

**The Kyrgyz Republic**  
**Ministry of Transport and Roads**



**ENVIRONMENTAL AND SOCIAL IMPACT  
ASSESSMENT**



**Central Asia Regional Links Program – Phase III (CARs-3 Project)**

**May 16, 2018**

**This Draft ESIA is a document of the Recipient.**

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## Abbreviations

<b>BOC</b>	Biochemical Oxygen Consumption
<b>BP</b>	Border post
<b>BSINAS KR</b>	Biology and Soil Institute of the National Academy of Sciences of the Kyrgyz Republic
<b>CAA</b>	Civil Aviation Agency
<b>CARs</b>	Central Asia Regional Links Programs
<b>CARs-3</b>	Central Asia Regional Links Program, Third Phase
<b>COC</b>	Chemical Oxygen Consumption
<b>CR</b>	Critically Endangered
<b>DD</b>	Detailed Design
<b>E</b>	Environment
<b>EHS</b>	Environmental, Health and Safety
<b>EIA</b>	Environmental Impact Assessment
<b>EIS</b>	Environmental Impact Statement
<b>EN</b>	Endangered
<b>EPA</b>	United States Environmental Protection Agency
<b>ESIA</b>	Environmental and Social Impact Assessment
<b>ESMP</b>	Environmental and Social Management Plan
<b>GOK</b>	Government of the Kyrgyz Republic
<b>GRG</b>	Grievance Redress Group
<b>GRM</b>	Grievance Redress Mechanism
<b>GRS</b>	Grievance Redress Service
<b>ICAO</b>	International Civil Aviation Organization
<b>IEE</b>	Initial Environmental Examination
<b>IESS</b>	International/ Regional Environmental and Social Specialist
<b>I-K BA</b>	Issyk-Kul Biosphere Area
<b>IPIG</b>	International Project Investment Group
<b>IPIG MOTR KR</b>	Investment Project Implementation Group under the Ministry of Transport and Roads of KR
<b>IUCN</b>	International Union for Conservation of Nature
<b>MACs</b>	Maximum Allowable Concentration
<b>MOTR KR</b>	Ministry of Transport and Roads of KR

<b>MPC</b>	Maximum permissible concentration
<b>MPL</b>	Maximum Permitted Levels
<b>MSI (sub-index)</b>	Maximum single concentration
<b>NABU</b>	Nature Protection Union
<b>NESS</b>	National Environmental and Social Specialist
<b>PCR</b>	Physical Cultural Resources
<b>PER</b>	Public Environmental Review
<b>RPF</b>	Resettlement Policy Framework
<b>RSA</b>	Raion State Administration
<b>RAP</b>	Resettlement action plan
<b>SAEPF KR</b>	State Agency of Environment Protection and Forestry Under the Government of the Kyrgyz Republic
<b>SEE</b>	State Ecological Expertise
<b>SEE</b>	State Ecological Expertise
<b>SPNA</b>	Specially protected natural area
<b>SSEMP</b>	Site-specific Environmental Management Plan (ie, EMP, designed for a specific site)
<b>SSESMP</b>	Site-Specific Environmental and Social Management Plan
<b>STDs</b>	Sexually Transmitted Diseases
<b>TDEPF</b>	Territorial Department of Environmental Protection and Forestry
<b>TSC</b>	Tourist Services Centers
<b>UNESCO</b>	United Nations Educational, Scientific, and Cultural Organization
<b>UNFCCC</b>	UN Framework Convention on Climate Change
<b>UNWTO</b>	United Nations World Tourism Organization
<b>VU</b>	Vulnerable
<b>WB</b>	World Bank
<b>WHO</b>	World Health Organization
<b>TK</b>	Tup-Kegen road

## Executive Summary

The Ministry of Transport and Roads of the Kyrgyz Republic (MOTR) has developed this document to summarize the results of the draft Environmental and Social Impact Assessment and Environmental and Social Management Plan (herein, draft ESIA/ESMP or draft ESIA) for the proposed Central Asia Regional Links Program, Phase III (herein, CARs-3 Project or Project). The civil works under the project would include the rehabilitation and upgrade of approximately 37 km of the road between the city of Tyup in Kyrgyzstan and city of Kegen in Kazakhstan (border crossing Karkyra). In addition, the project will finance rehabilitation of about 15 km of the mountain road adjacent to the Tyup-Kegen road leading to the mountain tourist camp and 500 meter long dirt road connecting the main road with the historical site, “the Stones of Tamerlane”, a cultural heritage site. The project will also finance the rehabilitation and/or construction of 5 tourist services centers (TSCs) in Issyk-Kul Oblast.

Based on the environmental screening the Project has been assigned the Environmental Category B – Partial Assessment, and the environmental safeguards policies triggered for this Project include: Environmental Impact Assessment OP/BP 4.01, Natural Habitats OP/BP 4.04, Physical Cultural Resources OP/BP 4.11 and Involuntary Resettlement (OP/BP 4.12, triggered). It should be noted that at the stage of the Project official Appraisal by the World Bank, the key design documents such as Feasibility Study and Detailed Design were still to be developed. Hence, though the project locations are mostly known, site specific environmental and social management plans (ESMPs) informed by the design documentation will have to be developed to account for site-specific impacts. The ESIA/ESMP will have to be updated with information after the preparation of detailed designs is completed.

The Project is located in Issyk-Kul region, with its capital Karakol and surrounded by Almaty Region (Kazakhstan) to the north, Chuy region (west), Naryn region (southwest) and Xinjiang, China (southeast). The region takes its name from Lake Issyk-Kul, the second largest saline lake in the world which is surrounded by the ridges of the Tian Shan mountain range with its highest peak, including Khan Tengri located in the easternmost part of the region. Most of the population lives around the Lake, in particular the cities of Karakol (near its eastern end) and Balykchy (near the lake’s western end). The Project is located in the Issyk-Kul biosphere, which supports unique biodiversity. It was identified that based on the IUCN Red List of Threatened Species, no Critically Endangered (CR), two Endangered (EN), three Vulnerable (VU) species are found in the protected areas and natural habitats close to the project area. The types of recorded and confirmed threats to identified EN and VU species are not directly linked to any type of linear infrastructure development (construction or rehabilitation). The preliminary conclusion of the ESIA is that the project activities will cause negligible to low impact on above mentioned habitats and species.

Safeguard issues and impacts associated with the Project are thus limited to the typical impacts associated with infrastructure rehabilitation projects. The severity of potential environmental impacts is expected to be moderate and mostly limited to the construction period: (i) air pollution and noise from trucks and other construction machinery, and asphalt and batching plants, (ii) soil disturbance during earthmoving and material (gravel/sand/soil) extraction, (iv) tree-cutting and loss of other vegetation, (iv) generation and disposal of construction and domestic solid waster (from construction camps), (v) construction camp management (which will be temporary with only minor and localized negative effects), and (vi) borrow area management. Potential environmental Impacts can thus be mitigated by good construction and housekeeping practices.

Nevertheless, if not properly mitigated, the road works may cause destruction of fertile soil, loss of vegetation (grass, bushes, trees), decrease in animal population, increased air, water and soil pollution. Fuel combustion products may lead to high level of salts of heavy metals, toxic sulfur oxide, nitrogen and lead in roadside organisms. Borrow pit development may lead to loss of vegetation cover and topsoil. Non-compliance with the land reclamation plans will lead to mud hole and gully formation and erosion. Oil and lubricants spills may cause contamination of soil, surface and ground waters, and reduction of vegetation cover and its further degradation. Noise and vibration may also adversely affect people and animal life and, as a result, the population of vertebrate animals, especially small mouse-like rodents may decrease. Potential pollutants may affect surface and ground waters. Household waste can be carried by wind and animals. Natural slopes and river basins can be harmed by the illegal tree harvesting because of improved access to ecosystems and they will be replaced by the secondary impoverished ecosystems. Improved access may also lead to poaching.

As far as possible, the project should prevent the withdrawal of private land. If land allocation is unavoidable, it is necessary to minimize the amount of seizures and impacts on the sources of income of the affected population. The Implementing Agency together with the hired Consultant will also develop a Resettlement Action Plan (RAP) to mitigate the negative impact of the Project and will examine the social environment for determining the local population's exposure to the Project's negative impact.

It should be noted that appropriate measures to reduce the severity of social consequences may occur during the implementation of the Project. Mitigation measures will be considered at various stages of the Project's work and could be undertaken in order to avoid consequences of socio-cultural character in connection with land allocation.

Land acquisition is expected to be avoided and impacts minimal. The proposed project interventions are expected to take place on public land and within the existing right-of-way and footprint. However, there is a possibility that works may require land for borrow pits, manufacturing areas or minor widening of the existing road or widening the area of tourist service centers. If it turns out that the construction is to be carried out on the territory of private lands, or it will lead to impacts on property and facilities that are privately owned or to direct economic impacts on production assets, then the land acquisition procedure will be carried out according to the Kyrgyz legislation and in accordance with the Operating Policy of the World Bank, OP 4.12. The RAP will be applied in respect of the sites that will be seized for the needs of the project. If private assets, property, structures or leased land, as well as land for which there is no legal right to use, to be affected by the project, a RAP will be prepared.

Until the final detailed designs, it is not known as to whether or not any of these activities will occur, and if so, if they will trigger OP/BP4.12. Therefore, the Recipient has prepared the Resettlement Policy Framework (RPF). The draft RPF was disclosed in country on November 3, 2017 and in person consultations were organized November 9-11, 2017 with key stakeholders. The final RPF was disclosed in country ([www.piumotc.kg](http://www.piumotc.kg)) and on the Bank's Infoshop on February 21, 2018. As detailed technical designs are being completed during implementation, IPIG Social Specialist will carry out social screening of all sub-project sites to identify any impacts covered under OP/BP4.12. If, during project implementation, it is determined that OP/BP4.12 is triggered, Resettlement Action Plan(s) will be prepared.

**The effective Grievance Redress Mechanism (GRM)** is an important process, therefore efforts, first of all, will be directed to the search for a solution to satisfy Complaints and interaction with all counterparts.

The Grievance Redress Mechanism (GRM) is available to people living or working in areas affected by project activities. Any person who has experienced or is concerned about project activities has the right to participate in the IRM, to have easy access to it and to receive assistance in its use. For the duration of the project, the Grievance Review Panel (GRP) will be established for the project period, which will address the extensive issues related to the project activities, such as social and environmental issues, road safety, occupational health and safety, that population and other stakeholders might have in the result of the construction work. Much attention will be paid to preventing public discontent, and all complaints will be considered in a timely and impartial manner.

The International Project Investment Group (IPIG) of the MOTR has conducted the pre-project environmental monitoring of several environmental receptors in the project area. In addition, they have established the monitoring values that will inform the project monitoring plan which will be developed at the detailed design stage. The framework level environment and social management plan which is included into the current document covers mitigation measures during the project design and implementation stage. These mitigation measures will be included into the bidding documentation and will help control environmental and health and safety risks reducing them to the level as low as reasonably practicable.

During the preparation of this document, meetings were held with concerned stakeholders, including state bodies (State Agency for Environmental Protection and Forestry and its departments, Issyk-Kul Biosphere Territory Directorate, Road Management Department under MOTR, Authorized Representative of the Government in Issyk-Kul oblast as well as the Ministry of Culture, Information and Tourism) and potentially affected other stakeholders, such as local communities. This draft ESIA/ ESMP was disclosed in country on April 13, 2018 and in-person consultations with key stakeholders were organized on April 24, 2018. The final ESIA/ESMP will be disclosed in country ([www.piumotc.kg](http://www.piumotc.kg)) and on the Bank's Infoshop upon Bank's clearance. As detailed technical designs are currently being prepared, the draft ESIA/ESMP will be updated with additional information collected and a final ESIA/ESMP will be published.



# 1. Project Description, Alternatives and Benefits

## 1.1 Project Description

1. The project components of CARs-3 will finance activities related to removing physical bottlenecks and addressing sector specific constraints to improve market opportunities for the development of regional trade and tourism in Issyk-Kul Oblast. Specific components include

2. **Component 1: Regional Connections, Associated Facilities and Equipment in Issyk-Kul Oblast (Estimated total cost – US\$46.00 million).** This component comprises the necessary civil works, rehabilitation of facilities and purchase of equipment to establish a reliable road connection to Kazakhstan via Karkyra BCP, important for regional trade (agriculture) and access to tourism sites. It will finance the rehabilitation of about 37 km of road section along Tyup-Karkyra BCP road with Kazakhstan (km 39.6-76) and its continuation (about 15 km) to the tourist camps in the Kyrgyz Republic and Republic of Kazakhstan, including construction supervision, adjacent facilities and links to access San-Tash Tamerlane historical monument as well as equipment for road maintenance, in particular snow removal equipment to ensure year-round operation of the Tyup-Karkyra BCP road. The activities will benefit from a climate change vulnerability assessment (supported by a grant from the Global Facility for Disaster Reduction and Recovery (GFDRR)) as well as include a “shared infrastructure” approach to facilitate diversification of fiber-optic connection of Issyk-Kul Oblast with Kazakhstan. In terms of net CO2 emissions, it is expected that those will increase by about 2,624 tons mainly due to an expected increase in traffic at the end of the project. However, total net CO2 emissions will not be increased, as some traffic will be diverted from Karakol-Bishkek-Almaty route to Karakol-Tyup-Kegen route, which is almost two times shorter. It is also expected that with the improved road pavement, the average speed will increase thus CO2 emissions from vehicles are likely to be reduced.

3. **Component 2: Aviation Safety and Service Provision (Estimated total cost – US\$4.5 million)** This component focuses on current aviation sector specific constraints, in particular safety and service provision through support to the Civil Aviation Agency (CAA) and the Kyrgyz Aviation Institute. With the objective of enhancing and developing the air transport sector of the Kyrgyz Republic, addressing aviation safety comes as the most binding constraints. The accomplishment would help the CAA to reach international safety standards by the International Civil Aviation Organization and to overcome the current blacklist of the EU for Kyrgyz carriers, enhance local carriers’ growth opportunities and ultimately increasing the country’s level of connectivity, a result that would benefit both local residents and international visitors. In this context, this component will finance an organizational review of the Civil Aviation Agency (CAA), support on drafting of aviation rules in accordance with the new Air Code as well as capacity building, software, equipment and training to strengthen safety oversight capacity of the CAA to comply with ICAO standards. The training program will be mainly geared towards enhancing qualifications of CAA personnel (e.g., safety inspectors), while the software and equipment will upgrade CAA’s record-keeping capabilities for monitoring and oversight functions (US\$3.5 million). To strengthen the Kyrgyz Aviation Institute, a review of its education program, capacity building and subsequent investment in testing software for aviation personnel, a flight training device as well as repair of its facilities are envisaged (US\$1 million).

4. **Component 3: Sustainable Tourism Development in Issyk-Kul Oblast (Estimated total cost – US\$3.5 million).** The component comprises activities focusing on support towards developing the tourism sector in Issyk-Kul Oblast in a sustainable manner. The activities will include the preparation of a Sustainable Tourism Strategy and Program (including the application of Tourism Satellite Accounts (TSA) in accordance with the UNWTO methodology) as well as rehabilitation/ construction of 5 Tourist Services Centers in Issyk-Kul Oblast. This will address current data gaps, describe links with tourism offerings in the Central Asia region, and assess trade-offs around roles for the public and private sector in the tourism development and investment, while establishing a balance between the environmental, economic and socio-

cultural aspects of tourism development based on industry know-how and best practice. The component will also provide support towards the implementation of initiatives geared towards community-based geopark development in the two eastern districts of Issyk-Kul Oblast, namely Tyup and Aksuu districts. The proposed Sustainable Tourism Strategy as well as initiatives towards community-based tourism will be gender sensitive by engaging women entrepreneurs in the consultation as well as taking into account their interests in the sector. Two-way engagement with beneficiaries are envisaged given that communities of these two districts will be directly involved in the design, implementation and oversight of the geopark development in accordance with UNESCO geopark concept.

**5. Component 4: Project Management and Implementation (Estimated total cost – US\$1.00 million):** This component will finance support required for MOTR and its IPIG to manage and implement the project, including provision of goods, consultants' services and training, as well as operating costs (including financial audits).

6. **Thus**, the project will include the following civil work activities:



7. **Rehabilitation of Tyup-Kegen road section** with an approximate length of 37 km (starting from km 39,6 to km 76) till the border between the Kyrgyz Republic and the Republic of Kazakhstan and installation of fiber optical channels for "joint use of infrastructure". The Tyup-Kegen road runs at the bottom of southern slopes of Kungei-Ala-Too Range on the right bank of Tyup river, Tyup till San-Tash mountain pass and then reaches the border with the Republic of Kazakhstan at the upstream of Irsu river, tributary of Karkyra river. In terms of designs solutions, it is expected that the existing road will be either category IV or category III (14 meters from the road axis), which will be finalized at the detailed design stage.

8. Civil works for reconstruction and rehabilitation would involve removal of landslides, rock cutting, sub grade formation, removal of existing bituminous and aggregate layer(s). The works would also include localized realignment and slope stabilization measures including retaining walls, gabions etc., reconstruction/repair, or building new structures (bridges, causeways, culverts), drainage improvements and road safety improvements including widening of the Right-Of-Way, where required, and in accordance with the defined road category construction of hard shoulders, construction of lay-byes, parapet and retaining walls, guardrails, road marking and road furniture. The works will also involve the construction and repair and/or construction of bridges and culverts, as well as tranche excavation for fiber optic ducts along the road, as a "shared infrastructure" approach. Snow and wind barriers and potentially an elevated road formation (in particular, from km70-76) will be considered during the finalization of the designs in order to ensure climate resilience and to reduce winter maintenance costs along Tyup-Karkyra required to snow removal. A road safety audit will be undertaken as part of the design work for the road sections to ensure the safety of all road users, e.g., pedestrians, vulnerable groups and drivers. More details and maps are provided below in Section 1.3 Project Location.

9. **Rehabilitation of the mountain access road, Karkyra – Tourist base (about 15 kilometers):** This is the continuation of the road from Karkyra village to the tourist base. The technical options will be finalized as part of the final designs. Asphalt overlay or even macadam/sealed gravel is foreseen within the category IV road parameters. There is no widening anticipated so the road will stay in the same RoW. The road is running along the Karkara river surrounded by hills and mountain ranges.

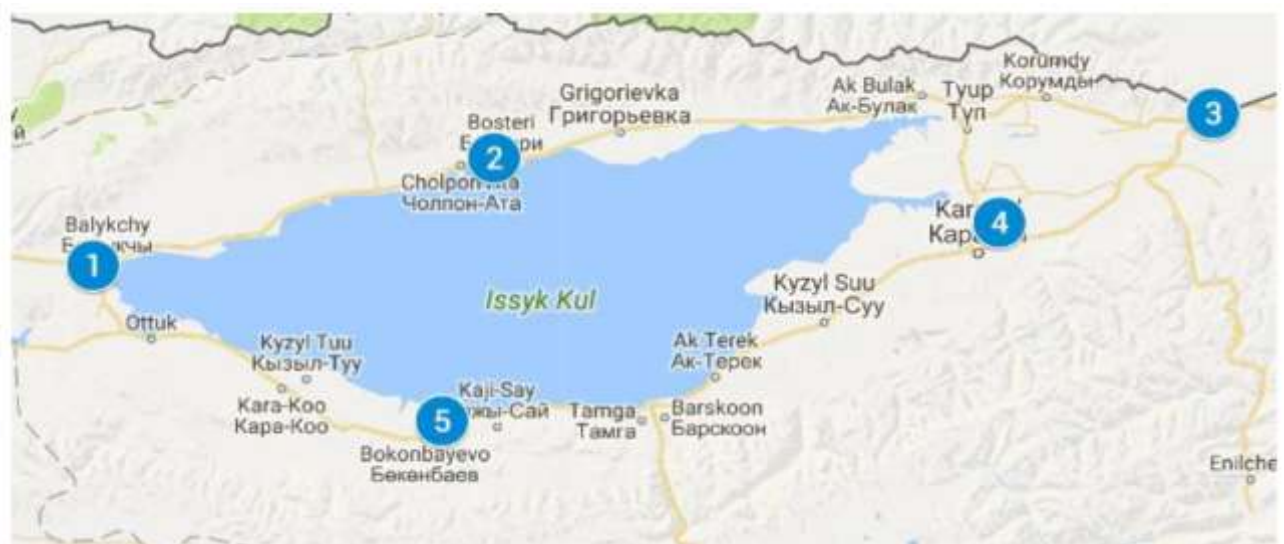
10. **Rehabilitation of a 500-meter dirt road to a historical site of Republican significance "Stones of Tamerlane" or "San Tash"**. The burial mound complex San Tash is located close to the pass of the same name (2195 m) between Kungei and Terskey Ala-Too mountain ranges. There are 257 large and small mounds which are graves of leaders of Saka tribes, dating back to 6th - 1st centuries BC. In the center of the complex there is a huge mound covered with

plenty of stones, which is called San Tash. The height of it is 4 m and the diameter is 56 m. Archaeologists estimate that more than 3500 cubic meters of stone were spent on its construction. According to the legend, the mound San Tash was formed when the conqueror Tamerlane during his military campaign ordered to each of his warriors to take a stone and throw it in a pile, to determine the number of his troops. That is how the mound got its name San Tash, which means "the counting stones".

<p>Figure 1: "San Tash" or the "Stones of Tamerlane"</p>	<p>Figure 2: Location of the "San Tash" historical site and the civil works</p>
	

11. **Small-scale infrastructure rehabilitation/ construction of tourist services centers (TSCs)** in 5 locations, including: (1) "EkoPost" and Biosphere museum at the entrance to the town of Balykchy, (2) territory of the hippodrome in Cholpon Ata-Bosteri towns, (3) historic site of Republican significance "The stones of Temirlan"– road from Tyup to Karkyra, (4) city of Karakol and (5) entrance of Kadji Sai town, on the main road.

Figure 3: Location of the Tourist Services Centers (TSCs)



12. It was concluded that the type of construction/upgrading works of each center will depend on its location and expected flow of tourists. The composition of the proposed centers will include infrastructure such as: tourism information desks, wash-toilet facilities, wifi point, parking lots, security/first aid point, souvenir point/shop, café/restaurants. The composition of each center will be confirmed by the Issyk Kul Governor's office and Department of Tourism

following consultations with the representatives from local municipalities, communities and potential operators of the TSCs. Standard requirements for TSCs operation needs to be developed by the Department of Tourism in close cooperation with the Interagency Working Group established under the project. It is proposed that one operating firm will be contracted for five TSCs. The construction and rehabilitation of the TSCs will be made following principles of universal design to ensure accessibility of persons with disabilities, the elderly and others with mobility constraints.

## 1.2 Analysis of Alternatives

13. Several alternatives were considered, including the option of "no action", alternative alignments and alternative types of transportation, which are considered below. If we consider economic and financial factors only, there are no acceptable alternative solutions for the proposed project. The option "No action" is not attractive due to environmental and economic factors. The decision with alternative modes of transport is not viable, taking into account the objectives of economic and social development. Taking into account the economic, financial and social factors, preference is given to the proposed project.

14. **No-Action Alternative.** Option "refusal to carry-out activities" is not recommended due to economic considerations. Economic factors, including: increased transportation time from KR and increased transportation costs as the existing road deteriorates despite the fact that this option does not imply direct costs that are disadvantages of No Action alternative

15. **Alternative routes.** Currently, there are no alternative routes, and construction of a new road may have a major impact on the environment. The new road construction alternative bypassing the existing road needs to be considered at the stage of feasibility study. The current road is a rural road in poor condition and is not suitable for heavy vehicles.

16. **Alternative types of transport.** Air transport. There are 11 airports in the Kyrgyz Republic, 4 of which have international status, and 7 have domestic status. The international airports are located in the cities of Bishkek (Manas), Osh, Karakol, and Issyk-Kul (Tamchi). Domestic airports are located in Batken, Isfana, Jalal-Abad, Kazarman, Kerben, Naryn, and Talas. The Karakol airport is the closest to the proposed project implementation area in terms of availability of air passenger and freight transportation. Commercial air freight services are usually limited to transportation of goods of small amount, high-value and sensitive to the duration of transportation. Cargo usually transported by road, is normally characterized by high volume, low to medium price, and insensitivity to the duration of transportation. In order to compete with the automobile and other types of land transport, the air freight will need to expand their services while reducing costs. Air transport is not an obvious alternative to the proposed project, as transport and trade services cannot be provided until technical re-equipment and rehabilitation of the Karakol Airport is done. Rail transport. There is a rail link in Issyk-Kul oblast in Bishkek-Balykchy section. No other railway lines exist in the rest of Issyk-Kul oblast, construction of railways has not been considered. In this connection, rail transport cannot be considered as an alternative to transportation of goods and passengers.

17. **Decommissioning of Tyup-Kegen road.** Taking into account the "narrow" context of potential negative environmental impacts, the only alternative "guaranteeing" prevention of adverse impacts on the environment associated with transportation, is to stop the traffic or use this road. This alternative would be contrary to the plans of economic development of the Kyrgyz Republic. It would leave the existing checkpoints between Kyrgyzstan and Kazakhstan in operation, and, in fact, would not contribute to further economic growth due to the favorable trade and development of the tourism zone in Issyk-Kul oblast. Considering the Government

development plans, which include expansion of cross-border trade, this option is not seen as a realistic alternative.

18. **Construction of a new road parallel to the existing one.** *Road on embankment.* It is theoretically possible to build a new road on a new alignment, roughly parallel to the existing road, but construction of a new road will have an adverse impact on the environment, and may entail irreparable damage for the whole Issyk-Kul Lake. This option should be considered at the stage of feasibility study to compare and have a clear picture of the possibility / impossibility of construction, and costs incurred during the construction. The high cost of this option is not justified by the current traffic intensity. Any environmental improvements achieved will be negligible, and the expected effect of the mitigation measures will not be as significant as compared to the proposed project. *Construction of a tunnel.* Theoretically, this is the best method to avoid any impact on the ecosystem. The developed countries use this method quite broadly, since it allows to avoid the impact not only on the environment. However, the cost may exceed USD 10 million/km, thus it is not seen as feasible.

19. **Preferred option – Rehabilitation of the existing road at the existing level.** Rehabilitation of the existing road is considered as the most feasible option in terms of minimizing the impact of construction works on the environment and the costs, providing economic benefits, and minimizing potential adverse environmental impacts. Potential environmental impacts can be mitigated by countermeasures to combat the spilled pollutants, speed limits, installation of new warning signs, and other measures. Currently, the existing route is used during the summer season, and mostly by tourists.

### 1.3 Project Sites Location

20. The Kyrgyz Republic is divided into seven oblasts. The oblasts in turn are divided into rayons and the rayons are divided into aiyl aimak (rural municipalities). The Tyup-Kegen road Project is located in Issyk-Kul oblast of the Kyrgyz Republic. The Tyup-Kegen road section under consideration is located in Tyup raion of Issyk-Kul oblast. Consequently, the project area is located in Issyk-Kul province, project influence area is located along the natural ecosystem nearby the existing gravel road in Tyup and Ak-Suu rayons. The five TSCs are located in Tyup rayon (TSC number 3), Aksuu Rayon (TSC number 4), Issyk-Kul rayon (TSC number 2), City of Balykchy (TSC number 1) and Tong rayon (TSC number 5).

21. [Figure 4](#) shows the geographical location of the project in the Kyrgyz Republic. [Figure 5](#) shows a satellite image of the project site (Tyup-Kegen road and mountain road from Karkyra to Tourist base). The location of the 5 TSCs is presented above, in [Figure 3](#). and include: (1) “EkoPost” and Biosphere museum at the entrance to the town of Balykchy, (2) territory of the hippodrome in Cholpon Ata-Bosteri towns, (3) historic site of Republican significance “The stones of Temirlan” – road from Tyup to Karkyra, (4) city of Karakol and (5) entrance of Kadji Sai town, on the main road.

Figure 4: Project location in Kyrgyzstan



Figure 5. Project Area for Road Sections to Be Rehabilitated, satellite image.



22. For the road rehabilitation works, the starting point of the alignment is Tyup village and it passes through Birlik village, located at km 7, Taldy-Suu village at km 13-15 км, Koochi village at km 18, Korumdu village at km 21-23, Chon-Tash at km 25, Jil-Bulak village at km 27, San-Tash village at km 29 and Ken-Suu at km 32. Sarytologoi village is located at km 39 on the right side, initial point of the project, and at km 58 on the left side 3rd Farm with 30 households is located. At km 70 on the right side, there is 4th farm where about 30 households live, and at the end of the alignment at km 76, there is a customs point of the Kyrgyz Republic.

23. As with many roads construction and rehabilitation, the development of the borrow pits pose a lot of environmental risks. It is important to define the optimal location and the size of the borrow pit areas. In this project, preliminarily three borrow pits areas are expected to be developed located at km 48+325 (2-3 ha), km 57+975 (2 ha), km 70+380 (2 ha) for road bed construction. Material available in the borrow pit is suitable for construction. Coordinates of borrow pit corner points and location on the map are presented below.

Table 1. Borrow pit location

Location	Coordinates		Available material (m <sup>3</sup> )
Borrow pit at km 48+325	42°44'27.9"N	78°53'39.8"E	110 000
Borrow pit at km 57+975	42°44'32.1"N	78°53'41.2"E	100 000
Borrow pit at km 70+380	42°45'15.1"N	79°07'55.8"E	120 000

Figure 6. Borrow pit at km 48+325

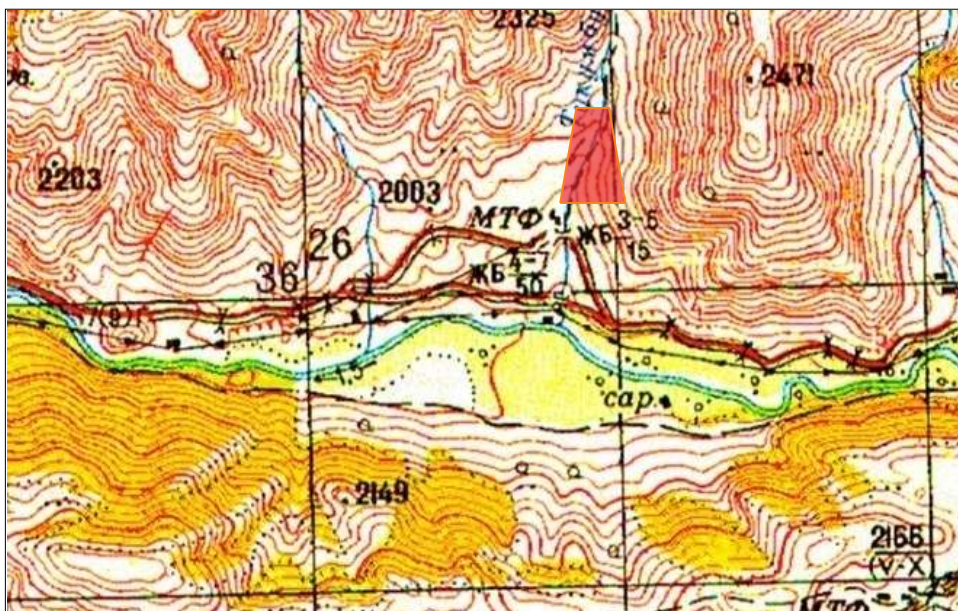
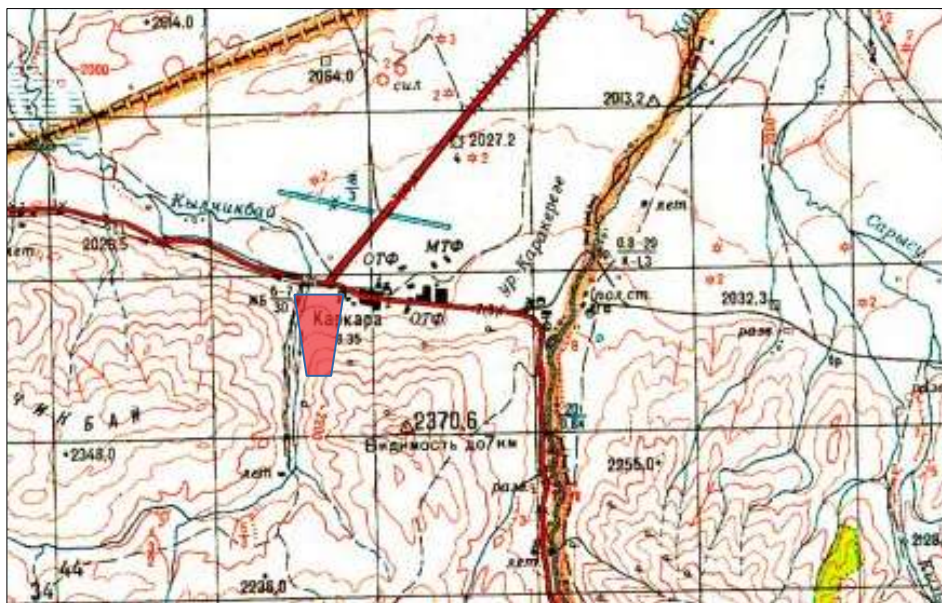


Figure 7. Borrow Pit at km 57+975



Figure 8. Borrow Pit at km 70+380



24. It should be noted, however, that the borrow pits location is not finally decided at the time of the preparation of this draft ESIA/ESMP and the feasibility study and detailed designs to be prepared will contain detailed technical information on the borrow pits.

#### 1.4 Project Benefits

25. Rehabilitation of Tyup-Kegen road is of strategic importance not only for development of the country transit potential. It allows to improve access to agricultural markets in Kazakhstan, in particular, to the largest one in Almaty. The rehabilitation of the road will reduce the travel time from Karakol to Almaty almost 2 times, as the travel distance will reduce from 660 km on Almaty-Bishkek-Cholpon-Ata-Karakol road to 383 km on Almaty-Tyup-Karkyra-Karakol road.



Accordingly, the cost of transport services reduces significantly due to reduced transportation costs. At the same time the traffic on this road is expected to grow in the range of 100% after rehabilitation in the next 3-4 years, and with the development of the RT-KR-RK-RF corridor – the traffic will grow several times. Tyup-Kegen Road Rehabilitation will also have a positive impact on the flow of tourists from neighboring Kazakhstan. The flow of tourists is expected to grow 10 times after completion of Tyup-Kegen road construction.

26. The majority of the population living in the project area is employed in agriculture i.e. are engaged in plant growing and cattle breeding, which is the main source of income for the population. The main activity is grazing of sheeps, goats, cattle, horses and other animals. Local population has barley and wheat, hay, keeps pets, grows cattle, vegetables, famous Issyk-Kul apricots, raspberries, currants. During the season, the inhabitants of the region use pasture lands for grazing.

27. During the period from May to October, when the 'Karkyra - Roadway' check point is operational, the passenger traffic increases during the tourist season, where the local population sells its products. Everything can be expanded in the result of the project and it is likely that trade along the road will expand with the improvement of the road, which in aggregate should increase the income of the local population.

28. During the construction period, many jobs will be created, including for local residents who will be able to participate in the construction work; the contractor will be recommended, during the project implementation, to recruit from among the local residents, mainly from the male population, meeting the criteria for the implementation work that lives in the project area. Also, road rehabilitation will significantly improve the conditions of people's movement on the road and improve road safety, which in turn will lead to an improvement in the social status of the population and road users.

29. Employment opportunities will be mainly useful for men. Qualified local staff - including operators, engineers, will be overwhelmingly employees of contracting companies and may be from other regions of the republic with the appropriate qualifications. Women can also take advantage of indirect project premiums, in connection with the development of tourism. Impacts on the livelihoods of the local community, as a result of the inflow of foreign labor, will be mitigated in accordance with the World Bank's best recommendations

30. It is expected that the following performance targets will be achieved:

- The volume of trade between the Kyrgyz Republic and Kazakhstan will increase;
- The cost of goods transportation from Issyk-Kul oblast of the Kyrgyz Republic to the Republic of Kazakhstan will decrease;
- The number of tourists from the Republic of Kazakhstan to the Kyrgyz Republic will increase several times;
- Daily international freight traffic crossing the border will increase;
- Travel time will be reduced;

31. The project will bring indirect benefits for people living along the road and for all the residents of Issyk-Kul oblast, of which 51% are women, dominating in the intra- and inter-regional trading activities in the Kyrgyz Republic. It is expected that on Tyup-Kegen section, in addition to economic benefits, the project will have a positive environmental impact. The positive environmental and safety impacts include:

- a. Reducing existing levels of noise, dust and vibration due to the smoother and non-stop movement of heavy vehicles;

- b. Improving road safety by upgrading road surface (minimizing road accidents), and prevention of roadside territory pollution;

32. The project will have certain adverse environmental impacts during construction and operation. Impacts during construction are mostly temporary and reversible, whereas the potential impact during operation can be avoided or minimized through appropriate solutions in the project documentation and control tools during operation.

## **2. Methodology, Disclosure and Consultations**

### **2.1 The Scope and Methodology of the Draft ESIA/ ESMP**

33. This Draft ESIA/ ESMP has been prepared by the Ministry of Transport and Roads (MOTR) - Executive Agency (EA) for the Project with support from its IPIG. The final ESIA/ESMP will be completed taking into account the requirements of environmental legislation of the Kyrgyz Republic and World Bank Safeguards Policy.

34. The purpose of this Draft ESIA/ESMP is to define the baseline environmental and social conditions in the Project area in order to identify and assess the impacts of the various activities of the Project as well as describe mitigation measures as part of the ESMP. The following methodology has been applied:

- Collecting, checking and analyzing all available data (including available environmental legislation and recommendations) and relevant reports from similar projects
- Holding stakeholder discussions with local experts from the State Agency for Environmental Protection and Forestry and its departments, Ministry of Transport and Roads, Ministry of Culture, Information and Tourism, Issyk-Kul Biosphere Directorate, and Authorized Representative of the Government in Issyk-Kul oblast. Public consultation with representatives of local residents and local authorities, living and located in the project area were carried out on April 24, 2018 in the project area.
- Studying existing design and engineering data and identifying environmental and social impacts and mitigation measures during design, construction and operating phase.
- As well as several field trips.

35. The draft ESIA/ESMP is expected to be complemented (and thereafter updated to a Final ESIA/ESMP) upon completion of the Feasibility Study and Detailed Technical Designs, which will start after contract signing. These studies will allow to propose, at the pre-project stage, measures to mitigate impacts during construction period, impact of excavation works, traffic intensity, exhaust emissions, and their impact on soil, water resources, as well as effective measures to prevent erosion and neutralize the negative impact of the road on the environment. In addition, the ESIA preparation supposes development of IEE, which will include double-vector monitoring; control of pollution sources and protection of ecological receptors, a comprehensive program to improve environmental protection, and improvement of public awareness about the environment protection activities.

### **2.2 Information Disclosure and Consultation**

36. Information disclosure and consultations for the Project will be carried out in accordance with the Kyrgyz Republic Law on “Access of population to information managed by state authorities” and the requirements of the World Bank OP 4.01 Environmental Assessment and OP/BP 17.50 Access to Information Policy. According to OP 4.01 “For all Category A and B projects proposed for IBRD or IDA financing, during the EA process, the borrower consults project-affected groups and local nongovernmental organizations (NGOs) about the project's environmental aspects and takes their views into account. The borrower initiates such consultations as early as possible”.

37. During the preparation of this document, meetings were held with concerned stakeholders, including state bodies (State Agency for Environmental Protection and Forestry and its departments, Issyk-Kul Biosphere Territory Directorate, Road Management Department under MOTR, Authorized Representative of the Government in Issyk-Kul oblast as well as the Ministry of Culture, Information and Tourism) and potentially affected other stakeholders, such

as local communities. This draft ESIA/ ESMP was disclosed in country on April 13, 2018 and in-person consultations were organized on April 24, 2018 with key stakeholders. The draft as well as the final ESIA/ESMP will be disclosed in country ([www.piumotc.kg](http://www.piumotc.kg)) and on the Bank's Infoshop upon clearance by the Bank. As detailed technical designs are being completed during implementation, the draft ESIA/ESMP will be updated with additional information collected.

38. Process of conducting public consultations is the main and important part of the project preparation and implementation. In order not to miss vital economic, social and environmental consequences of planned activities it is necessary to involve the community. The public consultations will be very effective provided all stakeholders express their points of view and the discussions take place in an atmosphere of mutual trust. This process includes two-way information flow.

39. The draft ESIA been prepared at the project preparation stage. The IPIG MOTR has conducted the pre-project environmental monitoring of several environmental receptors in the project area. In addition, they have established the monitoring values that will inform the project monitoring plan which will be developed at the detailed design stage. The framework of environment and social management plan which is included in this document covers mitigation measures at detailed design and implementation stages. These mitigation measures will be included into the bidding documentation and will help control environmental and health and safety risks reducing them to the level as low as reasonably practicable.

40. The draft ESIA was posted in Russian language and will be translated into Kyrgyz language, if needed. It is to note that the draft ESIA in Russian language was posted on IPIG website [www.piumotc.kg](http://www.piumotc.kg) on April 13, 2018. In addition, between April 13 – 23, 2018 there was a 2 week comment and disclosure period to the draft ESIA posted. It should be noted there were no comments and feedback to the draft ESIA within this period.

41. The public consultations on disclosure of draft ESIA were carried out by the Executing Agency on April 24, 2018 in Tyup Rayon of Issyk-Kul province. Invitation to participate in the public consultation on discussion and disclosure of information about the draft ESIA prepared for the proposed CARs-3 Project was distributed as follows:

- Invitation was posted on IPIG website [www.piumotc.kg](http://www.piumotc.kg);
- Official letters were prepared and sent to Tyup Rayon State Administration
- Verbal instructions by phone.

42. Additionally, the local authorities helped the Executing Agency in informing the population about this activity so that as many people as possible could participate in these public consultations.

43. The public consultations were held in Tyup village of Issyk-Kul province on April 24, 2018. Sitihin V.P., the First Deputy Head of Tyup Rayon State Administration, WB IPIG MOTR KR staff, Heads of ayil okmotus (village council) located along the tyup-Kegen road, Director and staff of Tyup forestry agency, representatives of DEU-4 participated in the consultations.

44. The public consultations were held in small assembly hall in the building of Tyup Rayon State Administration at the address of 53 Boronbai Street. The total number of participants was 46, 5 of them were women, NGO - 2, local community -18, heads and representatives of local authorities - 11 people, staff of forestry agency – 3, land specialists – 7, IPIG staff – 3, DEU # 4 staff – 2.

45. The purpose and tasks of the consultations were to carry out works on disclosure of the project and draft ESIA among the population and all stakeholders.

46. The presentation on the project was provided to the participants. During the consultations detailed information in the form of posters, booklets, information pamphlets in Kyrgyz and Russian languages, including detailed information about the project components,

project implementation period, draft ESIA, as well as GRG with contact information was provided to the participants.

47. An overview of the main results of these hearings, as they are related to the issues described / raised in the draft ESIA, is provided in the Annex. Participants of the hearing asked questions and made various comments. It should be noted that at public hearings a large number of questions and comments were about the length of time that the local population is waiting for the reconstruction of the Tyup - Kegen automobile road. The minutes of the consultations are presented in the Annex 1.

48. The draft ESIA was presented for public review. During the consultations, the people affected by the project and local residents expressed support to the project, as they clearly see the benefits for themselves and the region as a whole. Public access to the document will meet all the requirements of the World Bank's policy, which states that all Project documents should be accessible to all interested parties and the general public. The final report, as part of the project documents, will be posted on the IPIG website and Infoshop WB.

49. The main elements of the draft ESIA were publically disclosed in details and discussed during public consultations, detailed information was also given about the main operational policies of the World Bank on environmental and social safeguards, mechanisms for handling complaints and suggestions, explanations were given about the two way communication with the population, and contact details, as to where and how to apply to citizens in case they have questions, complaints and suggestions to the project, etc.

### **3. The Grievance Redress Mechanism (GRM)**

50. The procedures for handling project-related complaints serve to provide an effective and systemic mechanism for responding to questions, providing feedback and handling complaints from persons whose interests are affected by the project activity

#### **3.1 Functioning of the GRG within the Grievance Redress Mechanism**

51. Timely satisfactory resolution of complaints is an important process, therefore, efforts will primarily be directed towards finding a solution to Complaints and interaction with all interested parties.

52. The Grievance Redress Mechanism (GRM) is available to people living or working in areas affected by project activities. Any person who has experienced or is concerned about project activities has the right to participate in the GRM, to have easy access to it and to receive assistance in its use.

53. The grievance redress mechanism (GRM) involves the following two stages: local ,and central.

- At the local level, within 15 working days followed by taking a decision;
- At central level, within 15 working days followed by taking a decision; where decision is made following the consideration of complaints, requests or applications from citizens.

#### **Stage 1, Local Level:**

54. The grievances will be first lodged at the local level. The complainant will report his/her case to the Local contact person, who is nominated to GRG and is responsible for timely consideration of complaints and addresses. The local contact person shall coordinate the measures on addressing the complaint with local Roads Maintenance Unit (RMU), DEP, IPIG, representatives of local government bodies and local NGO, as required. After consultation the local contact person makes the final decision on submitted complaints and determines the eligibility of the complaint, as it notifies the applicant. In case the grievance is still not resolved at local level in the complaint or statement of claims within 15 days, the relevant information is sent to the applicant and the central level of GRG.

#### **Stage 2, Central Level:**

55. In case that within 15 days the grievance is still not resolved at local level, the complainant with support of the local authorized person will further raise the issue to central level. The central level of GRG, which consists of representatives of the IPIG and MOTR, will timely look into the complaint, decide on the eligibility and on the complaint case. IPIG will propose a decision to the level of MOTR.

56. In case the grievance is still not resolved at central level where the final decision is made and the applicant is not satisfied with the decision then he/she may go to the court.

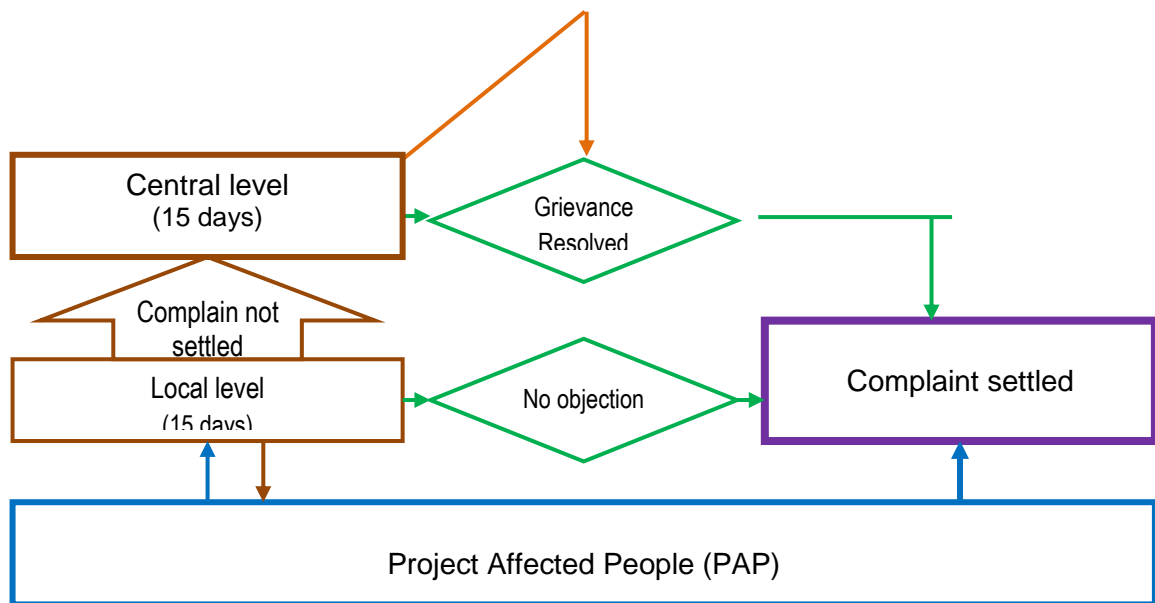
#### **World Bank Grievance Redress**

57. Communities and individuals who believe that they are adversely affected by a Bank supported project may submit complaints to existing project-level GRMs or the Bank's Grievance Redress Service (GRS). The GRS ensures that complaints received are promptly reviewed to address project-related concerns. Project affected communities and individuals may

submit their complaint to the Bank's independent Inspection Panel which determines whether harm occurred, or could occur, as a result of Bank's noncompliance with its policies and procedures. Complaints may be submitted at any time after concerns have been brought directly to the Bank's attention and the Bank management has been given an opportunity to respond. For information on how to submit complaints to the Bank's corporate GRS, please visit <http://www.worldbank.org/GRS>. For information on how to submit complaints to the Bank's Inspection Panel, please visit [www.inspectionpanel.org](http://www.inspectionpanel.org).

58. It should be noted that the person who files a complaint can go through each stage of described process of grievance redress before, during or after filing a complaint of the World Bank.

Figure 9: Grievance Redress Flowchart



## 4. Institutional and Regulatory Framework

### 4.1 KR Legislation and World Bank Policy on Environmental Protection

59. The legal framework of environmental assessment in the Kyrgyz Republic is formed by the Kyrgyz Republic Act on Environmental Protection (1999), KR Act On Environmental Impact Assessment (1999), Kyrgyz Republic Law on "General technical Guideline to ensure environmental safety in the Kyrgyz Republic " (2009). Instructions on the procedure of state ecological examination of pre-project, design and other materials and documents in the Kyrgyz Republic (1997), and Instructions on the procedure for assessing the impact of the proposed activity on the environment (EIA) in the Kyrgyz Republic (1997), as well as other regulations. The Kyrgyz Republic acceded to the Aarhus Convention on public participation and to the Espoo Convention on EIA in a Transboundary Context.

60. The relevant elements of the environmental legislation of the Kyrgyz Republic are given in the [Table 2](#), In addition to the list in [Table 1](#) there are special sections in the Administrative and Criminal Codes of the Kyrgyz Republic, which increase the responsibility for illegal hunting, collection of eggs and birds` nests, for destruction of nests, illegal enterprises in environmentally sensitive areas and pollution of wetlands and sensitive habitats. The State Agency of Environmental Protection and Forestry (SAEPF) is an authorized agency in Kyrgyzstan responsible for the formation and implementation of environmental policy in the Kyrgyz Republic. The Division of State Ecological Expertise of SAEPF KR is responsible for examination of documents on the environmental assessment of projects of national importance.

61. The environmental assessment system in the Kyrgyz Republic is based on two subsystems: (i) EIA (Environmental Impact Assessment), and (ii) State Ecological Expertise (SEE). Projects screening procedure carried out based on the list of activities subject to EIA, determines whether the project is subject to environmental impact assessment. If an assessment is required, EIA is carried out by qualified personnel to be selected by the project proponents. After submission of Environmental Impact Statement (EIS) for public consultations, the EIS shall be revised based on the comments received. Then, the EIA report and Environmental Impact Statement, along with other supporting documents shall be submitted to the state expert commission for State Ecological Expertise (SEE). The project can be approved, rejected or sent to a re-assessment/revision.

62. Public consultations should be carried out at the EIA stage, and can also be initiated in parallel with SEE as a Public Environmental Review (PER). Implementation of any project is permitted only in case of a positive decision of SEE. PER is an addition to SEE and has an advisory nature. Duration of SEE depends on the complexity of the project, however, it should not exceed 3 months from the date of submission of all EIA documentation and payment for SEE by the project proponent.

Table 2: Summary of Environmental Protection Legislation

№	Act of legislation	Number Year of adoption	Designation/content
<b>Main provisions of the environmental legislation</b>			
1	Constitution of the Kyrgyz Republic	2010	The land, subsoil, air space, waters, forests, flora and fauna, and other natural resources can be used, but at the same time they are protected.



№	Act of legislation	Number Year of adoption	Designation/content
			Everyone is obliged to take care of the natural environment, flora and fauna of the state.
2	Concept of Environmental safety of KR	№506 dated 23.11.2007	It sets the basic principles of environmental policy and determines the global, national and local environmental problems; priorities in field of environmental protection at the national level, as well as tools to ensure environmental safety
3	National sustainable development strategy of KR for 2013-2017	N 11 dated 21.01.2013	It provides conceptual framework of sustainable development, which consists in meeting the needs of present generations without compromising the needs of future generations.
4	Law of KR “On environment protection”	№53 Dated 1999	Sets the basic principles of environmental protection and provides legal authority for environmental quality, establishment of systems for environmental monitoring and control. Among the standards and norms of environmental quality, authorized under this Act, the followings are relevant to the project: norms of maximum safe concentrations of hazardous substances in air, water; standards for the use of natural resources; norms of maximum safe levels of noise, vibration and other harmful physical effects. This law establishes the requirements for environmental assessment in order to prevent possible harmful environmental impacts. It prohibits financing or implementation of projects related to the use of natural resources without positive conclusion of the State Ecological Expertise.
5	Law of KR “On environmental expertise”	№54, dated 1999	It is the main law relating to environmental assessment. Its objective is to prevent negative impacts on human health and the environment as a result of economic or other activities, and ensure compliance of these activities with the environmental requirements of the country.
6	Law of KR “General technical regulations for ensuring environmental safety in the Kyrgyz Republic”	N151, dated 2009	It is used to protect the environment, determines the main provisions of the technical regulation in the field of environmental safety, and establishes general requirements for environmental safety during designing and implementation of activities at the business facilities and other activities for all legal entities and individuals.
7	Regulation on procedure of environment impact assessment in the	№ 60 dated 13.02.2015	Sets the order of assessment of the impact of the proposed activity on the environment (hereinafter - EIA). The purpose of the EIA is to prevent and / or mitigate the impacts of the proposed activity on the

№	Act of legislation	Number Year of adoption	Designation/content
	Kyrgyz Republic		environment, and related social, economic and other consequences.
8	Regulation on water protection areas and zones of water objects in the Kyrgyz Republic	N 271 dated 7.07. 1995	Determines the procedure for establishing water protection zones and strips on water objects of the Kyrgyz Republic, establishes a regime of economic activity and use of land belonging to the water protection zones, as well as responsibility for their maintenance in proper condition.
9	Rules of surface water protection in KR	№128 dated 14.03.2016	Rules of Surface Water Protection of the Kyrgyz Republic govern protection of surface waters from pollution and depletion, during running by water users of different types of business activities that have or may have an adverse impact on surface waters, irrespective of their organizational-legal form, and regulate the procedure of surface water protection measures.
10	Law of KR “On protection of the atmosphere”	№51 dated 1999	Regulates the relations for the use and protection of atmospheric air.
11	Law of KR “On production and consumption waste”	№89 dated 2001	It defines the state policy in the field of production and consumption waste treatment, and is designed to help prevent the negative impact of production and consumption waste on the environment and human health during treatment, and maximum use in the business process as an additional source of raw materials.
12	Law of KR “On protection and use of flora”	№53 dated 2001	Establishes a legal framework for providing effective protection, rational use and reproduction of flora resources
13	Law of KR “On fauna”	№59 dated 1999	Establishes legal relations in the sphere of protection, use and reproduction of objects of fauna.
14	Law of KR “On local self government and local state administration”	№101 dated 2011	Establishes the principles of organization of local government at the level of the administrative-territorial units of the Kyrgyz Republic
<b>Land acquisition legislation</b>			
15	Constitution of the Kyrgyz Republic	2010	Article 12 recognizes the diversity of ownership, and guarantees equal legal protection of private, state, municipal and other forms of property (Article 12, paragraph 1). Land may be in private, municipal and other forms of ownership, except for pastures, which can not be privately owned (Article 12, paragraph 5). Any property shall be inviolable. No one can be arbitrarily deprived of his/her property. Withdrawal of the property by the state against the will of the owner shall be allowed only by court order (Article 12, paragraph 2).

№	Act of legislation	Number Year of adoption	Designation/content
			Acquisition of property for public purposes defined in the Act, may be by the court decision with a fair and advanced compensation for the value of this property and other damages caused as a result of the acquisition (Article 12, paragraph 2).
16	Civil code	№16 dated May 8, 1996 as amended May 30, 2013	It specifies that a person whose right has been violated may demand full compensation for damages caused, unless otherwise provided by the law or by the relevant agreement corresponding to the law (Article 14, paragraph 1). The Civil Code defines the following losses eligible for compensation: expenses that any person whose right was violated, made or will have to make to restore the violated right (Article 14, paragraph 2); loss of or damage to property (Article 14, paragraph 2); lost revenues that this person would have received under normal conditions of civil turnover, if his/her right had not been violated (lost profits) (Article 14, paragraph 2); compensation for loss of profits, along with other costs, at least in the amount of the income to a person who loses land, assets or sources of livelihood.
17	Land code	№ 45 Dated June 2, 1999 as amended May 26, 2009	Regulates land relations in the Kyrgyz Republic, grounds of origin of the right, and procedure for execution and termination of rights to land, and their registration, and is aimed at creation of land market relations in the environment where land is in state, communal and private ownership, and rational use and protection of land. The Land Code is the main document regulating the use of land.
18	Law "On the transfer (transformation) of land"	N 145 dated July 15, 2013	The law is designed in accordance with the Land Code of the Kyrgyz Republic, other normative legal acts of the Kyrgyz Republic, and defines the legal basis, conditions and procedure for transfer (transformation) of lands from one category to another, or from one type of land to another.
19	Law "On Roads"	№72 dated June 2, 1998	- (Article 4), public roads are owned by the state, and can not be sold, transferred to private ownership. - (Article 27), it specifies that the following is prohibited on the roads without a prior permission of the State Automobile Inspectorate and the Ministry of Transport and Roads of the Kyrgyz Republic, inter alia: trade on shoulders; placement of kiosks, pavilions and similar structures, - (Article 23) unauthorized use of lands of roads by

<b>№</b>	<b>Act of legislation</b>	<b>Number Year of adoption</b>	<b>Designation/content</b>
			illegal users.
20	Regulations on valuation of assets		Valuation of assets is based on the Provisional Rules of activities of valuers and valuation organizations (Government Decree №537 dated August 21, 2003), property valuation standards (Government Decree №217 dated April 3, 2006) and other provisions of national law
<b>Legislation on Protection and Use of Historical and Cultural Heritage</b>			
21	Law “On Protection and Use of Historical and Cultural Heritage”	№91 dated July 26, 1999	Establishes the legal norms in the field of protection and use of objects of historical and cultural heritage on the territory of the Kyrgyz Republic, objects of historical and cultural heritage being of a unique value to people are historical and cultural monuments associated with historical events in the life of the people, development of society and the state, works of material and spiritual creativity of historical, scientific, artistic or other value.
<b>Law “On Access to Information”</b>			
22	Law “On access to information under the jurisdiction of State bodies and local self-government bodies of the Kyrgyz Republic”	№213 dated 28.12.2006	This law regulates the rights and obligations of public authorities to provide information to the local population in order to achieve transparency.

63. Although the legislation seems sufficient, substantial numbers of operational difficulties prevail. The main challenges in the Kyrgyz Republic are the lack of funding for research, monitoring, assistance in complying with and enforcing the existing regulatory requirements and standards.

#### **4.2. Comparison of Kyrgyz Republic and World Bank Policy Requirements**

64. Differences between Kyrgyz Republic Law (Land Code) and World Bank’s policy are outlined in [Table 3](#). In case of discrepancies between the National Legislation and the World Bank Policy OP 4.12, the latter shall take precedence.

Table 3: Summary of Environmental Protection Legislation

<b>Provisions of Kyrgyz Republic’s Land Code</b>	<b>World Bank’s Policy on Involuntary Resettlement</b>
Compensation for acquired land shall be paid only for titled landowners, those with formal land use documents.	Lack of formal title to land will not be a bar to PAPs from entitlements. People without legal title to land and/or structures occupied or used by them are entitled to various options of resettlement assistance, provided they cultivated/occupied the land before the eligibility cut-off date.
Consultation with PAPs or communities in respect of land or	PAPs are to be fully informed and consulted on compensation, entitlements and resettlement options

Provisions of Kyrgyz Republic's Land Code	World Bank's Policy on Involuntary Resettlement
asset acquisition not required	incl. relocation sites. Includes consultation, participation, information dissemination campaigns, and opportunities to participate in monitoring. Resettlement plans to be developed and prepared in consultation with PAPs and other stakeholders. Grievance redress mechanisms are to be established. Requirement for gender specific consultation and information disclosure.
Land compensation is at replacement rates through provision of land for land or in cash. Normative land prices are established through coefficients. No reference as to whether there are deductions.	Land for land as a priority, with replacement land to be acceptable to PAPs and to be of same size and productive capacity. If suitable land cannot be found, compensation in cash, or a combination of land and cash, at current market value without deduction of the costs of any transaction (administrative charges, taxes, registration or titling costs), or depreciation
Compensation for other assets (structures, crops and trees and business income) is at replacement cost. No provision for severe impacts or vulnerable PAPs. Does not provide for transportation and transition expenses/costs.	The amount of cash or kind needed to replace an asset in its existing condition, at current market price without deduction of the costs of any transaction (administrative charges, taxes, registration or titling costs), depreciation or for any material salvaged. Includes provision of transfer or relocation allowances
At infrastructure planning stage, proposals for acquisition of agricultural or high-yielding land discouraged when other land is available.	Any land acquisition and resettlement is to be avoided, or if it cannot be avoided, it should be minimized by exploring all viable options.
No provision for income/livelihood rehabilitation measures, allowances for severely affected PAPs and vulnerable groups, or resettlement expenses.	Requires to restore income/livelihood, serious damages and expenses incurred by PAPs during the acquisition or resettlement process. Includes provision of transfer or relocation allowances, subsistence allowances, technical and financial support for crop or production intensification of diversification, training for alternative employment, creation of jobs, linking with existing livelihood development or poverty alleviation projects in the area. Requires specific measures to improve the status of the poor and vulnerable, incl. strategies to create new income opportunities. Includes restoration of access to public facilities and infrastructure, cultural property and common property resources

65. In principle, the Land Code of Kyrgyz Republic and World Bank Policy consider the compensation at replacement cost.

66. Replacement cost – is the method of valuation of assets that helps determine the amount sufficient to replace lost assets.

67. Market value of assessed structure is the most probable price at which an asset would trade in a competitive auction setting

68. However, Kyrgyz law does not provide for rehabilitation and in practice this has been left to ad hoc arrangements taken by project proponents in order to meet international donor requirements. To clarify these issues and reconcile eventual gaps between Kyrgyz law and World Bank Policy, this RPF has been drafted for the Project, ensuring compensation at replacement cost of all items, the rehabilitation of non-titled people and informal settlers, and the provision of subsidies or allowances for PAPs that may be relocated, suffer business losses, or may be severely affected.

69. The main provisions affording reconciliation of the differences between Land Code and World Bank Policy includes:

- Any PAPs, regardless of title or not, will be entitled to compensation (for structures, crops and trees) and rehabilitation measures under the project. This includes land-less people using land and non-titled users;
- PAPs and affected communities will be consulted on options and any impacts of land acquisition and resettlement;
- If land for land compensation is not technically or sociably feasible, compensation will be in cash at full replacement cost at current market value;
- Compensation for any other assets affected (structures, crops and trees, as well as business/income loss) will be in cash or kind at full replacement cost at current market value. Vulnerable and poor PAPs will be entitled to additional measures as relevant, and gender issues will be addressed;
- Maintenance works will avoid or minimize, as far as possible, the need for land acquisition and resettlement; and
- The RPF includes measures for severely impacted PAPs and requires that any RAP prepared for the project include all costs related to rehabilitation and/or livelihood restoration.

### **4.3 International Conventions**

70. The Kyrgyz Republic has ratified the following international conventions related to environment management:

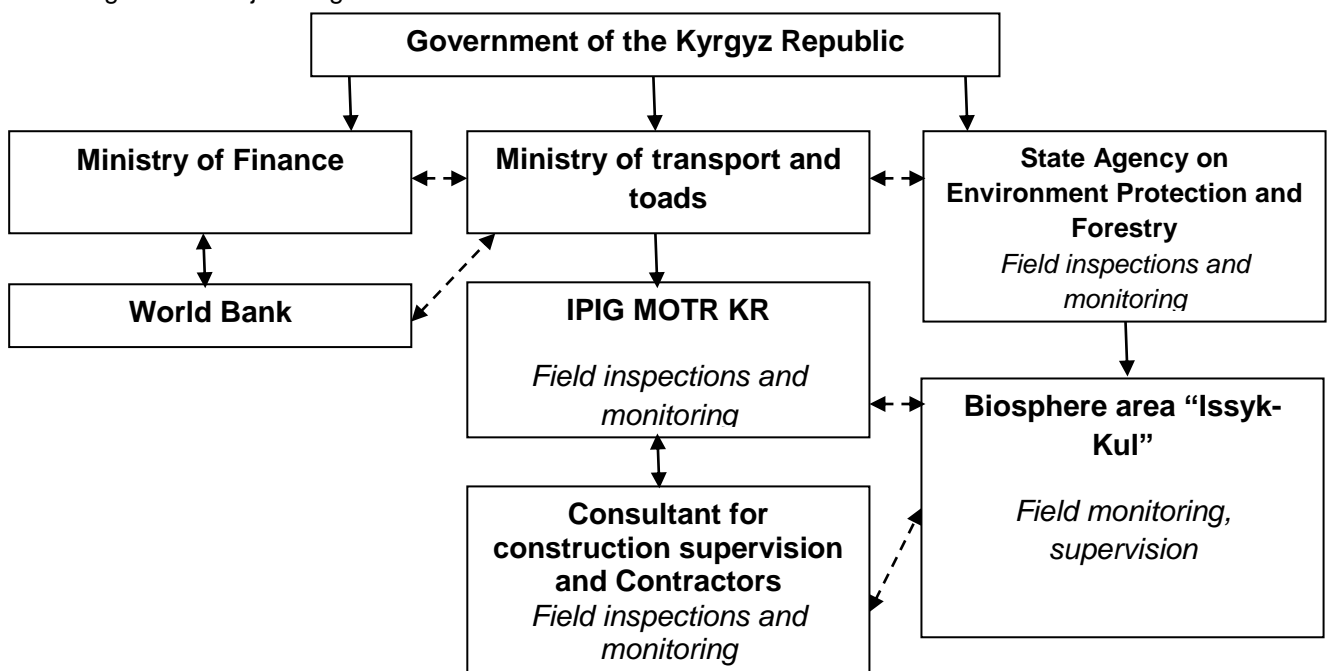
- i. UN Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal, 1996
- ii. Convention on Biological Diversity, 1996
- iii. Convention on transboundary air pollution on long distance 2000
- iv. United Nations Framework Convention on Climate Change, 2000
- v. UN Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade 2008
- vi. Vienna Convention for the Protection of the Ozone Layer, 2000

- vii. The Montreal Protocol on Substances that Deplete the Ozone Layer, 2000
- viii. The Stockholm Convention on Persistent Organic Pollutants, 2002
- ix. UNECE Convention on Environmental Impact Assessment in a Transboundary Context, 2001
- x. The Ramsar Convention on Wetlands, the UN Convention on Wetlands of International Importance especially as Waterfowl Habitat, 2003
- xi. The UNECE Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Issues; KR joined in 2001
- xii. Convention to Combat Desertification in Countries Experiencing Serious Drought and / or Desertification, Particularly in Africa, joining in 1999
- xiii. Convention on the International Trade in Endangered Species of Wild Fauna and Flora; KR joined in 2006
- xiv. The Cartagena Protocol on Biosafety. KR joined in 2005
- xv. Convention of the World Cultural and Natural Heritage; KR joined in 1995.

#### 4.4 Institutional Framework for the Project

71. [Figure 10](#) shows the organizational structure of the Project, including the Government of the Kyrgyz Republic, the Ministry of Finance (MOF), MOTR (IA), SAEPF responsible for granting environmental permits, the subordinate organization under the SAEPF and the World Bank.

Figure 10: Project Organization



72. MOF is a government body responsible for coordinating foreign aid from the World Bank and other donors. MOTR is responsible for development of the transport sector, and is an Executing Agency for the Project. MOTR bears an overall responsibility for planning, design and implementation of the project.

73. SAEPF is responsible for environmental policy, regulation and coordination of the examination, and issuance of permits. Its functions include:

- i. administration, coordination of subordinate structures - regional and territorial divisions;
- ii. development of environmental policy and its implementation;
- iii. environmental information services;
- iv. development of policies for development of forestry and hunting business;
- v. environmental monitoring;
- vi. state ecological expertise;
- vii. issuing environmental licenses;
- viii. international cooperation.

74. A new state body was established in the Kyrgyz Republic in January 2012 - the State Inspectorate for Ecological and Technical Safety under the Government of the Kyrgyz Republic. The Inspectorate took over inspection and supervision functions from a number of government agencies and departments, among which the followings should be highlighted:

- i. functions of control and supervision of the environment protection of the State Agency of Environmental Protection and Forestry of the Kyrgyz Republic;
- ii. functions of the State Inspectorate for Industrial Safety and Mining Supervision of the liquidated Ministry of Natural Resources;
- iii. functions of the Land Inspectorate for state control over land use and protection of the liquidated Ministry of Natural Resources of the Kyrgyz Republic.

75. SAEPF has territorial administration in Karakol with the same specific duties that the central agency.

76. In addition to SAEPF under the Government of the Kyrgyz Republic responsible for the formation and implementation of environmental policy in the Kyrgyz Republic, other important actors - state and municipal authorities responsible for environmental assessment issues are:

- i. Ministry of Health (questions of safety and health protection, quality of drinking water, noise and vibration);
- ii. Ministry of Emergency Situations (risks and situations related to natural conditions) and the General Directorate for Hydrometeorology under MOE (Kyrgyzgidromet) responsible for monitoring of air and water quality;
- iii. Ministry of agriculture, irrigation and food processing (use of agricultural lands and pastures);
- iv. Ministry of Culture, Information and Tourism is responsible for implementation of the state policy in the field of culture, information and tourism.
- v. State Agency for Geology and Mineral Resources under the Government of the Kyrgyz Republic (certificates and licenses for inert materials stocks);
- vi. State Inspectorate for ecological and technical safety under the Government of the Kyrgyz Republic (state environmental control);
- vii. Raion State Administrations (RSA) for issues of resettlement and land acquisition, public hearings, disclosure, etc.);
- viii. Local self-government bodies - Aiyl okmotu (social issues, provision of land for dumps, asphalt plants, workers` camps, and others).

#### **4.5 World Bank Safeguard Policies Applicable to the Project**

77. The World Bank's environmental and social safeguard policies are regarded as a cornerstone of its support to sustainable poverty reduction. The objective of these policies is to prevent and mitigate undue harm to people and their environment in the development process. These policies provide guidelines for the World Bank and recipients in the identification, preparation and implementation of programs and projects. The project triggers the following



environmental and social safeguard policies: Environmental Assessment (OP/BP 4.01), Natural Habitats (OP/BP 4.04), and Physical Cultural Resources (OP/BP 4.11), and Involuntary Resettlement (OP/BP 4.12).

78. **Environmental Assessment:** Environmental Assessment is one of the 10 environmental, social, and legal Safeguard Policies of the World Bank. Environmental Assessment is used in the World Bank to identify, avoid, and mitigate the potential negative environmental and social impacts associated with Bank lending operations. In World Bank operations, the purpose of Environmental Assessment is to improve decision making, to ensure that project options under consideration are sound and sustainable, and that potentially affected people have been properly consulted. The World Bank's environmental assessment policy and recommended processing are described in Operational Policy (OP) 4.01: Environmental Assessment. This policy is considered to be the umbrella policy for the Bank's environmental 'safeguard policies'. Initially the Bank undertakes environmental screening of each proposed project to determine the appropriate extent and type of EA. The Bank classifies the proposed project into one of four categories, depending on the type, location, sensitivity, and scale of the project and the nature and magnitude of its potential environmental impacts.

79. Considering probability and severity of environmental and health and safety risks, the project was assigned a safeguards Category B according to the World Bank OP 4.01 Environmental Assessment. A proposed project is classified as Category B if its potential adverse environmental impacts on human populations or environmentally important areas--including wetlands, forests, grasslands, and other natural habitats--are less adverse than those of Category A projects. These impacts are site-specific; few if any of them are irreversible; and in most cases mitigatory measures can be designed more readily than for Category A projects. The scope of EA for a Category B project may vary from project to project, but it is narrower than that of Category A EA. Like Category A EA, it examines the project's potential negative and positive environmental impacts and recommends any measures needed to prevent, minimize, mitigate, or compensate for adverse impacts and improve environmental performance. The findings and results of Category B EA are described in the project documentation (Project Appraisal Document and Project Information Document). The Project herewith has been classified as a Category B Project.

80. The main envisaged potential negative impacts during construction are the development of borrow areas, generation of waste (construction materials, expendable materials and spare parts, household waste and wastewater from camps), excessive land use, topsoil destruction and erosion. There is also a potential impact on groundwater and surface water (e.g. excessive turbidity and silting, accidental spills of fuel and lubricants). During operation of the road, storm water drainage, noise, dust, air pollution may be considered as potential issues. The ESMP has been developed and the requirements for compliance will be integrated into bidding and contract documents to provide clear guidance and contractual obligations for environmental and social due diligence in detailed project design and implementation.

81. **Natural Habitats OP/BP 4.04 (triggered):** This policy is triggered to ensure that any interventions into the natural habitats in their immediate vicinity consider potential impacts and are fully harmonized and supportive of the habitat conservation goals.

82. **Physical Cultural Resources OP/BP 4.11 (triggered):** This policy is triggered as some of the project interventions are located in close proximity to historic sites of the Kyrgyz Republic which are registered as a monument of republican significance. Moreover, one of the project objectives is to provide access to such sites by improving roads and promoting tourism. Projects that will significantly damage non-replicable cultural property will be excluded from funding.

Projects shall include a plan for the protection and/or enhancement of cultural properties accidentally encountered (“chance finds”).

83. **Involuntary Resettlement (OP/BP 4.12, triggered).** This policy is triggered as despite the fact the interventions are expected to take place within the existing public right-of-way or within the existing footprints of the respective TSC some works might be performed that require widening of the road bed or works outside the TSC territory. Land acquisition is expected to be avoided and impacts minimal. Specific impacts will be determined after completing the detailed technical designs. If applicable, Resettlement Action Plan(s) will be prepared by the Borrower. *For more information regarding the social safeguards refer to the Project Resettlement Policy Framework (RPF).*

84. **Comparison of the Kyrgyz Republic legislation and the World Bank Operational Policies.** As a result of comparing the Kyrgyz Republic legislation and the World Bank Operational Policies no inconsistencies were found. Each of policies applied has several relevant Kyrgyz laws. In addition, Law on Access to Information was included in order to ensure the transparency during the implementation of the Project. This Law regulates the rights and obligations of state bodies providing local population with information to ensure transparency while making decisions related to the Project and project implementation.

<b>Environmental Impact Assessment OP/BP 4.01</b>	Constitution of the Kyrgyz Republic	2010
	Concept of Environmental safety of KR	№506 dated 23.11.2007
	National sustainable development strategy of KR for 2013-2017	N 11 dated 21.01.2013
	Law of KR “On environment protection”	№53 Dated 1999
	Law of KR “On environmental expertise”	№54, dated 1999
	Law of KR “General technical regulations for ensuring environmental safety in the Kyrgyz Republic”	N151, dated 2009
	Regulation on procedure of environment impact assessment in the Kyrgyz Republic	№ 60 dated 13.02.2015
<b>Natural Habitats OP/BP 4.04</b>	Regulation on water protection areas and zones of water objects in the Kyrgyz Republic	N 271 dated 7.07. 1995
	Rules of surface water	№128 dated 14.03.2016

	protection in KR	
	Law of KR “On protection of the atmosphere”	№51 dated 1999
	Law of KR “On production and consumption waste”	№89 dated 2001
	Law of KR “On protection and use of flora”	№53 dated 2001
	Law of KR “On fauna”	№59 dated 1999
<b>Physical Cultural Resources OP/BP 4.11</b>	Law “On Protection and Use of Historical and Cultural Heritage”	№91 dated July 26, 1999
<b>Involuntary Resettlement (OP/BP 4.12)</b>	Constitution of the Kyrgyz Republic	2010
	Civil code	№16 dated May 8, 1996 as amended May 30, 2013
	Land code	№ 45 Dated June 2, 1999 as amended May 26, 2009
	Law “On the transfer (transformation) of land”	N 145 dated July 15, 2013
	Law “On Roads”	№72 dated June 2, 1998
	Regulations on valuation of assets	Valuation of assets is based on the Provisional Rules of activities of valutors and valuation organizations (Government Decree №537 dated August 21, 2003), property valuation standards (Government Decree №217 dated April 3, 2006) and other provisions of national law
	Law of KR “On local self government and local state administration”	№101 dated 2011
	Law “On access to information under the jurisdiction of State bodies and local self-government	№213 dated 28.12.2006

	bodies of the Kyrgyz Republic”	
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#### 4.6 World Bank Environmental, Health and Safety (EHS) Guidelines

85. The WBG has developed a range of environmental, health and safety (EHS) guidelines. Part of these guidelines include specific standards for ambient air quality and noise.

##### WBG Air Quality Guidelines

86. The WBG use the ambient air quality guidelines proposed by the World Health Organization (WHO). [Table 4](#) provided these standards.

Table 4: WHO Air Quality Guidelines

Parameter	Averaging Period	Guideline Value ( $\mu\text{g}/\text{m}^3$ )
Sulfur Dioxide ( $\text{SO}_2$ )	24 hour	20
	10 minute	500
Nitrogen Dioxide ( $\text{NO}_2$ )	1 year	40
	1 hour	200
Particulate Matter $\text{PM}_{10}$	1 year	20
	24 hour	50
Particulate Matter $\text{PM}_{2.5}$	1 year	10
	24 hour	25
Ozone	8 hour daily maximum	100

##### WBG Noise Guidelines

87. According to the WBG EHS Guidelines, noise impacts should not exceed the levels presented in [Table 5](#) or result in a maximum increase in background levels of 3 dB at the nearest receptor location off-site.

Table 5: WBG Noise Level Guidelines, One Hour Laeq (dBA)

Receptor	Daytime (07.00 – 22.00)	Night-time (22.00 – 07.00)
Residential, institutional, educational	55	45
Industrial, commercial	70	70

##### General WBG EHS Guidelines

88. In addition to the above, the WBG EHS guidelines also provide extensive guidance on a range of other EHS issues, such as occupational health and safety, community health and safety, etc. The mitigation measures that have been adopted for this Project have included all of the relevant WBG EHS guidelines.

## 5. Baseline Data

### 5.1 Baseline Monitoring

89. The IPIG at the MOTR has contracted an independent body to conduct baseline monitoring at the potential project sites. The samples were taken for various environmental receptors including water, soil, noise environment and air.

Figure 11: Location of Sampling Points for Air, Water and Soil Quality and Noise Level



90. Based on the chemical analysis of water at eight various locations, the copper content has exceeded threshold values twofold at 3 locations including the mountain camp Karkyra. The soil was analyzed at 13 locations and no exceedance of Maximum Allowable Concentration (MACs) of any of the pollutants was found. Similarly, no exceedance of noise threshold values was detected at any of the sampling sites. The dust sampling showed very low values at all project locations. Finally, as expected, air pollution values of SO<sub>2</sub>, NO<sub>x</sub>, formaldehyde and CO at all sampling locations was below threshold values. The only sampling point where the NO<sub>x</sub> content has exceeded the MAC of 0.04 mg/ m<sup>3</sup> was the historical site, “the Stones of Tamerlane” (0.193 mg/m<sup>3</sup>).

91. The following values have been established against which the project environmental performance will be monitored.

#### Air quality

92. Maximum Permissible Level (MPL) of pollutants in the air in compliance with the Kyrgyz and international standards is presented below.

Table 6: MPL of Pollutants

Pollutant	Maximum permissible level (mg/m <sup>3</sup> )		Concentration averaging time	
	According to the National Legislation	According to international requirements*	According to the National Legislation	According to international requirements*
Solid particles:	0,5	0,02	Daily average	1 year
Sulfur dioxide SO <sub>2</sub>	0,5	0,02	Daily average	24 hours
Nitrogen dioxide NO <sub>2</sub>	0,085	0,04	Daily average	1 year

Pollutant	Maximum permissible level (mg/m <sup>3</sup> )		Concentration averaging time	
Carbon monoxide CO	3,0	0,1	Daily average	Max 8 hours per day at average

\* World Health Organization (WHO). WHO Air Quality Guideline

### Water quality

Surface Water Quality Standards.

Table 7: Surface Water Quality Standards

Pollutants	Maximum permissible level (mg/m <sup>3</sup> )	
	According to the National Legislation	According to the EU Legislation
Muddiness	Not less than 20 cm	Not less than 1,0 meter/depth
Oil products	0,3 mg/l	Not visible as a membrane

SN 2.1.5.1315-03 with changes in CH 2.1.5.2280-07 and SanPiN 2.1.5.980-00. Directive 2006/44EC of the European Parliament and Council 6.09 on "The quality of fresh water to be protected and quality improvement to preserve water life.

### Noise levels.

Table 8: International Noise Standards

Noise level guideline *		
	One hour Leq (dBAs)	
Category	Day time 07:00 - 22:00	Night time 22:00 - 07:00
Villages	55	45
Industrial, commercial	70	70

Recommendations for the noise level values measured outside of the buildings. Source: Guideline for noise level determination, World Health Organization (WHO), 1999.

Table 9: Permissible Noise Levels in the Kyrgyz Republic (dB)

Description of activities / category	Lequi*		Lmax**	
	Day	Night	Day	Night
Areas directly adjacent to hospitals and sanatoriums	45	35	60	50
Areas directly adjacent to residential buildings, clinics, dispensaries, rest homes, boarding	55	45	70	60

Description of activities / category	Lequi*		Lmax**	
	Day	Night	Day	Night
houses, libraries, schools, etc.				
Areas directly adjacent to Recreational area hospitals and dormitories	60	50	75	65
Recreation areas in the territory of hospitals and sanatoriums	35		50	
Recreation areas on the territory of microdistricts and residential areas, recreation centers, health centers, schools, nursing homes, etc.	45		60	

SN 2.2.4/21.8.562-96 "Noise at workplaces, in residential accommodation, public buildings and in the territories of residential construction.

## 5.2 Physical Resources

93. **Geology and Topography.** Issyk-Kul oblast is the northernmost of the seven oblasts of the Kyrgyz Republic. On the west it borders with Naryn and Chuy oblasts, on the north with Kazakhstan, on the south and east with China. Issyk Kul basin with the territory of 22 000 km<sup>2</sup> occupies the half of the oblast territory. Balykchy city (420 27' 40" on the north, 760 10' 49" on the east) is located at the western end of the lake 123 km east of capital city Bishkek; Karakol is the administrative center of the oblast (42029' 24" on the north, 780 22' 48" on the east) and located at the eastern end of the oblast 300km from Bishkek.

94. Approximately 180 km long and 60 km wide Issyk-Kul Lake is located at an altitude of about 1,600 m above sea level and mainly surrounded by mountains. The most famous ranges are the Kungei Ala-Too in the north, which rises to a maximum height of 4,771 m at Chok-Tal and Teskey Ala-Too in the south with maximum height of 5,216m at Karakol. Lower and isolated peaks surround the eastern and western ends of the basin, including: Alabel and Chaarzhon (2,722 m); and Karakuu and Kyzylompol, respectively. Only a narrow valley, Boom Gorge, in the west breaks the mountains system. The Chui River flows through the gorge.

95. The region has a rugged topography which is mainly controlled by the north-eastern and north-western tendentious displacements at Kungei Alatau. Topography is characterized by numerous mountain ridges, separated by deep and narrow gorges with gentler wavy foothills. The topography was also exposed to climate influence, especially the glaciation periods and the numerous rivers and streams that flow down the mountain slope, deepening the gorges and carrying the precipitation. As a result, intermountain regions are gradually filled with Mesozoic and Cenozoic origin sediments.

96. The basin center is dominated by the lake and surrounding flood plain which descends slightly down to the water's edge from about 2,100 m height. The plain width varies from a few kilometers to almost 40-50 km at some places and consists of river alluvium (a extensively cemented conglomerate, clay and sand) of Quaternary period deposited by rivers; And diluvial material (coarse gravel, pebbles, clay and sand), washed away from the mountains by rain or ephemeral currents.

97. **Landscape.** The landscape of the basin is one of the main natural beauty with distant mountains and foothills, forming an impressive background. Nevertheless, the landscape was

slightly exposed to anthropological impact, as flood plains were dewatered and natural vegetation was removed during the Soviet period to allocate lands for large-scale agricultural projects, and dry regions were irrigated to expand productive areas.

98. The flood plain between foothills and the lake has a slight slope and mainly used for agriculture. Nowadays, the agricultural activities are relatively low and individual small farmers are engaged in these activities. The most part of the landscape is weedy, as secondary vegetation covered the uncultivated land. The lake presents another sharp contrast, as bright blue and green colors of water and orange and yellow shades of the coastline supplement colors of green and brown vegetation and the rare bright colors of crop.

99. The region is not densely populated. However, there are still unsettled issues in many city areas where roads, drainage ditches and other infrastructures, including many private houses are often poorly maintained. But at the center of Cholpon-Ata, where modern buildings are located, the situation with maintenance is better, this is due to income received from the tourism which is the key industry of the area. A positive characteristic of the city landscape in many cities and villages is the wide roads and spaces that are strengthened by the planning uniformity.

100. **Soils.** In many places the type and distribution of soil in the study zone are the result of complex interactions between a variety of factors, including geography, geology, topography, climate, vegetation; and anthropogenic impacts such as land use, irrigation, and etc. There are three main types of soil in the Issyk-Kul basin, distributed according to the altitude:

101. The main types are:

- i. Soil in lowland and foothill: found in bottom land of the lake and intermountain basin (between 2000-2500 m);
- ii. Soil in the surrounding intermountain basin (3000-4000m);
- iii. Soil on mountain slopes (2500m and higher)

102. A distinctive feature of the mountains is a hard climate, which means that the soils were deeply frozen within a longer period of the year and are developed under the influence of cryogenic processes, including seasonal freezing and thaw, and stable permafrost in some zones. Generally, soils in the mountains are not deep and infertile, and at high peaks there is no soil. In depressions soil variety starting from rock gravel and sandy soil to turfy bases can be found in zones where vegetation used to grow.

103. In the foothills, the soil has a tendency to be stony with a high content of gravel and other particles eroded from the mountains or left after the glacier. Closer to the lake, the soil becomes more turfy in zones that were flooded and covered with reeds and other swamp vegetation; and closer to the lake shore, the soil is water logged, swampy and drains poorly due to the high level of groundwater and high organic content. In the east, the soils are dark chestnut brown and, quite fertile, and this is one of the main zones for cultivation. In the northwest, the lowland soil is dark brown and then becomes sandy gravel in the semidesertic steppe zone.

104. **Climate.** The climate is milder than to be expected in the middle of dessert zone of the Central Asia the reason for this is buffering effect of the lake which never freezes and the mountains protecting the zone from cold masses of the Arctic air on the north and hot air of the Central Asian desert on the south and east. However, the climate is quite severe in highland and mountain areas because of the altitude, but it is milder in the valleys, especially closer to the lake.



105. The climate is influenced by the general structure of the Northern Hemisphere, summer period with high temperatures in June, July and August, and winter period with low temperatures between November - March, relatively short spring and autumn periods, during which conditions change quite rapidly. Nevertheless, there are distinctive differences in the maximum temperature due to altitude. In the vicinity of lake, the maximum average temperature is 170 C in July, whereas the daytime temperature is often above 300 C, in winter period the minimum average temperature is -70 C in January, while night time temperature often goes down to -250 C. In the mountains the temperatures is about 100C lower throughout the year, average temperature 10 0C in July and -18.60C in January.

106. Generally, precipitation falls in summer, when the west winds from the Atlantic Ocean warm up over the territory of the Central Asia and are saturated with water evaporated from Issyk-Kul and then get cool in the mountains in the east of the basin. This leads to a gradual precipitation increase from the west to the east of the region; average rainfall of 115 mm/year near Balykchy, 200-250 mm/year near Cholpon-Ata, 415 mm/year in Karakol and 600 mm/year in Kungei Alatau. Precipitation mainly falls in the form of snow in high lands throughout the year; the snow line (above which the snow does not melt fully) is about 3600 m in the north and east, and 4000 m - 4300 m in the south and west.

107. 60 % of the time, the wind in the basin blows from the west and the locals call it “ulan” or “boom” which passes through Boom Gorge. The direction changes to the east, especially in winter, when the wind is known as santash. In summer, convection currents cause local changes around the lake, as the earth warms up at day time, making winds blow from the lake to earth in the afternoon and in the opposite direction at night time.

108. **Surface water.** There are 118 rivers in the basin, 80 of which flow into the lake. Usually there is no outflow from the lake, but in periods when the water level is high, water outflows from the lake and flow into the Chui River through the natural depression and the Kutemaldy channel ast the west end. The quantity of water in the lake is about 1,700 km<sup>3</sup> and it is obvious that the water level has decreased by almost 3.5 m within the last century, averagely more than 30 mm per year. Mainly it is caused by river water diversion for irrigation, and since late 1990s water level has increased, as the Government has suspended support for agriculture and there was a decline in farming and, which resulted in using less water for irrigation.

109. The hydrological cycle in the basin is characterized by such parameters: high water level in the river in spring, when snow and glaciers in the mountains melt as the temperature increases in March and April. Afterwards water level in the rivers will increase due to precipitation in summer, although the actual cycle largely depends on the river water diversion for irrigation. Ground water also play important role in feeding certain rivers, in particular, during low water flow in winter and early spring. Hydrological features of the five main rivers in the basin are presented below.

Table 10: Hydrological Features of Main Rivers in Issyk-Kul Basin

River	Basin area (km <sup>2</sup> )	Average altitude of basin (m)	Total length of river (km)	Annual average flow (m <sup>3</sup> /s)
Jirgilan	2060	2840	250	22,5
Tyup	1130	1960	120	10,6
Karakol	325	3670		6,6
Jeti-Oguz	263	3340	46	5,3
Juuku	516	3260	55	6,3

110. **Water Quality.** According to chemical composition, water in the Issyk-Kul lake belongs to the sulfate-chloride class, the magnesium group, and has an alkaline reaction (8.06-8.80 pH). The oxygen regime is satisfactory, high oxygen content is observed throughout the water thickness from the surface to the bottom. The water salinity varies from 5,300 mg/l to 6,100 mg/l. Water hardness is 28-32 mg/l. Water clarity according to Secchi disk varies from 12 m to 30 m, the color of water is between 2 and 4 degrees.

111. Upon the order of the Directorate of Biosphere Territory "Issyk-Kul", Chui laboratory located in Kara-Balta city has carried out monitoring of water and sediments quality in Issyk-Kul Lake and several adjacent rivers. Water samples were taken at 29 sampling points in the lake and 10 sampling points in big rivers in August and September 2008, in March and June 2009. The collected samples were tested for various determinants, consisting of the followings: temperature, Ph, oxidation-reduction potential, electrical conductivity, salinity, suspended solids, dissolved oxygen, oxygen saturation, biochemical oxygen consumption (BOC), chemical oxygen consumption (COC), alkalinity, chloride, sulfate, nitrate, ammonia, phosphate, potassium, sodium, calcium, magnesium, iron, chrome and manganese.

112. The obtained results confirm the results of previous researches on the total chemical composition of lake water, which is dominated by sodium and magnesium cations and chloride and sulfate anions, and slightly saline (about 2-6%) due to the mineral content of the lake bottom and the water evaporation from the surface. Mineralization can be high enough in shallow bays in the north and west where relatively small quantity of water comes from the rivers.

113. Previous research indicates that the lake is polluted with various substances: run off water and local water flow into the rivers; waste water from septic tanks and pit latrines penetrate to groundwater; nitrates and phosphates flow with water from farming lands; metals are washed away from spoil dump and etc. However, the results of the DOB research program contain few data on this. There are few minerals in the river water because of their mostly crystallized origin and there are few pollution indicators, except for rare aboveground levels of ammonia. In rivers, the levels of dissolved oxygen are high (8-10 mg/L), the biochemical oxygen consumption for 5 days is not excessive (maximum 5.3 mg/l), the concentration of ammonia, nitrate and phosphate is also below the limits. However, the data are limited as they were collected only from coastal zones and included limited range of determinants, as such there is an obvious need to collect data from deep waters and greater variety of potential pollutants, including waste water bacteria, heavy metals, hydrocarbons, pesticides and radioactive elements to assess the impact of waste water from the uranium mine.

114. Analysis of the Issyk-Kul Lake water quality results. Laboratory tests were conducted in June 2016. Environmental Monitoring Department of SAEPF under the Government of the Kyrgyz Republic informed that the Issyk-Kul lake water pollution level is low. The content of ammoniacal nitrogen, nitrate nitrogen, phosphoric mineral, BOC5, and total iron does not exceed the limit. The oil product content exceeded the MPL at 4 points out of 8: Chopon Ata 2 km from the coast "Goluboy Issyk-Kul" sanatorium - 0,08 mg/l (1,6 MPL), Cholpon-Ata city, the lighthouse 20 km from the northern coast - 0,07 mg/l (1,4 MPL), Grigorievka 4.4 km from the mouth of the Chon-Aksuu River - 0.12 mg/l (2.4 MPL), Grigorievka 15 km from the mouth of the Chon-Aksuu River - 0.013 mg/l (2.6 MPL).

115. **Ground water.** In the Issyk-Kul Lake basin 118 rivers and streams flow towards the lake, but only 49 of them flow into it. The characteristics and distribution of ground water is usually determined by the physical properties of the zone, in particular by geology, topography and climate, as well as the distribution and hydrology of surface water. In this case, the presence of the lake and the structure and composition of the basin are key factors.

116. There is a large artesian basin lying deep in the lake, which consists of three hydrogeological layers: (i) the upper layer of wide quaternary sediments; (ii) the middle layer of hardened Mesozoic and Cenozoic rocks; (iii) the lower layer of semi-permeable rocks. The supply of main groundwater is found on the upper layer and the lower layer does not significantly flow to the resources. The middle water bearing bed is mostly passive and does not receive significant meteorological water, retaining old water accumulated in sandy and coarse-grained sandy layers which interchange with clay. The upper layer consists of porous sand and clay and is hydrogeologically tied with the lake and a main storage for water that merges through the surface of the soil.

117. River network reflects the atmospheric precipitation in the depression. In the western part of the lake basin, where precipitation is low, the river network is poorly developed and the specific flow of the rivers is low. In the eastern part of the lake, where the quantity of precipitation is higher, a thick hydrographic network is developed and rivers are rich in water. The rivers with the most specific water content are located in the eastern part of the basin. The rivers in the western part of the depression have a much lower water content.

118. The cycle of ground water formation begins with the fall of precipitation, which flows down to the lowlands as rainwater and snow in the mountains penetrates into the earth through the cracks on the rocks. Then it goes towards the surface through deep fractures or air channels like thermal mineral water. A large portion of the penetrated ground water becomes part of the surface runoff in the underwater mountain ridge; and about 15-20% of it remains as groundwater in the basin. At the next stage, the water in the basin is supplied by a river flow below the mountains, mainly by peripheral currents. Here the main portion of surface flow is filtered through the river bed (about 50 m<sup>3</sup>/s) and irrigation channels (20 m<sup>3</sup>/s). Fall of precipitation feeds only a small source of groundwater compared to filtration through the vadose zone and groundwater reservoirs at a level of 1.5 m<sup>3</sup>/s. Irrigation modifies the ground water regime by locally raising the water level to the surface of the soil in places causing waterlogging and salinization.

119. Ground water provides a significant portion of the required domestic water in the basin through public water supply network in villages, and private wells in rural areas. Below are the data showing the projected and the dimensional tolerances of precipitation in the Issyk-Kul basin. In 2007, the inventory of the water supply system identified that there were about 500 household wells, and many of them are located in resort areas. Majority of old wells are out of order due to inadequate maintenance and repair, but there are a lot of new wells, especially in tourist areas with control on a small scale. Although there is no direct evidence that the resources are used beyond the level of their natural recovery, the quality of water raises a concern, including the existing high groundwater levels and the unsanitary waste-water disposal practices, particularly to pit latrines.

Table 11: Projected Precipitation and Approved Water use in Issyk-Kul Basin

	<b>Approved use (m<sup>3</sup>/24 h. x1 000)</b>	<b>Projected precipitation (m<sup>3</sup>/24h. x1 000)</b>
Rybachinskoe	47,0	64,0
Rybach-Tamchniskoe	279,4	509,4
Karakol	105,2	260,0
Korgulenskoe	102,7	348,7

Akolonskoe	128,1	234,7
Sarybulun	103,7	165,9
Chatkal-Ananyevskoe	196,2	500,9

**Source: State Committee for Industry, Energy and Mineral Resources.**

120. Ground water also has a great influence on the economy of the basin, as many tourists visit the thermal mineral springs that are located around the lake at more than 50 locations. However, some of these locations are poorly maintained and dirty, damaging their attractiveness and therapeutic value.

121. Rivers are classified as long water bodies and possible contamination in elevated places spreads over long distance by water flow. The Tyup River flows nearby the project area, therefore it is recommended to develop measures to ensure maximum environmental safety of all structures: roadbed, construction camp, workshops, fuel storage facilities, borrow pits and asphalt plant. Detailed discussion of Issyk-Kul Lake has been driven by potential risks of pollution of the lake with oil products. For example oil spill as a result of accident involving fuel tanker will result in local man made environmental disasters.

122. The quality of water in water streams located in the project area is good. Analysis of results of three water samples indicated that copper exceeds the MAC, but it is not related to the project activities. There is copper zinc deposit in the vicinity of the project area and the copper is an accompanying element. The remaining chemical elements in water are within MAC.

### 5.3 Biological Resources

123. **Flora and Fauna.** The landscape is characterized by diversity, contrast and mosaic structure. The complexity of landscape differentiation is determined by the history of development, orography, the total climate aridity, and large amplitudes of heights. On the slopes of mountain ranges and massifs with different mediocre orientations (and, consequently, different positions in relation to moisture-bearing air masses) and different conditions of insolation, different types of landscapes are formed and develop, alternating with altitude. At the same time, the influence of latitudinal zoning, which determines the difference in the landscapes of the northern and southern parts of the region, is clearly appeared. Meridional differences are observed, and this is due to local characteristics of the atmospheric circulation (the western part - deserts and steppes, the eastern - steppes, meadows and forests). Landscape differentiation of the territory is complicated by the presence of intermountain and intermontane depressions located at different absolute altitudes.

124. There are six main series of landscapes within Issyk-Kul oblast:

- Humid line is represented by mountain meadow (meadow-steppe), mountain-forest landscapes in conditions of sufficient moisture on the mountain slopes of the northern and the north-eastern exposures, starting from height of 1700-1800 m above sea level to the nival zone;
- Arid line is represented by deserts, semi-deserts and steppes. Desert landscapes are represented by two zonal variants - flat-foothill zone and mountainous zone. Desert and semi-desert landscapes in the western part of the Issyk-Kul basin are formed on alluvial-proluvial deposits of the foothill and lakeside flat land;
- Mountainous deserts are formed by wormwood, saltwort, eurotia and other formations, mainly of Central Asian origin. Semidesert mountain landscapes are mainly represented

by wormwood- gramineous semi-desert. High-mountain semi-deserts occur at altitudes from 3000 to 3300-3500 m above sea level. on accumulative syrt of low hill flat lands;

- Steppe foothill-low mountain and flat land landscapes are located at an altitude of 1610 m in the eastern part of the Issyk-Kul basin and replace the meadow-steppe zone in the western part at an altitude of 2000 m. Soils differ from light chestnut to chestnut and dark chestnut.
- Tundra landscapes are represented by small spots on all ridges above 3,700 m and on the syrt flat lands of Arabelsuu, Kumtor, Taragay, Karasay;
- Mountain-rocky-nival and glacial-nival landscapes can be seen in the peak side parts of ridge and are represented by glaciers of different types, rocks, moraines, corries, circuses, rock glaciers, dandruffs.

125. Terrestrial habitat in the basin varies depending on climate, soil type, land use and in particular altitude, and includes deserts, semi-deserts, steppes, lowlands, tundra and forests. The altitude range and climatic conditions, as well as the geographical isolation of the basin are key features that affect the rich and diverse environment of the region. Desert areas are mainly located in the west and north-west, where precipitation is low and the soils are granular and sandy, and vegetation is limited due to severe conditions. As a result, the flora mainly consists of drought-resistant and salt-tolerant shrubs, herbs and plants, such as *Sympegma regelii*, *Kalidium caspica*, *Eurotia ceratoides*, and others.

126. Pastures are the dominant habitable environments and cover the major part of the lake basin and intermountain zones, as well as the foothills where the initial forest environment has been removed. The steppes of this region are part of a significant area of the pasture that covers major part of the southern Russia and the Central Asia, stretching from the Ukraine in the west to China in the east, forming a large zone of cold steppes in the world. In the Issyk-Kul basin there are dry, lowland and vegetative steppes, including extensive subalpine lowlands. The flora in many of these zones was influenced by human activities, in particular, farming in the valleys and grazing on the highlands. Nevertheless, there is still a large zone of natural environment and zones of secondary planting on the abandoned agricultural lands. Typical species include *Stipa caucasica* (feather grass or filamentous grass), *Stipa splendens*, *Polygonum karelini* (buckwheat or spore), *Caragana multiflora*, *Aconitum rotundifolium*, and others.

127. Alpine lowlands appear at altitudes and include species resistant to cold, including *Festuca rubra* (fescue red), *Helictotrichon pubescens* (oats), *Origanum vulgare* (wild marjoram), *Lamium album* (dead nettle), *Geranium collinum* (cranesbill), *Leontopodium lutens* (edelweiss), etc. There are also numerous shrubs in this zone, including *Lonicera altmanni* (honeysuckle), *Rosa* spp (rose) and *Hippophae* spp (buckthorn). As of today, the forest is a relatively small environment in the basin, as it covers only 3% of the land area (about 65,000 ha), that is significantly smaller than the area that it used to cover only a few hundred years ago. The majority of the preserved forest is coniferous, dominated with endemic *Picea schrenkiana* (Tien-Shan spruce) and found mainly on cold and humid northern slopes at an altitude of 1900-2800 m. There are also some broad-leaved trees, mainly they are birch, poplar and oak, and found in the lowlands.

128. There is small number of trees in the zones of high mountain tundra due to low temperature and short growing season. There are some forms of stunted tree, but the main vegetation consists of low shrubs, sedges and grasses, including mosses and lichens. This natural environment is located above 3500 m and the habitat for a lot of rare and endangered animals of the basin, including snow leopard and its main prey Pamir sheep and the Tien Shan

goat, eagle (*Aquila chrysaetos*) and *Octocolobus manul*. One of the significant features of this natural habitat is that, due to the short growing season, most angiosperms bloom simultaneously in early summer, when the tundra lowlands turn into a huge land of flowers. Some vegetation species found in the basin are rare, and nine of them are listed in the Red Book of the Kyrgyz Republic as endangered species. They include the *Acorus calamus* (found in the inundated meadow in the Tup River), the snow lotus *Saussurea villosa involucrate* (Teskey Alatau, the upstream of the Sary-Jaz river), the legumes *Chesneya villosa* (in the west of the basin), *Hedysarum kirgisorum* (Teskey Alatau), Kolpakowski Tulip (Chu Valley), *Anemone obtusiloba* (Teskey Alatau, in the basin of Sary-Jaz).

129. **Endemic Species.** The fauna of the basin is the result of migration of various species from the nearby zones after the glacial period, so there are representatives from a wide range of habitats and vegetation type, including the European, Mediterranean, Central Asian, Mongolian, Arctic and Palaeartic. Geographical division of the zone is also the result of the evolution of some endemic species found only in the mountains of the Tien Shan and/or Issyk-Kul Lake. There are 335 species of terrestrial and aquatic vertebrate species in the basin, including 4 amphibians, 31 fish (including 12 endemic species in the lake), 11 reptiles and 54 mammals (10 of them are endemic species of the Tien Shan). The rare and endangered animals are snow leopard (*Panthera unica*), Siberian mountain goat (*Capra sibirica*), Tien Shan brown bear (*Ursus arctos isabellinus*), Saker Falcon (*Falco cherrug*) and Pallas' sea eagle (*Haliaeetus leucophrys*) are. Other inhabitants are roe deer (*Capreolus pygargus*), beech marten (*Martes foina*), black grouse (*Tetrao tetrix*), eagle (*Aquila chrysaetos*), Himalayan vulture, Himalayan griffon (*Gyps himalayensis*), bearded vulture, lamer geyser (*Gypaetus barbatus*) and griffon vulture (*Gyps fulvus*).

130. *Haliaeetus leucoryphus* or Pallas' sea eagle is considered as Endangered Species by the IUCN. This species was previously thought to be a migratory breeder north of the Himalayas, with a stronghold in Mongolia, and a resident population in the Indian subcontinent, recent evidence and re-evaluation of historical data has since suggested that this is not, and may never have been, the case. Surveys in Mongolia between 2005-2009 found the species to be absent from 13 of 21 historically known sites, and found very little evidence for the species breeding anywhere north of the Himalayas. Further surveys in Mongolia between June-August in 2012-2015 similarly found no evidence of breeding. The species may instead breed only in northern India (apparent strongholds in Assam and Uttarakhand), Bangladesh and Myanmar, with very small numbers in Bhutan, dispersing north of the Himalayas to Kazakhstan, Russia and Mongolia in its non-breeding season (May to September). No estimation of species has been conducted during the migratory period of these birds in Kyrgyzstan, and particularly around the area of the project activities. Additional studies conducted during the feasibility studies and detailed design stages may shed some light on population of these birds along the Tyup-Kegen road and Karkara valley.

Table 12: *Haliaeetus Leucoryphus* or Pallas' Sea Eagle



131. Key threats to these species include habitat loss, degradation and disturbance. Across the Indian subcontinent, and probably most of its range, wetlands have been drained or converted for agriculture and human settlements. The felling of large trees near wetlands has reduced the availability of nest and roost sites. Pollution of wetlands with pesticides and industrial effluents reduces breeding success. Habitat loss and degradation are compounded by disturbance of wetlands. It can be tentatively concluded that because the species habitats are wetlands and trees along the water, the rehabilitation of the existing roads will not add to the existing threats.

132. The biological significance of the lake is its fish fauna (see below) and the fact that it attracts a large number of migratory and waterfowl birds. Some of the birds, such as *Ibidorhyncha struthersii*, mountain goose (*Anser indicus*) are rare. About 50,000-80,000 (from 30-35 species) birds regularly overwinter in the lake, and many others use the area as a temporary place for rest during seasonal migration. The main birds which visit this area are the great crested grebe (*Podiceps cristatus*), red necked grebe (*Pgrisegena*), horned grebe (*Pauritus*), black necked grebe (*Pnigricollis*) and small *Tachybaptus ruficollis*, heron (grey heron *Ardea cinerea*, big white heron *A alba*), swan (wooping swan *Cygnus cygnus*, deaf swan *C olor*), goose (wild goose *Anser anser*, white-fronted *Aalbifrons*), redhead pochard, (red-crested pochard *Netta rufina*, redhead pochard *Aythya ferina* (IUCN Vulnerable), red pochard *Anyroca* , tufted pochard *A fuligula* ), ducks (mallard duck *Anas platyrhynchos*, grey duck *Anas strepera*, white bellied duck *Aacuta*, garganey *Anas querquedula*, bimaculate duck *Anas formosa*, coot (*Fulica Atra*) and many others.

133. **Biodiversity of the Issyk-Kul Lake.** Though no impact is expected on the lake environment due to the fact that project site locations are situated more than 30 km away from the lake, it is worth to describe the lake environment to ensure that habitat sensitivities are taken into consideration during the feasibility and design stages. Issyk Kul lake might play a significant role on the biological processes in the habitats located directly in the project areas. The lake has a specific influence on the environment and biological diversity as it is isolated from other aquatic habitats and it allows endemic species to develop. It never freezes, thus it attracts a large number of water fowl, where they can overwinter or have a rest during annual migration. Therefore, the lake is an attractive and, to some extent, an unusual habitat, and also one of the main reasons why this region has rich biodiversity.

134. The Issyk-Kul Lake is of tectonic origin, formed as a result of fractures, faults and deflections of the earth surface. The vast part of the lake settled down and was filled with water,

while neighboring areas ascended to 3000-3500 m above the lake level and formed the Teskey Alatau mountain ridges to the south and Kungei Alatau to the north of the lake. In the east, the hollow is enclosed by the isolated highlands of Chaarjoo (2722 m) and Ala-Bel, and in the west Kara-Koo and Kyzyl-Ompol. The mountain border of the Issyk-Kul Lake disappears in the west by a narrow Boom Gorge through which the Chu River flows. The Chuy River does not reach the Issyk-Kul Lake only 4 km. The lake is 180 km long and 60 km wide with average depth of 280 m and maximum depth of 668 m, the area is 6236 km. Depths up to 100 m, domesticated by living organisms, compose about 38% of the total lakescape. The water volume is 1,738 km, the length of the coastline is 688 km. The water level of the lake changes according to the seasons of the year. During spring and summer periods of abundant water entry because of thawing water and melting glaciers, the water level increase by 21-22 cm, at average, and in the autumn and winter period water level decreases.

135. Due to great depths, slight ruggedness of the coastline, uniqueness of the climatic conditions of the basin and the hydrological conditions of the lake itself, Issyk-Kul can be classified as an oligotrophic water body. Thus, phytoplankton production does not exceed 488 mg/m<sup>3</sup>, zooplankton - 910 mg/m<sup>3</sup>, zoobenthos-10 g/m<sup>2</sup>. Approximately 300 species of phytoplankton were identified. Cyanobacteria (Cyanophyceae) prevail, but since they are microscopic, their biomass (the weight of their living tissue) is low. Macrophytes (macroscopic aquatic plants) are found in the lake coastline and spread down to approximately 1.5 m deep. Pondgrass is the most widespread macrophytes, and four species of stonewort (*Chara*) grow in shallow water and three others in great depths. There is also chained seaweed that spreads down upto 30-40 m deep in places.

136. There are 117 zooplankton species that are mainly presented by rotifers (98 species), cladocerans (11) and copepods (8). The population density of plankton is higher in shallow water than in the depth, perhaps this is because there is more food material closer to the coastline. Copepods (*Arcotodiaptomus salinus*) are present in all parts of the lake and within a year they can represent 75-95% of the total number of zooplankton and 95-99% of biomass. At night time, when a lot of zooplankton species migrate towards the surface, the concentration of crustaceans can reach 35,000 individuals/m<sup>3</sup> within several meters to the water surface. They are also a main food source for some fish species (Savvaitova and Petr 1999).

137. There is a quite rich zoobenthic community (animals living in the lake or at the bottom of the lake), which consists of 224 species. They were also found in shallow waters, at an approximate depth of 40 m. The low annual zoobenthos biomass is 8-10 g/m<sup>2</sup> with typical freshwater species such as shellfish and opossum shrimps, which are the dominant forms. The three species of the opossum shrimp were brought from the Sevan and Baikal lakes in 1965-68, and now there are a lot of them in shallow water, mainly at 1-2 m deep and spread down to 10 m deep, and their low biomass is about 1.5-2.5 g/m<sup>2</sup> (Ivanova 1986).

138. The lake is famous for its high level of endemism, which is obvious in many animal and plant groups, and especially in fish fauna. There are 26 fish species of which 12 (46%) are endemic species of the lake and its catchment, 4 others are Central Asian endemic species and the remaining 10 species were brought to develop and expand fisheries. However, fish production remains relatively low, about 1.5-2 kg/ha. (Konurbaev and Temirhanov 2001). Mainly this is because of oligo tropical feature of the lake (low levels of plant nutrients and primary productivity), and poaching, poor management of fisheries, and disintegration in the ecosystem associated with the bringing of nonlocal species. Data on fish fauna of the Issyk-Kul lake are presented below.

Table 13: Fish Fauna of the Issyk-Kul Lake



Genus	Species	Name	Origin/status
Salmon fishes (salmon, trout)	Salmo ischchan gegarkuni	Sevan trout	Brought in 1930
	Salmo giardinieri	Rainbow trout	Brought
	Coregonus lavaretus	Sevan vendace	Brought in 1970s.
Carp like fish (carp, dace)	Leuciscus schmidti	Schmidt's dace	Endemic
	Leuciscus berji	Issyk-Kul dace	Endemic
	Phoxinus issykkulensis	Issyk-Kul minnow	Endemic
	Gobio goboi latus	Issyk-Kul gudgeon	Endemic
	Schizothorax pseudoaksaiensis issykkuli	Issyk-Kul marinka	Endemic
	Diptychus dybovskii	Scaleless osman	Endemic (mainly in rivers )
	Diptychus dybovskii lansdelli	Issyk-Kul scaleless osman	Endemic (in the lakes)
	Diptychus gymnogaster microcephalus	Issyk-Kul scaly osman	Endemic
	Cyprinus carpio (IUCN Vulnerable)	Carp or mirror carp	Brought in 1950.
	Carassius auratus gibelio	Golden carp	Brought in 1950s.
	Tinca tinca	Tench	Accidentally brought in 1950ies.
	Abramis brama	Common bream	Brought in 1956-58.
	Pseudorasbora parva	Minnow or stone moroco	Brought
Cobitidae (char)	Noemacheilus stoliczkai	Tibetian char	Endemic in the Central Asia
	Noemacheilus elegans	Tien Shan char	Endemic in the Central Asia
	Noemacheilus strauchii	Thick lipped char	Endemic in the Central Asia
	Noemacheilus strauchii ulacholicus	Spotted char loach	Endemic
	Noemacheilus strauchii ulacholicus var pedaschenko	Spotty thick lipped char	Endemic

Genus	Species	Name	Origin/status
	Noemacheilus strauchii dorsalooides	Lake char	Endemic
	Noemacheilus dorsalis	Grey char	Endemic in the Central Asia
	Noemacheilus labiatus	Flat char	Brought
Percidae (perch)	Stizostedion lucioperca	Pike perch	Brought in 1956-58.
Eleotridae	Hypseleotris cinctus	Sleeping pigfish	Brought

**Source: Strengthening policy and regulatory framework for mainstreaming biodiversity into the fishery sector (UNDP 2007.)**

139. The natural fish fauna consists of 12 endemic species and four Central Asian species. And among them, stone morocos (*Leuciscus bergi*) were dominant species till early 1970s, which decreased to > 100 m and reached a maximum size of 165 mm and 60 g. Schmidt's dace (*Leuciscus schmidti*) were also widespread and are found in coastal waters till 35 -40 m deep, reaching 310 mm and 650 g and living up to 11 years. Scaleless osman (not scaly) appears as *Diptychus dybovskii* in the rivers and sub-species (*D d lansdelli*) in the lake. They both are omnivorous and formed an important component in fishery till the 1070s. The Issyk-Kul lake char (*Noemacheilus strauchii ulacholicus*) is widespread in coastal shallow waters, but also spreads down to 100 m deep and feeds on benthos, plankton and egg cells of other fish. The Issyk-Kul gudgeon (*Gobio goboi latus*) feeds on benthos, detritus and egg cells of fish and is important in the ecosystem, as it becomes a prey for plain char, Sevan trout and perch. Marinka (*Schizothorax pseudoaksaiensis issykkuli*) is omnivorous and one of the widespread fish species in the lake, reaching a length of 700 mm and a weight of 8 kg.

**140. Key Biodiversity Areas (KBAs), Important Bird Areas (IBA) and Protected Areas.**

The existing laws demand that designated state agencies give different levels of protection to rare and/or important territories, monuments and facilities. In the case of the environment, there are various definitions, including: state reserves, biosphere reserves, national parks, natural monuments, resorts and recreation areas, botanical gardens, forests and zoological parks. The general structure of the protection levels is as follows:

- i. State national reserves where any economic and other activities, which may impact the natural environment are prohibited;
- ii. National parks where differentiated protection regime is applied (reserve, recreation areas and etc.), depending on environmental sensitivity
- iii. Natural monuments, geological reservation areas and etc. to which access is allowed, though some certain activities might be prohibited (for example, camping, fire and etc.);
- iv. Reservation areas, established to protect particular parts of larger territories (for example, forest reserves, zoological reserves).

141. The World Database of Key Biodiversity areas recognizes two KBAs in the vicinity of the project area (See [Figure 12](#)) One is the Eastern Issyk Kul Lake whose territory includes mudflats along the shores, sea buckthorn thickets growing along the 2km length of shores, shallow floodplains, estuaries of Tyup, Djergalan, Kara-Kol, Kizil- Suu rivers. The territory is situated in close proximity to Karakol city.

142. IBA criterion A4iii is applied to the site because of the big concentration of wintering waterfowl. During stopover for resting and feeding, up to 2,5 thousand Demoiselle crane, many

waders, geese (Bean Goose), as well as White-headed ducks may stop here. Whooper swan and White-tailed eagle are common in winter. Tundra swan is rare. From 15 to 40 thousands individuals of 30 species winter here each year. Issyk-Kul basin hosts 267 bird species. Mallard, Gadwall, Common and Red-Crested pochards, Common coot and Great Crested grebe breed here. Species seen during the passage include Demoiselle crane, Northern Pintail, Garganey and Shoveler. Whooper and Mute swans, Goldeneye, Red-crested pochard and occasionally Tundra swan winter here. Non-bird biodiversity species include mammals (fox, ondatra, jackal, badger, weasel, water shrew and voles) and amphibians (Marsh frog and European green toad). Plants are sea buckthorn thickets, plantings of poplar, elm, barberry, sedges and reed. It should be noted that this KBA is about 30 km away from the projects site and will unlikely be impacted by the project activities.

143. Another site, which is in a close proximity to the potential operations is Karkyra valley. It covers an area of around 5000 hectares. The valley is confined in the north by Ketmenski and Kegetsy mountain ranges (Kazakhstan), in the south by Terski Ala Too mountain range. The relief is dominated by foothill- adyr plains, hilly valley. Precipitation up to 370 mm per year. Main rivers are Karkira, Kelen and Tekes. The highway passes along the valley. Landscapes are dominated by steppe and meadow formations of different types. Forests are spruce and deciduous trees species. Shrubs and wetlands are present in river valleys. This area is known as an area of mass migration of Demoiselle crane (*Grus virgo*) (IUCN LC) in April. Ibisbill (*Ibidorhyncha struthersii*) (IUCN LC) is seen in fall and early spring. Rare birds recorded here are Black stork (*Ciconia nigra*) (IUCN LC) and Saker falcon (*Falco cherrug*). Site is along the mass passage route of passerine, waders and Anatidae.

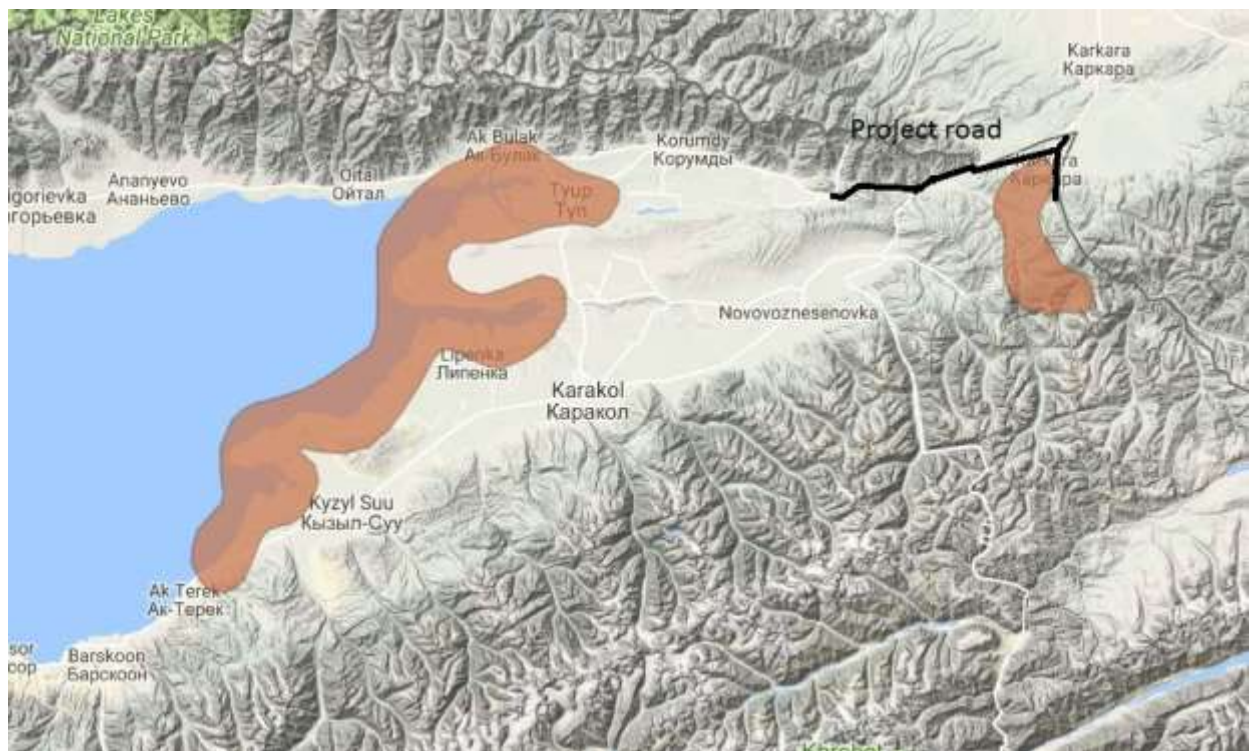
144. Saker falcon is classified as endangered by the IUCN. Latest population trend analysis indicates that it may be undergoing a very rapid decline. This negative trend is a result of a range of anthropogenic factors including electrocution on power lines, unsustainable capture for the falconry trade, as well as habitat degradation and the impacts of agrochemicals, and the rate of decline appears to be particularly severe in the species' Central Asian breeding grounds. It should be noted that this classification is highly uncertain and may be revised when new information becomes available. Additional surveys are needed to produce more robust and less uncertain population estimates, in particular for China, Russia and Mongolia. Further research to monitor key populations and to clarify the extent of anthropogenic threats and their effect on population trends is vital.

145. Saker falcon species, however, occurs in a wide range across the Palearctic region from eastern Europe to western China, breeding in Armenia, Austria, Bulgaria, Croatia, Czech Republic, Georgia, Hungary, Macedonia, Moldova, Romania, Russia, Serbia, Slovakia, Turkey, Ukraine, Iran (Islamic Republic of), Iraq, Armenia, Uzbekistan, Tajikistan, Kyrgyzstan, Kazakhstan, Mongolia and China, and at least formerly in Turkmenistan and probably Afghanistan, possibly India (Ladakh), with wintering or passage populations regularly in Italy, Malta, Cyprus, Israel, Jordan, Egypt, Libya, Sudan, South Sudan, Tunisia, Ethiopia, Kenya, Saudi Arabia, Yemen, Oman, U.A.E., Bahrain, Kuwait, Iran, Pakistan, India, Nepal, Afghanistan and Azerbaijan. The historical and present global population size remains subject to considerable uncertainty. However, a revised analysis of available data resulted in a global population estimate of c.17,400-28,800 breeding pairs (median c.22,100) in 1990, incorporating estimates in 2010 for countries neighboring or located close to Kyrgyzstan: China (3,000-7,000 pairs, median 5,000), Kazakhstan (4,808-5,628 pairs, median 5,218) and Mongolia (2,792-6,980 pairs, median 3,884). No estimation was performed for Kyrgyzstan populations.

146. In Europe, this species has suffered mainly from electrocution on power lines and decreased prey availability due to the loss and degradation of steppes and dry grasslands

through agricultural intensification, plantation establishment and declines in sheep pastoralism, while offtake for falconry has also been a serious problem, which has caused local extinctions in the past. In eastern Hungary, landscape reversion following the abandonment of agriculture could have a negative influence, as most prey species require short swards that are maintained by agricultural practices. Elsewhere, declines are mainly attributable to offtake for falconry, (especially trapping of breeding birds) and to the electrocution on power lines, although persecution, pesticide use leading to secondary poisoning (notably in Mongolia in 2003) and agrochemical deployment play a lesser part. Thus, it is believed that road rehabilitation activities would not cause an additional threat to population of these birds in Kyrgyzstan.

Figure 12: Eastern Issyk-Kul Lake and Karkyra KBAs



Derived from BirdLife International (2018) Important Bird Areas factsheet. Downloaded from <http://www.birdlife.org> on 01/02/2018.

147. Currently, almost all categories of environment protection have been represented in the Issyk-Kul Lake. This includes 2 km buffer zone around the Issyk-Kul lake coastline; some wild reserves – zoological/hunting (Jeti-Oguz, Jargylchak, Tyup, Ken-Suu and others), botanical (Tyup, Malaya, Ak-Suu), topographical/landscape (Barskoon, Jeti-Oguz); national park (Karakol); and two state natural reserves (Issyk-Kul and Sarychat-Ertash). The most important of these territories are State Natural Reserve “Issyk-Kul”, State park “Sarychat-Ertash” and National park “Karakol”.

148. The State park “Sarychat-Ertash” is located in Jeti-Oguz rayon, directly to the south from Karakol city, on the south slopes of Teskei Alatau mountain range. It is located in Sary-Chat basin at an altitude of 2000-5000 above sea level and was established in 1995 to conserve alpine natural environment and nature of the Inner Tien-Shan. This territory is habitat for 6 animal species listed in the Red book of the Kyrgyz Republic (snow leopard, manul cat, Tien-Shan bear, Pamir sheep and eagle), as well as other numerous rare mammals, birds and plants. The park is also the center for a snow leopard study, carried out within the internationally funded project since 2002. Sarychat-Ertash Reserve is located to the south from

the Terskei-Too range quite far from the project implementation area and not associated with it. The distance between the reserve and the project implementation area is more than 60 km and there is Teskei Ala-Too range between them. Teskei Ala-Too water parting line is located at altitude of 3500 m above sea level. Therefore, any impact on fauna in the reserve is unlikely.

Figure 13: Location of “Sarychat-Ertash” State Park



149. Karakol National Park is located at north slopes of Teskei Alatau between the state park “Sarychat-Ertash” and Karakol city. The area of the park is 38,256 ha and was established in 1997 to protect typical fauna and flora species of the north-east of Kyrgyzstan and scenic beauty of Karakol Gorge territory. This park also serves as a recreational area for foreign tourists and local population. There are some natural paths and itineraries for walking, rope way and other tourist facilities. Karakol National Park is not adjacent to the project activities.

150. On the ground of the Government Decision, Issyk-Kul Biosphere Territory was founded in 1998 in order to conserve rich natural and cultural heritage. The area of Issyk-Kul Biosphere Territory is 43,100 km<sup>2</sup>. The Issyk-Kul General Directorate of Biosphere Territory is the body which manages and coordinates the implementation plans and programs.

151. Biosphere territory means that areas of unique natural zones with high development indicators where natural environment complies with the international evaluation criteria for unique natural zones are under special protection. Territories as:

- Conception core of the zone
- Buffer zone which protects the main biosphere area against undesirable human impact
- Transitional development site where environmental and smooth economic activities are carried out
- Sanitary zone where, the restoration processes of all ecosystems take place and they will be included in one of the main zones of the biosphere territory.

152. Due to the presence of all above mentioned factors, the Issuk-Kul Lake was recognized as a biosphere territory in 2001 with the same name and it received UNESCO's formal approval for registration of the areas in the World Network of Biosphere Reserves. Data provided by the Directorate of Issyk-Kul Biosphere Territory and summary of wild animal census carried out in autumn 2017 in the reserves are presented in Table 14 below. It should be noted, however, that none of these sites is located in the close proximity to the project sites.

Table 14: Species Composition of Animals in Reserves

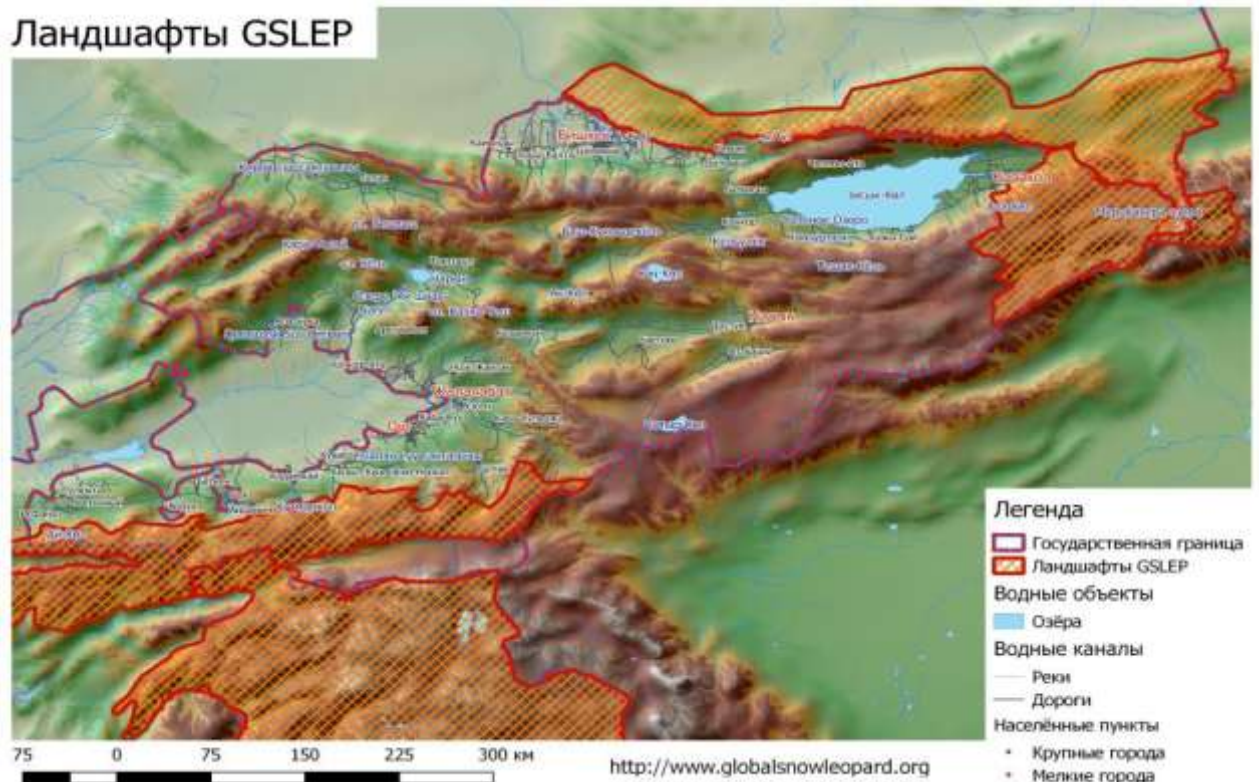
Animal species	Teploklyuchenk	Jeti-Oguz	Tyup	Chon-	Total
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reserves	a			Jargylchak	
Snow leopard	5	3		2	10
Manul cat		1			1
Brown bear	8	12	6	3	29
Wolf	6	8	11	4	29
Jackal		3		15	18
Roe	30	44	52	13	139
Argali			32		32
Alpine ibex	220	75	52	54	401
Maral			21		21
Boar	45	20	35	2	102
Lynx	7	18	8	8	41
Stone marten	9	21	22	8	60
Fox	9	52	38	16	115
Squirrel	400	195	655	80	1330
Weasel		108	35	20	163
Rabbit	12	160	37	84	293
Snowcock	30	205	47	45	327
Pheasant	150	175	80	77	809
Partridge	80	150	225	88	543

153. **Snow leopard habitat.** Given that 90% of the Kyrgyz Republic is mountainous, there are areas suitable for habitation of snow leopard listed in the Red Book. With the assistance of environmental experts from different countries and international donor communities, 12 countries endorsed Bishkek Declaration on Conservation of Snow Leopard and Global Program of Snow Leopard Ecosystem Recovery on October 23, 2013. The local and international organizations, such as Snow Leopard Group, Global Tiger Initiative, Nature Protection Union (NABU), Snow Leopard Trust, UNDP, World Bank, Global Environmental Fund, Snow Leopard Conservancy, USAID, World Wildlife Fund and Snow Leopard Network are working on this issue. The total area suitable for habitation of snow leopard in the country is estimated at 54 000km<sup>2</sup> which is more than ¼ of the country's territory. Camera team of the Germany Nature Protection Union in Kyrgyzstan (NABU) and Snow Leopard Group filmed 3 snow leopards. The snow leopards were filmed in Issyk-Kul in 2017 at syrts above Jeti-Oguz. The map below shows the areas suitable for snow leopard inhabiting.

Figure 14: Territory of Likely Habitat of Snow Leopards

## Ландшафты GSLEP



154. While studying the location area of Tyup-Kegen road section and based on the available information, snow leopards have not been identified in the vicinity of the existing road. It is known that these mammals tend to live in the high mountains and avoid areas where human activities are present. Considered that the project aims at only rehabilitating existing roads, the impact on snow leopard is expected to have a low impact and probability.

155. **Summary.** It was identified that based on the IUCN Red List of Threatened Species no Critically Endangered (CR), two Endangered (EN), three Vulnerable (VU) species are found in the protected areas and natural habitats close to the project area, however none of the habitats are located right at the projects sites. Moreover, the types of recorded and confirmed threats to identified EN and VU species are not directly linked any type of linear infrastructure development (construction or rehabilitation). Additional studies will be conducted to help identify and confirm or exclude the temporary or permanent presence of species at the project locations and, design solutions, e.g. choice of the borrow pit areas and construction camps will focus on minimization of impacts to natural habitats, the preliminary conclusion is that the project activities will cause negligible to low impact on above mentioned habitats and species.

## 5.4 Socio-Economic Resources

156. **General Overview.** Issyk-Kul oblast is located in the eastern part of the Kyrgyz Republic, it occupies the Issyk-Kul basin and Issyk-Kul syrt. The oblast center is - Karakol. The oblast is located at an altitude of 1600 to 7439 m above sea level, occupies the eastern part of the country, famous resort closed lake Issyk-Kul is entirely located within it. In the northeast the oblast borders with Almaty oblast of Kazakhstan, in the south-east - with Xinjiang Uygur Autonomous Region of China, in the south-west with Naryn oblast and in the north-west with Chui oblast. Territory is 43.1 thousand sq. km.

157. The main forms of relief of oblast are Issyk-Kul Basin, most of which is filled with waters of Issyk-Kul Lake and its surrounding mountain ranges of central Tien Shan. The northern part of the basin is surrounded by slopes of Kungoy Ala-Too ridges, the southern shore is

surrounded by Terskey Ala-Too. Internal highland areas of the oblast occupied by Central Tien Shan mountain, where notable ridges are Jetim-Bel, Borkoldoi, Kakshaal -Too (here famous Victory Peak with a height of 7439 meters above sea level is situated), and others.

158. The territory of Issyk-Kul oblast is divided into 5 administrative rayons: Ak-Suu, Jeti-Oguz, Ton, Tyup and Issyk-Kul. There are 3 towns: Balykchy, Karakol and Cholpon-Ata - resort town; 6 urban-type settlements; 189 rural settlements. Specificity of mountainous terrain of relief influences on the economic and geographical location of the region. In modern conditions Bishkek - Karakol road through the Boom gorge is very important for tourism. It links the state capital with the oblast. The Issyk-Kul region can be accessed through three different modes of transport, including air and land transport (road and rail) while the latter is mainly used for moving bulk commodities from mines to Bishkek and onwards. Entry points to the region are mainly by roads and airports through which goods and people move. Three points of entry are severely constrained by their poor state of the infrastructure, which require rehabilitation and upgrading as set out in government's strategies, including the "Strategy for the Development of the Civil Aviation, 2013-2020". Linking Karakol, the administrative capital of Issyk-Kul region to Almaty, Kazakhstan's largest metropolis and a major economic center and hub currently requires travelling via Bishkek (680 kilometers).

159. The cross-border link through Karkyra Border Crossing Point (BCP)<sup>1</sup> with the Republic of Kazakhstan, building part of the north-south axis connecting the country and the Republic of Tajikistan with Kazakhstan and further to Russia and China can reduce journey time significantly with a distance of less than 300 kilometers between Karakol and Almaty<sup>2</sup>. With an estimated average annual daily traffic (AADT) of about 1,000 – 1,500 vehicles in summer this road link historically served as the main transportation artery for agricultural products from Karakol to Almaty (and onwards to Russia) as well as the main entry point for tourists. After the collapse of the Soviet Union, borders appeared, road maintenance became limited and road condition deteriorated, downgrading the Karkyra BCP to a seasonal crossing which is open only during summer season since 2010. While the road link not only substantially reduces travel times to Almaty Oblast, it also opens new and more direct links to China as the distance from Karkyra BCP to Khorgos BCP, the main border crossing between China and Kazakhstan is only 200 kilometers. Khorgos is also one of the main gateways from China to Central Asia under the Belt and Road initiative of the government of China.

160. The rehabilitation of the adjacent road section in the Republic of Kazakhstan, namely from the Karkyra BCP to Kegen (18 kilometers) is at full implementation, expected to be completed in 2018 and financed out of the Republican budget. The Karkyra BCP which is a priority customs border post of the EEU is expected to be upgraded within the years to come in order to move towards a year-round and 24/7 operations. Additionally, and given the climatic conditions of the region and potential of extreme weather events, the design, operation and maintenance of the transport infrastructure must take into account climate change vulnerability, including through a specific vulnerability assessment as well as additional road maintenance equipment for snow removal.

161. **Demographics and Economic Conditions in Project Area.** Total population is 458 thousand people, including about 225 thousand women and 220 thousand men, majority (two

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<sup>1</sup> Tyup to Karkura Road joins Almaty-Khorgos road section of the Western Europe-Western China International Road Corridor of the Republic of Kazakhstan

<sup>2</sup> This road links forms part of the Central Asia Transit Corridor announced by the government in 2015 linking Tajikistan (Kairagach BCP, road sections rehabilitated under CARs-1 project) and continues through the new north-south axis (alternative route through Kazakhstan) ending in Karkyra BCP with Kazakhstan where it connects to the Western Europe-Western China Highway in Kazakhstan.



thirds) living in rural areas. Favorable demographic trends are demonstrated by an increasing share of working age population (i.e. 16-62 for males and 16-57 for females). This trend is expected to continue in the nearest future. Although there is a large number of population under 16 and a growing share of the elderly (62+), the dependency ratio has been declining. From a macroeconomic point of view, the demographic situation over the past decade can be regarded as positive because of the large share of working age population, which support economic growth. However, it appears that oblast economy has constraints in absorbing a growing number of labor market entrants, especially of younger age.

162. Some of health characteristics are as follows: there were 3,900 cases, or less than 1% of total population, of communicable diseases registered in 2016, mortality rate was 11.8 in 2016, infant mortality - 137 in 2016. Education rate in Issyk-Kul Oblast is high, about 99%. According to the latest Human Development Report, Issyk-Kul Oblast has highest human index in the country. Population growth rate was 24.2 per 1,000 of population.

163. Regional GDP growth of Issyk-Kul Oblast is volatile and highly depends on gold mining production, in particular Kumtor. Average real regional GDP was 4.7 percent over 2006-2015. Periods of high economic growth have been followed by steep contractions, thus reflecting Issyk-Kul's economic vulnerability to shocks. Over the past decade, the country has experienced several exogenous and endogenous shocks, which affected the trajectory of oblast development and poverty levels. During the recent years, improvement in welfare in the Issyk-Kul region has been weak due to vulnerability of oblast economic growth. The growth of total consumption was negative and also highly unstable from 2011 to 2015, inclusive. During the same period, the average annualized growth of consumption was (-) 0.72 percent. The most significant fluctuation was observed in 2013 and 2015 and were caused by poor harvest and relatively cold weather conditions during summer. The bottom 40, on average has experienced almost no increase in the consumption since 2012.

164. The pattern however is different for rural and urban areas with the bottom 40 in urban areas benefitting from the observed economic growth. On average consumption of the bottom 40 grew by 2.4 percent in urban areas and (-) 0.3 percent in rural areas during 2011 to 2015. The growth was driven mainly by Karakol, experiencing an increasing flow of tourists in the winter season and by Cholpon-Ata, experiencing increase of services in summer time. Clearly, poverty has reduced significantly in urban areas, while impact of stagnation in agriculture in rural areas on poverty was essential. Volatility of economic growth and income in Issyk-Kul oblast was reflected in fluctuation of the oblast poverty headcount. The absolute poverty rate, measured using national methodology was 28.9 percent in 2015 and declined by 0.6 percent points only in comparison to 2011. In 2015, around 135,800 people out of the total oblast population of 470,000 lived below the poverty line of KGS31,573 per year per capita. Extreme poverty was low at 0.4 percent in 2015. The majority of the poor live in rural areas and fluctuations of poverty rates mainly were driven by rural poverty.

165. Issyk-Kul oblast is highly dependent upon two employment sectors: agriculture and tourism. Agriculture is the largest employment activity, which includes 36.4 percent of the total employed population in 2015. However, the seasonally dependent tourism sector has been proven to be more economically violable. Impact of tourism is easily noticeable when comparing seasonal and non-seasonal incomes. The most vulnerable, the poorest group of population, work in agriculture and construction, being informal employees. Seasonality affects employment rates, particularly for employees working in services related to tourism and agricultural workers resulting in irregular incomes for poor households. According to the data from Issyk-Kul Regional Department of Labor, Employment and Migration the number of unemployed able-bodied population registered in State Service for Employment for 2016 is 5,308 people. 4,734

people had official status of unemployed of which 32 people received unemployment allowance. Between January to October, 2016, the demographic situation was characterized by a slight increase in the birth rate and a decrease in overall mortality.

166. Project activities are mainly located in the following rayons, namely Issyk-Kul (TSC number 2), Ak-Suu (TSC number 4) and Tyup (Tyup-Kegen road as well as TSC number 3) and only marginally in Tong rayon (TSC number 5) and City of Balykchy (TSC number 1):

167. **Issyk-Kul rayon** was founded in 1930, and the administrative centre was Sazanovka village (current Ananevo village). The territory of the rayon is 36,000 km<sup>2</sup> with a population of 58,000 people. Cholpon-Ata city is the administrative center of Issyk-Kul rayon and the third largest city of the Issyk-Kul oblast in terms of population. It is located 240 km from Bishkek, the capital city of the Kyrgyz Republic and 135 km from Karakol city, the administrative centre of Issyk-Kul oblast. On the west it borders with Karaoi village and on the east with Bosteri village. City territory covers almost the Cholpon-Ata river fan and the part of lakeside plain. The Issyk-Kul rayon is located on the coastline of Issyk-Kul Lake and aggradation plain of Kungoy Ala-Too range, and on the north it borders with Kemin rayon and the Republic of Kazakhstan, on the west with Balykchy city and on the east with Tyup rayon. Enumerated population in Issyk-Kul Rayon is 78,440 people and resident population is 87,119 people. 89% of the population is rural. Ethnical composition of the population: Kyrgyz – 68 504 people, and other nationalities – 9 936 people. There are 4 big enterprises in the rayon. Tourism is the priority sector for the development of rayon's economy. Main socio-economic problems of the region: further development of social infrastructure of villages; improvement of material and technical basis of education, health care services and culture; improvement of service provision quality; industrial activities development.

168. **Tyup rayon** is located in Issyk-Kul oblast. The international road "Tyup – Kegen" passes through the rayon and connects the eastern part of the Kyrgyz Republic with Kazakhstan. On the south-west, the rayon borders with the Issyk-Kul lake, on the south-east with Ak-Suu rayon, on the west with Issyk-Kul rayon and on the north with the Republic of Kazakhstan. The nearest settlements are - Taldy-Suu, Koochu, Korumdu, Chon-Tash, Zhyluu-Bulak, Baizak and Ken-Suu villages. Economy of the surveyed area is focused on agriculture and livestock. At the beginning of 2016 rayon population was 64,105 people. Labor force was 35,617 people with an economically active population of 35,082 people. The majority of the population of Tyup rayon is involved in agriculture; farming and livestock which are the main income source of the population. They plant barley, wheat and hay, and keep livestock and cattle. Besides that, they cultivate vegetables, famous Issyk-Kul apricots, raspberries and currants. During summer time, residents of the region use pasturelands for grazing. Between May and October when Karkyra BCP is open, passenger flow increases during the tourist season and local residents sell their products.

169. **Ak-Suu rayon** was founded in 1973. The rayon is located in the eastern part of the Issyk-Kul Lake and has a great agro-industrial potential, abundant land, water and mineral resources. The population of Ak-Suu rayon is 66,768 people, and there are 47 villages. The administrative center of the rayon is Teploklyuchenko village where 11,000 people live permanently. The territory is 10.1 thousand km<sup>2</sup> which is one of the biggest territories in the oblast. Given the syrt zone, the length of the rayon from the east to the west is 350 km. The distance between the rayon center and the remotest village (Enilchek village) is 150 km. The rayon is located on the border with Kazakhstan and China. The length of border with China is 105 km. There are a lot of glaciers and hills with the altitude of more than 2000 meters in the syrt zone which has rugged topography and is located in the southern and eastern parts of the rayon behind the Teskei Ala-Too mountain range. There is a Victory peak (7439 m) in the east

on the border with China. There are also major industrial enterprises, hot springs (in Jurgalan and Ak-Suu) and sanatoriums in this rayon. But mainly the alpinists trying to conquer the Tian-Shan peaks and hikers travelling by mountain tourist routes visit this place. The rayon is remarkable for its picturesque outskirts, where the coniferous forests occupy the gorge slopes, as well as picturesque meadows covered with grasses in summer time. The villages are located in the lower western part of the rayon, in the vicinity of Issyk-Kul Lake and rivers feeding it. Local population is involved in subsistence farming (garden farming, livestock, bee farming) and traditional handicraft.

170. **Squatters/Encroachers:** The assessment showed that all civil works will be carried within the right-of-way, and any impact on squatters/encroachers is unlikely to happen. However, in case any potential squatters/encroachers are identified during the detailed design stage, World Bank's Resettlement Policy (OP4.12) will be applied.

## 5.5 Health and Safety

171. The main regional health issues are related to the access to drinking water which has resulted in increased rate of digestive diseases: infections and helminthiases. Other related diseases are kidney diseases. The situation with tuberculosis diseases, lung diseases and cardiovascular diseases remains unsatisfactory.

## 5.6 Physical Cultural Resources (PCR)

172. PCR are important as sources of valuable historical and scientific information, as assets for economic and social development, and as integral parts of a people's cultural identity and practices. PCR can be defined as:

- Sites, structures or objects having archaeological, paleontological, historical, religious, or other cultural significance.
- Natural environmental features that have cultural significance (e.g. sacred graves, sacred sites).

173. The management of the cultural heritage of the Kyrgyz Republic is divided into the following main levels: the Ministry of Culture, Information and Tourism at the central level, the Department of Culture, Information and Tourism at the regional/provincial level, the Rayon Division at the district level, and the village authorities at the fourth level.

174. The management of cultural heritage is included in the National Programme for Preservation of Physical Cultural Resources. Historical site Stones of Tamerlan is included in the National List of Historical sites. Such status means special management approach: developing infrastructure, information support, fencing and improving adjacent territory

## 6. Environmental and Social Impacts and Mitigation Measures

### 6.1 Scoping for the cumulative and long-term environmental assessment

175. Increase in traffic, changes in the seasonality of the road use (i.e. using the road all year round instead of only during the warm season), increase in the intensity and the traffic load (e.g. transporting heavy loads by big trucks) can generate additive, multiplicative or synergetic effects, which can then result in damage to the function of one or several ecosystems. Technically, a subset or variant of cumulative impacts, ecosystem function impacts, which disable or destabilize whole ecosystems, are the most dangerous and often the least likely to manifest themselves over a short period of time. Some examples of such potential impacts applicable to the rehabilitation of the Tyup- Kegen road and 15 km mountain road, as well as construction of TSCs include as follows:

- **De-vegetation and eventual erosion** of a roadside pullout as a result of drivers stopping indiscriminately in the absence of designated rest areas;
- **Cut off of the traditional grazing areas** by reconstructed road with raised-horizontal alignments. Cattle farmers may be forced to move their herds onto forest or park lands, which results in a rapid depletion of the understory (grasses, etc.);
- **Increase in mortality rates** and, thus, declines of the populations of the wildlife animals that are likely to cross the road and being hit by cars. Rates of mortality are closely linked with movement patterns, as more movement generally incurs a greater chance of coming into contact with a road.
- **Habitat fragmentation & alteration.** This can result from either animals not being able to cross the road without being killed or through avoidance of the road. This can cause reduction in gene flow and impediment to the access to particular habitats (e.g. reaching water);
- **Pollution by chemicals, light and noise.** As it is expected that Tyup- Kegen road will be used more intensely and the amount of traffic will increase. This will lead to increase in the emissions of air pollutants from transportation, namely Nitrogen Oxide, Carbon Monoxide, Volatile Organic Compounds, Sulphur Dioxide and PM, which in turn may cause impact on vegetation and fauna. In addition, noise from cars can also adversely impacts many species, e.g. birds by disrupting acoustic communication and interfering with warning signals.

176. One of the Project objectives is to promote tourism and provide access to tourist destinations. Tourism can be affected both positively and negatively by road improvements. For example, while improved access may benefit the local tourist industry in the short run, increased activity may damage tourist attractions and lead to a decline in tourists and revenues, if not managed properly. The degree of environmental impact varies, depending on the type of tourist and the intensity of site use. There are day tourists, who visit a destination for a day and then leave; seasonal residents; and tourists on bus tours and other trips that may visit a location for a short time. Day tourists have an impact on the environment through their transportation to their destination as well as their activities once there. This is also true for seasonal residents, but these tourists also have a cumulative impact, as they are in one place for a longer period of time. On the other hand, seasonal residents may become an important force in preserving the natural beauty of an area. Tourists who visit an area for longer than a day and choose to stay in hotels contribute to the impacts that the hospitality industry has on the environment. In addition to the duration of stay, tourist impacts depend on the type of the activities undertaken. Passive

activities such as birdwatching have different impacts than more active ones, such as snowmobiling or rafting. Overall, in addition to road and transportation issues mentioned above, long term adverse impacts from tourism development might include as follows:

- **Development and land use** issues include accommodations, roads, small shops and restaurants, tourist attractions, tourists' seasonal waterfront homes and hotels, water supplies, and waste disposal facilities. One typical example would be untreated wastewater from the hotels flowing directly into the rivers;
- **Impacts on host communities** include the development of the areas without proper consideration of the natural landscape and local character, e.g. the construction of buildings that do not fit local architecture and are examples of visual pollution;
- **Direct impacts from hospitality industry** such as energy use and associated GHG emissions, water use (drinking, cleaning, sanitary purposes), solid waste generation. Based on several studies solid waste generated in the hotels range from 20 kg per room per month to 30 kg per room per month. Water use is estimated at up to 300 L per room per day for small hotels.
- **Tourist activities.** Tourists hiking along mountain ranges can harm the ecosystem by littering and by trampling vegetation. The greatest impact of tourists on vegetation usually occurs during initial contact with an area, with the most sensitive species affected first. The cumulative impact of tourists on vegetation gradually shifts species composition, because only the most resilient plants can survive in an area under constant pressure from tourist activities.

177. Although tourism can be an impetus for destructive development, it has also been the motivation for preserving sensitive ecosystems. Some of this ability stems from economic returns, as natural parks serve as attractions for tourists. Heritage tourism, i.e. visiting heritage sites, has been the driving force for the rehabilitation of existing historic sites, buildings, and monuments. Another benefit of tourism development is its role in fostering an appreciation and understanding of nature. Tourism development can facilitate an increasing awareness and appreciation of the natural world. For example, the development of mountain trekking and athletic resorts in high altitudes can make it possible for people to visit and appreciate the previously unknown area.

178. It should be noted that the appropriate measures to address social issues may occur during the implementation of the Project. Mitigating measures will be considered at various stages of the work of the Project and could be undertaken to avoid [issues of] socio-cultural character in the result of the land allotment:

- If possible, avoid [aquisition of] agricultural land;
- In the event that the acquisition of permanent rights is required to perform certain activities, such as the development of a construction materials quarry, for example, the owners of the rights will be paid appropriate compensation;

179. As no objects of religious, cultural or historical significance will be relocated, mitigating measures are not required. If temporary land rights are acquired for a site for the construction of temporary camps, the terms of the lease must be stipulated for the satisfaction of the farmers involved in the process, and contracts must be drafted in a local language they understand.

180. Mitigation measures during the construction phase: (i) In order to avoid conflicts / disagreements with the local population, Project employees and Contractors must perform work within a clearly defined construction site; (ii) the Contractor shall work with materials only in specially designated areas; (iii) Rules of conduct of the worker will be developed and made effective; (iv) The project should not affect the mobility of the local population; (v) The contractor must respect and follow local customs and traditions

## 6.2 Impact Phases and Types of Impacts

181. This impact assessment and mitigating measures cover the entire cycle of the project activities, from design, pre-construction, construction and operation and maintenance. The coverage of each of this sub-project phases is defined as follows:

- Design – This is the period of the detailed design.
- Pre-construction Phase – this period is the time that the ‘Notice to Proceed’ is given to the Contractor until commencement of construction.
- Construction Phase - the period from the completion of the Pre-construction activities time until the issuing of the ‘Certificate of Completion’.
- Operation and Maintenance Phase – This final period is the time from completion of works.

182. The key feature of the three Project activities that mitigate the overall adverse impact is the fact that all Projects will be confined within the existing road alignment. Potential impacts from projects such as road improvement projects may be classified as:

- Direct Impacts - i.e., those directly due to the project itself such as the conversion of land previously used for agricultural purposes to transport use. Direct impacts also include the impact of construction expenditures in the local economy.
- Indirect Impacts – i.e., those resulting from activities prompted by the project, but not directly attributable to it. The use of rock for the improved roadbeds, for example, has an indirect impact of increasing the demand for crushed rock and increased borrow operations.
- Cumulative Impacts – i.e., impacts in conjunction with other activities. A single road improvement may not exert a significant environmental impact, but if several roads comprising a network are developed in the same area, or are combined with agricultural reform programs in the same general area, the cumulative or additive effect could be large.

183. Impacts in all three categories may be either:

- Short-term – i.e., impacts which occur during road construction and affect land use, air quality and other factors. Many of these impacts, however, will be short-lived and without long-lasting effects. Even the effects of some relatively significant impacts such as borrow pits, for example, may be eventually erased if appropriate mitigation actions are taken. Many potential short-term negative impacts can be avoided or otherwise mitigated through proper engineering designs and by requiring contractors to apply environmentally appropriate construction methods. Or;
- Long-term – i.e., road impacts that could, for example, affect regional land use and development patterns and regional hydrology and flooding if roads are poorly designed. Long-term negative impacts can also result from the loss of agricultural land to other land uses; air and water pollution; problems associated with scattered borrow pits; and haphazard growth.

184. Both short-term and long-term impacts may be either beneficial or adverse. Short-term positive impacts will include, for example, the generation of employment opportunities during construction period. Long-term benefits will include enhanced development opportunities, improved transport services, easier access to commercial and service facilities; faster

communications and commodity transport; improved access to markets and growth centers and increased services and commercial facilities.

### **6.3 Direct impacts during construction and operation**

185. Road construction works will disturb natural balance and facilitate changes in adjacent ecosystems. This might be destruction of fertile soil, loss of vegetation (grass, bushes, trees), decrease in animal population, increased air, water and soil pollution.

186. To take more effective measures to minimize environmental impact, the issue of involving scientific team to carry out survey in the project area should be considered at project preparation stage. This environmental survey will identify possible adverse natural and anthropogenic factors in the project area and recommend more effective safeguard measures. The gradual expansion of human presence in the project area has been already making visible changes in the species composition in the project area. If significant mitigation measures are not taken, the expected impact on the main directions will lead to permanent substantial impact, with cumulative effect. Under various factors, anthropogenic factors can take their critical values. Among them:

#### **Natural factors:**

- Wind erosion
- Water erosion
- Catastrophic processes of natural nature.

#### **Anthropogenic and technogenic factors:**

- Vehicle exhaust
- Borrow pits
- Spill of oil products and hazardous materials
- Worn tires and brake pads
- Wastewater
- Domestic waste from villages and camp sites
- Grazing
- Tree cutting
- Poaching.

187. Intensification of natural factors: due to the effect of wind, water and natural disasters changes in the landscape will be unsustainable and this will result in land surface erosion and likely destruction of road facilities and disruption in the infrastructure functioning: water pipeline, [power supply and etc.

188. Man-made and technological impact on the environment can be summarized as follows: a) fuel combustion products will lead to high level of salts of heavy metals, toxic sulfur oxide, nitrogen and lead in roadside organisms; b) borrow pit development will lead to loss of vegetation cover and topsoil, non-compliance with the recultivation requirement will lead to mud hole and gully formation and erosion; c) oil spill will cause contamination of soil, surface and ground waters, and reduction of vegetation cover and its further degradation and lead to disruption in gas exchange in vegetation cover and topsoil; d) noise and vibration are the sustainable factors of disturbance for the animal life, as a result of this the population of vertebrate animals, especially small mouselike rodents will decrease ; e) products of tire and road surface wear will cause blockage of vegetation pores and disruption in gas exchange in vegetation cover and its degradation within 500m from the central line of the road; f) wastewater – potential pollutants for both surface and ground waters (by leaking through substrate); g) household waste can be carried by wind and animals; h) grazing – decrease in

esthetic and environmental value of the landscape is connected with the degradation of fertile layer and formation of gullies and erosion; i) tree harvesting - destruction of natural slope and river basin based forests and replacing them with secondary impoverished ecosystems; j) poaching – reduction in biodiversity in the region.

189. After additional surveys, more detailed information about the condition of environment will be gathered:

- Abiotic environment (Air, Water, Noise)
- Biotic environment (Mammals, hydrobiology, ornithofauna, insects and flora)
- Potential impact during design and construction.
- Potential impacts during operation.
- Mitigation measures

190. In order to determine the performance targets and indicators exactly, temporary physical works on site and necessary activities to minimize environmental impact and others it might be necessary to carry out surveys in the vicinity of natural boundaries of Karkyra and other project areas at the stage of detailed design preparation.

191. The rehabilitation works will have temporary impact on the environment of the Tourist Service Centers. However, it is expected that TSCs will have minimum impact, as major construction works will not be performed. The construction works at these centers will be limited to construction of a toilet septic and a parking area with installed litter boxes and information board.

192. The project is being implemented in almost uninhabited area and is of a seasonal character. The impact on social aspects is reduced, firstly, down to the effects of dust, secondly, to noise, and, thirdly, to a very small degree, to vibration, and indirectly pasture areas adjacent to the road might be affected. But with proper application of methods of dust suppression, the dust effect will be minimized, noise and vibration from the operating equipment will only occur during the working shift during the daylight hours. Quarries are planned to be developed at a distance from settlements.

#### **6.4 Pollution and land impact**

193. The complex of the technological processes, connected with a construction of a subgrade causes usually the greatest damage to environment. On all earth place, occupied under road reconstruction and structures of a road complex, building sites, first of all pollution of a soil cover is observed.

194. Soil pollution takes place mainly by atmospheric deposition on a covering of firm finely-divided dusty fractions, particles, brought by wheels of cars from roads and passages with unimproved covering, partial losses of the transported loose freights, products of attrition of tires and coverings, and also toxic components of the burned gases of cars. About 80% of the lead containing in exhaust gases runs into the soil.

195. It should be noted the stability of lead compounds in the soil and its intensive accumulation in vegetation with the subsequent transition to animals and the person. In roadside space about 50% of lead emissions in the form of microparticles are distributed on a surface of the adjacent territory.

196. At earth works production considerable pollution of soil by fuels and lubricants on the ways of transportation, loading and unloading of soil, in parking places of excavatory and



transport and other road-building machines is observed. Road-building machines are characterized by big losses of fuels and lubricants. Loss of exhaust oil for bulldozers is 15-30%..

197. Deicing materials, especially salts, getting with rainfall and snow melting from the road are dangerous as other toxic materials.

198. The water and wind erosion of subgrade slopes is especially dangerous. In the course of construction slopes remain not strengthened, therefore in some cases soils can be washed away by water into the lowered relief places (especially in a cross-country terrain), and then its part is taken out in reservoirs and waterways, polluting them. The wind erosion can lead to an exposure of a subsoil layer.

199. In the territory of the projected road site the soils are presented by light-chestnut carbonate and ordinary gray soils, hydromorphous soils, therefore occurrence of a wind erosion on this site is quite admissible.

200. During road operation there can be a pollution of a roadside strip by household garbage from the passing transport.

## **6.6 Surface and ground water**

201. The road of the highway crosses a lot of rivers and rivulets. All rivers flow from mountains from the south to the north and they are objects of economic value. Coming from mountains, their drain is strenuously got for hydroeconomic needs, mainly on an irrigation.

202. Pollution of surface water can result from dumpings of production and household drains, transfer of chemical and mechanical pollutants from the road into the water.

203. Pollution of ground waters can happen owing to a filtration of drains from an earth surface, and also by waste water disposal without cleaning from highways in the underground horizons.

204. From the widespread substances, polluting reservoirs, the greatest concern causes transfer of oil products into the water. The first factors in the form of separate color spots appear already at flood of 4 ml/sq.m. Maximum-permissible concentration for oil and oil products is 0,1-0,3 mg/l.

205. The main pollutants of road drains have a condition of suspensions and emulsions. At transferring into the water, they accumulate at the bottom in seaweed, pass into composition of silt, form the palet on the surface of reservoir, embarrassing ingress of oxygen from air. As a result of anaerobic processes toxic substances in bottom layers can become more active. Heavy metals, other substances, which do not lend itself to biological decomposition, are collected in near-bottom deposits. As a result the biosystem of reservoirs and water currents is broken, the plankton, fish juveniles and fish perish. Concentration of pollution more than 90 mg/l already becomes pernicious for fishes.

206. The important role in pollution of water objects is played by the suspended substances in the form of suspended particles of sand, clay, silt, etc., and also nitrates, nitrites, plumbum and ether-soluble substances.

207. From the inorganic polluting materials, capable to make considerable impact on environment, it should be noted various deicing agents, first of all, of salt. In the spring salt is deposited in a right-of-way at snow melting, leaks in the soil or flows down into reservoirs and waterways, polluting them. Concentration of organic substances of a thawed drain fluctuates from 70 to 150 mg/l.

208. Surface flow, which is forming as a result of loss of an atmospheric precipitation washes away and takes out soluble and insoluble impurity with a flow. Besides, atmospheric waters as a result of a sorbing on a surface of a hydroaerosol of dust, gas particles and other impurities, which are located in the air become contaminated in a ground layer. Storm runoff, as a rule, has some quantity of biogenous elements (combinations of nitrogen and phosphorus) and bacterial pollutants. Except undissolved and dissolved organic impurity the storm runoff drainage contains a significant amount of the mineral dissolved components. Salinity of a storm runoff fluctuates ranging from 20 to 900 mg/l. From anion there are mainly sulphate and chlorides.

209. Badly strengthened slopes and subgrade excavation, filling shoulders, works on arrangement and repair of artificial structures can promote a water thickening in reservoirs and waterways, forming a suspended matter, which gradually settles at the bottom. As a result the underwater vegetation perishes.

210. Water discharge after washing-up of mixing basin with concrete remaining residue does the significant damage to reservoirs and waterways. Cleaning water is need to be collected and clarified in special sedimentation research. Dumping in natural reservoirs of a superficial drain is allowed only after its clarification not less, than for 70%.

## **6.7 Noise impact**

211. Along with air pollution, noise becomes a negative factor of impact on the person. Chaotic mix of sounds of various frequency creates noise. Noise level is measured in decibels (dBA). Impact of transport noise on environment, and, specifically on human health may be considered as a potential issue. Systematic impact of noise causes a condition of anger, fatigue, enhances stress and may sleeping disorders.

212. Transport factors: movement intensity, structure of cars parking, movement speed, transport and operational road condition have the largest impact on noise level. Noise level depending on type of the car changes significantly. Trucks, especially with diesel engines cause noise levels on all operating modes on 15 dba above, than automobile cars.

213. The special problem is noise of the heavy-load dump trucks, working on borrow pits, when their high-speed opportunities are limited and specific time of their work on the idling mode is great. Noise level from traffic on the road, and also all road-building machines and mechanisms used at road reconstruction is very high and it is within 75-90 dBA. Especially intense noise is from bulldozers, scrapers, jack hammers, vibrators and other cars. So noise from scrapers makes 83-85 dBA, at unloading of dump truck is 82-83 dBA, from rollers, working at soil compaction is 76-78. Big noise level is formed at the simultaneous operation of several road-building mechanisms. Noise level significantly changes depending on the movement speed and car loading. At movement speed of 75-80 km/h and full loading of the car noise is generally made by the engine, at a speed over 80 km/h noise is made by auto tires.

214. Traffic intensity and its structure has considerable impact on noise level from traffic flow. In a transport flow noise intensity significantly exceeds the noise level of the separate car. Condition of road paving and the organization of road traffic influences on noise level except type of the engine and speed movement of the car.

## **6.8 Dust formation calculation**

215. Dust air pollution takes place at performing of many road works, especially it is connected with development and movement of soil and road-building materials. Formation of the respirable dust takes place in the presence of particles in soil smaller than 10 micrometers. Larger particles form dust emissions of insignificant transfer. The most intensive dust formation

takes place at sandy loams, silt loam, silty clay development. Humidity of soil has the greatest impact on dust formation. At the correct organization of works on a subgrade construction humidity of soil has to be close to optimal, that will provide good consolidation. The soil, having density close to maximum, practically does not form dust from wind action.

216. Mineral dust and formed from particles of construction materials belongs to nontoxic materials, and its concentration in air is limited by general sanitary and hygienic requirements.

217. The established sanitary requirements allow the following indicators of dust content in a working zone at extraction of mineral materials by open way, provided in the [Table 15](#).

Table 15: Sanitary Requirements to Dust Content

№№ c/sc	Dust emission types	Maximum permissible concentrations, mg/m <sup>3</sup>
1	Settlements (all non-toxic types)	0,15
2	Content of more than 70% SiO <sub>2</sub> in crystal modification	1,0
3	Content of more than 10% of free SiO <sub>2</sub> and more than 10% of asbestos	2,0
4	Silicate, containing less than 10% of unbound SiO <sub>2</sub>	4,0
5	Clayish, mineral and mixes, not containing of unbound SiO <sub>2</sub>	6,0
6	Cement, clay, other small fractional minerals and mixes, not containing unbound SiO <sub>2</sub>	6,0

218. The conducted researches showed, that at a wind speed to 1m/sec. particles with a diameter of 10 mc are transferred to distance to 100 meters, and diameter of 1mc – on 800-900m. Respectively, at big speed of a wind dust particles are transferred to longer distance.

219. At excavation of rock mass at extraction-and-loading works with use of the excavator at a surface stripping and extraction a dust emission is produced to 250 mg/m<sup>3</sup>. Material overturning, unloading of dump trucks into earth deposits, and also vehicle works are intensive unorganized sources of dust formation.

220. The greatest dust emission arises at soil developing by excavator with loading into dump trucks, on dry soils in the summer in borrow pits to 250 mg/m<sup>3</sup>, at transport operations on temporary dirt roads to 350mg/m<sup>3</sup>.

221. At design of highways it is necessary to estimate influence of the dust, which is formed at traffic. Intensity of dust formation is influenced by physicomechanical properties of material, traffic speed, weight, dimensions and types of cars, and also climatic conditions around passing of the road.

222. The movement of vehicles in working zones is connected with dust emission as a result of interaction of wheels with a roadbed and its blowing-off from a surface of the material transported in a body.

223. Proceeding from volumes of requirement of road-building materials for road reconstruction, annual (annual) dust emissions will make 2046,14 tons/year, including:

1. at excavation of rock mass (extraction-and-loading works) - 57,04 tones/year
2. at soil overturning and spreading, GSM and crushed-stone - 177,30 tones / year
3. at soil transportation by vehicle - 1811,80 tones / year.

## 6.9 Community Health and Safety

224. The project's construction phase can cause a range of community health and safety risks. Potential impacts due to the Project activities can be identified as follows:

- Easier access to health care facilities – positive health impacts may result due to quicker response time in emergency situations;
- Air quality – The amount of particulate matter, or dust, generated by vehicle movements may increase slightly during construction works, but will decrease during the operational phase of the Project. This will have positive impacts to the health of the population living and working adjacent to the road.
- Contamination of local water supplies during construction – potential impacts to local water supplies include the possibilities of temporary labor camps and the water supply and wastewater disposal associated with them during the construction period;
- Noise levels with health consequences – potential noise issues come from the operation of construction equipment. Typical noise signatures of the different equipment for different construction activities are enumerated below. If we assume three pieces of equipment maybe working at the same time, taking a random sample of equipment, bulldozer, front end loader and dump truck and combining their maximum noise levels a figure of around 94.3 decibels. Considering that many properties within the Project are less than 20 meters from the edge of the existing pavement this would give a figure of around 67 decibels, which is considerably higher than WBG daytime and nighttime standards. This impact would be temporary in nature. Construction activities would be carried out during daytime.

Table 16: Construction Equipment Noise Levels

Site Clearing		Excavation and Earth Moving		Structure Construction	
Equipment	Noise Level	Equipment	Noise Level	Equipment	Noise Level
Bulldozer	80	Bulldozer	80	Pneumatic drill	81-98
Front end loader	72-80	Backhoe	72-93	Crane	75-77
Dump Truck	83-94	Dump Truck	83-94	Welding Machine	71-82
<b>Grading and compacting</b>		Jack Hammer	80-93	Concrete Mixer	74-88
Grader	80-93	<b>Landscaping and Clean Up</b>		Concrete Pump	81-84
Roller	73-75	Bulldozer	80	Concrete Vibrator	76
<b>Paving</b>		Excavator	72	Air Compressor	74-87
Paver	86-88	Truck	83-94	Bulldozer	80
Truck	83-94	Paver	86-88	Cement and Dump trucks	83-94
Tamper	74-77				

- Public safety During Construction - Construction activities may result in an increase in the total number of road traffic accidents between vehicles, pedestrians and vehicles

and livestock and vehicles. Other accidents could occur if work sites are not appropriately signed and secured, for example borrow pits, excavation for culverts, etc.;

- Public Safety During Operational Phase – Increases in the number of vehicles using the Project road and their speeds may result in an increase in the number of road accidents during the operational phase of the Project. It is relatively easy for pedestrians to cross the road in its current two-lane form. However, when the first section of the road is increased to four lanes with a concrete median, crossing will only become possible at dedicated crossing points otherwise accidents will occur as people attempt to cross the four lanes and a median which will, over time, see an increase in traffic levels.
- Labour Influx - Labor influx for construction works can lead to a variety of adverse social and environmental risks and impacts, they include:
  - Risk of social conflict: Conflicts may arise between the local community and the construction workers, which may be related to religious, cultural or ethnic differences, or based on competition for local resources. Personnel of contractors will live in camps, far from settlements, and therefore such issue is unlikely to occur at the construction stage.
  - Increased risk of illicit behavior and crime: The influx of workers and service providers into communities may increase the rate of crimes and/or a perception of insecurity by the local community, as well as by contractor's personnel. Such illicit behavior or crimes can include theft, physical assaults, substance abuse, prostitution and human trafficking. . Personnel of contractors will live in camps, far from settlements, will have a camp guards and therefore such issue is unlikely to occur at the construction stage.
  - Influx of additional population ("followers"): Especially in projects with large footprints and/or a longer timeframe, people can migrate to the project area in addition to the labor force, thereby exacerbating the problems of labor influx. These can be people who expect to get a job with the project, family members of workers, as well as traders, suppliers and other service providers (including sex workers). However, this issue cannot be mitigated by this draft ESIA.
  - Increased burden on and competition for public service provision: The presence of construction workers and service providers (and in some cases family members of either or both) can generate additional demand for the provision of public services, such as water, electricity, medical services, transport. However, workers will be housed in construction camps with independent services, so this issue will not be significant.
  - Increased risk of communicable diseases and burden on local health services: The influx of people may bring communicable diseases to the project area, including sexually transmitted diseases (STDs), or the incoming workers may be exposed to diseases to which they have low resistance. The contractors' camp will be equipped with a first-aid post and staff, for the provision of the first aid. The project area is located not in the places of spread of focal infections.
  - Gender-based violence: Construction workers are predominantly younger males. Those who are away from home on the construction job are typically separated from their family and act outside their normal sphere of social control. This can lead to inappropriate and criminal behavior, such as sexual harassment of women and girls, exploitative sexual relations, and illicit sexual relations with minors from the local community. A large influx of male labor may also lead to an increase in exploitative sexual relationships and human trafficking whereby women and girls are forced into sex work. Personnel of contractors will live in camps, far from settlements, and therefore such issue is unlikely to occur at the construction stage.

- Child labor and school dropout. Increased opportunities for the host community to sell goods and services to the incoming workers can lead to child labor to produce and deliver these goods and services, which in turn can lead to enhanced school dropout. Legislation of the Kyrgyz Republic prohibits the use of child labor and the Ombudsman Institute provides protection for children.
- Local inflation of prices: A significant increase in demand for goods and services due to labor influx may lead to local price hikes and/or crowding out of community consumers. However, this issue cannot be mitigated by this draft ESIA.
- Increased pressure on accommodations and rents: Depending on project worker income and form of accommodation provided, there may be increased demand for accommodations, which again may lead to price hikes and crowding out of local residents. Contractors staff will be located within camps far from settlements and as such this issue is unlikely to occur during the construction phase.

## **6.10 Environmental Receptors**

225. The Project area covers two populated settlements – San Tash (Farm 3) and Karkara (Farm 4) which could be identified as sensitive areas. San Tash is comprised of 25-30 households located around the Road Operation Enterprise, the village has no kindergarten or school. Karkara includes 15-20 households and has no social facilities.

226. The major factors affecting the population of these two villages are noise and vibrations caused by operating equipment and highly intensive dust pollution. To reduce the aforementioned negative impact, the ground coating is moistened regularly. No works are conducted at nighttime.

### **Sensitive Natural Sites**

Sensitive natural sites, such as wildlife sanctuaries or conservation areas, are located at long distances from the project site. The nearest Karakol conservation area is located to the south over 50 kilometers from the Jergalan river flowing at the bottom of Terskey Ala Too northern macroslope.

On the left bank of the Tyup river, 10-12 kilometers are covered by fir forest. The rehabilitated road section crosses the right bank. The two quarries situated along the 39-65 km section are also located on the right river bank.

No local timber shall be used for building the construction camp.

### **Water Consumption Calculation**

This section should describe the existing practice of water consumption calculation.

The required quantity of water for utility and drinking needs shall be calculated following the procedure established by the Kyrgyz legislation and based on the findings of the Sanitary and Epidemiological Supervision Service confirming that the water source in question conforms to the sanitary and hygienic standards and norms.

The estimated road reconstruction period is 620 working days, the total number of staff is 190 people, including 130 workers and 60 technicians and engineers.

The construction sites should be equipped with portable toilets and sanitary water collection pits that should be cleansed later.

To prevent soakage of waste water to subsoil waters, the bottom of the water collection pits should be treated with concrete.

Waste water should be removed from the water collection pits within 3-4 days by special-purpose vehicles to the water treatment facilities.

Table 17: Water Consumption for Construction Works

#	Types of Consumers	Unit of Measurement	Operational Capacity	Water Consumption per Unit Time					Annual Water Consumption, thous. m <sup>3</sup>				
				Recycled Water	Fresh from Water Source				Fresh from Water Source				
					Total	Including			Total	Including			
						Construction and Technical Consumption	Utility Consumption and Drinking	Moistening		Construction and Technical	Utility Consumption and Drinking	Moistening	
1	Workers	person	120		0.250			0.250		2,4190		2,4190	
2	Technicians and Engineers	person	45		0.160			0.160		0,6166		0.6166	
3	Moistening of the road	m <sup>3</sup>	650000		0.0004			0.0004		49,1400			49,1400
4	Roadbed reinforcement	m <sup>3</sup>	814000		0.1			0.1		81,4000			81,4000
5	Reinforcement of road layers and road shoulders	m <sup>3</sup>	210000					0.07		14,7000			14,7000
6	Reinforcement of road shoulders	m <sup>3</sup>	252000					0.07		17,6400			17,6400
Total										165,9156		3.0356	162,8800

Working days (24-hour days)	Persons	Number of food portions – 6.6	16 liters per day per person – canteen	Total Q <sub>1</sub> , m <sup>3</sup>	Q <sub>2</sub> , m <sup>3</sup> /day, canteen	Shower cabin	Liters of water per shower cabin per day	Total Q <sub>2</sub> , m <sup>3</sup>	Total, m <sup>3</sup>
820	165	6,6000	16,0000	14287,6800	17,4240	10,0000	500,0000	4100,0000	18387,6800



**The purpose of temporary water supply on the construction site is to provide water for construction and utility needs and firefighting.**

The required quantity of water (liters per second) is calculated based on the following formula:

$$Q = P_{\text{б}} + P_{\text{np}} + P_{\text{пож}}$$

where  $P_{\text{б}}$  (quantity of water required for utility needs),  $P_{\text{np}}$  (quantity of water required for construction needs),  $P_{\text{пож}}$  (quantity of water required for firefighting) mean quantity of water required for utility and construction needs and firefighting, respectively, liters/ second.

Quantity of water for utility needs is the sum of:  $P'_{\text{б}}$  – quantity of water for washing, cooking, and other domestic needs and  $P''_{\text{б}}$  – quantity of water for taking shower.

Quantity of water for utility needs is calculated based on the following formula:

$$P'_{\text{б}} = \frac{N \cdot b \cdot K_1}{8 \cdot 3600}, \quad P''_{\text{б}} = \frac{N \cdot \alpha \cdot K_2}{t \cdot 3600}$$

where N is the number of workers per shift (see para 4.1);

b – water allowance per person per shift (in case there is no sewage facility, this number is 10-15 liters, in case there is a sewage facility this number is 20-25 liters);

$\alpha$  - water allowance per person taking shower (in case there is no sewage facility, this number is 30-40 liters, in case there is a sewage facility this number is 80 liters);

$K_1$  is the water consumption irregularity coefficient (assumed as 1.2-1.3)

$K_2$  is the coefficient taking into account the number of workers taking shower out of the total number of workers per shift (assumed as 0.3-0.4);

8 is the number of working hours per shift;

t is the time during which the shower unit is used – hours (assumed as 0.75 hour).

$$P'_{\text{б}} = \frac{79 \cdot 20 \cdot 1,2}{8 \cdot 3600} = 0,0658 \quad P''_{\text{б}} = \frac{79 \cdot 80 \cdot 0,3}{0,75 \cdot 3600} = 0,7022$$

Quantity of water for construction needs is calculated based on the formula:

$$P_{\text{np}} = \frac{1,2 \cdot K_3 \cdot \sum q}{n \cdot 3600}$$

where 1.2 is the unaccounted water consumption coefficient;

$K_3$  is the water consumption irregularity coefficient (assumed as 1.3-1.5);

n is the number of working hours per shift;

$\sum q$  is the total water consumption (liters) per shift for construction needs that takes place during the working hours (according to the job schedule).

Table 8 provides norms of water consumption for construction needs.

$$P_{\text{np}} = \frac{1,2 \cdot 1,5 \cdot 5623,8}{8 \cdot 3600} = 0,3514$$

The required quantity of water is, thus, calculated as follows:

$$Q = 0.0658 + 0.7022 + 0.3514 + 10 = 11.1194 \text{ liters/ second.}$$

Table 18: Water Consumption for Construction Needs

Types of Works	Unit	Quantity		Norms of Consumption	Water Consumption per Shift, liters
		Total	Per shift	Per unit	
Concrete	m3	21.08	2.108	200	421.6
Plastering	m2	9 897.9	1 124.76	5	5 623.8
Painting	m2	3 997.9	434.49	1	434.49
Soil excavation by ICE shovel	machine-hours	16	8	10	80
<b>Total:</b>					<b>6 559.89</b>

**The finalized water consumption data for these sites will be calculated during preparation of the technical feasibility studies.**

### **Borrow Pits**

The borrow pits should be located at long distances from populated areas. The impact on flora and fauna should be limited with the area of 1 km from the borrow pits. Impact factors also include dust and noise. Works in the borrow pits shall be conducted only during the project implementation period. To reduce the impact from the borrow pits, dust prevention measures are planned to be undertaken. The borrow pits should be reclaimed upon completion of all works.

### **Construction and Operation Plan**

Borrow pits. Stripping works should be performed before any other works on the borrow pits. The soil should be stripped to the depth of 0.5m and piled along the borrow pit perimeter as 1-2m high embankments to preserve soil fertility. During soil re-cultivation operations, the stripped soil should be distributed on the entire area of the borrow pit with arranging 30° slopes on the sides of the borrow pit.

Construction camp. At the start of the construction works, the fertile layer of the soil should be stripped and piled along the perimeter. To prevent dust dispersion, gravel surfacing should be arranged on the entire territory of the camp. Only foundations of residential and office structures should be concreted.

Construction sites. Fertile layer of the soil should be stripped and removed. Any plants and equipment should be installed on concrete foundations. Floors of technical premises should be concreted. Concrete precast units should be stacked on special-purpose sites.

Road traffic bearing surface. To reduce the dust levels, water should be regularly sprinkled by special-purpose vehicles. No vehicles or machinery should be parked or left in locations other than the designated areas.

Machinery park. Flooring in all repair shops and warehouses should be concreted. Fuel and lubricant depots should be located at a distance from residential structures. Machinery and vehicles should be refueled only on concreted sites.

Landfill site. Necessary structures should be built – fencing, waste containers, lids for cesspools – to limit access of wild and domestic animals to the landfill site. The bottom and walls of the cesspool should be concreted to prevent soakage of waste waters into soil and crumbling of the cesspool walls.

All infrastructure facilities should be erected at a distance from natural water flows.

## **7. Environmental and Social Management Plan**

227. The ESMP provided herewith documents the impacts identified in this draft ESIA report, the actions required to mitigate those impacts to acceptable levels in accordance with the laws of the Kyrgyz Republic and the World Banks Operational Policies, and the monitoring activities that are to be undertaken as part of the project to confirm that the mitigation actions have been effective in achieving their objectives or to initiate changes in the actions required. The ESMP also details the institutional arrangements and capacities that currently exist, or that will be put in place as part of the project implementation, to ensure that the environmental due diligence (including the ESMP) has comprehensively considered both Kyrgyz Republic and World Bank requirements for environmental protection, has identified all likely environmental impacts and proposed appropriate mitigation measures, and has the systems in place to ensure that effective procedures for environmental monitoring and control of the project impacts and mitigation measures are implemented throughout the life of the project. The EMSP will be implemented in 4 stages: (i) detailed design, (ii) pre-construction, (iii) construction, and (iv) operation and maintenance of the road and TSCs.

### **7.1 Mitigation and Monitoring**

228. The environmental impacts associated with the Project activities, have been detailed above in the relevant sections of this draft ESIA. Mitigation measures required to address the impacts identified in the draft ESIA have been summarized in each of the relevant sections covering the physical, biological and socio-economic environment affected by the project. The impacts identified and the specific mitigation measures proposed to address them have been consolidated into the Environmental and Social Mitigation Plan (ESMP) as tables, which include time frames and responsibilities.

Table 19: Environmental and Social Management Plan at the Design Phase

ESMP on the detailed design phase			
	Potential Impact	Mitigation measures	Responsibility
Soils	Soil erosion	<p>To reduce the impact of erosion processes, the technical design shall include the following:</p> <ul style="list-style-type: none"> <li>• Slopes of undercuts and embankments are constructed so as to take into account the soil strength and other conditions according to the project specifications to prevent landslides and erosion;</li> <li>• In areas with steep slopes, the design shall include provision of protection from rockfalls, riprap, barrier structures and gabions;</li> <li>• Stepped embankments shall be arranged for embankments higher than 6 m are</li> <li>• Intercepting channel shall be built at the tops of undercut slopes, or on the shelves. Drainage systems are built for steep slopes to catch the water flows and divert them from the slopes</li> </ul>	The Engineer shall include mitigation measures in the design
	Slope stabilization	<p>Design requires installation of culverts of required size to avoid the effect of loose soil and their block under unstable bare slopes. The Contractor will follow the recommendations of the preliminary design for choosing slope stabilization methods.</p> <p>In addition, the Contractor must provide during the work:</p> <ul style="list-style-type: none"> <li>• Designing of dispersal zones of drainages with riprap to reduce erosion, where appropriate.</li> <li>• Sewage drains and outfalls should be combined with riprap / concrete pavement.</li> <li>• Side slopes are strengthened according to soil type and other conditions as specified in the design documentation in order to reduce erosion. It is recommended to reinforce the steep slopes with rock fill, or other material.</li> <li>• Build stepped slopes of the road, if their length is more than 6 meters.</li> </ul>	The Engineer shall include mitigation measures in the design

<b>Air</b>	Air quality	Location of quarries and pits, asphalt plant require approval of the Engineer and environmental specialist in this phase. It is necessary to ensure that these facilities are located with due regard to the requirements to selecting such places. None of the asphalt plants or quarries should be placed closer than 300 meters from any populated areas, protected areas or sensitive objects.	<ul style="list-style-type: none"> <li>The Engineer shall include mitigation measures in the design .</li> </ul>
<b>Geology and seismic conditions</b>	<b>Seismicity</b>	Seismic parameters of the potential impact zone must be taken into account at the pre-design phase. Load from earthquakes shall be included in the design parameters of structures, including bridges, in order to avoid structural failure during operation	<ul style="list-style-type: none"> <li>The Engineer shall include mitigation measures in the design</li> </ul>
<b>Hydrology</b>	Drainage	The design shall provide for improved drainage systems and culverts providing passing of high volumes of water, and their diversion from the places where previously they did not exist. Developing of the design shall take into account all historical data and forecasting of precipitations and water content of the rivers/ streams. Structural components must comply with the accepted standards and best practices applicable to the conditions of construction.	<ul style="list-style-type: none"> <li>The Engineer shall include mitigation measures in the design</li> </ul>
	Wells	The Contractor is preparing all permits before drilling any wells	<ul style="list-style-type: none"> <li>The Engineer shall include mitigation measures in the design</li> </ul>
	Bridge construction	All new and expanding bridges are designed for a lifetime of 75 years. Rehabilitation and strengthening of bridges should provide 50 years service life. The development of all components of the structure must meet the bridges design standards, as stated in the special requirements for the Contractor. The developed and designed bridges should have aesthetic appeal and fit the environment.	
<b>Specially-Protected Areas</b>	Impact on specially protected natural zones	The project should not damage the ecological integrity of the biosphere zone Issyk-Kul	<ul style="list-style-type: none"> <li>The Engineer shall include mitigation measures in the design</li> <li>Engineer shall review and approve the document</li> </ul>
<b>Quality of soil and ground</b>	Quality of soil and ground	During the design, the Contractor shall provide adequate measures to ensure the quality of soil and ground	<ul style="list-style-type: none"> <li>Engineer shall agree the issue with MoTR.</li> </ul>

<b>Mammals</b>	Reduced populations	Contractor includes following measures: <ul style="list-style-type: none"> <li>• training for workers on the inadmissibility of poaching or trapping</li> <li>• introduction of a system of fines (if necessary)</li> <li>• agree with the Engineer and environment specialist the places for earthworks</li> <li>• avoid filling lubricants</li> </ul>	<ul style="list-style-type: none"> <li>• Engineer shall agree the issue with MoTR.</li> </ul>
<b>Ichthyofauna</b>	Habitat destruction	Contractor includes following measures: <ul style="list-style-type: none"> <li>• training for workers</li> <li>• agree with the Engineer and environment specialist the places for earthworks</li> <li>• avoid filling lubricants</li> </ul>	<ul style="list-style-type: none"> <li>• Engineer shall agree the issue with MoTR.</li> </ul>
<b>Avifauna</b>	Reduced populations, habitat destruction	Contractor includes following measures: <ul style="list-style-type: none"> <li>• training for workers on the inadmissibility of poaching or capture of birds, destruction of nests and chicks</li> <li>• introduction of a system of fines (if necessary)</li> <li>• agree with the Engineer and environment specialist the places for earthworks</li> <li>• avoid filling lubricants</li> </ul>	<ul style="list-style-type: none"> <li>• Engineer shall agree the issue with MoTR.</li> </ul>
<b>Insects</b>	Reduced populations, habitat destruction	Contractor includes following measures: <ul style="list-style-type: none"> <li>• training for workers</li> <li>• agree with the Engineer and environment specialist the places for earthworks</li> <li>• avoid filling lubricants</li> </ul>	<ul style="list-style-type: none"> <li>• Engineer shall agree the issue with MoTR.</li> </ul>
<b>Flora</b>	Loss of vegetation	During the design process, the Contractor shall ensure that the asphalt plant, camps, and other equipment are placed according to the plan of their placement. The Contractor shall avoid loss of vegetation cover where possible. Where this can not be avoided, the Contractor will ensure restoration of vegetation by sowing seeds of native species of grasses.	<ul style="list-style-type: none"> <li>• Engineer shall agree the issue with MoTR</li> </ul>
<b>Health and safety</b>	Safety	At the design phase, the Contractor must take into account issues of traffic safety and consider installation of appropriate road signs, such as “Crossroads”, “Speed limit”, “Detour”, “Road works”, “Movement / passage denied.” If necessary, the Contractor shall install road signs indicating the time of road closing / opening.	<ul style="list-style-type: none"> <li>• Engineer shall review and approve the document</li> </ul>
<b>Social Impact</b>	Squatters/Encroachers	At the design stage, the detailed assessment of any potential squatters/encroachers in the project area should be carried out.	<ul style="list-style-type: none"> <li>• Consultant shall include mitigation measures in the design</li> </ul>

			<ul style="list-style-type: none"><li>• Engineer shall review and approve the document</li></ul>
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Table 20: Environmental Management Plan at Construction Phase

ESMP during construction phase			
	Potential Impact	Mitigation measures	Responsibility
Air quality	Open burning of wastes	The Contractor shall not burn trash or other materials without Engineer`s permission	<ul style="list-style-type: none"> <li>• Contractor implements mitigation measures.</li> <li>• Engineer regularly monitors the Contractor`s activities.</li> </ul>
	Smoke from burning	The Contractor shall not, without Engineer`s approval install burners, boilers and similar facilities or equipment using any type of fuel that can generate pollutants.	<ul style="list-style-type: none"> <li>• Contractor implements mitigation measures.</li> <li>• Engineer regularly monitors the Contractor`s activities.</li> </ul>
	Exhaust gases from construction machinery	The Contractor shall monitor the service of construction equipment and maintain it in good technical condition, meeting the requirements to control of emissions. This equipment (including monitoring devices) shall be regularly checked by the Engineer, and these checks shall be recorded by the Engineer as part of the monitoring activities. The Contractor will: <ul style="list-style-type: none"> <li>• Avoid idle operation of the equipment;</li> <li>• Prohibit use of equipment and technology on sites emitting visible smoke;</li> </ul>	<ul style="list-style-type: none"> <li>• Contractor implements mitigation measures.</li> <li>• Engineer regularly monitors the Contractor`s activities.</li> </ul>
	Volatile contaminants from the quarry and asphalt plant.	The Contractor shall place the conveyor belts in front of the wind protection boards (on quarries) and hopper doors should be covered to prevent blowing dust. The entire conveyor material from which the dust may be blown away, must be completely covered and combined with a belt cleaning device.	<ul style="list-style-type: none"> <li>• Contractor implements mitigation measures.</li> <li>• Engineer regularly monitors the Contractor`s activities.</li> </ul>

	Dust from roads, unpaved roads, open soil and disposal areas.	<p>Since the road is in the territory of the biosphere zone “Issyk-Kul” the Contractor shall provide necessary measures to prevent the dust:</p> <ul style="list-style-type: none"> <li>• All trucks carrying materials shall be covered with a tarpaulin or other material (fixed) to prevent falling of materials from the truck body and blowing dust;</li> <li>• landfill areas should be compacted as soon as possible in order to avoid formation and blowing of dust.</li> <li>• Roads in areas of constant movement of road equipment must have hard coating, and</li> <li>• Water spraying (roads on construction sites and unpaved road sections shall be watered at least twice a day or more, if necessary in the Engineer’s opinion).</li> </ul>	<ul style="list-style-type: none"> <li>• Contractor implements mitigation measures.</li> <li>• Engineer regularly monitors the Contractor’s activities.</li> </ul>
<b>Topography</b>	Soil undercut and excavation	<p>The Contractor shall provide:</p> <ul style="list-style-type: none"> <li>• If excess loose material can not be used, its utilization in the river and all tributaries / watercourses shall be prohibited.</li> <li>• In case of excess material (not included in the design), the Contractor shall report to the Engineer to determine specific storage/disposal site.</li> <li>• Temporary and permanent materials storage sites should be on public lands, and under no circumstances shall not be dumped on agricultural lands, fertile lands or protected areas, or any water sources.</li> <li>• If construction waste is dumped on one of these places, or silt is washed away, such a contaminant or waste should be immediately removed, and the land and the area shall be restored to its natural state at the discretion of the Engineer.</li> </ul>	<ul style="list-style-type: none"> <li>• Contractor implements mitigation measures.</li> <li>• Engineer regularly monitors the Contractor’s activities.</li> <li>• Permits shall be taken by the Contractor from local environment protection and forestry office.</li> </ul>
	Slope stabilization	<p>The Contractor shall provide:</p> <ul style="list-style-type: none"> <li>• Final formation of slopes is carried out in places determined by the Engineer and the Project as soon as possible after filling them with soil.</li> <li>• Where necessary, planting furrows shall be arranged on the slopes, where seeds of fast-growing plants typical for this area shall be planted.</li> <li>• Planting of seeds of fast-growing plants shall be carried out immediately after soil filling to prevent erosion;</li> <li>• Construction in areas prone to erosion and flooding shall be allowed only in the dry season.</li> </ul>	<ul style="list-style-type: none"> <li>• Contractor implements mitigation measures.</li> <li>• Engineer regularly monitors the Contractor’s activities</li> </ul>
	Quarries	<p>Before opening any quarry or crusher, the Contractor must obtain appropriate permissions. Quarries are located in ecologically safe places:</p> <ul style="list-style-type: none"> <li>• Not less than 500 meters away from watercourses;</li> <li>• Outside of the agricultural land, and</li> <li>• Located on public lands.</li> </ul>	<ul style="list-style-type: none"> <li>• Contractor in coordination with environment specialist shall receive permission.</li> <li>• Engineer will check the permission before</li> </ul>

		Development and reclamation of quarries shall be carried out according to the developed Borrow pits Management Plan. Monitoring of these quarries shall be carried out on a daily basis, and summarizing information shall be provided once in a month.	opening. <ul style="list-style-type: none"> <li>Contractor, Consultant, IPIG (MOTR)</li> <li>Contractor, Consultant, IPIG (MOTR)</li> </ul>
<b>Ground</b>	Loss of the fertile layer	Engineer ensures the adoption of adequate measures to prevent irrecoverable loss of the fertile layer of the ground or its destruction by construction equipment or during construction. Preservation of topsoil is a critically important task.	<ul style="list-style-type: none"> <li>Engineer shall coordinate with MOTR and Contractor</li> </ul>
	Erosion	Contractor shall provide: <ul style="list-style-type: none"> <li>Least erosion affected material shall be used to place around bridges and culverts</li> <li>Restoration of vegetation on exposed slopes includes; (i) selection of fast-growing native species of flora; (ii) immediate planting of all slopes and embankments if not covered with gabions; (iii) placing of fiber material for germination of seeds, taking into account the local climate.</li> </ul>	<ul style="list-style-type: none"> <li>Contractor implements mitigation measures.</li> <li>Engineer regularly monitors the Contractor's activities</li> </ul>
	Pollution due to spills of petroleum products and hazardous materials	Contractor shall provide: <ul style="list-style-type: none"> <li>All fuel and chemical materials shall be stored on the waterproof basis, with a roof to protect them from the weather, and shall be fenced. These depots shall be arranged away from any watercourse or wetland areas. The very foundation and walls of embankments must carry a load of 110% of the weight of the storage tanks.</li> <li>Repair workshops in construction camps shall be organized on waterproof base with drainage for collecting spills. Outdoor repair of equipment is not allowed.</li> <li>Fueling shall be strictly controlled and regulated by formal procedures. Containment basins should be used at all filling points. Used oil is stored and handled by a licensed contractor.</li> <li>All valves and guns should be protected from unauthorized interference and vandalism, disabled and locked when not in use.</li> <li>Labels on containers or barrels should clearly indicate the content. It is necessary to avoid contamination of water sources with any pollutant.</li> <li>Storage of bitumen containers or barrels on the open ground is not allowed - they shall be put on the waterproof trays.</li> <li>Places where bitumen is used shall be arranged on a hard waterproof surface.</li> <li>Places designated for bitumen work should be arranged on a waterproof basis.</li> </ul>	<ul style="list-style-type: none"> <li>Contractor implements mitigation measures.</li> <li>Engineer regularly monitors the Contractor's activities</li> </ul>
<b>Hydrology</b>	Drainage	Contractor shall provide: <ul style="list-style-type: none"> <li>In the construction phase, the Contractor shall build, maintain, clean and replace,</li> </ul>	<ul style="list-style-type: none"> <li>Contractor implements mitigation</li> </ul>

		<p>as necessary, temporary drains, and take other precautions to avoid damage from flooding and washing out of sludge from construction sites.</p>	<p>measures.</p> <ul style="list-style-type: none"> <li>• Engineer regularly monitors the Contractor's activities</li> </ul>
	<p>Construction camps and storage places</p>	<p>Contractor shall provide:</p> <ul style="list-style-type: none"> <li>• Waste water shall be collected and discharged from the site by a sewer system and placed in an area and manner that prevents pollution and troubles.</li> <li>• Direct discharge of sanitary and latrines water on the ground is not allowed. Disposal of such materials as fuels and lubricants in open ground or water is prohibited.</li> <li>• Places designated for collection of liquid waste should not have leaks in the ground.</li> <li>• Spilled petroleum products must be removed immediately, and the means for their removal and soil cleaning should be kept in the camps.</li> <li>• Construction and working sites must be equipped with toilets that do not have leaks into surface waters.</li> <li>• Disposal of carried and latrine water in surface water sources is not permitted. It should be collected in settling ponds or tanks prior to its removal.</li> <li>• Equipment and materials to eliminate spills of petroleum products must be on site. Following conditions must be met to avoid spills of petroleum products and for storage of reagents: <ul style="list-style-type: none"> <li>- Refueling of machinery shall be only in certain places.</li> <li>- All storage of fuel and chemicals (if any) should be placed on a waterproof basis with a roof, protected from the weather, and fenced. Such places shall be located away from water sources and wetlands. The very foundation and walls of embankments must withstand a load of 110% of the storage tanks.</li> <li>- Fueling shall be strictly controlled and regulated by formal procedures and carried out in palces surrounded by an embankment to prevent spills of petroleum products and potentially hazardous liquids.</li> <li>- All valves and guns should be protected from unauthorized interference and vandalism, disabled and locked when not in use.</li> <li>- Labels on containers or barrels should clearly indicate the content. It is necessary to avoid contamination of water sources with any pollutant.</li> <li>- Disposal of fuel and other potentially hazardous liquids into the soil or water sources is prohibited.</li> <li>- In the event of accidental spills of petroleum products they need to be removed</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Contractor implements mitigation measures.</li> <li>• Engineer regularly monitors the Contractor's activities</li> </ul>

		<p>immediately; such materials shall be stored in a safe place designated for storage of hazardous materials.</p> <p>As directed by the Engineer, the Contractor shall arrange a washing ditch, or a place for washing cars on the exit from construction sites. The Contractor shall provide washing of vehicles (body and wheels from sand and dirt) before their departure. Removal of dirty water or mud outside the construction site shall not be allowed.</p>	
	Bridge construction	<p>Contractor shall provide:</p> <ul style="list-style-type: none"> <li>• Diversion of flows from bridge abutments</li> <li>• Cofferdams, silt traps or traps or other structures to trap silt.</li> <li>• Drying and cleaning cofferdams to prevent silting.</li> </ul>	<ul style="list-style-type: none"> <li>• Contractor implements mitigation measures.</li> <li>• Contractor shall consult with local environment protection and forestry office.</li> <li>• Engineer regularly monitors the Contractor's activities</li> </ul>
	Pits	<p>Contractor shall provide:</p> <ul style="list-style-type: none"> <li>• Restoration of pits upon completion of works in full compliance with applicable standards and requirements.</li> <li>• Terms of the contract for opening of the pit and use of material are binding.</li> <li>• Development and restoration of a pit and the surrounding area shall be in accordance with the contract.</li> <li>• Additional pits shall not be opened without restoring the unused.</li> </ul>	<ul style="list-style-type: none"> <li>• Contractor implements mitigation measures.</li> <li>• Engineer regularly monitors the Contractor's activities</li> </ul>
<b>Flora and fauna</b>	Loss of flora	<p>Contractor shall provide:</p> <ul style="list-style-type: none"> <li>• Re-seeding of native species of grasses, where necessary.</li> <li>• Provide building camps with adequate fuel to prevent firewood from illegal sources.</li> </ul>	<ul style="list-style-type: none"> <li>• Contractor implements mitigation measures.</li> <li>• Engineer regularly monitors the Contractor's activities</li> </ul>
	Protected areas	<p>For opening of additional quarries and pits the contractor is required to obtain approval from SAEPF.</p> <p>Engineer ensures safety of protected areas.</p>	<ul style="list-style-type: none"> <li>• Contractor implements mitigation measures.</li> <li>• Engineer regularly monitors the Contractor's activities</li> </ul>

<b>Land use</b>	Construction camps and other ancillary buildings	Contractor is responsible for maintaining order in the territory of the construction camps. The used land shall be restored to an acceptable level within a reasonable time.	<ul style="list-style-type: none"> <li>• Contractor implements mitigation measures.</li> <li>• Engineer regularly monitors the Contractor`s activities</li> </ul>
<b>Transport and infrastructure</b>	Closure of roads and detours	<p>Contractor shall provide:</p> <ul style="list-style-type: none"> <li>• Installation of direction signs and signals for bypass roads;</li> <li>• Contractor is responsible for opening roads during construction activities at least for 50% during the day, and for 100% at the end of the working day.</li> </ul>	<ul style="list-style-type: none"> <li>• Contractor implements mitigation measures.</li> <li>• Engineer regularly monitors the Contractor`s activities</li> </ul>
	Electrical systems	During the construction period, all power lines should not be disconnected. The same applies to temporary power lines, except for the time when the poles are moved. Contractor needs to coordinate its activities to have the transmission lines disconnected at this time.	<ul style="list-style-type: none"> <li>• Contractor implements mitigation measures.</li> <li>• Engineer regularly monitors the Contractor`s activities</li> </ul>
<b>Wastes and contaminants</b>	Contamination	Under no circumstances the excess material shall be disposed of without Engineer`s permission. Excess material can not be discharged into rivers or streams. It requires coordination with the Engineer and environment specialist.	<ul style="list-style-type: none"> <li>• Contractor implements mitigation measures.</li> <li>• Prevent discharge of waste into the river.</li> <li>• Engineer regularly monitors the Contractor`s activities</li> </ul>
	Inert solid and liquid waste	<p>Contractor shall provide:</p> <ul style="list-style-type: none"> <li>• Installation of garbage containers in the workplace;</li> <li>• Maintain construction sites clean and tidy, and provide everything needed for temporary storage of waste until their final removal;</li> <li>• Train all staff in waste management practices and procedures within the environmental process</li> <li>• Collect and export hazardous and non-hazardous waste separately at a location agreed by the Engineer and environmental specialist. For this, a special company (if needed) may be hired to collect waste from the camps and temporary storage sites,</li> </ul>	<ul style="list-style-type: none"> <li>• Contractor implements mitigation measures.</li> <li>• local environment protection and forestry office approves waste disposal places.</li> <li>• Engineer regularly monitors the Contractor`s</li> </ul>

		and export to a landfill.	activities.
	Hazardous waste	Hazardous wastes management, handling and disposal rules should be included in the Contractor's Waste Management Plan. Hazardous waste disposal areas shall be agreed with SAEPPF. The Contractor shall collect the carbon-containing wastes, including oil, for safe removal, recycling or disposal in temporary storage areas, or transfers them to a licensed operator.	<ul style="list-style-type: none"> <li>• Contractor implements mitigation measures.</li> <li>• Engineer regularly monitors the Contractor's activities</li> </ul>
<b>Health and Safety</b>	Health and Safety of workers	<p>Contractor shall provide:</p> <ul style="list-style-type: none"> <li>• Safety training program. All Contractor's workers must undergo safety training in their specialty, and taking into account the duration of the works. Instruction shall be provided for all field workers for all levels of management and leadership.</li> <li>• Safety meetings. Regular meetings shall be held monthly, visits of the Contractor's HESO are required unless otherwise provided by the Engineer.</li> <li>• Inspections. The Contractor will regularly check, test and maintain all safety equipment, scaffolding, rails, working platforms, roof supports, ladders and other tools, lifting, lighting, signaling and safety equipment. Lighting and symbols should not be hidden, and should be readable. Equipment contaminated, or not in proper place, shall fixed immediately, and put in proper place.</li> <li>• Protective equipment and clothing. Protective equipment and clothing must be on site at any time of work; effective measures should be taken to correct use and replacement. All construction facilities must be equipped with safety devices.</li> <li>• First aid facilities. Fully equipped first aid station with climate-control to maintain the temperature inside the building at 20°C. Conditions for such aid shall be agreed with the Engineer.</li> </ul> <p>The Contractor will cooperate with local health authorities and should conclude an agreement with them to use hospitals and other facilities.</p>	<ul style="list-style-type: none"> <li>• Contractor implements mitigation measures.</li> <li>• Engineer regularly monitors the Contractor's activities</li> </ul>
	Health and Safety of subcontractors	All sub-contractors shall receive copies of ESMP. All sub-contracts will include a provision requiring ensuring compliance with ESMP at all stages of works. All subcontractors shall appoint safety representative for the duration of the works, unless otherwise ordered by the Engineer in writing form.	<ul style="list-style-type: none"> <li>• Contractor implements mitigation measures.</li> <li>• Engineer regularly monitors the Contractor's and subcontractor's activities</li> </ul>

	Labor Influx and Gender-Based Violence	<ul style="list-style-type: none"> <li>Contractor shall ensure that its personnel is aware on consequences of gender-based violence, communicable diseases and illicit behavior.</li> <li>Local population, especially young males, is properly informed about avoidance of illicit behavior towards with contractor's personnel, about legal consequences of damaging the contractor's property, etc.</li> </ul>	<ul style="list-style-type: none"> <li>Engineer ensures that the contractor regularly conducts awareness sessions in the camp.</li> <li>Local-self government jointly with the law enforcement agencies conduct periodic awareness sessions with local communities.</li> </ul>
	HIV /AIDS	Contractor shall ensure through appropriate services (structure) awareness of workers on HIV/AIDS, as appropriate, in accordance with the requirements of the Contract.	<ul style="list-style-type: none"> <li>Contractor implements mitigation measures.</li> <li>Engineer approves the program</li> </ul>
	Child Labor	<ul style="list-style-type: none"> <li>The Contractor will ensure that no children under 16 years are employed under the Project.</li> <li>Local representatives of the Issyk-Kul Social Protection Department (branch of the Ministry of Labor and Social Protection of the Kyrgyz Republic) in close collaboration with local self-governments will inform the communities on the risks of child labor and school drop out.</li> </ul>	<ul style="list-style-type: none"> <li>Contracts will be regularly checked for age of workers by Engineer</li> <li>Regional branches of the Ministry of Labor and Social Protection jointly with local self-government will regularly monitor school attendance as well as any children involved in selling goods and services to the incoming workers, especially during school hours.</li> </ul>
<b>Specially protected natural areas, archaeological finds</b>	Impact on protected areas	<p>In order to avoid potential negative impacts the Contractor shall:</p> <ul style="list-style-type: none"> <li>Adhere to accepted international practices and requirements for environmental safety with regard to protected areas, as well as the specific requirements set out in the EIA.</li> <li>In case of detection of finds and historical artifacts (movable or immovable) during the works, the Contractor shall take all necessary steps to protect such finds, and inform Engineer and local authorities. If continuation of the works would threaten such finds, the project will be suspended until a decision on the preservation of such</li> </ul>	<ul style="list-style-type: none"> <li>Contractor implements mitigation measures.</li> <li>Engineer regularly monitors the Contractor's activities</li> </ul>



		finds is taken.	
<b>Noise</b>	Construction noise and vibration	<p>Contractor shall provide:</p> <ul style="list-style-type: none"> <li>• Control of sources, ie, fulfill the requirements for exhaust systems, engines covering and noise dampers on the air inlets and regular maintenance of equipment;</li> <li>• Requirements to placement of stationary equipment near environmentally sensitive areas, optimization of noise impact and use of protection mechanisms, where appropriate, shall be fulfilled according to standard procedures;</li> </ul>	<ul style="list-style-type: none"> <li>• Contractor implements mitigation measures.</li> <li>• Engineer regularly monitors the Contractor`s activities</li> </ul>

Table 21: Environmental and Social Management Plan During Operation and Maintenance

ESMP during operation and maintenance			
Area	Potential Impact	Mitigation measures	Responsibility
<b>Air quality</b>	Impact of the road on air quality	Potential impacts during operation as provided for in project documents, this EMP and monitoring section of EIA.	<ul style="list-style-type: none"> <li>Monitoring of the emissions in the atmosphere during operation shall be carried out by by MOTR and SAEPF</li> </ul>
<b>Soil</b>	Erosion	Contractor shall be responsible within the warranty period over 1 year. During this period, the Consultant together with MOTR shall conduct visual monitoring of the road and erosion associated with it. Any problem found shall be reported to MOTR that brings the Contractor to responsibility. No final payment under the Contract shall be made until the problem is addressed.	<ul style="list-style-type: none"> <li>Consultant, MOTR and SAEPF shall monitor vegetation growth and erosion processes in the warranty period.</li> </ul>
	Stability of slopes	Given the ecological specificity of the project zone and the engineering conditions, the Contractor shall pay special attention to the stability of slopes, road embankments, especially at the intersections of the road with watercourses/ rivers / streams.	<ul style="list-style-type: none"> <li>Consultant, MOTR (DEP) shall monitor stability of the slopes and growth of vegetation on them (if any).</li> </ul>
<b>Hydrology</b>	Hydrology and water quality as a result of construction works.	The Contract stipulates that the Contractor shall be responsible within the warranty period for 1 year. During this period, the Consultant together with SAEPF shall conduct water quality monitoring and surveillance in the area of completed construction. Any problem found shall be reported to MOTR that involves the Contractor to carry out improvements. No final payment under the Contract shall be made until the problems are addressed	<ul style="list-style-type: none"> <li>Consultant, MOTR, SAEPF shall monitor water quality in the warranty period.</li> </ul>
<b>Specially protected natural area</b>	Impact on protected areas	<p>In order to avoid potential negative impacts, the Contractor shall:</p> <ul style="list-style-type: none"> <li>Adhere to accepted international practices and environmental safety requirements with regard to protected areas, as well as the specific requirements set out in the EIA.</li> <li>Maintains road signs</li> <li>Maintain the drainage system and retention ponds</li> </ul>	<ul style="list-style-type: none"> <li>Contractor implements mitigation measures.</li> <li>Engineer regularly monitors the Contractor`s activities</li> </ul>

EMP also includes a description of duties and responsibilities for mitigation and monitoring, reporting and review, the preliminary cost estimates. In addition, EMP should be developed taking into account the Contractor`s Work Program.

## 7.2 Implementation Arrangements and Responsibilities

229. The environmental impacts associated with the Project activities, have been detailed above in the relevant sections of this draft ESIA. Mitigation measures required to address the impact. The main institutions that will be involved in implementation of the ESMP are the DD Consultants, the Implementation Support and Work Supervision Consultants (the Engineer), the Contractor and to a lesser extent the MOTR through its IPIG.

230. **Detailed Design Consultant Responsibilities.** The DD Consultant has already started to coordinate with the draft ESIA Team on issues such as impacts from bridge rehabilitation / construction. Moving forward, the DD Consultant will ensure that he reads and understands all of the identified environmental impacts highlighted by this draft ESIA. He will also ensure that all recommendations made for the design phase of the ESMP are considered and incorporated in the final detailed designs, or that justifications are made for the exclusion of any recommended mitigation measure.

231. **Implementation Support and Supervision Consultant (Engineer Responsibilities).** The Engineer is tasked with specific responsibility to ensure safeguard compliance of civil works – with particular emphasis on the monitoring of implementation of ESMP through the Contractors SSESMP and related aspects of the project. To achieve this, the Engineer will include a part-time International Environmental and Social Specialist (IESS) (for 3 months during the first year of construction and 2 months per year for the second and the third year) and a full time National Environmental and Social Specialist (NESS) to monitor implementation of the ESMP during construction of all Project Components. In addition, an International Team Leader of the Implementation support and supervision consultant will take overall responsibility in ensuring that the Project is implemented consistent with the provisions of the environmental management plan (ESMP). The main responsibilities of the Engineer are as follows:

- NESS to monitor the Contractor's implementation of his SSESMP via weekly inspections of the Contractors camps and work sites;
- NESS to prepare Monthly Environmental Reports summarizing the Contractors compliance with the ESMP and SSESMP for that particular month;
- IESS to prepare Quarterly Environmental Reports providing details of the Contractors activities (such as training programs, community meetings, etc) and compliance with the ESMP and SSESMP; and
- Engage external service from a certified laboratory for environmental instrumental monitoring of air quality, noise and water quality.

232. In the event that the Engineer identifies any ESMP / SSESMP non-compliance issues by the Contractor, a Non-Compliance Notice will be issued to the contractor if the Engineer requires action to be taken. The Contractor will be required to prepare a corrective action plan which is to be implemented by a date agreed with the Engineer. Non-compliance will be ranked according to the following criteria:

- Non-Compliance Level I: A situation that is not consistent with requirements of the ESMP/SSESMP, but not believed to represent an immediate or severe social or environmental risk. Repeated Level I concerns may become Level II concerns if left unattended.
- Non-Compliance Level II: A situation that has not yet resulted in clearly identified damage or irreversible impact, but which demonstrates potential significance. Level II

requires expeditious corrective action and site-specific attention to prevent severe effects. Repeated Level II concerns may become Level III concerns if left unattended.

- Non-Compliance Level III: A critical situation that will result in significant social or environmental damage occurring or a reasonable expectation of very severe impending damage. Intentional disregard of Non-Compliance Notices or specific prohibitions is also classified as a Level III concern.
- The failure to prepare a corrective action plan or to implement it within the required timeframe will result in the Employer undertaking the work at the Contractor's expense (as will be specified in the Contract).

233. A terms of reference for the Engineers IES and NES is provided below.

#### **National Environmental and Social Specialist (NESS)**

234. Scope of Services: He/she will (i) review all documents and reports regarding the integration of environmental and social including contractor's environmental and social action plan, (ii) supervise the contractors' compliance to ESMP / SSESMP, and (iii) prepare monthly compliance reports.

235. Qualification: Degree in environmental sciences, occupational health and safety or equivalent. Preferably five (5) years' experience in conducting environmental and social impact assessments and implementation of environment and social mitigation plans and/or monitoring implementation of environmental and social mitigation measures during implementation of projects including highway projects funded by developing partners.

236. Time Period—The NESS will be a full time position over the duration of the construction period.

#### **International/Regional Environmental and Social Specialist (IESS)**

237. Scope of Services: During the supervision stage the IESS will prepare a detailed action plan including environmental and social monitoring checklists to be completed by the NESS to ensure that the Environmental and Social Management System is established, implemented, maintained and will monitor its performance. He/she will also take care of all environmental and social issues during construction works. He/she will also conduct environmental and social training and briefings to provide environmental awareness on World Bank and the government environmental safeguards policies, requirements and standard operating procedures in conformity with the government's regulations and international practice; ensure baseline monitoring and reporting of Contractor's compliance with contractual environmental and social mitigation measures during the supervision stage. The IESS will also help the with the development of the Contractors SSESMPs (at least three months prior to the start of construction).



238. Qualification: Degree or diploma in environmental sciences or equivalent. Preferably twelve (12) years' experience in conducting environmental and social impact assessments and implementation of environment mitigation plans and/or monitoring implementation of environmental mitigation measures and health and safety plans during implementation of projects including highway projects funded by developing partners, including 8 years' international experience. Working knowledge in Russian and experience in Central Asian countries is preferred.

239. Time Period: The IESS will be engaged on a part-time basis for a period of four months per year spread over the duration of the construction period.

#### **Contractor Responsibilities**

240. The Contractor will appoint a full time Environmental and Social Manager (ESM) to be a senior member of the construction management team based on site for the duration of the contract. The ESM will have a university degree (preferably at Masters level) in Environmental Science or related discipline and have at least 10 years work experience in environmental and Social management of infrastructure projects.

241. Key responsibilities of the Contractor (through the ESM) are as follows:

- Preparing the Site Specific Environmental and Social Management Plan (SSESMP) for approval by the Engineer prior to the Contractors taking possession of the construction site (see below).
- Ensuring the SSESMP is implemented effectively throughout the construction period.
- Coordinating community relations issues through acting as the Contractor's community relations focal point (proactive community consultation, complaints investigation and grievance resolution).
- Establishing and maintaining site records of:
  - o Weekly site inspections using checklists based on the SSESMP;
  - o Environmental accidents/incidents including resolution activities;
  - o Non-compliance notifications issued by the Engineer;
  - o Corrective action plans issued to the Engineer in response to non-compliance  notices;
  - o Community relations activities including maintaining complaints register;
- Preparing monitoring reports (Monthly);
- Routine reporting of SSESMP compliance and community liaison activities;
- Adhoc reporting to the Engineer of environmental  incidents/spillages including actions taken to resolve issues; and
- Provide daily toolbox training at the construction camp and also at construction sites. The EO will keep a record of all monthly training and toolbox training undertaken.


242. The Contractors monthly reports, which will include the weekly environmental and Social checklists, will contain sections relating to:

- General Progress of the Project.
- Environmental Incidents; e.g. spills of liquids, blasting issues.
- Progress of any environmental initiatives, e.g. protection of sensitive sites.
- Records of any environmental monitoring, both observational and instrumental.
- Records of community relations or stakeholder meetings conducted, complaints received and actions taken.
- Conclusions and Recommendations.

IPIG responsibilities

243. IPIG within MOTR will be responsible for the day to day management of the Project components including implementation of the ESMPs. The IPIG Director is supported by one

Environmental Consultant and one Social Development Consultant to lead all technical aspects of safeguards preparation, monitoring and reporting. The MOTR/ IPIG responsibilities in respect of implementation of the ESMP will be as follows:

- Overseeing full compliance with project safeguard instruments and will conduct monitoring of safeguard policy implementation.
- Ensure that all relevant ESMP requirements (including environmental designs and mitigation measures) are duly incorporated into the project bidding documents.
- Review necessary permits and/or clearance, as required, from relevant government agencies, ensuring that all necessary regulatory clearances are obtained by the Contractor before commencing any civil work on the project.
- Liaising with the State Agency for Environmental Protection.
- Ensure that the Contractor has access to the ESMP and ESIA report.
- Ensure that the Contractor understands his responsibilities to mitigate environmental problems associated with their construction activities and facilitate  training of their staff in implementation of the ESMP.
- Approve the SSESMP, with support from the engineer, before the Contractor takes possession of construction site.
- Undertake regular site visits to assess the Contractors compliance with the ESMP / SSESMP and make recommendations to the Contractor where non-compliance issues are identified.
- Keep proper safeguards documentations.
- Lead safeguard supervision and reporting at the project level. MOTR/IPIG will prepare six month and annual safeguard progress report.
- Integrating the gender dimension into safeguards documents, and consultation processes;
- Track and report on grievances received, addressed, and overall work and implementation of the grievance redress mechanism (GRM).

244. **Site Specific Environmental and Social Management Plan (SSESMP).** Following the award of the contract and prior to construction commencing the Contractor will review the ESMP and develop this into his detailed SSESMP. The SSESMP will identify persons who will be responsible for supervising the work within the Contractor's team. This information will be presented in a series of site plans covering the whole project site showing all environmental management requirements for all activities in the construction phase. The SSESMP will also include the following plans:

- Waste Management and Recycling Plan
- Construction Camp Plan
- Borrow Pit Plan
- Emergency Response Plan
- Air Quality Plan

- Health and Safety Plan
- Traffic Management Plan
- Spill Response Procedures

245. The SSESMP will also include a monitoring plan and a reporting program corresponding to the requirements of the ESMP. The SSESMP, and all of its plans without exception, will be submitted to the Engineer, IPIG and World Bank for review and approval prior to the Contractor taking possession of any work site. It is recommended that the Engineers' IESS supports the Contractor's ESM through on the job training in the preparation of the SSESMP.

246. Following approval of the SSESMP the Contractor will be required to attend a site induction meeting with the Engineers IESS whereby the SSESMP is confirmed with the Contractor to ensure that all compliance conditions are clearly understood. Following confirmation of the SSESMP with the Contractor the Engineers IESS advises the Engineers Team Leader that the Contractor is now cleared to take possession of the Site and may commence moving equipment to the Site. The Contractor will be responsible for ensuring that all sub-contractors abide by the conditions of the SSESMP.

247. Contractors Reporting - The Contractor will prepare two levels of environmental reports:

- Weekly Environmental Checklists – These will be prepared weekly by the Contractors ESM and will be submitted to the Engineer on a weekly basis.
- Monthly Summary Report - (Maximum 3 pages and appendices, if required) in respect of compliance with ESMP / SSESMP requirements that will be submitted to the PIU through the Engineer. The report will contain the following sections.
  - o Details of any environmental incidents
  - o Status of all non-conformance identified during audits and inspections that are identified by non-compliance notices.
  - o Complaints from the public and proactive community relations activities
  - o Monthly Accident Report
  - o Waste volumes, types and disposal
  - o Details of any contaminated areas that have been identified and rehabilitated.
  - o Details of any archaeological discoveries.
  - o Details of any ecological issues.
  - o Other relevant environmental issues.

248. The Contractor will have a duty to immediately report to the Engineer if any serious environmental breach has occurred during construction e.g. clearing of sensitive areas, serious oil spills etc.

249. Engineer Reporting – The Engineer will prepare two levels of environmental reports as follows:

- Monthly Environmental Report – prepared by the NESS and submitted to the PIU. This monthly report will summarize the Contractors environmental performance based on the Contractors weekly checklists and the weekly site visits by the NESS.
- Quarterly Environmental Report – prepare by the IESS and submitted to the PIU and World Bank, this report will be more detailed than the monthly monitoring reports and will include findings of the IESS site visits to the Contractors work sites and camps.

250. World Bank responsibilities. In regard to implementation of environmental and social safeguards requirements for the project include: undertaking periodic monitoring of the ESMP / SSESMP implementation and due diligence as part of an overall project review mission; and if required, provide advice to the IPIG in carrying out its responsibilities to implement the ESMP for the project.

251. IPIG Capacity Building Requirements. The MOTR with its IPIG has experienced Safeguard Specialists with experience of oversight of these types of road rehabilitation projects. However, IPIG capacity to implement and supervise implementation of mitigation measures and monitoring program that meet international best practices could be further strengthened. The engineer's International Environmental and Social Specialist tasks will include strengthening the capacity of MOTR/IPIG to implement and monitor environmental and social mitigation measures and monitoring as specified in the project ESIA/ESMP.



## **Annex 1: The minutes of the public consultations on disclosure of ESIA under the Third Phase of Central Asia Road Links Programme**

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### **Public Consultations in Tyup village**

Venue: Tyup Rayon State Administration, small assembly hall

Date: April 24, 2018

Time: 11:00 a.m.

Attendees: Sitihin V.P., the First Deputy Head of Tyup Rayon State Administration, WB IPIG MOTR KR staff, Heads of ayil okmotus (village council) located along the tyup-Kegen road, Director and staff of Tyup forestry agency, representatives of DEU-4.

46 people participated in the public consultations, and the list of the participants with their contact information is presented below.

1. Mr. Sitihin V.P., the First Deputy Head of Tyup Rayon State Administration, opened the public consultations, welcomed the participants, introduced the WB IPIG staff and provided brief information about the objectives of the consultations and the proposed project. He also informed the participants that the project would be financed by the World Bank. Mr. Sitihin stated that the main objective of the public consultations was to inform the population about the procedures and policies of the World Bank and get opinions of the local population regarding the proposed project, what the local communities would benefit from the project and disclose the draft Environmental and Social Impact Assessment (ESIA) that had been prepared for the consultations.
2. Then the WB IPIG staff informed the participants about the project implementation schedule and the documents that had been prepared at pre-project stage, particularly ESIA. Hardcopies of ESIA and information pamphlets in Kyrgyz and Russian languages including comprehensive information about the project components and GRG with contact information were distributed among the participants. The representatives of the WB IPIG noted that one of the objectives of the public consultations was to provide necessary information and discuss the expected social impacts and mitigation measures, as well as review of safeguard policies of the World Bank and others.
3. The participants noted that all issues as well as social issues had been well developed and stressed the importance of informing the representatives of local authorities and local communities in a timely manner.
4. During the discussion of the draft ESIA some participants requested to explain some questions:
  - Saliev A., Senior Land Specialist of Taldy-Suu ayil okmotu, requested to include in the design the construction of sidewalks in Taldy-Suu, Korumdu, Jolu-Bulak, Kara-Chunkur and Ken-Suu villages within the rehabilitation of Tyup-kegen Road and consider the issue if tracked vehicles can drive on the road. He also supported the idea that the project implementation would have positive impacts on the socio-economic condition of the region, expressed his gratitude and stated that management of ayil okmotu would support the project and the Executing Agency.
  - Japarov O., head of San-Tash ayil okmotu, specified the road category and requested the Executing Agency to pay particular attention to borrow pits. He stated that since the

road passed through the territory of San-Tash ayil okmotu and given the poor condition of gravel paved road it was necessary to speed up the project implementation, speaking on the behalf of the local population he noted that the local population supported the project and requested to accelerate the project implementation. It was also requested to include construction of culverts and drainage system in the design at design stage to avoid erosion. As for the borrow pit issues, the representatives of the Executing Agencies said that the issue would be additionally considered in cooperation with other agencies, for which the quality and suitability of materials would be tested additionally.

- Ryspaev M., Director of Forestry Agency, requested to ensure road safety in villages by constructing underpass for livestock.

5. Other questions were related the employment opportunities for the local population during the project implementation and engineering parts of the project.

6. Main conclusions of the discussions: the participants took notice of the information provide and confirmed the timeliness and relevance of the project, and since there was no objection the ESIA prepared was disclosed and approved by the communities.

## **The list of participants**

### Общественные слушания

по обнародованию ОВОСС Программы по улучшению дорожных путей сообщения в Центральной Азии (ПУДСА ЦА-3) 24 апреля 2018 года.

Кыргызстан, Иссык-Кульская область, Тонпский район, с.Тюп, Районная Государственная Администрация Тонпского района

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**Общественные слушания**

по обнародованию ОВОСС Программы по улучшению дорожных путей сообщения в Центральной Азии (ПУДСА ЦА-3) 24 апреля 2018 года.  
 Кыргызстан, Иссык-Кульская область, Тюпский район, с.Тюп, Районная Государственная Администрация Тюпского района

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