design of erosion protection measures at lower parts of bridge embankments. Prefabricated concrete protection plates prevent erosion processes at the lower and lateral parts of bridge and river embankments. Detailed design of the respective protection measure is drafted in the technical design documentation for the respective bridges.	Design Consultant	Construction supervision Consultant (CSC), IPIG of MoTC

MITIGATION MEASURES DURING DESIGN, CONSTRUCTION AND OPERATION				
Activity	**Potential Impact**	**Mitigation measures**	**Institutional Responsibility**	
			Implement	Monitor
Road traversing cattle crossings	Accidents because of collision with cattle	Further impacts from the road may include cattle crossing the road. This will be clarified during public hearings. Depending on the situation, mitigation measures will be specified as appropriate. Possible mitigation measures would be the provision of warning signs in accordance with relevant road safety standards. In addition, reflectors may be provided on trees in the critical sections and the road fenced near pastures.	Design Consultant	Construction supervision Consultant (CSC), IPIG of MoTC
CONSTRUCTION PHASE				
Top soil preservation	Loss of top soil.	Removing of top soil occurring within site clearing corridor. Topsoil shall be removed and stored for reuse. Long-term stockpiles of topsoil will immediately be protected to prevent erosion or loss of fertility. For erosion protection it will be sawn with a fast growing vegetation, e. g. grass	Contractor	Construction supervision Consultant (CSC), SETI,IPIG of MoTC
Road alignment in areas of tree plantations. Embankment filling of the tree stem area.	Tree losses due to embankment fill.	A maximum fill up of the tree stem area of 30 cm can be accepted. Fill up material in the tree stem area has to be organic soil. A filling up of more than 30 cm will damage the tree. In this case cutting can't be prevented and a new tree is to be planted as a compensation measure at the respective location within the existing RoW. Species to be planted are walnuts, maple ash tree, elm tree, white poplars, white willow, white acacia. Plantings shall be conducted after technical works have been completed. Planting time shall be restricted to spring (March till April) and/or autumn (September till October). Quality of newly to be planted trees shall be 16 to 18 cm of stem circumference at least in 1,5 m height.	Contractor	Construction supervision Consultant (CSC), SETI, IPIG of MoTC

MITIGATION MEASURES DURING DESIGN, CONSTRUCTION AND OPERATION				
Activity	**Potential Impact**	**Mitigation measures**	**Institutional Responsibility**	
			Implement	Monitor
Bottom of embankment of designed road lying very close to tree rows	Potential damaging of trees during construction activities	Implementation of a temporary vegetation protection fence during construction activities.	Contractor	Construction supervision Consultant (CSC), SETI, IPIG of MOTC
The road crosses or comes close to the Sokuluk (28,3 km), Zhelamysh (17,85) and the Ak-Suu (44,65 km) rivers.	Alteration of surface water hydrology resulting in increased sediment by increased soil erosion at construction site	Implementation of settlement ponds at locations where construction site comes close to natural watercourses to retain sediments and mitigate possible impacts on water hydrology. Oil and solid waste management need to be described in the SSEMP and consider these sensitive receptors (rivers and their floodplains). No campsite are allowed near river floodplains.	Contractor	Construction supervision Consultant (CSC), SETI, IPIG of MOTC
Operation of borrow areas and quarries	Potential disfigurement of landscape, vegetation losses and damage to access roads Increased dust emission Siltation and obstruction of surface waters	All proposed borrow areas are already in operation. Therefore environmental impacts concerning potential disfigurement of landscape, vegetation losses and damage to access roads are kept to a minimum. Wet aggregates and/or provide cover on haul trucks to minimize dust emission and material spillage. Locate stockpiles away from surface waters. Prior to start material extraction the contractor shall submit his SSEMP through the Construction Supervisor (CS) to the Safeguard Department of the IPIG of the MoTC indicating the location of the proposed extraction site as well as rehabilitation measures and implementation schedule for the borrow areas and access roads. Rehabilitation measures may not be necessary for borrow areas still in operation after road works have finished. The SSEMP needs to address the sensitive issues of avoidance of transportation thru residential areas as far as technically	Contractor	Construction supervision Consultant (CSC), IPIG of MOTC

MITIGATION MEASURES DURING DESIGN, CONSTRUCTION AND OPERATION				
Activity	**Potential Impact**	**Mitigation measures**	**Institutional Responsibility**	
			Implement	Monitor
		feasible and closure rehabilitation.		
Operation of aggregate crusher	Increased dust emission and noise emission	Careful site selection of aggregate crusher in order not to interfere with any sensitive receptor. Distance to next settlement and residential houses at least 300 m downwind. Site selection for aggregate crusher has to be approved by the Safeguard Department in the IPIG of the MoTC.	Contractor	Construction supervision Consultant (CSC), IPIG of MOTC
Operation of asphalt plant	Odor emission and safety risks	Asphalt plants shall be 500 m downwind from any settlements and residential houses. Provide spill and fire protection equipment and submit an emergency response plan (in case of spills, accidents, fires and the like) to the authority in responsibility prior to operation of the plant. Secure official approval for installation and operation of asphalt plants from MoTC.	Contractor	Construction supervision Consultant (CSC), IPIG of MOTC
	Water pollution due to spilled bitumen	Bitumen will not be allowed to enter either running or dry streambeds nor shall it be disposed of in ditches or small waste disposal sites prepared by the contractor. Bitumen storage and mixing areas must be protected against spills and all contaminated soil must be properly handled according to legal environmental requirements. Such storage areas must be contained so that any spills can be immediately contained and cleaned up.	Contractor	Construction supervision Consultant (CSC)
Site selection, site preparation and operation of contractor's yard	Potential soil and water pollution	The contractor shall submit documents for approval (short statement and site plan in appropriate scale) which indicate: • Site location, surface area required and layout of the work camp. The layout plan shall also contain details of the proposed measures to address adverse environmental impacts resulting from its installation.	Contractor	Construction supervision Consultant (CSC), IPIG of MOTC

MITIGATION MEASURES DURING DESIGN, CONSTRUCTION AND OPERATION				
Activity	**Potential Impact**	**Mitigation measures**	**Institutional Responsibility**	
			Implement	Monitor
		• Sewage management plan for provision of sanitary latrines and proper sewage collection and disposal system to prevent pollution of watercourses; • Waste management plan covering provision of garbage tons, regular collection and disposal in a hygienic manner, as well as proposed disposal sites for various types of wastes (e.g., domestic waste, used tires, etc.) consistent with appropriate regulations; • Description and layout of equipment maintenance areas and lubricant and fuel storage facilities including distance from water sources and irrigation facilities. Storage facilities for fuels and chemicals will be located away from watercourses. Such facilities will be bounded and provided with impermeable lining to contain spillage and prevent soil and water contamination. Prior to the commencement of works the site installations shall be inspected for approval. The selected site will not be on top of ground water area or near surface waters.		
	Competition for water resources	Prior to establishment of the work camps, conduct consultations with local authorities to identify sources of water that will not compete with the local population.	Contractor	Construction supervision Consultant (CSC)
Site selection, site preparation and operation of contractor's yard (continuation)	Health and safety risks to workers and adjacent communities	For health and safety protection of workers and adjacent communities the following shall be provided: • adequate health care facilities (including first aid facilities) within construction sites; • training of all construction workers in basic sanitation and health care issues, general health and safety matters, and on the	Contractor	Construction supervision Consultant (CSC), IPIG of MOTC

MITIGATION MEASURES DURING DESIGN, CONSTRUCTION AND OPERATION				
Activity	**Potential Impact**	**Mitigation measures**	**Institutional Responsibility**	
			Implement	Monitor
		specific hazards of their work; • personal protection equipment for workers, such as safety boots, helmets, gloves, protective clothing, goggles, and ear protection in accordance with legal legislation; • clean drinking water to all workers; • adequate protection to the general public, including safety barriers and marking of hazardous areas; • safe access across the construction site to people whose settlements and access are temporarily severed by road construction; • adequate drainage throughout the camps so that stagnant water bodies and puddles do not form; • sanitary latrines and garbage bins in construction site, which will be periodically cleared by the contractors to prevent outbreak of diseases. Where feasible the contractor will arrange the temporary integration of waste collection from work sites into existing waste collection systems and disposal facilities of nearby communities;		
Work site operation / Operation of equipment maintenance and fuel storage areas	Worker's health and soil / water pollution	The contractor shall hire a qualified health and safety expert who will provide safety training to the staff according to the requirements of the individual work place. Prior to the commencement of works, the work site personnel shall be instructed about safety rules for the handling and storage of hazardous substances (fuel, oil, lubricants, bitumen, paint etc.) and also the cleaning of the equipment. In preparation of this the contractor shall establish a short list of materials to be used (by quality and quantity) and provide a rough concept explaining the training / briefing that shall be provided for the construction	Contractor	Construction supervision Consultant (CSC);

MITIGATION MEASURES DURING DESIGN, CONSTRUCTION AND OPERATION				
Activity	**Potential Impact**	**Mitigation measures**	**Institutional Responsibility**	
			Implement	Monitor
		personnel. Locate storage facilities for fuels and chemicals away from watercourses. Such facilities will be bounded and provided with impermeable lining to contain spillage and prevent soil and water contamination. Store and dispose waste/used oil consistent with environmental legal requirements. Work site restoration: After completion of construction works the contractor shall execute all works necessary to restore the sites to their original state (removal and proper disposal of all materials, wastes, installations, surface modeling if necessary, spreading and leveling of stored top soil).		
Operation of construction camp	Road construction projects bear a high potential risk to affect local communities and the health and well-being of those that live in or near to the temporary work camps by supporting the spread of STD and HIV/AIDS. In addition, the transport sector itself actually helps the epidemic, as infrastructure and associated transport services give people and infections mobility.	Providing information to workers, encouraging changes in individual's personal behavior and encouraging the use of preventive measures. The goal of the information is to reduce the risk of HIV / STD transmission among construction workers, camp support staff and local communities.	Contractor	Construction supervision Consultant (CSC), IPIG of MOTC, local health units of the Ministry of Health
Earth works and various construction activities	Loss of topsoil	Topsoil on the sections to be used as a stockpile for surplus construction material shall be removed and stockpiled to reuse them to cover these areas upon completion of works. In addition a soil management plan shall be provided detailing measures to be undertaken to minimize effects of wind and water erosion on stockpiles, measures to minimize loss of fertility of top soil, timeframes, haul routes and disposal sites.	Contractor	Construction supervision Consultant (CSC)
Earth works and various construction activities	Siltation of surface waters and/or impact on soils due to improper disposal of excess	Mostly all excavated material will be reused. In addition the reclaimed asphalt pavement will be	Contractor	Construction supervision

MITIGATION MEASURES DURING DESIGN, CONSTRUCTION AND OPERATION				
Activity	**Potential Impact**	**Mitigation measures**	**Institutional Responsibility**	
			Implement	Monitor
(continuation)	materials	recycled for the construction of new pavement. Thus potential impacts due to the need for disposal of excess material will be kept to a minimum.		Consultant (CSC)
	Competition for water resources	Conduct consultation with local authorities to identify sources of water (for spraying and other construction requirements) that will not compete with the local population.	Contractor	Construction supervision Consultant (CSC)
	Air pollution due to exhaust emission from the operation of construction machinery	The contractor will maintain construction equipment to good standard and avoid, as much as possible, idling of engines. Banning of the use of machinery or equipment that cause excessive pollution (e.g., visible smoke).	Contractor	Construction supervision Consultant (CSC)
	Disturbance of adjacent settlements due to elevated noise and vibration levels	Restrict speed limit to 30 km/hr within 500m of any settlements. Restrict work along the road close to any settlement between 7.00 as to 6.00 pm. Restrict work of large and noisy machinery in the vicinity of settlements to daytime and to agree the work schedule between the contractor and local communities Compaction shall be made by certified machinery only which complies with all KR laws concerning noise and vibration at construction sites CH 2.2.4/2.1.8.562-96 “Noise at work sites, living premises, public buildings and within residence construction site”; CH 2.2.4/2.1.8.566-96 “Production vibration. Vibration in premises, residence and public buildings”.	Contractor	Construction supervision Consultant (CSC), Straffic police service of the Ministry of home affairs
	Soil compaction due to operation of heavy equipment	Confine operation of heavy equipment within the corridor that is absolutely necessary for the road construction to avoid soil compaction and agricultural used land close to the road.	Contractor	Construction supervision Consultant (CSC)
Earth works and various construction activities	Traffic impairment	Submit a traffic management plan to local traffic authorities prior to mobilization.	Contractor	Construction supervision

MITIGATION MEASURES DURING DESIGN, CONSTRUCTION AND OPERATION				
Activity	**Potential Impact**	**Mitigation measures**	**Institutional Responsibility**	
			Implement	Monitor
(continuation)		Provide information to the public about the scope and schedule of construction activities and expected disruptions and access restrictions Allow for adequate traffic flow around construction areas. Provide adequate signalization, appropriate lighting, well - designed traffic safety signs, barriers and flag persons for traffic control.		Consultant (CSC)
Within settlements, encroachment into private and residential land	Dislocation or involuntary resettlement of people.	Resettlement Specialist will issue LARP covering assessment of loss and compensation procedure.	IPIG of MoTC, Construction Supervision Consultant (CSC)	IPIG of MoTC
Within settlements, encroachment on business assets and / or Disturbance to business, people, activities and socio-cultural resources due to construction work	Loss of businesses and income of people operating their business within the existing RoW	Resettlement Specialist will issue LARP covering assessment of loss and compensation procedure. In addition the following mitigation measures shall be implemented: Inform all residents and businesses about the nature and duration of work well in advance so that they can make necessary preparations Limit dust by removing waste soil quickly; by covering and watering stockpiles, and covering soil with tarpaulins when carried on trucks Increasing workforce and use appropriate equipment to complete the work in minimum time in the important areas Avoid construction work in sensitive times like festivals near religious places	IPIG of MoTC, Construction Supervision Consultant (CSC)	IPIG of MoTC
Within settlements disproportionate encroachment on poor people's assets.	Loss of wealth and property of poor people. Poor and vulnerable households might be affected.	Resettlement Specialist will issue LARP covering assessment of loss and compensation procedure.	IPIG of MoTC, Construction Supervision Consultant	IPIG of MoTC

MITIGATION MEASURES DURING DESIGN, CONSTRUCTION AND OPERATION				
Activity	**Potential Impact**	**Mitigation measures**	**Institutional Responsibility**	
			Implement	Monitor
			(CSC)	
Construction activities in close vicinity to existing infrastructure such as water supply pipes and other facilities, waste water discharge facilities, electricity lines etc.	Damage to infrastructure, supply cuts of infrastructure services.	Measures will be ensured in engineering designing to avoid any disturbance to the existing infrastructure. Prior to construction start the respective service agencies shall be informed about the construction work. Coordinate with respective agencies and provide prior information to the public in case of any required disruption in services during construction	Contractor	Construction supervision Consultant (CSC); IPIG of MoTC
Rehabilitation works within villages and along sensitive receptors such as schools and hospitals. List of sensitive receptors is provided in para 57	Noise exceeding applicable noise standards. Vibrations may result in damage to local infrastructure, including private property and local (haulage) roads	For sensitive receptors such as schools and hospitals applicable noise standards shall be complied with as far as technically feasible by means of noise measurements and in case of exceedence of standards, ascribe of time restrictions for construction activities between 6 am and 6 pm. For potential damages to local infrastructure, including private property and local (haulage) roads, compensation procedures will have to be established prior to the beginning of construction and approved by the engineer. In addition grievance redress procedures shall be put in place to facilitate communication between the contractor and potentially affected people. In addition haul routes and construction site access roads should be discussed and jointly approved between the contractor and local officials to minimize the risk of conflicts.	Contractor	Construction supervision Consultant (CSC); IPIG of MoTC
Provide work conditions for the CSC environment specialist	Monitoring of compliance by the contractor with the EMP requirements during construction works	In order to implement monitoring of compliance with the EMP requirements, the CSC environment specialist shall be provided with transport when required and a work place in the office at the construction site	Contractor	Construction supervision Consultant (CSC), IPIG of MoTC

MITIGATION MEASURES DURING DESIGN, CONSTRUCTION AND OPERATION				
Activity	**Potential Impact**	**Mitigation measures**	**Institutional Responsibility**	
			Implement	Monitor
OPERATION PHASE				
Increased traffic flow	Elevated levels of gaseous and noise emissions due to increased traffic. In addition increased pedestrian vs. vehicle accidents due to traffic volume and higher speed as a result of improved road design	Integrate in the engineering design safety features such as speed control signs, proper road markings, streetlights, pedestrian crossing, livestock crossing and other visual means.	Design Consultant, Road police service	Construction Supervision Consultant (CSC)
Increased traffic volumes and higher vehicle speeds	Increased risk of accidents with possible spills of harmful substances	Spill-contingency plan A contingency plan or emergency response plan is a set of procedures to be followed to minimize the effects of an abnormal event on the Project roads, such as a spill of oil, fuel or other substances that may harm drinking water resources or have adverse effects on the natural balance of sensitive areas. Additional measures to mitigate risk of accidents and spill of harmful substances are speed control and weight stations.	DEP-9 of MoTC	MoTC
Damaged drainage or uncontrolled erosion.	Harmful environmental impacts resulting from damaged drainage or uncontrolled erosion.	Routine monitoring of drainage and erosion control at least twice a year.	DEP-9 of MoTC	IPIG of MoTC

206. Prior to construction works, the contractor shall provide a comprehensive SSEMP covering the following aspects:

- Dust management which shall include schedule for spraying on hauling and access roads to construction site and details of the equipment to be used. The contractor shall pay a special attention to water spraying in settlements and at repair and construction sites.
- Layout of the work camp and details of the proposed measures to address adverse environmental impacts resulting from its installation
- Sewage management including provision of sanitary latrines and proper sewage collection and disposal system to prevent pollution of watercourses
- Waste management covering provision of garbage bins, regular collection and disposal in a hygienic manner, as well as proposed disposal sites for various types of wastes (e.g., domestic waste, used tires, etc.) consistent with appropriate regulations
- Description and layout of equipment maintenance areas and lubricant and fuel storage facilities including distance from water sources and irrigation facilities. Storage facilities for fuels and chemicals will be located away from watercourses. Such facilities will be bounded and provided with impermeable lining to contain spillage and prevent soil and water contamination
- Soil Management Plan detailing measures to be undertaken to minimize effects of wind and water erosion on stockpiles of topsoil and excess materials, measures to minimize loss of fertility of top soil, timeframes, haul routes and disposal sites for excess materials.
- Emergency response plan (in case of spills, accidents, fires and the like) prior to operation of the asphalt plant
- Method statement or plan for the execution of bridge construction works including measures that will be undertaken to address adverse environmental impacts such as erosion of river embankment and siltation of watercourses that may result from such activities

207. The SSEMP shall be submitted by the contractor for approval to the Construction Supervision Consultant.

D. The Environmental Monitoring Plan

208. Environmental monitoring is an important aspect of environmental management during construction and operation stages of the project to safeguard the protection of environment. During construction, environmental monitoring will ensure the protection of embankment from potential soil erosion, borrow pits restoration, quarry activities, location of work sites, material storages, asphalt plants, community relations, and safety provisions. During operation, air, noise, and surface water quality monitoring will be important parameter of the monitoring program.

Tab. 25: Environmental Monitoring Plan

Issue	What parameter is to be monitored?	Where is the parameter to be monitored	How Is the parameter to be monitored?	When is the parameter to be monitored? Frequency	Institutional responsibility
Construction stage					
Water quality in surface waters (rivers)	pH, dissolved oxygen, oil products, turbidity, total suspended solids, conductivity, temeperature, lead	Upstream and downstream where the Project road crosses the rivers Zhelamysh, Sokuluk, Ak-Suu and other water courses.	Measurement either directly in river water with a suitable measurement device or sample taking and measurement in a certified laboratory	Second round of baseline monitoring measurements to be conducted before construction start. Than on a quaterly basis during construction stage	Construction supervision Consultant (CSC)
Noise/ vibration Rehabilitation works within settlements at locations where the Project road runs close to sensitive receptors such as schools, hospitals, mosques, bazars or other sensitive socioeconomic infrastructure.	Prior to construction and during construction activities within identified sensitive hotspots and sensitive receptots close vicinity of sensitive receptors regular control of noise level by portable measure instrument. In case noise standards are exceeded implementation of time restrictions for construction activities	At sensitive receptors within settlements	By means of portable noise / vibration measurement device	Second round of baseline monitoring measurements to be conducted before construction start. Than a quarterly basis during construction stage.	CSC
Air quality deterioration	Dust, noise, SO2, NOx, CO	Whithin settlements where the Project road comes close to sensitive receptors such as schools, hospitals, mosques, bazars or other sensitive socioeconomic infrastructure. At asphalt plant and at aggregate crusher.	By means of suitable portable measurement device	Second round of baseline monitoring measurements to be conducted before construction start. Than on a quarterly basis during construction stage.	CSC

Issue	What parameter is to be monitored?	Where is the parameter to be monitored	How Is the parameter to be monitored?	When is the parameter to be monitored? Frequency	Institutional responsibility
Potential tree losses because tree stem area is subject to embankment filling.	Trees located within the newly designed embankment.	At respective tree locations.	Inspections; observation. An embankment fill of up to 30 cm at the bottom of the tree stem area can be accepted. A filling up of more than 30 cm will damage the tree and cutting will be necessary. Decision is to be made by the construction supervision engineer.	During construction phase.	Contractor, Construction Supervision Consultant (CSC) control by IPIG of MoTC
Top soil preservation	Stockpiling and means of protection	Job site	Inspections; observation	Upon preparation of the construction site, after stockpiling and after completion of works on shoulders	Contractor, Construction Supervision Consultant (CSC) control by IPIG of MoTC
Equipment servicing and fuelling	Prevention of spilling of oil and fuel	Contractor's yard	Inspections; observations	Unannounced inspections during construction	Contractor, Construction Supervision Consultant (CSC) control by IPIG of MoTC
Worker's safety and health	Official approval for worker's camp; Availability of appropriate personal protective equipment; Organization of traffic on the construction site Provision of safety training to the staff according to the requirements of the individual work place	Job site and worker's camp	Inspection; interviews; comparisons with the Contractor's method statement	Weekly site visits by the hired Health and safety expert. Unannounced inspections during construction and upon complaint.	Contractor, Construction Supervision Consultant (CSC)

Issue	What parameter is to be monitored?	Where is the parameter to be monitored	How Is the parameter to be monitored?	When is the parameter to be monitored? Frequency	Institutional responsibility
Worker's education on AIDS and STD	Has relevant education been provided?	To be determined by assigned Construction Supervision	To be determined by assigned Construction Supervision	After beginning of works and at appropriate intervals throughout construction	Contractor, Construction Supervision Consultant (CSC), local health units of the Ministry of health
Material supply Asphalt plant	Possession of official approval or valid operation license	Asphalt plant	Inspection	Before work begins	Contractor, Construction Supervision (CS)
Borrow areas	Possession of official approval or valid operation license	Sand and gravel borrow pit and / or quarry	Inspection	Before work begins	Contractor, Construction Supervision Consultant (CSC) control by IPIG of MoTC
Material transport Asphalt	Are the truck loads covered or wetted?; Compliance with the Contractor's method statement (restricted working hours; haul routes) dust suppression methods where required	Job site / haul routes	Supervision	Unannounced inspections during work	Contractor, Construction Supervision Consultant (CSC)
Stone		Job site / haul routes	Supervision spot checks	Unannounced inspections during work	Contractor, CSC
Sand and gravel		Job site / haul routes	Supervision	Unannounced inspections during work	Contractor, CSC
Surface water protection	Contractor's compliance with his approved method statement	Bridges and Culverts	Inspection	Unannounced inspections during bridge and culvert works	Contractor, CSC, SAEPF
Air pollution from improper maintenance of equipment Asphalt plant and Machinery	Exhaust fumes, dust	At site	Measurement at asphalt and crushing plants. Regular check certificate of vehicles and equipment.	Unannounced inspections during construction works	Contractor, CSC

Issue	What parameter is to be monitored?	Where is the parameter to be monitored	How Is the parameter to be monitored?	When is the parameter to be monitored? Frequency	Institutional responsibility
Planting of new road side trees	Regular monitoring and control of successful growth of new planted trees	At locations of new planted trees	Replanting of trees that have died	Monitoring to be conducted in autumn so as to allow for replacement of failures	Contractor 1st Year, CSC, control by IPIG of MoTC
Operational stage					
Increased road kills of domestic animals due to higher traffic loads and vehicle speeds	Road kills of animals	Along the new road	Keep records of accidents. In the case that accident hot spots with large mammals are identified, appropriate protective measures shall be elaborated (e.g. reflectors / local fencing, warning signs, speed reductions etc.)	Throughout the Year	Regional Departments of State Road Administration (UAD, PLUAD, and GDAD BO)
Increased traffic volumes may increase possible spills of harmful substances	Accidents that cause spills of harmful substances	Along the new road	Counting of accidents	Throughout the Year	MoTC jointly with Road police service of the KR Ministry of home affairs and KR Ministry of emergency situations
Damaged drainage or uncontrolled erosion	Leakages in drainage system and damages due to erosion	Culverts and drainage facilities	Documentation	Throughout the Year	Local MoTC departments
Tree maintenance along the road	Maintenance of newly planted trees	In locations of newly planted trees		Throughout the Year	Local MoTC departments jointly with local authorities

Innovation for monitoring during construction period

209. This IEE and its EMP provide details on the water and air quality and noise monitoring requirements. These will be considerable and need to be done according to a fixed schedule. There could be problems when choosing a laboratory since some laboratories could have an expired accreditation. The consultant recommends MOTC to consider purchasing an air quality and noise analyzer in order to undertake the sampling more consistently and with greater control. To that end the consultant has provided the website of the supplier for the Environmental Perimeter Air Sampler (model haz-Scanner) referred as the EPAS developed by Environmental Devices Corporation, USA.

Figure 6: EPAS: Multi-probe scanner and data collection array in use on long term ADB-funded rail air quality and noise monitoring program

210. After discussion with the MoTC the issue of procurement of an air quality and noise analyzer it was decided to reject this proposal as after the project completion this equipment would not be used by a number of reasons:

1. Lack of a specialist to work with the equipment;
2. High cost of the EPAS air quality and noise analyzer which would be about 37,000 USD including training;
3. Calibration to be required for the equipment;
4. No certification of the MoTC to implement such type of works.

Tab. 26: Cost Estimate for Mitigation Measures (KGS)

Description	Unit	Quantity	Rate KGS	Amount KGS
Protection of Environment				
Procurement of trees (5-7 year old)	Pieces	4,500	500	2,250,000.00
Planting of trees	Pieces	4,500	100	450,000.00
Maintenance and watering (during construction) as trees on the road side as explained in the EMP	Pieces	4,500	700	3.150,000.00
Tree protection during construction works (contractor's responsibility)	l.s.			500,000.00
Protection of water resources	l.s.			Included in civil engineering works
Management of Solid Waste and Sewage Waste from the Construction Camp	l.s.			Included in civil engineering works
Potential restoration of Work and Storage Sites, Quarries and Borrow Pits, Construction Site Roads	l.s.			Included in civil engineering works
Preparation of the tree felling plan (recruitment of a forester technician)	months	9	30,000.0	270,000.0
Securing of Storage and Equipment Maintenance Areas	l.s.			Included in civil engineering works
Total				**6,170,00.0**

Tab. 27: Cost Estimate for Monitoring Measurements (KGS)

Description	No. stations of one measurement	Measurement Cost (KGS)	No. Measurements a year	Total cost of monitoring measurements per 1 year (KGS)	Total cost of monitoring measurements during construction and the first year of operation (KGS)
Monitoring measurements					
Noise monitoring during construction period (Bishkek – Kara-Balta)	16	5,104.00*	8	40,832.00	163,328.00
Vibration monitoring during construction period (Bishkek – Kara-Balta)	16	5,104.00*	8	40,832.00	163,328.00
Dust and air pollution monitoring during construction period (Bishkek – Kara-Balta)	16	10,144.00**	8	81,152.00	324,608.00
Water quality monitoring (Bishkek – Kara-Balta)	6	9,216.00**	4	36,864.00	147,456.00
Total:		**25,568.00**		**199,680.00**	**798,720.00**

* Rates of the Department for disease prevention and sanitary-epidemiology supervision (DDP SES)

** Rates of the laboratory under the State agency for environment protection and forestry (SAEPF)

The approximate budget of monitoring by local laboratories over the construction period (3 years) and operating Year 1 has been prepared by using the prices of 2015. It is necessary to note that the prices could go up.

IX. STAKEHOLDER CONSULTATION AND INFORMATION DISCLOSURE

A. Stakeholder Consultations

211. The IEE process for the Bishkek – Osh road rehabilitation project includes stakeholder participation and consultation to help MoTC to achieve public acceptance of the project. ADB requires one Consultation for category 'B' projects during project preparation stages.

Consultation Process and Information Disclosure

212. Public Consultation Meetings were held in June 2013 in Voenno Antonovka village, Sokuluk city, Belovodskoye village and Poltavka village. Results of the conducted consultational meetings are attached in the Annex. The following table shows a summary.

213. MOTC will prepare other environment-related documents available in accordance with Kyrgyz and ADB requirements for disclosure. Timing of disclosure is scheduled immediately after abstaining of the SEE (State Ecological Expertise) from the State Agency of Environmental Protection.

214. After Finalization the IEE reports documenting the mitigation measures and consultation process will be submitted to MOTC and ADB and will be disclosed on ADB and IPIG websites.

Tab. 28: Summary table on public consultation for the Bishkek to Kara Balta Section

Time	Venue	Patrticipants	Issues discussed	Answer and suggestions for incorporation
June 10, 2013. 10:20 am to 11:45 am	Belovodskoje town, Conference hall of Moscowskiy Rayon Administration	IPIG/MOTC Asylbek Abdygulov Safeguard Specialist Kocks Consult Vasiliy Chernyh Deputy Team Leader, Nurul Hoque Sociologist Erik Shukurov Ecologist	Duration of road construction.	Duration will be three years.
			What will be the amount of compensation?	The compensation size will be determined additionally during the resettlement commission work, while preparing a detailed design.
			What is the forecasted traffic flow increase?	Estimated increase of road flow capacity is 4% per year over the next 20 years.
			What about construction of a by-pass road?	Construction of a new road is double expensive then rehabilitation of old road pavement. Besides there is a moratorium on seizure and transformation of the agricultural land.
			Will be the subways, drainage structures, auxiliary roads rehabilitated/constructed to relief the main road?	The subways would be rehabilitated: extended, strengthened, furnished. After the rehabilitation they would be maintained by local governments. Also the project includes construction of sidewalks, channels and drainage chutes. No additional auxiliary roads.
			How will the issue on cut plantations be solved?	First the owners of the trees to be cut will be identified. Upon implementation of the project all cut trees will be rehabilitated/compensated as 1:10. The contractor will be responsible for plantation and watering the trees during a year upon completion of construction works with following handing them over to RMD or local authority. Only local and drought-resistant species of trees and bushes would be planted.

Time	Venue	Patrticipants	Issues discussed	Answer and suggestions for incorporation
			What is the width of the designed road? What about the communication lines?	Designed width of the roadway including shoulders is up to 29 meters. Total width within the Right of Way is 50 meters. During the road construction works the culverts which are in bad conditions will be replaced. After replacement, the old ones will be handed over to local authorities. All power lines will be replaced with new ones – new posts would be erected as well as new lines. Only after complete replacement and reconnection of power lines the old ones will be demolished.
			What is the total cost of the project? Then Abdygulov Assylbek explained that there would be the Grievance Redress Mechanism to be implemented within the frameworks of the Project. This mechanism would facilitate and speed up the feedback with the public. He also informed on measures to be taken to reduce the environmental impacts. To enhance awareness among the people it is planned to distribute informative brochures containing information on social, economical and engineering aspects of the Bishkek-Osh road rehabilitation project.	Total cost of the project is appr. $ 209 mln.
June 11, 2013, 14:30 pm to	Petropavlovka village	IPIG/MOTC Asylbek Abdygulov Safeguard Specialist	Who will be the contractor?	The contractor will be determined based on results of the tender. It could be both local and foreign company.

Time	Venue	Patrticipants	Issues discussed	Answer and suggestions for incorporation
16:10 pm		Kocks Consult Vasiliy Chernyh Deputy Team Leader, Nurul Hoque Sociologist Erik Shukurov Ecologist	How will the construction works influence on the environment of Petropavlovka village? What about the current situation with maximum permissible concentration of harmful substances in vehicle emissions, noise and vibration? Is there is an excess?	Without doubt in the course of rehabilitation works the dust level will increase as well as other emissions since along with the usual traffic flow some heavy road construction equipment and heavy trucks will be engaged. At present we have no any data on air quality, noise and vibration. In the nearest future certain measurements will be taken. The results of those measurements will be used as a basic reference environment data and will being compared with the results of the following measurements. The environment condition will be monitored within the settlements through which the road passes.
			What is the width of the designed road? What about the communication lines?	Designed width of the roadway including shoulders is up to 29 meters. Total width within the Right of Way is 50 meters. During the road construction works the culverts which are in bad conditions will be replaced. After replacement, the old ones will be handed over to local authorities. All power lines will be replaced with new ones – new posts would be erected as well as new lines. Only after complete replacement and reconnection of power lines the old ones would be demolished
			What is the total cost of the project?	Total cost of the project is appr. $ 209 mln.
June 10, 2013, 14:15 pm to 15:40 pm	Sokuluk village, conference hall of Sokuluk ayil okmotu	IPIG/MOTC Asylbek Abdygulov Safeguard Specialist Kocks Consult Vasiliy Chernyh Deputy Team Leader, Nurul Hoque Sociologist Erik Shukurov Ecologist	Will the channel lines near the road in Shopokov street be destroyed or otherwise impacted?	All communication and channel lines will be either shifted or equipped by protective coats.
			What will happen to the trade outlets occurred within the project implementation zone?	All kiosks built in a light construction will be temporary shifted from the construction side and returned back upon completion of the project. Capital structures most likely will be removed. Big trade complexes will be provided with access roads. Parking is not foreseen. Construction works will cause only temporary impact by hindering access to these complexes.

Time	Venue	Patrticipants	Issues discussed	Answer and suggestions for incorporation
			What about the traffic lights, street lighting? Will they be provided? How will the road pavement and adjacent territory look?	Traffic lights, street lighting are foreseen by the project. Also the project includes construction of sidewalks, channels and drainage ditches. Besides it is planned to pave with asphalt the junctions 30-50 meters long as well as access roads to the gates of households. The sidewalks will be equipped with ramps. The profile of the road will be raised; there will be reinforced concrete chutes on the shoulders as well as all required engineering measures will be taken to improve the safety of the roadway. Number of bus stops will be increased and re-equipped. All road construction works will be carried out in accordance with all established standards, the construction supervision consultant will monitor the whole construction process. The service life of the road is appr. 18 years.
			How will the old asphalt be utilized? V. Chernyh.	The old asphalt will be used in the following way: 50% for construction needs and 50% for the needs of local people (repair of feeder roads and others).

B. Grievance and Redress Mechanism

Objectives

215. Grievance redressing mechanism will be established to allow APs appealing any disagreeable decision, practice or activity arising from implementation of Rehabilitation of 45.1 km Bishkek~ Kara Balta and 67 km Madaniyak - Jalalabad roads under CAREC Corridor 3 (Bishkek-Osh Road) Improvement Project Phase 4 (45169-002) financed by ADB. APs will be fully informed of their rights and of the procedures for addressing complaints whether verbally or in writing during consultation, survey, time of compensation and implementation of the project. Care will always be taken to prevent grievances rather than going through a long redress process.

216. The GRM will cover issues related to social, environmental and other safeguard issues under ADB safeguard covenants and Kyrgyz law.

b) Grievance Redress Group (GRG)

217. The GRG will be established for the duration of project implementation. The GRG is tasked with all activities needed to discuss a grievance, assess its validity, assess the scope of eventual impacts, decide eventual compensation needed and instruct/facilitate the functioning of the grievance redress mechanism.

b.1 Functioning of the GRG within the Grievance Redress Mechanism

218. The grievance redress mechanism (GRM) involves the following 2 stages appeals:

Stage 1, Local (Village) Level

219. The grievances will be first lodged at the level of the complainant's village community. The complainant will report his case to the Local Point of Contact (LPC) The LPC will trigger the action of the Grievance Redress Group (GRG) which will assess the situation and seek a solution through consultation with complainants, local Roads Maintenance Unit (RMU) the oblast Ombudsman, and the selected AP representative.

Stage 2, Central Level

220. In case within additional 15 days the grievance is still not resolved at local level the complainant will further raise the issue to MOTC's headquarters in Bishkek again with the support of the LPC, AP representatives, and the oblast Ombudsman. The GRG will decide on the eligibility and on the complaint case and prepare the resolution, subject to IPIG/MOTC consent.

221. GRM proceedings will entail one or more meetings for each complain and may require field investigations by specific technical or valuation experts. Grievance cases shared by more than one complainant may be held together as a single case.

222. For deliberations at the local level, the meetings will be held in the village of the complainant. For appeals at central level the meetings will be carried out at in MOTC office in Bishkek with field trips of GRG members to the village of the complainant.

b.2 Composition of GRG

223. GRG will be established by the order of MOTC. The GRG is composed at different levels of appeal by the following individuals/officers:

Local level GRGs

224. Local level GRGs will be established at each Ayil-Okmotu along the project roads with the provision of members of following composition.

Tab. 29: Composition of local GRGs

Members	Position
Head of Ayil-Okmotu	LPC
Representative of the RMU	Member
2 Representatives of APs	Members
Ombudsman of the Oblast	Member

Central level GRG

225. The central level GRG will be represented by 6 members of the following composition.

Tab. 30: Composition of Central GRG

Members	Position
Head of IPIG of MoTC	Chairperson
IPIG Project Coordinator	Member
Representative of IPIG safeguards unit (environment)	Member
Representative of IPIG safeguards unit (resettlement)	Member
Representative of the RMU	Member
Ombudsman of the Oblast	Member

226. At each level of appeal, the GRG will be assisted as needed by the professional capacity needed to solve each specific case. This will include among others:

- Representatives of State Rayon Administration
- Representatives of the Rayon Branch of the State Agency for Architecture and Construction
- State Registration Services of the Rayon
- Ministry of Agricultural
- State Agency for Environment and Forestry
- Ministry of State Property
- Technical expertise from professional engineers

b.3 Duties of GRG Members

Local Point of Contact (LPC) / Head of Ayil-Okmotu

227. Once the LPC Receives written notification of a complaint s/he will:

- draft a complaint memo to be signed by the complainant and the LPC indicating name of complainant, date and place of presentation of complaint, description of complaint and supporting documents, if any;
- send the complaint memo to all members of the local level GRG, summon them for a GRG meeting and establish the date of the first and (if needed following) grievance redress meetings;
- request village authorities to organize the meeting(s)
- chair the GRG meetings;
- convey requests and enquiries of the complainants to IPIG/MOTC and to the other members of the GRG at village level;
- maintain records of each meeting and each communication between him/her and the complainants;
- participate as a witness to appeal cases at all levels;
- ensure the administrative and organizational support for GRG members to work;
- disseminate the information on the GRM across the local communities concerned.

RMU Representative

228. Once notified of a complaint and summoned by the LPC to a grievance meeting the RMU representative will:

- contact the complainant(s) and draft a note with his/her understanding of the complaint;
- recording of complaints and submitted documents of proof;
- participate to all grievance meetings, provide opinions and analysis, take minutes of the discussions
- accompany eventual assessment/valuation specialists in the field
- based on the position reports of GRG members and on his/her understanding of the case prepare the final grievance report and recommendations to be sent to complainant, other GRG members and IPIG. The report may indicate that: i) the case is solved without further action; ii) that the case is solvable but requires compensation or other action or iii) that the case remains unsolved.
- if the complaint is considered valid and the needed compensation/action is approved by IPIG, proceed for the delivery or compensation or for the execution of the redress action.
- when prompted by the LPC that a complainant with an unsolved grievance wants to lodge the complaint at a higher appeal level inform IPIG/MoTC and proceed with the organization of the central level appeal meeting.

Representatives of the APs

229. Two representatives of the APs from the affected community will participate in all GRG meetings and will:

- participate to all grievance redress meeting;
- provide relevant information related to the submitted complaints;
- provide other GRG members as relevant with a position note to be reflected in the final meeting report.

Ombudsman

230. Once notified of a complaint and a summoned by the LPC to a grievance meeting is submitted the Ombudsman will:

- monitor complaint handling process and ensure that decisions made by the GRP are equitable and objective;
- provide independent opinions and recommendations related to the decision made on the case by the GRP team;
- advise the complainant(s) on their rights and entitlements, as necessary;
- participate to all GRG meetings and site visits;
- participate in eventual assessment/valuation in the field;
- prepare a position memo at the end of the meeting(s) and forward it to LPC/chairperson of the GRG.

GRG Chairperson / Head of IPIG of MoTC

231. Once notified that a complainant has lodged an appeal case at central level, the GRG chairperson will:

- contact the complainant(s) and draft a note with his/her understanding of the complaint;
- trigger the GRG members through a letter of invitation;
- chair the GRG meetings and ensure that minutes of the meeting are shared with all relevant parties;
- review the content of each response prepared after deliberations to ensure accuracy as well as consistency of answers provided to the complainants;

- ensure the administrative and organizational support for GRG members to work;
- support the decision made by the GRG and ensure that the follow-up actions are taken.

IPIG Project Coordinator

232. Once notified that a complainant has lodged an appeal case at central level project coordinator will:

- contact the complainant(s) and draft a note with his/her understanding of the complaint;
- participate to the appeal meeting, provide opinions and analysis, take minutes of the discussions;
- if needed summon again assessment/valuation specialists and accompany them in the field;
- request the chairperson to organize meetings, as necessary;
- maintain communication between GRG and the complainants.

Representatives of IPIG Safeguards Unit

233. Once notified that a complainant has lodged at central level, the representatives of IPIG safeguard and technical unit will:

- prepare the chronology of events to understand sequence of developments prompting the complaint;
- provide environmental and resettlement opinion on impacts claimed by the claimant
- request the chairperson to organize meetings, as necessary;
- maintain communication between GRG and the complainants.

Technical Experts

234. Once summoned to provide expert advice for the assessment or valuation of an impact claimed by a complainant the relevant technical expert will carry out the needed investigations and prepare a report to be handed to the complainant and the other members of the GRG. The tasks will include:

- provision of relevant technical opinion for the case reviewed;
- carry out the needed investigations relevant to their expertise;
- provide recommendation when the legal opinion from the relevant state agencies is necessary.

C. Grievance Resolution Process

235. The LPC of GRGs will be regularly available and accessible for APs to address concerns and grievances. He will assist the aggrieved APs in formally lodging their claims to the GRG. The complaints and grievances from the APs will be addressed through the process described below.

Tab. 31: Grievance Resolution Process

Steps	Action level	Process
Step 1	Negotiation	At initial stage, the LPC will give hearing to the aggrieved person and try to give acceptable solutions. If any aggrieved AP is not satisfied with the solutions, then the aggrieved AP will lodge grievances in written to the concerned local GRG within 7 days.
Step 2	GRG Resolution	After receiving written complaints of AP the LPC will review and prepare a Case File for GRG hearing and resolution. A formal hearing will be held with the GRG at a date fixed by the LPC in consultation and the aggrieved APs. On the date of hearing, the aggrieved AP will appear before the GRG at the office of concerned Ayil-Okmotu and produce proof in support of his/her claim. The LPC will note down the statements of the complainant and document all proof. The decisions from majority of the members will be considered final from the GRG and will be issued by the LPC and signed by

		other members of the GRG. The case record will be updated and the decision will be communicated to the complainant AP by the LPC within 15 days of submission. If any aggrieved AP is not satisfied with the solutions, then the LPC will lodge grievances in written to the central GRG at MoTC with conclusion and supporting documents prepared at local level.
Step 3	Resolution of Central GRG	After receiving written complaints of AP the GRG Chairperson of the central GRG will review and prepare a Case File for GRG hearing and resolution. A formal hearing will be held with the GRG at a date fixed by the GRG Chairperson and the aggrieved APs. GRG members will contact the complainant and visit his village. The IPIG Project Coordinator will note down the statements of the complainant and document all proof. The decisions from majority of the members will be considered final from the GRG and will be issued by the GRG Chairperson and signed by other members of the GRG. The case record will be updated and the decision will be communicated to the complainant AP by the IPIG Project Coordinator within 15 days of submission.

236. If the grievance redress system fails to satisfy the aggrieved APs, then they can apply to the appropriate court at their own cost for desired remedy at any time and stage. The APs have access to ADB Accountability mechanism at any stage after their concerns have been registered with the GRM log.

237. The grievance redress process is shown in the flowchart below.

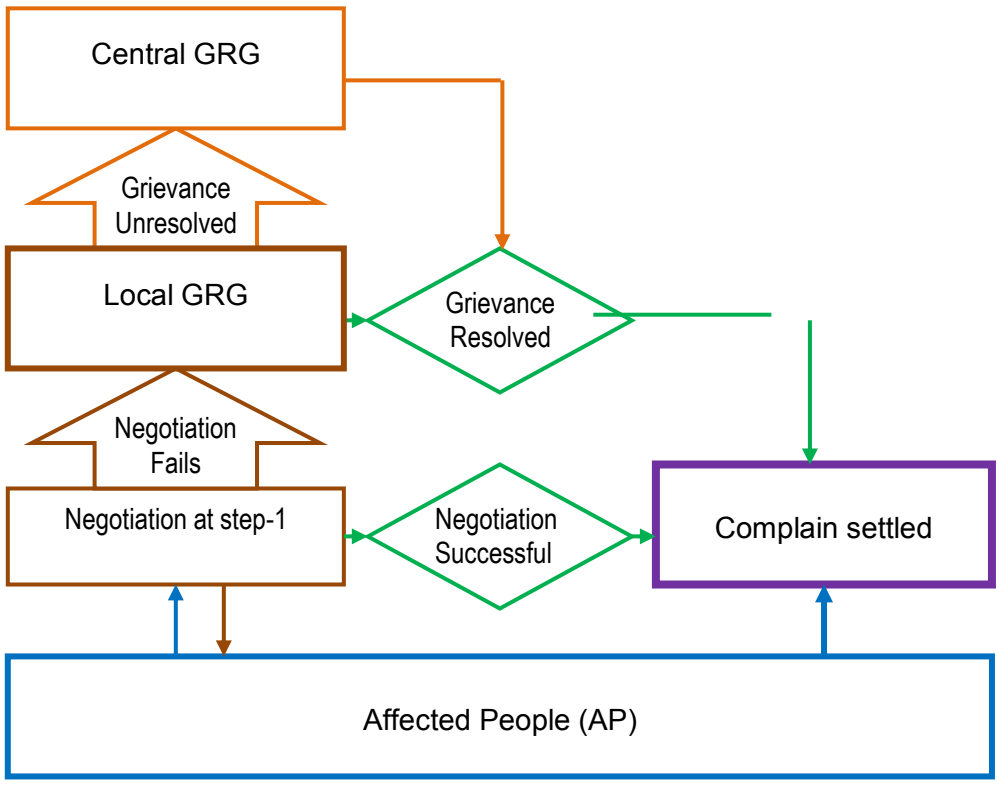

Figure 7: Grievance redress process

D. GRG Records and Documentation

238. IPIG of MoTC will maintain record of all complaints for regular monitoring of grievances and results of services performed by the GRGs, and for periodic review of ADB.

X. CONCLUSIONS AND RECOMMENDATIONS

A. Conclusions

239. The Bishkek–Kara Balta road project will rehabilitate an important part of the transport corridor across the Kyrgyz Republic, in fact the most heavily travelled section of highway on the country. It will improve the country's competitiveness by improving the central transport corridor. The better road design and condition of the pavement will decrease operating costs for all vehicle owners, helping to make vehicles last longer. Road safety measures will also be improved by providing new traffic signs, safety railings, pedestrian and livestock crossings for the road.

240. Overall the project has significant advantages to the local people and companies operating in the country by providing better access to national and regional markets.

241. At the same time, this project has many work components that can potentially lead to long term, even chronic environmental impacts. These are associated with erosion, tree removal, damage to intersections and roadside access, unaddressed chronic and rising air pollution and noise conditions which are already excessive, inadequate management of large volumes of old asphalt pavement to be removed and inadequate repair and replacement of the more than 200 culverts and 7 bridges along the route. The IEE and its EMP have provided the steps necessary to avoid many of the construction period impacts, by developing good protocols and work programs for managing potential impacts, and will be implemented.

242. The following tasks, all discussed in detail in the IEE and the EMP material are considered the most important impacts which, if the EMP is followed, could be adequately mitigated.

243. During the preconstruction period the eight key tasks to be implemented by MOTC, IPIG and CSC will be:

1. Insertion of EMP mitigation and monitoring measures into contract specifications;
2. Preparation of a list of sections where topsoil conservation works will be required when rehabilitating the road;
3. Handling and reprocessing of >1 million m3 of old asphalt, but PRECEEDED BY CORE SAMPLES AND TESTING FOR ASBESTOS FIBERS IN THE PAVEMENT.
4. Earthworks Haul Route framework, defining at least were vehicles cannot go;
5. Construction period access management and restoration steps, as a basis for use by the contractor, working with the traffic police;
6. Tree Inventory, identification of special groves, protection where possible , and cutting a replanting plan;
7. Inclusion in road design of public safety and public services features, namely:
    - Pedestrian crossings and traffic lights
    - Lighting signage and sidewalks
    - Bus stops
    - Livestock passes.
8. Provision of technical capacity building.

During the construction period CSC and the contractor(s) will need to:

1. Undertake Air Quality and noise measurement field-testing for the full three years and one operating year.

2. Contractor to manage all petroleum products and prevent spills, proper disposal.
3. Contractor to manage sewage and garbage at work sites at all time
4. Provision of basic occupational health and safety items at work sites, including first aid, water, shade and proper gear including hats, shoes and face masks.
5. Maximize the reuse or redistribution of the old asphalt.
6. Undertake the tree planting and maintenance task as each construction area is vacated; i.e. do not wait until the end of the construction period.
7. Implement dust suppression program on all haul roads and at construction sites
8. Understand and implement all regulations standards and obtain licenses for all borrow site operations and rehabilitation.
9. Enforce occupational health and safety as prescribed by law;
10. Inspect all culverts to be sure the re-installation does not lead to chronic downstream scour, and that any diversion and debris have been cleared.

During year 1 of the operating period the CSC and Contractor with input from the RMU will:

11. Make certain that all replanted trees are healthy and properly maintained and protected for the winter—this may require strengthen the RMU as there will be up to 10,000 trees to manage.
12. Prepare a photo record of all culverts, confirming proper placement and debris removal
13. Continue the air quality and noise monitoring for the year
14. Examine noise data collected and plan noise attenuation measures such as berms and barriers at sensitive sites.
15. Inspect decommissioned borrow areas to confirm rehabilitation and proper closure.
16. Monitor value of pedestrian and livestock crossing features, with a view to adjustments/improvement as needed.
17. At the end of each period the EMP specifies the completion of progress reports, which will be used to monitor compliance and shape the next stage.

Recommendations

1. The EMP will be followed carefully and required reporting completed in a timely fashion. MOTC recommends that, based on the noise testing during construction and the first operating year, noise suppression measures be implemented.

2. The tree management and maintenance function should be passed to local communities or RMD, until trees have reached 8+ years and do not need careful maintenance.

3. CSC and IPIG will deliver the training to all active project participants and concentrate giving sound advice to the contractor, especially on the preparation and implementation of the CEWP.

4. Shortly after the operating period starts, the CSC and contractor will conduct a safeguards compliance check to be sure that all measures required of the contractor have been met.

5. The issue of purchase of gas and noise analyzer will be worked out by MOTC.

6. This IEE is “living” and if required, it will be updated taking into account all environmental requirements, and any significant changes will be discussed and agreed to with ADB.

Annex 1: Public Consultational Meetings

Minutes of the Public Consultation Meeting
under the CAREC Corridor 3 (Bishkek-Osh Road) Improvement Project, Phase 4
Road Sections: Bishkek-Kara-Balta and Madaniyat-Djalal-Abad

Date: June 11, 2013

Place of meeting: Belovodskoye town, Moscowskiy rayon, Chuiskaya oblast, Conference-hall of Moscowskiy Rayon Administration

Meeting started: 10.20

Meeting ended: 11.45

Presented:

IPIG/MOTC

Asylbek Abdygulov	Safeguard Specialist

CONSULTANT «KOCKS CONSULT GMBH»

Vasiliy Chernyh	Deputy Team Leader
Nurul Hoque	Sociologist
Erik Shukurov	Ecologist

LOCAL COMMUNITY (List is attached).

Agenda: Presentation on Bishkek-Osh Road Rehabilitation Project, Section Bishkek-Kara-Balta

V. Chernyh made a presentation on Bishkek-Osh Road Rehabilitation Project, road section Bishkek-Kara-Balta to the local community (residents of Belovodskoye town). The presentation covered the following issues: 1) who is going to finance the project implementation, 2) who will implement the project, 3) ADB policy, 4) economical and social benefits of the project 5) environmental impacts' mitigation measures. Also, people were explained about the Grievance Redress Mechanism to be applied towards APs and others having any relation to the project implementation.

Upon completion of the presentation made by V. Chernyh, local residents asked a few questions. The focus was on how road safety measures would be implemented.

Question: How long the road construction will last?

V. Chernyh. Total project implementation period is approximately three years. Besides the construction works will start simultaneously in several sections.

Question: What will be the amount of compensation?
Asylbek: The compensation size will be determined additionally during the resettlement commission work, while preparing a detailed design.

Question: What is the forecasted traffic flow increase?

V. Chernyh. Estimated increase of road flow capacity is 4% per year over the next 20 years.

Question: What about construction of a by-pass road?
V. Chernyh. This option was discussed. Construction of a new road is double expensive then rehabilitation of old road pavement. Besides there is a moratorium on seizure and transformation of the agricultural land.

Question: Will be the subways, drainage structures, auxiliary roads rehabilitated/constructed to relief the main road?
V. Chernyh explained that the subways would be rehabilitated: extended, strengthened, furnished. After the rehabilitation they would be maintained by local governments. Also the project includes construction of sidewalks, channels and drainage chutes. No additional auxiliary roads.

Question: How will the issue on cut plantations be solved?
Asylbek: First the owners of the trees to be cut will be identified. Upon implementation of the project all cut trees will be rehabilitated/compensated as 1:10. The contractor will be responsible for plantation and watering the trees during a year upon completion of construction works with following handing them over to RMD or local authority. Only local and drought-resistant species of trees and bushes would be planted.

Question: What is the width of the designed road? What about the communication lines?
V. Chernyh. Designed width of the roadway including shoulders is up to 29 meters. Total width within the Right of Way is 50 meters. During the road construction works the culverts which are in bad conditions will be replaced. After replacement, the old ones will be handed over to local authorities. All power lines will be replaced with new ones – new posts would be erected as well as new lines. Only after complete replacement and reconnection of power lines the old ones will be demolished.

Question: What is the total cost of the project?

V. Chernyh. Total cost of the project is appr. $ 209 mln.

Then Abdygulov Assylbek explained that there would be the Grievance Redress Mechanism to be implemented within the frameworks of the Project. This mechanism would facilitate and speed up the feedback with the public. He also informed on measures to be taken to reduce the environmental impacts. To enhance awareness among the people it is planned to distribute informative brochures containing information on social, economical and engineering aspects of the Bishkek-Osh road rehabilitation project.

At the end of the meeting V. Chernyh thanked the participants for taking part in the public consultation meeting and expressed hope for successful cooperation in the course of the project implementation.

Minutes of the Public Consultation Meeting
under the CAREC Corridor 3 (Bishkek-Osh Road) Improvement Project, Phase 4
Road Sections: Bishkek-Kara-Balta and Madaniyat-Djalal-Abad

Date: June 11, 2013

Place of meeting: Petropavlovka village, Dzhayilskiy region, Chuiskaya oblast, Conference-hall of Petropavlovskiy local administration.

Meeting started: 14.30

Meeting ended: 16.10

Presented:

IPIG/MOTC

Asylbek Abdygulov	Safeguard Specialist

CONSULTANT «KOCKS CONSULT GMBH»

Vasiliy Chernyh	Deputy Team Leader
Nurul Hoque	Sociologist
Erik Shukurov	Ecologist

LOCAL COMMUNITY (List is attached).

Agenda: Presentation on Bishkek-Osh Road Rehabilitation Project, Section Bishkek-Kara-Balta

V. Chernyh made a presentation on Bishkek-Osh Road Rehabilitation Project, road section Bishkek-Kara-Balta to the local community (residents of Petropavlovka village). The presentation covered the following issues: 1) who is going to finance the project implementation, 2) who will implement the project, 3) ADB policy, 4) economical and social benefits of the project 5) environmental impacts' mitigation measures. Also, people were explained about the Grievance Redress Mechanism to be applied towards APs and others having any relation to the project implementation.

Upon completion of the presentation made by V. Chernyh, local residents asked a few questions. The focus was on how road safety measures would be implemented?

Question: How long the road construction will last?

V. Chernyh. Total project implementation period is approximately three years. Besides the construction works will start simultaneously in several sections.

Question: Who will be the contractor?
V. Chernyh: The contractor will be determined based on results of the tender. It could be both local and foreign company.

Question: : What will be the amount of compensation?
Asylbek: The compensation size will be determined additionally during the resettlement

commission work, while preparing a detailed design.

Question: What about construction of a by-pass road?
V. Chernyh. This option was discussed. Construction of a new road is double expensive then rehabilitation of old road pavement. Besides there is a moratorium on seizure and transformation of the agricultural land.

Question: Will be the subways, drainage structures, auxiliary roads rehabilitated/constructed to relief the main road?
V. Chernyh explained that the subways would be rehabilitated: extended, strengthened, furnished. After the rehabilitation they would be maintained by local governments. Also the project includes construction of sidewalks, channels and drainage chutes.

Question: How will the issue on cut plantations be solved?
Asylbek: First the owners of the trees to be cut will be identified. Upon implementation of the project all cut trees will be rehabilitated/compensated as 1:10. The contractor will be responsible for plantation and watering the trees during a year upon completion of construction works with following handing them over to RMD or local authority. Only local and drought-resistant species of trees and bushes would be planted.

Question: How will the construction works influence on the environment of Petropavlovka village? What about the current situation with maximum permissible concentration of harmful substances in vehicle emissions, noise and vibration? Is there is an excess?
Asylbek: Without doubt in the course of rehabilitation works the dust level will increase as well as other emissions since along with the usual traffic flow some heavy road construction equipment and heavy trucks will be engaged.
E. Shukurov. At present we have no any data on air quality, noise and vibration. In the nearest future certain measurements will be taken. The results of those measurements will be used as a basic reference environment data and will being compared with the results of the following measurements. The environment condition will be monitored within the settlements through which the road passes.

Question: What is the width of the designed road? What about the communication lines?
V. Chernyh. Designed width of the roadway including shoulders is up to 29 meters. Total width within the Right of Way is 50 meters. During the road construction works the culverts which are in bad conditions will be replaced. After replacement, the old ones will be handed over to local authorities. All power lines will be replaced with new ones – new posts would be erected as well as new lines. Only after complete replacement and reconnection of power lines the old ones would be demolished.

Question: What is the total cost of the project?
V. Chernyh. Total cost of the project is appr. $ 209 mln.

Then Abdygulov Assylbek explained that there would be the Grievance Redress Mechanism to be implemented within the frameworks of the Project. This mechanism would facilitate and speed up

the feedback with the public. He also informed on measures to be taken to reduce the environmental impacts. To enhance awareness among the people it is planned to distribute informative brochures containing information on social, economical and engineering aspects of the Bishkek-Osh road rehabilitation project.

At the end of the meeting V. Chernyh thanked the participants for taking part in the public consultation meeting and expressed hope for successful cooperation in the course of the project implementation.

Minutes of the Public Consultation Meeting
under the CAREC Corridor 3 (Bishkek-Osh Road) Improvement Project, Phase 4
Road Sections: Bishkek-Kara-Balta and Madaniyat-Djalal-Abad

Date: June 10, 2013

Place of meeting: Sokuluk village, Sokulukskiy rayon, Chuiskaya oblast, conference-hall of Sokuluk ayil okmotu

Meeting started: 14.15

Meeting ended: 15.40

Presented:

IPIG/MOTC

Asylbek Abdygulov	Safeguard Specialist

CONSULTANT «KOCKS CONSULT GMBH»

Vasiliy Chernyh	Deputy Team Leader
Nurul Hoque	Sociologist
Erik Shukurov	Ecologist

LOCAL COMMUNITY (List is attached).

Agenda: Presentation on Bishkek-Osh Road Rehabilitation Project, Section Bishkek-Kara-Balta

V. Chernyh made a presentation on Bishkek-Osh Road Rehabilitation Project, road section Bishkek-Kara-Balta to the local community (residents of Sokuluk). The presentation covered the following issues: 1) who is going to finance the project implementation, 2) who will implement the project, 3) ADB policy, 4) economical and social benefits of the project 5) environmental impacts' mitigation measures. Also, people were explained about the Grievance Redress Mechanism to be applied towards APs and others having any relation to the project implementation.

Upon completion of the presentation made by V. Chernyh, local residents asked a few questions. The focus was on how road safety measures would be implemented?

Question: Will the channel lines near the road in Shopokov street be destroyed or otherwise impacted?
V. Chernyh explained that all communication and channel lines will be either shifted or equipped by protective coats.

Question: Will be the subways rehabilitated?
V. Chernyh explained that the subways would be rehabilitated: extended, strengthened, furnished. After the rehabilitation they would be maintained by local governments.

Question: What will happen to the trade outlets occurred within the project implementation zone?
V. Chernyh explained that all kiosks built in a light construction will be temporary shifted from the construction side and returned back upon completion of the project. Capital structures most likely will be removed. Big trade complexes will be provided with access roads. Parking is not foreseen. Construction works will cause only temporary impact by hindering access to these complexes.

Question: How will the issue on cut plantations be solved?
Asylbek: First the owners of the trees to be cut will be identified. Upon implementation of the project all cut trees will be rehabilitated as 10:1. The contractor will be responsible for plantation and watering the trees during a year upon completion of construction works with following handing them over to RMD or local authority. Only local and drought-resistant species of trees and bushes would be planted.

Question: What is the width of the designed road? What about the communication lines?
V. Chernyh. Designed width of the roadway including shoulders is up to 29 meters. Total width within the Right of Way is 50 meters. During the road construction works the culverts which are in bad conditions will be replaced. After replacement, the old ones will be handed over to local authorities. All power lines will be replaced with new ones – new posts would be erected as well as new lines. Only after complete replacement and reconnection of power lines the old ones would be demolished.

Question: What about the traffic lights, street lighting? Will they be provided? How will the road pavement and adjacent territory look?
V. Chernyh. Traffic lights, street lighting are foreseen by the project. Also the project includes construction of sidewalks, channels and drainage ditches. Besides it is planned to pave with asphalt the junctions 30-50 meters long as well as access roads to the gates of households. The sidewalks will be equipped with ramps. The profile of the road will be raised; there will be reinforced concrete chutes on the shoulders as well as all required engineering measures will be taken to improve the safety of the roadway. Number of bus stops will be increased and re-equipped. All road construction works will be carried out in accordance with all established standards, the construction supervision consultant will monitor the whole construction process. The service life of the road is appr. 18 years.

Question: How will the old asphalt be utilized?

V. Chernyh. The old asphalt will be used in the following way: 50% for construction needs and 50% for the needs of local people (repair of feeder roads and others).

Then Abdygulov Assylbek explained that there would be the Grievance Redress Mechanism to be implemented within the frameworks of the Project. This mechanism would facilitate and speed up the feedback with the public. He also informed on measures to be taken to reduce the environmental impacts. To enhance awareness among the people it is planned to distribute informative brochures containing information on social, economical and engineering aspects of the Bishkek-Osh road rehabilitation project.

At the end of the meeting V. Chernyh thanked the participants for taking part in the public consultation meeting and expressed hope for successful cooperation in the course of the project implementation.

Minutes of the Public Consultation Meeting
under the CAREC Corridor 3 (Bishkek-Osh Road) Improvement Project, Phase 4
Road Sections: Bishkek-Kara-Balta and Madaniyat-Djalal-Abad

Date: June 10, 2013

Place of meeting: Voenno-Antonovka village, Sokulukskiy rayon, Chuiskaya oblast, Conference-hall of Voenno-Antonovka ayil okmotu

Meeting started: 9.00

Meeting ended: 10.20

Presented:

IPIG/MOTC

Asylbek Abdygulov	Safeguard Specialist

CONSULTANT «KOCKS CONSULT GMBH»

Vasiliy Chernyh	Deputy Team Leader
Nurul Hoque	Sociologist
Erik Shukurov	Ecologist

LOCAL COMMUNITY (List is attached).

Agenda: Presentation on Bishkek-Osh Road Rehabilitation Project, Section Bishkek-Kara-Balta

V. Chernyh made a presentation on Bishkek-Osh Road Rehabilitation Project, road section Bishkek-Kara-Balta to the local community (residents of Voenno-Antonovka village). The presentation covered the following issues: 1) who is going to finance the project implementation, 2) who will implement the project, 3) ADB policy, 4) economical and social benefits of the project 5) environmental impacts' mitigation measures. Also, people were explained about the Grievance Redress Mechanism to be applied towards APs and others having any relation to the project implementation.

Upon completion of the presentation made by V. Chernyh, local residents asked a few questions. The focus was on how road safety measures would be implemented?

Question: Will be a bend provided to a knitting factory "VOSST"?
V. Chernyh explained on furnishing of all junctions with gaps in a median strip with road marking, installation of traffic lights.

Question: What will happen to the trade outlets occurred within the project implementation zone?
V. Chernyh explained that all kiosks built in a light construction will be temporary shifted from the construction side and returned back upon completion of the project. Capital structures most likely will be removed.

Question: How will the issue on cut plantations be solved?

Asylbek: First the owners of the trees to be cut will be identified. Upon implementation of the project all cut trees will be rehabilitated as 10:1. The contractor will be responsible for plantation and watering the trees during a year upon completion of construction works with following handing them over to RMD or local authority.

Question: What is the width of the designed road? What about the communication lines?
V. Chernyh. Designed width of the roadway including shoulders is up to 29 meters. Total width within the Right of Way is 50 meters. During the road construction works the culverts which are in bad conditions will be replaced. After replacement, the old ones will be handed over to local authorities.

Question: What about the traffic lights, street lighting? Will they be provided? What will be the structure of the road pavement?
V. Chernyh. Traffic lights, street lighting are foreseen by the project. Also the project includes construction of sidewalks, channels and drainage ditches. Besides it is planned to pave with asphalt the junctions 30-50 meters long as well as access roads to the gates of households. The sidewalks will be equipped with ramps. The profile of the road will be raised; there will be reinforced concrete chutes on the shoulders as well as all required engineering measures will be taken to improve the safety of the roadway. All road construction works will be carried out in accordance with all established standards, the construction supervision consultant will monitor the whole construction process. The service life of the road is 18 years.

Then Abdygulov Assylbek explained that there would be the Grievance Redress Mechanism to be implemented within the frameworks of the Project. This mechanism would facilitate and speed up the feedback with the public. He also informed on measures to be taken to reduce the environmental impacts.

At the end of the meeting V. Chernyh thanked the participants for taking part in the public consultation meeting and expressed hope for successful cooperation in the course of the project implementation.