

Initial Environmental Examination

May 2014

KGZ: Emergency Assistance for Recovery and Reconstruction

Prepared under the Emergency Assistance for Recovery and Reconstruction Project for the Improvement of Water Supply System for Osh City financed by the Asian Development Bank.

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ABBREVIATIONS

A/O	Ayil Okmotu
ADB	Asian Development Bank
CAP	Corrective Action Plan
CIS	Commonwealth of Independent States
COD	Chemical Oxygen Demand
DEAP	Disaster and Emergency Policy
DO	Dissolved Oxygen
DSC	Design and Supervision Consultant
EA	Executing Agency
EARF	Environmental Assessment and Review Framework
EARR	Emergency Assistance for Recovery and Reconstruction
EHS	Environment, Health and Safety
EIA	Environmental Impact Assessment
EIS	Environmental Impact Statement
EMoP	Environmental Monitoring Plan
EMP	Environmental Management Plan
FSR	Feasibility Study Report
GRG	Grievance Redress Group
GRM	Grievance Redress Mechanism
IA	Implementing Agency
IEE	Initial Environmental Examination
km	Kilometers
KR	Kyrgyz Republic
LAR	Land Acquisition and Resettlement
LPCs	Local Point of Contacts
m³ / s	Cubic meters per second
masl	Meter above sea level
MoF	Ministry of Finance
MPC	Maximum Permissible Concentration
ND	Nominal Diameter
NES	National Environmental Specialist
NGOs	Nongovernment Organizations
OVOS	Procedure for Environmental Impact Assessment
PAM	Project Administration Manual
PER	Public Environmental Review
PMC	Project Management Consultant
REA	Rapid Environmental Assessment
RP	Resettlement Plan
SAACCS	State Agency for Architecture, Construction, and Communal Services
SAEPF	State Agency on Environmental Protection and Forestry
SanPin	Sanitary and epidemiologic rules and regulations
SDRD	State Directorate for Reconstruction and Development for Osh and Jalal- Abad cities
SER	State Environmental Review
SIETS	State Inspectorate on Environmental and Technical Safety
SPS	Safeguard Policy Statement
SPZ	Sanitary Protection Zone
SS	Suspended Solid
ToR	Terms of Reference
UNECE	United Nations Economic Commission for Europe
WTP	Water Treatment Plant
WWTP	Wastewater Treatment Plant

EXECUTIVE SUMMARY

Introduction

1. This is the Initial Environmental Examination (IEE) for the proposed “Improvement of Water Supply System for Osh City” subproject, prepared under the Emergency Assistance for Recovery and Reconstruction (EARR) Project financed by the Asian Development Bank (ADB). The purpose of the subproject is to improve water supply infrastructure in Osh City, located in Osh Oblast (province) in the Kyrgyz Republic (KR).

2. In accordance with the EARR environmental assessment and review framework (EARF), the proposed subproject has been classified as Environment Category B, requiring the preparation of an IEE. The IEE has been prepared in accordance with requirements of the Natural Environment Conservation law of the KR, the EARF, and ADB’s Safeguard Policy Statement (SPS).

Subproject Description

3. The subproject’s water supply infrastructure are located in Osh City and the “Plotina” intake site, located approximately 7 km south of Osh on the right bank of the Ak-Bura River. The proposed water supply system improvements include construction of an infiltration gallery at the Plotina river water intake; a new water supply transmission main between the new drainage gallery and the “Ozgor” water treatment plant (WTP); rehabilitation of the chlorination station at the Ozgor WTP; rehabilitation of the 6,000 m³ reservoir at the Brick Factory site; and construction of a new reservoir at the Brick Factory. The infiltration gallery will replace a gallery that was constructed earlier but was damaged in early 2010 by a flood before it was commissioned.

Construction of an infiltration gallery at the Plotina river water intake

- Construction of an infiltration gallery made from stainless steel bridge-slotted filter pipes with nominal diameters (NDs) of 1000/1200/1600 mm, a length of 300 m, a cover depth of up to 3 m, a slope of 0.1 %, and an infiltration hydraulic capacity of 0.8 m³/sec.
- Construction of a two-layer inverse sand filter surrounding the drainage pipes.
- Construction of an impermeable clay screen above the pipes to prevent the inflow of surface water.
- Construction of 5 cast-in-situ reinforced concrete control chambers with a cross section of 3.0 x 2.0 m and a depth of up to 5 m.
- Construction of an earth fill protection embankment with a length of 350 m and a height of up to 3 m. The embankment will be constructed with excavated and supplied material. Rock-filled gabions and riprap will be placed on the river side of the embankment.

4. In addition to these works, Sanitary Protection Zones (SPZs) will be established to protect the water intake.

Construction of a new water supply transmission main between the new drainage gallery and the Ozgor WTP

- Construction of a new 4.7 km transmission main, made from polyethylene pipes, connecting the new infiltration gallery to a distribution chamber at the existing Ozgor WTP. The outside diameter (OD) of the pipes will be 1200 mm for the first 200 m and OD 1000 mm along the remainder of the pipe route. The depth of pipes underground will be up to 5 m. The hydraulic capacity of the new transmission main will be 0.8 - 1.0 m³/sec.

- Construction of two rectangular cast-in-situ control manholes with the following dimensions: 5.1 x 4.2 x 3.4 m (Manhole B-1) and 6.6 x 5.8 x 6.47 m (Manhole B-2).
- Construction of a pipe bridge at the crossing with an irrigation channel. The pipe shall be welded steel with a diameter of 1000 mm.
- Partial reinstatement of macadam and asphalt road pavement.
- Construction of a distribution chamber at Ozgor WTP including ND 500 mm connection to the reservoirs at the brick factory site and to the inflow pipes for the reservoirs at the WTP.
- Construction of a 400 m long fence.

Rehabilitation of the chlorination station at Ozgor WTP

- Reconstruction of the existing chlorination building at Ozgor WTP including civil works, heating and ventilation, electrical power supply, water supply and sewerage pipes.
- Complete replacement of the chlorination plant including automatic control of residual chlorine and laying of chlorine pipelines. Chlorination shall be facilitated for 2 reservoirs of 3,000 m³ each, 2 reservoirs of 2,000 m³ each, and injection to the new transmission main from the new drainage gallery.
- Construction of external water supply network including pipelines and valve chambers.

Rehabilitation of the 6,000 m³ reservoir at the Brick Factory site

- Internal waterproofing of the reservoir in order to prevent leakages and destruction of the embankment and its soil foundation.
- Construction of drainage ditches for removal of flood waters.
- Rehabilitation of a distribution chamber.
- Strengthening of the slope subject to erosion on the western side of the reservoir.

Construction of a new reservoir at the Brick Factory

- Construction of a new reinforced concrete reservoir with a volume of 6,000 m³.
- Construction of a new fence around the reservoir site consisting of modular pre-cast reinforced concrete panels.
- Installation of level meters.

Environmental, Legal and Administrative Framework

5. The subproject has been classified by ADB as environment category B, requiring the preparation of an IEE (this report) including an environmental management plan (EMP) which will ensure (i) implementation of identified mitigation and management measures for anticipated adverse environment impacts; (ii) implementation of monitoring and reporting; and (iii) subproject compliance with the KR's relevant environmental laws, standards and regulations and ADB's SPS.

Environmental Baseline of Subproject

Geo-Physical Profile

6. The subproject is located on the Ak-Bura River in Osh City, in the north-central part of Osh Oblast. The Osh region includes the northern slopes of the Trans-Alay mountain range, and the southeastern part of the Fergana mountain ranges.

7. The climate of Osh Oblast is characterized by vertical zonation. Flat valleys and the foothill zone are characterized by hot summers (up to 28°C) and moderately cool and snowless winters. The highest precipitation levels are in Uzgen district and reach up to 1,000 mm/year. The lowest precipitation levels are in Chon-Alai and Aravan districts (up to 300 mm/year).

8. Ak-Bura River flows through the area and is part of the Naryn River basin. The Naryn River rises in the Tian Shan mountains and flows west through the Fergana Valley into Uzbekistan, where it merges with the Kara Darya River to form the Syr Darya.

9. The Ak-Bura River has a water catchment area of 2,430 km² and an average altitude of 3,030 meters above sea level (masl). It is fed by upper mountain precipitation including snow and glacial runoff.

10. Groundwater is encountered in proluvial modern deposits between 1.0-9.5 m depth, and in alluvial boulder-pebbles between 9.5-14.5 m depth. Sand-gravel-loam deposits (interval 14.5-15.0 m) form a relatively confining layer.

Local Environment at Intake Site

11. The intake area has been heavily modified, and there are no rare or endangered flora or fauna at or near the site. There are no State Reserves, Parks or Wildlife Refuges that will be affected by any subproject activity.

12. In the upper reaches of the Ak-Bura River there are young unconsolidated sediments, erosion of which results in high turbidity averaging 200 mg/l. The problem is further exacerbated during high rainfall events, leading to turbidity levels of up to 19,000 mg/l. In such situations Vodokanal closes the water intake and suspends water supply to the city.

13. There are no industrial enterprises in the vicinity of the water intake which can cause water pollution in the river. There are also no crops in the immediate surroundings of the water intake, and there are no known historical archaeological resources within or adjacent to the subproject sites.

Socio-Economic and Cultural Environment

14. The population of the KR is 5.5 million. As of January 2011 the population of Osh Oblast was 1.13 million people, representing 20.6% of the KR population. Average population density for the Oblast is 38.9 persons/km², though in mountainous areas the population density is lower than the valleys and the border area with Uzbekistan where the population density can reach 300-400 persons/km². Approximately 70% of the Province's population lives in rural areas.

15. During the Soviet period Osh became a major industrial center, hosting cotton and silk plants, clothing and footwear factories, and food processing, engineering, and metalworking enterprises. Manufacturing, electric-power, fuel, construction materials, food processing, and flour, cereal and feed mill industries remain important. Textile and tailoring industries are the most significant light industries, and Osh has taken a leading role in the country in the production of cotton cloth.

Analysis of Alternatives

16. The following alternatives were considered:

- a surface intake approximately 2 km upstream of the existing Plotina intake;
- a system of sedimentation tanks and rapid sand filters and/or a slow sand filter at the Plotina water intake; and

- rehabilitation and/or reconstruction of the WTP at Ozgor, or construction of a separate chlorination plant at the reservoir in the Brick Factory.

17. These options were not considered viable from both economic and technical perspectives, or because of unavailability of sufficient land.

18. In addition, not undertaking the subproject - the “No Action Alternative” - was also considered. However, not undertaking the subproject would not realize the objective of improving municipal services through a more reliable water supply, and was deemed neither a reasonable nor prudent course of action.

Environmental Impacts and Mitigation Measures

19. A subproject environmental impact is any change in physical, biological, and socio-economic conditions, and physical cultural resources resulting from subproject activities. The methodology for identifying potential subproject impacts and associated mitigation measures has included the collection of subproject information and screening of subproject preconstruction, construction and operational stage activities to identify those with the highest potential for environmental impacts. Characterization of potential environmental impacts has been undertaken based on information on the proposed project and on available environmental data, surveys and site visits undertaken by national and international environmental specialists. Identification of appropriate mitigation measures has been undertaken based on experiences in similar projects in the region and the expertise of the national and international environmental and other specialists.

20. The subproject will generate environmental impacts during the preconstruction, construction and operation phases.

21. The physical works do not require any land acquisition or resettlement. The water transmission pipelines from Plotina to Ozgor will require clearing of 51 trees. Although planted on public land, these trees are owned by 2 households living adjacent to the affected area in Ozgor Village. Compensation will be provided to tree owners in accordance with KR and ADB requirements through a Resettlement Plan (RP).

22. Construction phase impacts are low to moderate in magnitude and are typically temporary and localized in nature. There are no high magnitude construction phase impacts. All impacts can be adequately addressed through typical mitigation measures including good construction and health and safety practices.

23. The operation phase is expected to have limited negative impacts. Potential threats to drinking water quality will be addressed by the delineation of SPZ zones I to III and through chlorination and ongoing drinking water quality laboratory analysis. Worker health will be protected through appropriate health and safety practices. On the other hand, subproject operation will create high positive impacts on public health and hygiene. Provision of good quality water is expected to significantly enhance the quality of life of affected peoples.

Environmental Management Plan

24. A comprehensive EMP was developed to ensure (i) implementation of identified mitigation and management measures to avoid, reduce, mitigate, and compensate for anticipated adverse environment impacts; (ii) implementation of monitoring and reporting against the performance indicators; and (iii) subproject compliance with the KR's relevant environmental laws, standards and regulations and ADB's SPS.

25. The EMP includes an environment monitoring plan (EMoP) to monitor the environmental impacts of the subproject and assess the effectiveness of mitigation measures, and a worker training program. Organizational responsibilities and budgets are clearly identified for execution, monitoring and reporting.

Information, Disclosure, Consultation and Participation

26. ADB's SPS has specific requirements for information disclosure and public consultation. Information disclosure involves delivering information about a proposed project to the general public and to affected communities and other stakeholders, beginning early in the project cycle and continuing throughout the life of the project. Information disclosure is intended to facilitate constructive engagement with affected communities and stakeholders over the life of the project.

27. In this regard, public hearing/consultation meeting were held on 20 June and December 3rd, 2013, and the summaries of the meeting proceedings are presented in Appendix 2.

Grievance Redress Mechanism

28. A subproject-level grievance redress mechanism (GRM) will build on the GRM earlier established for the EARR to receive and facilitate resolution of complaints about the subproject's environmental performance during the construction and operation phase. The GRM includes procedures for receiving grievances, recording/ documenting key information, and evaluating and responding to the complainants in a reasonable period of time. Any concerns raised through the GRM will need to be addressed quickly and transparently, and without retribution to the affected person.

Conclusion

29. Based on the analysis undertaken in this report, it is concluded that:

- i) the proposed subproject will have no significant adverse impacts, and will result in significant positive socioeconomic and environmental benefits. Any minimal adverse environmental impacts associated with the subproject can be addressed through the application of appropriate mitigation measures;
- ii) the subproject's categorization as ADB environment category B is confirmed; and
- iii) this IEE is considered sufficient to meet ADB's environmental safeguard requirements for the subproject, and no additional studies are required.

I. INTRODUCTION

A. Subproject Background

1. This is the Initial Environmental Examination (IEE) for the “Improvement of Water Supply System for Osh City” subproject, developed under the Emergency Assistance for Recovery and Reconstruction (EARR) Project financed by Asian Development Bank (ADB).
2. The Kyrgyz Republic (KR) has received a Loan and a Grant through Financing Agreement LPS: KGZ 44236 for the EARR Project, signed between the KR and ADB on 27 September 2010.¹
3. The EARR is in response to the Government's call for assistance to mitigate the adverse effects of the June 2010 ethnic conflicts. The EARR Project is based on ADB's Disaster and Emergency Policy (DEAP), which offers a framework to promptly respond to emergency needs, and provides rapid funding to help rebuild high priority assets and restore economic, social, and governance activities after emergencies.
4. The EARR Project includes:
 - uninterrupted provision of education, health, social assistance, transport and urban services (Component 1: Fiscal Support);
 - damaged houses repaired and/or reconstructed and rehabilitated (Component 2: Housing Reconstruction);
 - critical public infrastructure improvement (Component 3), including improved water supply and sewerage (Component 3A) and other community and public infrastructure improvement and an education and awareness program (Component 3B); and
 - implementation assistance through consulting services (Component 4)
5. The Ministry of Finance (MoF) is EARR's Executing Agency (EA). It also implemented the fiscal support component. The State Directorate for Reconstruction and Development of Osh and Jalal-Abad (SDRD) was Implementing Agency (IA) until 15 January 2013, and successfully implemented the housing component. The State Agency for Architecture, Construction, and Communal Services (SAACCS), the successor agency to SDRD, is implementing the water supply and sewerage and community infrastructure improvement component under the overall guidance by, and direction from, its Director, with the Deputy Chief Architect of Osh City responsible for technical project implementation aspects.
6. This “Improvements of Water Supply System in Osh City” is one of the three subprojects included under Component 3A of the EARR. The overall objective of component 3A is to improve water supply and sewerage infrastructure in the cities of Osh and Jalal-Abad, and in Bazar-Korgon village. With respect to water supply system infrastructure, Component 3A is expected to rehabilitate water supply intake works and rehabilitate or construct new transmission pipelines from intakes to treatment plants and reservoirs. With respect to sewerage infrastructure, Component 3A is expected to rehabilitate or construct new sewerage treatment plants and main sewer lines.
7. The Environmental Assessment and Review Framework (EARF) adopted for the EARR requires that component 3A subprojects are screened to determine their environmental category utilizing ADB's Rapid Environmental Assessment (REA) Checklists (Appendix 1). On the basis of the screening the Osh subproject has been classified as Environment Category B, requiring the preparation of this IEE.

¹ Loan No. 2668-KGZ (SF) and Grant No. 0217-KGZ(SF).

B. Approach to IEE Preparation

8. This IEE report has been prepared based on a subproject Feasibility Study Report (FSR) and data collection, surveys, site visits and consultations undertaken by national and international environmental consultants.²

C. Structure of the Report

9. The IEE has been prepared in accordance with requirements of the Natural Environment Conservation law of the KR, the EARF, and ADB's Safeguard Policy Statement (SPS). The IEE Report describes the baseline environmental conditions, including physical, biological, socio-economic conditions, and physical cultural resources; assesses potential subproject environmental impacts; and provides mitigation measures. It includes an Environmental Management Plan (EMP) and an Environmental Monitoring Plan (EMoP) to ensure that the mitigation measures are appropriately implemented and are effective.

10. The IEE report is organized as follows:

- Executive Summary. Summarizes critical facts, significant findings, and recommended actions.
- Introduction. Introduces the proposed subproject, report purpose, and IEE structure.
- Description of the Subproject. Provides a detailed description of the subproject scope, components, location, layout, budget and implementation schedule.
- Environmental Legal and Administrative Framework. Discusses KR and ADB environmental assessment legal and institutional frameworks.
- Environmental Baseline. Provides a description of the relevant physical, biological, socioeconomic conditions within the area potentially affected by the subproject. The description is based on reviews of available documentation, statistical data and field surveys and investigations.
- Analysis of Alternatives. Provides and considers possible subproject alternatives.
- Assessment of Anticipated Environmental Impacts and Mitigation Measures. Describes impacts predicted to occur as a result of the subproject, and identifies suitable mitigation measures.
- Environmental Management Plan. Presents the EMP, including required construction and operation phase environmental mitigation measures, an EMoP, reporting requirements, and capacity building.
- Information, Disclosure, Consultation and Participation. Describes the process undertaken for engaging stakeholders and carrying out IEE disclosure and public consultation.
- Conclusion. Presents conclusions drawn from the assessment and recommendations.
- Annexes. Presents additional supporting information.

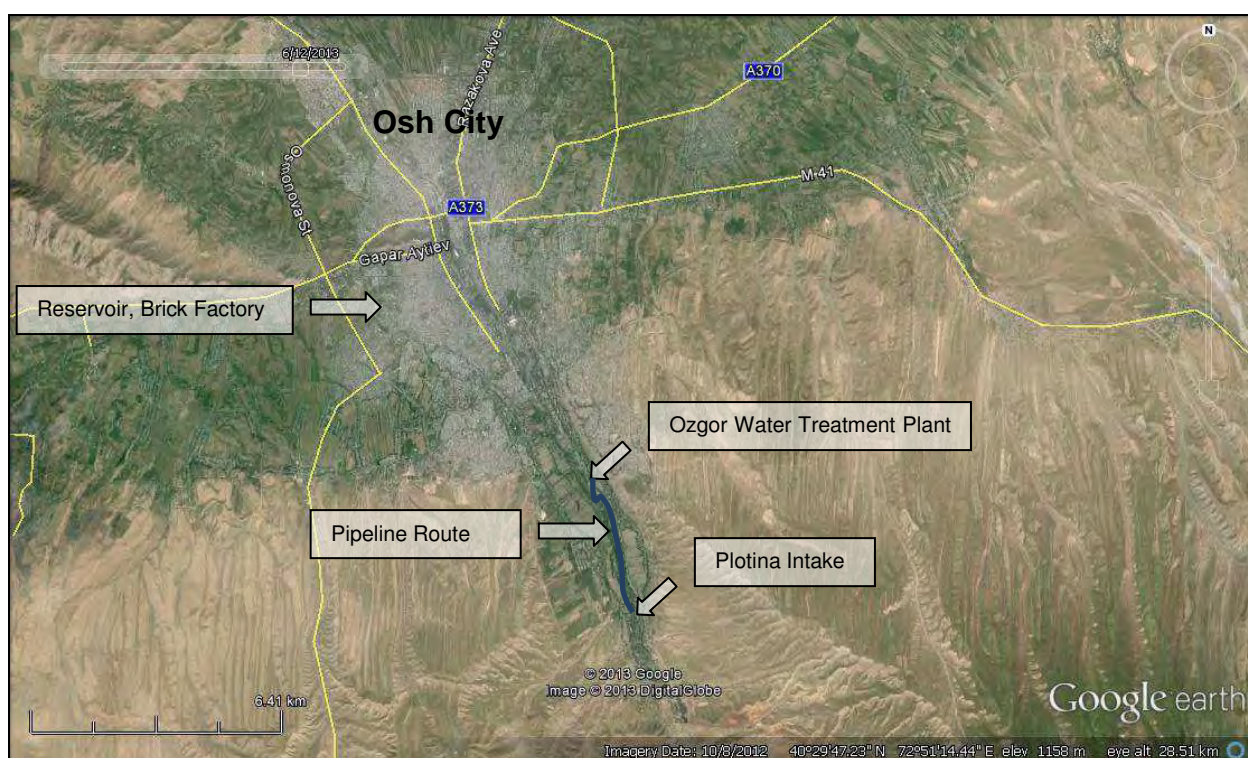
² International and national environmental specialist site visits and data collection missions were undertaken in June 2012, October 2012, 5 May to 9 July 2013, and 06-14 November 2013.

II. DESCRIPTION OF THE SUBPROJECT

A. Location

11. The water supply infrastructure included under the subproject is located in Osh City, in northeastern Osh Oblast. The infiltration gallery is located at the “Plotina” intake site, approximately 7 km south of the Osh outskirts, on the right bank of the Ak-Bura River. The “Ozgor” Water Treatment Plant (WTP) is located approximately 4.5 km north of the Plotina intake site, while the Brick Factory reservoirs are located in the southwest of Osh City (Figure 1).

Figure 1: General Location of the subproject



B. Subproject Works

12. The subproject includes the following improvement works:
- construction of an infiltration gallery at the Plotina river water intake;
 - construction of a new water supply transmission main between the new drainage gallery and the Ozgor WTP;
 - rehabilitation of the chlorination station at the Ozgor WTP;
 - rehabilitation of the existing reservoir at the Brick Factory site; and
 - construction of a new reservoir at the Brick Factory.

1. Construction of an infiltration gallery at the Plotina river water intake

13. The existing direct intake at Plotina was constructed in 1972 and has been functioning since then. There is a Water Treatment Plant (WTP) of 180 million liters per day

(MLD) capacity, at Ozgor, which has not been in operation for the last 17 years due to the expense of chemicals required for the coagulation process and other operational issues. The WTP is currently functioning as a basic filtration system only. Due to its poor condition, the Ozgor WTP cannot properly treat the water and eliminate turbidity especially during floods when the turbidity in the Ak-Bura River reaches up to 19,000 mg/l. In such situations, Vodokanal closes the water intake and suspends water supply to the city. An earlier constructed drainage gallery at the Plotina water intake was damaged in early 2010 by a flood before it was commissioned.

14. Thus, it is proposed to construct a new drainage gallery with a capacity of up to 0.8 cubic meters per second (m^3/s) to supply clean water to the Ozgor WTP. In order to prevent damage to the gallery by the river flow and erosion, an earth fill protection embankment with river site slope protection will be constructed.

15. The works include the following main components:

- Construction of an infiltration gallery made from stainless steel bridge-slotted filter pipes with NDs of 1000/1200/1600 mm, a length of 300 m, a cover depth of up to 3 m, a slope of 0.1 %, and an infiltration hydraulic capacity of $0.8 \text{ m}^3/\text{sec}$.
- Construction of a two-layer inverse sand filter surrounding the drainage pipes.
- Construction of an impermeable clay screen above the pipe to prevent the inflow of surface water.
- Construction of 5 cast-in-situ reinforced concrete control chambers with a cross section of $3.0 \times 2.0 \text{ m}$ and a depth of up to 5 m.
- Construction of an earth fill flood protection embankment with a length of 350 m and a height of up to 3 m. The embankment shall be constructed with excavated and supplied material. Rock-filled gabions or riprap will be placed on the river side of the embankment. The embankment will be designed so as to avoid flood damage to the gallery such as occurred in 2010.

16. In addition to these works, Sanitary Protection Zones (SPZs) will be established to protect the water intake.

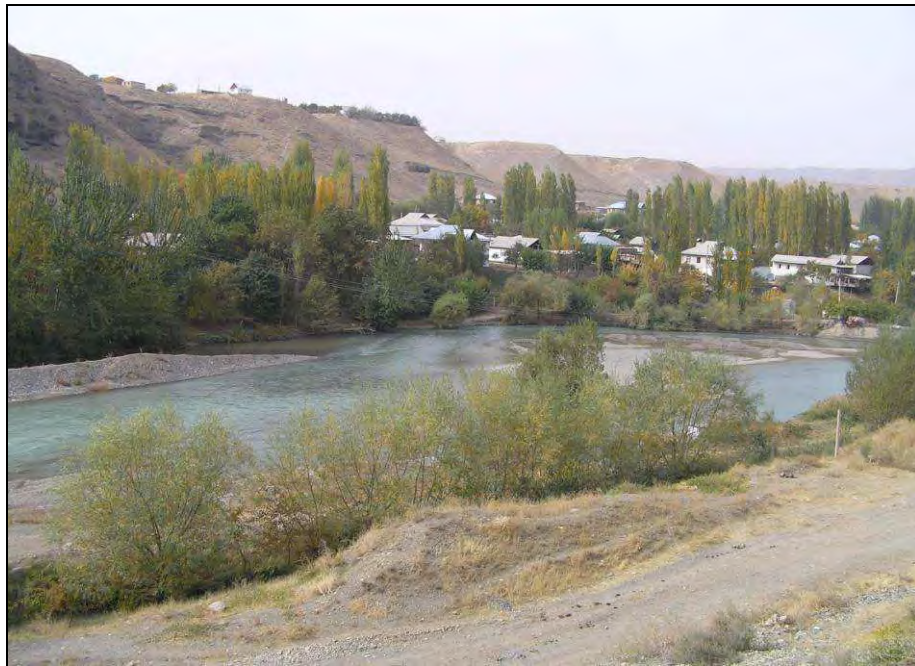
2. Construction of a new water supply transmission main between the new drainage gallery and the Ozgor WTP

17. River water is currently supplied from the Plotina water intake through two transmission pipelines with ND of 800/1000 mm to the WTP. A new transmission pipeline will be constructed connecting the new drainage gallery to a distribution chamber at the existing WTP.

18. The works include the following main components:

- Construction of 4.7 km new transmission main made from polyethylene pipes PN 10 connecting the new infiltration gallery to a distribution chamber at the existing Ozgor WTP with pipe diameters of OD 1200 mm at the beginning (200 m) and OD 1000 mm along the further pipe route. The depth of pipes will be up to 5 m. The hydraulic capacity of the new transmission main will be $0.8 - 1.0 \text{ m}^3/\text{sec}$.
- Construction of two rectangular cast-in-situ control manholes with the following dimensions: $5.1 \times 4.2 \times 3.4 \text{ m}$ (Manhole B-1) and $6.6 \times 5.8 \times 6.47 \text{ m}$ (Manhole B-2).
- Construction of a pipe bridge at the crossing with an irrigation channel. The pipe shall be welded steel with a diameter of 1000 mm.
- Partial reinstatement of macadam and asphalt road pavement.

Figure 2: Surroundings of the Plotina intake area



- Construction of a distribution chamber at the Ozgor WTP including ND 500 mm connection to the reservoirs at the brick factory site and to the inflow pipes for the reservoirs at the WTP.
 - Construction of a 400 m long fence.
19. Figure 3 shows the transmission pipeline alignment.

Figure 3: Transmission pipeline alignment



3. Rehabilitation of the chlorination station at Ozgor WTP

20. The subproject will reconstruct the existing chlorination building at the Ozgor WTP, and supply and install a new chlorination system.
21. The works include the following main components:
- Reconstruction of the existing chlorination building at Ozgor WTP including civil works, heating and ventilation, electrical power supply, water supply and sewerage pipes.
 - Complete replacement of the chlorination plant including automatic control of residual chlorine and laying of chlorine pipelines. Chlorination shall be facilitated for 2 reservoirs of 3,000 m³ each, 2 reservoirs of 2,000 m³ each, and injection to the new transmission main from the new drainage gallery.
 - Construction of external water supply network incl. pipelines and valve chambers.
22. Figures 4 and 5 shows the location and a view of the Ozgor WTP.

Figure 4: Location of the Ozgor WTP



Figure 5: A view of the Ozgor WTP



4. Rehabilitation of the reservoir at the Brick Factory site

23. The rehabilitation of the existing reservoir of 6,000 m³ at the Brick Factory site includes the following works:

- Internal waterproofing of the reservoir in order to prevent leakages and destruction of the embankment and its soil foundation.
- Construction of drainage ditches for removal of flood waters.
- Rehabilitation of a distribution chamber.
- Strengthening of the slope subject to erosion on the western side of the reservoir.

Figure 6: A view of the reservoir at the Brick Factory



5. Construction of a new reservoir at the Brick Factory

The works include the following main components:

- Construction of a new reinforced concrete reservoir with a volume of 6,000 m³.
- Construction of a new fence around the reservoir site consisting of modular pre-cast reinforced concrete panels.
- Installation of level meters.

C. Subproject Budget and Time Schedule

24. The subproject cost is estimated at \$9.8 million. The construction period will be 15 months, with construction commencement tentatively scheduled for March 2014. The subproject expected lifetime is 25 years.

III. ENVIRONMENTAL, LEGAL AND ADMINISTRATIVE FRAMEWORK

A. Legal Framework of Environmental Assessment in Kyrgyz Republic

1. General Provisions

25. The KR is divided administratively into seven oblasts (provinces) plus the metropolitan region of Bishkek, the country's capital. An oblast usually comprises several rayons (districts) and towns. Each oblast has a provincial council while the main executive authority is represented by the head of the oblast administration (Governor) who is appointed by the central government.

26. The executive arm of the central government is headed by the Prime Minister and the First Vice-Prime Minister who are responsible for the economy, industry, and environmental protection, and the supervision of the respective ministries and national agencies. There are also two additional Vice-Prime Ministers responsible for other sectors: one is responsible for social policy, employment, science, cultural development, and mass media while the other is in charge of defense, public security, anti-corruption, emergencies, etc.

27. The legal basis for environmental assessments in KR is formed by the Law on Environmental Protection (1999), the Law on Ecological Expertise (State Environmental Review (1999)), the Instruction on Procedures of State Environmental Expertise for Pre-Project, Project and other Materials in Kyrgyz Republic (1997), and the Instruction on Environmental Impact Assessment Performance Procedures in the Kyrgyz Republic (1997). These legal documents are supported by normative documents. The KR acceded to the *Aarhus Convention on Public Participation in Decision-making and Access to Justice in Environmental Matters* and *Espoo (EIA) Convention* for projects that are likely to have significant adverse environmental impacts across boundaries.

2. Institutional Framework for Environmental Assessment

28. At the highest level of government, the Jogorku Kenesh (Parliament) - through the Commission on land and agricultural issues, water resources, ecology and regional development - is responsible for:

- defining the overall framework for nature protection policy;
- developing and approving laws and regulations; and
- approving government proposals on resource charges and taxes.

29. A number of environmental responsibilities are delegated to the President's office. The President has the authority to:

- establish specific rules and decide on the use of natural resources;
- define and announce the boundaries and the status of environmental emergencies and environmental disaster zones; and
- approve procedures for the collection and use of environmental protection funds.

30. According to Clause 64 of the 2010 Constitution of the KR, the President is responsible for signing all laws adopted by the Jogorku Kenesh, conducting international negotiations, and signing international conventions and treaties with the approval of the Prime Minister. In doing so, the President has the right to transfer the named powers of signing treaties and conventions to the Prime Minister, and members of the Government while keeping the powers for signing the ratification and accession instruments.

31. The key government institution responsible for the establishment and implementation of environmental policy and management in the KR is the State Agency on Environmental Protection and Forestry (SAEPF). According to legal provisions, the SAEPF is the

governmental body for environmental protection and ecology, and industrial safety. Its major mandate is to:

- exercise state control over environment protection, development and implementation of a common policy in the field of environment protection and nature management; and
- control and provide licenses in the field of industrial safety, economic activities and mining.

32. Another recently (2011) established environment-related body under the Government is the State Inspectorate on Environmental and Technical Safety (SIETS). It exercises state control in terms of requirements and norms related to life and health safety provisions for human beings, animals and plants, and environment. Specifically, the SIETS, amongst others, carries out:

- state oversight and control over the legislation, technical regulations on mechanical, seismic, fire, environmental, industrial, energy, biological, chemical, and radioactive safety and/or associated with it processes of production, construction, mounting, setting-up, operation, preservation, transportation, application, implementation, burying, disposal and recycling;
- making provisions for the implementation of commitments regarding international agreements within the limits of its competence; and
- other relevant tasks.

33. The IEE has been carried out in compliance with the following legal documents of the KR: “Overall technical regulations related to ensuring environmental safety in the KR” №151 of 08.05.2009 (as revised of the Law of the KR on 1 March 2012 №11)” and “Instruction about procedure of conducting assessment of environmental impacts in the KR” approved by Minister for Environmental Protection of the KR on 27.06.1997.

3. Application of the Legislation on Environmental Assessment

34. The system for environment assessment in the KR is based on two subsystems: OVOS (the Russian acronym for “Environmental Impact Assessment”), and Ecological Expertise (State Environmental Review, SER). A procedure based on screening lists identifies whether a project is the subject for an environmental assessment. In case this is required, an OVOS is conducted by an OVOS Developer hired by a Project Proponent. After presentation of an Environmental Impact Statement (EIS) for public consultations, and its improvement as a result of the feedback from the public, the OVOS report and a Statement of Environmental Consequences along with other supporting documentation is submitted to a state expert commission for the SER. The project may be approved, rejected or send for re-examination.

35. Public consultation should occur during the conduct of the OVOS and may also be initiated in parallel to the SER as Public Environmental Review (PER). The implementation of any project is permitted only following approval by the SER. The PER is a supplement to the SER and is of a recommendatory nature. The SER duration depends on the complexity of the project, but should not exceed 3 months after submission of all OVOS documents.

4. Other Governmental Bodies with Environment-related Responsibilities

36. Other government institutions with a responsibility related to environmental matters are:

- State Agency for Hydrometeorology (“Hydromet”) under the Ministry of Emergencies;
- National Statistics Committee;

- State Sanitary-Epidemiological Department of the Ministry of Health;
- State Agency for Geology and Mineral Resources;
- Water Industry and Melioration Department under the Ministry of Agriculture and Melioration; and
- Kyrgyz State Design Institute “Giprozem” (responsible for elaboration on land use design documents).

5. Sanitary Protection Zones

37. According to the Sanitary Rules and Norms No. 2.1.4.1110-02 "Zones of sanitary protection of water sources and potable water supply" developed during the time of the Russian Federation, normally adopted in the KR through Sanitation Norms and Standard 2.1.4.015-03, all water intake facilities shall have sanitary protection zones (SPZs). These zones provide protection from pollution to both ground and underground water sources. Water intakes shall have three protection zones:

- SPZ I – the area of high security;
- SPZ II – the area to be protected from bacterial contamination; and
- SPZ III – the area to be protected from chemical pollution.

38. SPZ I has strict conditions for the protection of underground water sources; it extends normally 30 m from the outer well. The zone is designed to provide maximum protection from intentional or accidental contamination. Within this zone, the following is strictly prohibited:

- human habitation, and the construction and placement of any structures and buildings that have no direct relation to the operation of the water intake; and
- the presence of unauthorized people, pets and farm animals; the use of pesticides and organic fertilizers for crops and plantations.

39. The territory of SPZ I must be fenced off. This land is strictly protected and improved by placing an artificial surface such as asphalt, gravel, pebbles etc. To ensure pollution prevention to the high security zone, necessary measures should be taken to protect the territory, especially for the areas located near residential and industrial facilities.

40. The purpose of SPZ II is to protect a groundwater source from bacterial contamination. The boundaries of this zone are determined by hydrodynamic and pollutants migration parameters. They are calculated based on the survival period of various pathogens in the groundwater. The estimated survival period (100, 200, 400 days) is dependent on the degree of bacterial contamination and the local climate. Within the SPZ II:

- construction of all types of buildings leading to the disturbance of the soil formation and/or rocks that overlay the aquifers is strictly forbidden;
- the area is to be strictly protected from effluents, sewage, pesticides and fertilizers; and
- cemeteries, burial grounds, warehouses, fuel depots, landfills, livestock and poultry farms, etc. are strictly prohibited.

41. The purpose of the SPZ III is to protect a groundwater source from chemical pollution. To calculate the boundaries of this zone, the rate of migration of chemical contaminants is to be determined. The design life-cycle is at least 25 years. Within the SPZ III:

- it is strictly prohibited to place objects that can cause chemical contamination such as storage facilities for fertilizers, pesticides and fuel; sludge ponds, etc.

6. Environmental Standards

42. Relevant KR environmental standards and procedures include:

Air Quality, Sampling and Analysis

- GN 2.1.6.695-98 “Maximum Permissible Concentrations (MPC) of polluting substances in the atmospheric air of the populated areas”.
- GOST17.2.1.03-84. Environmental Protection. Terms and definitions of pollution control.
- GOST 17.2.4.02-81. Environmental Protection. General requirements for polluting substance detecting methods.
- GOST17.2.3.01-86 Environmental Protection. Atmosphere. Rules to control quality of the air in populated areas.
- GOST17.2.6.01-85. Environmental Protection. Atmosphere. Instruments for air sampling in the populated areas.
- GOST17.2.6.02-85 Environmental Protection. Atmosphere. Automated gas analyzers to control atmospheric pollution.
- RD 52.04.186-89 “Guidelines to control atmospheric pollution”.

Water Quality and Sampling

- SanPiN 2.1.4.002-03. "Drinking water. Hygienic requirements for water quality of the centralized drinking water supply. Quality control ".
- SanPiN 2.1.4.002-03. Regulations on monitoring at a water intake structure.
- SanPiN 2.1.4.002-03. Regulations on frequency of water sampling at water intakes.

Noise Levels, Measurement and Protection

- MSN 2.04-03-2005 "Noise protection"
- SN 2.2.4/2.1.8.562-96 "Noise in the workplace, in residential and public buildings and in the residential area";
- GOST 23337-78 * "Methods of noise measurement in the residential area and in residential and public buildings";
- MUK 4.3.2194-07 "Control of noise level in residential areas, residential and public buildings and premises»
- SNIP 23-03-2003 "Noise protection ".

B. ADB Requirements

43. The major applicable ADB policies, regulations, requirements and procedures for EIA are the Environmental Safeguards – A Good Practice Sourcebook (2012), and the Safeguard Policy Statement (SPS 2009), which provides the basis for this IEE. The SPS promotes good international practice as reflected in internationally recognized standards such as the World Bank Group’s EHS Guidelines. The policy is underpinned by the ADB Operations Manual for the SPS (Section F1, 2010).

44. All projects funded by ADB must comply with the SPS, which establishes an environmental review process to ensure that projects undertaken as part of programs funded through ADB loans are environmentally sound, are designed to operate in line with applicable

regulatory requirements, and are not likely to cause significant environment, health, social, or safety hazards.

45. At an early stage in the project cycle, typically the project identification stage, ADB screens and categorizes proposed projects based on the significance of potential project impacts and risks. A project's environment category is determined by the category of its most environmentally sensitive component, including direct, indirect, induced, and cumulative impacts. Project screening and categorization are undertaken to:

- i. reflect the significance of the project's potential environmental impacts;
- ii. identify the type and level of environmental assessment and institutional resources required for the safeguard measures proportionate to the nature, scale, magnitude and sensitivity of the proposed project's potential impacts; and
- iii. determine consultation and disclosure requirements.

46. ADB assigns a proposed project to one of the following categories:

- i. **Category A.** Proposed project is likely to have significant adverse environmental impacts that are irreversible, diverse, or unprecedented; impacts may affect an area larger than the sites or facilities subject to physical works. A full-scale environmental impact assessment (EIA) including an EMP is required.
- ii. **Category B.** Proposed project's potential environmental impacts are less adverse and fewer in number than those of category A projects; impacts are site-specific, few if any of them are irreversible, and impacts can be readily addressed through mitigation measures. An IEE including an EMP is required.
- iii. **Category C.** Proposed project is likely to have minimal or no adverse environmental impacts. No EIA or IEE is required although environmental implications need to be reviewed.
- iv. **Category FI.** Proposed project involves the investment of ADB funds to, or through, a financial intermediary.

47. The subproject has been classified by ADB as environment category B, requiring the preparation of an IEE (this report) including an EMP which will ensure (i) implementation of identified mitigation and management measures for anticipated adverse environment impacts; (ii) implementation of monitoring and reporting; and (iii) subproject compliance with the KR's relevant environmental laws, standards and regulations and ADB's SPS.

C. International Agreements

48. The KR has signed or ratified the following international agreements and protocols:

- UN (Rio) Treaty on Biological Diversity;
- RAMSAR Convention 'Protection of Wetlands';
- The Convention on Environmental Impact Assessment in a Transboundary Context (Espoo);
- The Convention on the Protection and Use of Transboundary Watercourses and International Lakes (Water Convention);

- Aarhus Convention on Access to Information and Public Participation in Decision-Making and Access to Justice in Environmental Matters;
- UN Framework Convention on Climate Change; and
- The Kyoto Protocol – UN framework convention on climate change.

49. Of the above protocols, only the RAMSAR and the Aarhus Convention may have to be considered in the context of the Component 3A subprojects.

IV. ENVIRONMENTAL BASELINE OF THE SUBPROJECT

A. General

50. The KR is a land-locked country with an area of approximately 200,000 km² square kilometers (km²) surrounded by the People's Republic of China, Kazakhstan, Tajikistan, and Uzbekistan. A large portion of the country is mountainous (94% of the country's area is occupied by mountains, average elevation is 2,750 masl), and it composes a part of the Tien Shan Mountains. Lenin Peak rises to 7,134 masl and Pobeda Peak is the highest mountain in the Tian Shan Mountains at 7,439 m. The country is rich in hydropower resources with most of its hydropower plants situated on the Naryn River, the biggest tributary of the Syr Darya River. The population of the country was 5.5 million at the end of 2012.

51. The subproject is located in the Osh Oblast, which occupies an area of 29,200 km² and has a population of 1.176 million people. Osh Oblast is comprised of seven districts: Alai, Aravan, Kara-Kulja, Kara-Suu, Nookat, Uzgen, and Chon-Alai. The Oblast has 3 cities and 2 towns, 85 rural districts/aiylokmots (AO), and 467 rural settlements.

Figure 7: General location of the KR and its bordering countries



B. Geo-Physical Profile

52. Environmental constraints and potential impacts in the subproject area were studied through field surveys, complemented by secondary information from reports and interviews with representatives of the local bodies.

1. Topography

53. The Osh region includes the northern slopes of the Trans-Alay mountain range, and the southeastern part of the Fergana mountain ranges. Alai mountain system has almost latitudinal strike and is characterized by relatively flat northern slope complicated by a series of sharply defined foothill ridges. The northern slopes of the Trans-Alay mountain range are high with altitudes ranging from 2,200 to 7,134 masl (e.g. Lenin Peak). The southeastern part

of the Fergana range is characterized by a pronounced zonal relief structure. Ferghana Valley, the eastern part of which is in the Osh region, is relatively flat with an altitude from 800-1.000 masl. It is replaced by the adyr zone (up to 1500 m), then the area of advanced high foothills and mountain ranges (up to 2000 m), and finally by the alpine zone (up to 3500-5000 m).

2. Climate and Rainfall

54. The country's climate is influenced chiefly by the mountains, KR's position near the middle of the Eurasian landmass, and the absence of large enough water bodies to influence weather patterns. Those factors create a distinctly continental climate that has significant local variations such as fluctuations in the air temperature, precipitation, hours of sunshine, solar radiance and cloudiness. Frosty weather persists until the end of February and intrusions of cyclones from the south-west during the cold period of the year bring humid, tropical air from the Mediterranean and the Arabian seas, with heavy precipitation in Fergana Valley and on the slopes around it.

55. The climate of Osh Oblast is characterized by vertical zonation. Flat valleys and the foothill zone are characterized by hot summers (up to 28°C) and moderately cool and snowless winters. The highest precipitation levels are in Uzgen district and reach up to 1,000 mm/year. The lowest precipitation levels are in Chon-Alai and Aravan districts (up to 300 mm/year).

3. Geology

56. One of the most distinctive features of the geological structure of the Kyrgyz Tien Shan is the presence of two megacomplexes of its constituent rocks. The lowest of these is represented by a highly dislocated variety of sedimentary, igneous and metamorphic rocks of Paleozoic and pre-Paleozoic age, and the upper consists of weakly metamorphosed mainly continental sedimentary Mesozoic and Cenozoic strata. The layers of the lower megacomplex are composed by numerous ranges of the Tien Shan and foundation of the intermountain basins, and Cenozoic deposits fill intermountain basins and foothills. The orogenic system divides the territory of Kyrgyzstan into three parts: the Northern, Middle and Southern Tien Shan. Osh Oblast belongs to the Southern Tien Shan.

57. The Hercynian fold system of the Southern Tien Shan is located southward of the folded structures of the Middle Tien Shan. The South Tien Shan fold system belongs to the sedimentary and volcanic strata of the middle and upper Paleozoic. Lower Paleozoic and Precambrian rocks make up the base of the Hercynian folded complexes. Most outcrops of the Lower Paleozoic deposits are limestone, chert, clay and siliceous shales, sandstones containing fossils Cambrian and Ordovician.

58. From a geomorphological point of view the region is a submountain complex with is tectonic-erosive-accumulative relief as is represented by terraced alluvial valley of the Ak-Bura River.

59. Geolithological structure of the area is formed by surface deposits of intermountain troughs formations represented by alluvial-proluvial upper quaternary coarse grounds (pebbles). Surficial deposits are clayey grounds (loams, sandy loams) of different thickness and with soil-vegetable layer, and anthropogenic formations of modern age (represented by artificial roadbed and embankment of pebbles with thickness up to 1.0-1.45 m).

4. Soils

60. In the lower parts of the region at an altitude of 900-1,500 masl there are gray soils (light, dark and typical ones). At altitudes of 1,500-3,000 masl there are different subtypes of brown soil (typical, carbonate), and in the more humid areas under spruce forests there are

dark brown leached soils. In the subalpine zone there are meadow-steppe and mountain-meadow soils.

5. Hydrology

a. Lakes and Rivers

61. The KR is rich in water resources. There are some 2,000 lakes in the country with a total area of 6,836.2 km². The largest of them is the Issyk-Kul Lake, covering 91.2 % of the country's lake area.

62. KR is a part of the Central Asian closed inland basin located at the heart of the continent. Most part of the river network belongs to the Aral Sea basin and the hydrographic systems of the biggest rivers of Central Asian, namely Syr Darya, Amu Darya, Chu and Talas. Additionally one can include the rivers flowing into the closed Issyk-Kul Lake. The river network of the south-eastern part of the country belongs to the Tarim River basin. At the eastern border of the country, the river Karkyra forms part of the Lake Balkhash basin.

b. Lakes and Rivers in Osh Oblast

63. The Ak-Bura River, which bisects Osh, is part of the Naryn River basin. The Naryn River rises in the Tian Shan mountains and flows west through the Fergana Valley into Uzbekistan. Here it merges with the Kara Darya River to form the Syr Darya.

64. The Ak-Bura River starts in the mountains approximately 150 km south of Osh, and flows roughly in a northerly direction through Osh and into Uzbekistan and the Naryn River basin. It has a water catchment area of 2,430 km² with an average altitude of 3,030 masl. The Papanskoye Reservoir, constructed in 1981, is approximately 20 km upstream of Osh City center.

Figure 8: The Ak-Bura River in the subproject area

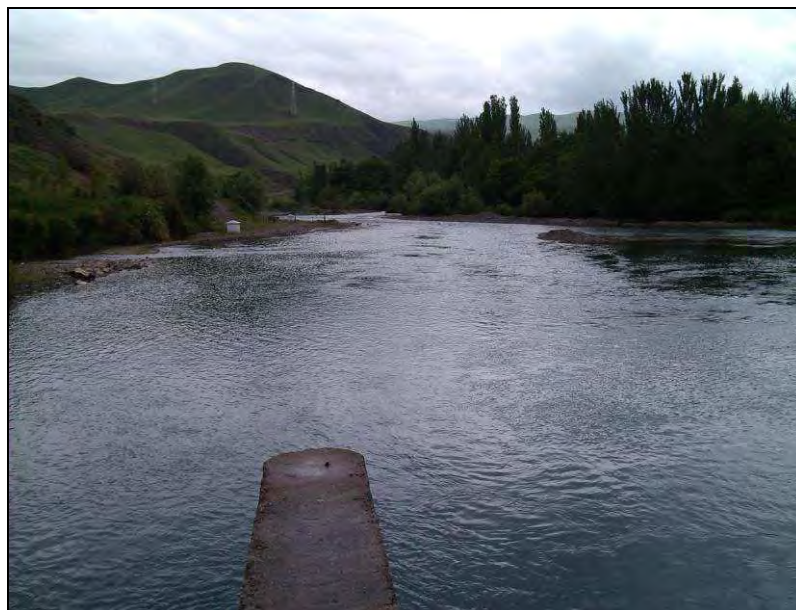


Figure 9: Left bank of Ak-Bura River at the intake site



65. The Ak-Bura is fed by upper mountains precipitation including snow and glacial runoff. According to over 40 years of data collected from the Tuleken Village Hydrological Station, the average annual flow was $21.6 \text{ m}^3/\text{s}$. Lowest flows occur in February ($7.3 \text{ m}^3/\text{s}$), and highest flows occur in July ($50.2 \text{ m}^3/\text{s}$). The highest recorded flood discharge was $170 \text{ m}^3/\text{s}$.

6. Hydrogeology

66. Based on the design surveys, groundwater in the intake area is encountered in proluvial modern deposits (mudslides of the right bank) between 1-9.5 m depth, and groundwater is encountered in alluvial (river) boulder-pebbles between 9.5-14.5 m depth. Sand-gravel-loam deposits (interval 14.5-15 m) form a relatively confining layer. There are currently no other users of groundwater in the intake area.

67. According to the results of chemical analyses, the quality of the groundwater meets the requirements of KR Law dated 21.04.2011: *Technical Regulations (Specifications) on Safety of Potable Water* with respect to all parameters.

C. Ecologic Resources

1. KR Ecology

68. The KR is a country that contains biological resources, ecosystems and landscapes, resulting in high biological diversity. Despite the country's small surface area, elevations and current geology give rise to a large number of biomes, including highly elevated areas, fertile valleys and larger freshwater bodies and the KR is characterized by a higher species concentration per land unit than other Central Asian countries.

69. Only 7% of the total territory is occupied by anthropogenic ecosystems. The remaining part represents undisturbed or partially disturbed natural ecosystems. 23% of the territory is located higher than 3,500 masl characterized by lifeless glaciers and rocks. Some 15% consists of stony, shale, clay surfaces with almost no life.

70. There are 22 classes of ecosystems³ (see Table IV.1). The presence of deserts (more than 13,200 km², or 6.8% of the territory) together with extremely poor ecosystems of nival – subnival belt (11,500 km², or 5.8% of the territory) creates rather hard living conditions in the larger part of the country (12.6%). The highest diversity is located at mid-elevation areas at 2,000-3,000 masl, where 14 of the 22 classes of ecosystems can be found, or 63 % of the total diversity. However, the mid-elevation area occupies just 30.8% of the country territory.

71. The Ecosystem diversity is unevenly spread. It is the richest in the Western Tien-Shan and Central Tien-Shan bio-geographical regions, where 16 of 22 ecosystem classes can be found, or 72.7% of the total diversity. The poorest regions are Fergana and South-Kazakhstan provinces where only 3-5 classes of ecosystem can be found, or 22.7%.

Table IV.1: Ecosystems of the Kyrgyz Republic

Ecosystem name	Area (km ²)	% of the country area
Spruce forests	2,722	1.39
Juniper forests	2,680	1.35
Broad-leaved forests	464	0.23
Tugays	226	0.14
Small-leaved forests	711	0.36
Mid-mountain deciduous forests	970	0.48
Mid-mountain petrophilousbushes	2,317	1.17
Savannoids	6,081	3.06
Almonds and pistachios	182	0.09
Nival and sub-nival belt	11,527	5.81
Cryphilic forests	27,242	13.72
Criophilic steppes	21,413	10.79
Criophilic deserts	1,911	0.96
Mid-mountain meadows	8,764	4.42
Mid-mountain steppes	17,643	8.89
Mid-mountain deserts	2,543	1.28
Mountain boghara	2,791	1.41
Piedmont steppes	823	0.41
Piedmont deserts	8,768	4.42
Petrophilic low-mountain bushes	181	0.09
Lakes and swamps	393	3.57
Cultivated lands	12,475	6.28

72. Significant number of types and sub-types of animals and plants are endemic and cannot be found anywhere else in the world.

73. Natural grassy ecosystems are used as pastures and meadows, and occupy the second important place after the anthropogenic systems (settlements and grazing lands), which replaced natural step ecosystems at the elevation of 500-2,000 masl. These ecosystems were subjected to human activity and eroded up to 70%. Decrease of grazing in certain pastures positively affects restoration of eroded ecosystems. However, it happens mainly because of growth of weed grass in such areas. Pastures dominate on the slopes and are also important for slope protection.

³ Shukurov E.D. Issues of Biodiversity in the Kyrgyz Republic. Proceedings of the Nat. Ac. Of Sci. Echo of Science. Bishkek. 1997. - №2-3; Project on biodiversity preservation action plan and strategy. Ministry of Environmental Protection KR. Bishkek. 1998.

2. Osh Oblast Ecology

a. Fauna

74. The fauna of Osh Oblast is diverse: in the walnut-fruit forests there are foxes, wolves, badgers, weasels, brown bear, wild boar, roe deer, and porcupine; and in the high mountains there are mountain goats and snow leopards.

b. Flora

75. The world largest walnuts and fruit forests are located in the KR covering 70,000 hectares. They represent a unique natural formation and primarily grow in Ferghana and Chatkal ranges at the elevation of 1,000-2,200 masl.

76. Vegetation is typically zoned by altitude. To the north, in the foothills (adyrs), at altitudes up to 1,500 masl there is wormwood-ephemeral-halophytic semi-desert vegetation. Higher at the slopes of the foothills and low mountains up to 2,000 m, there are fescue-feather grass steppes with piliferous couch grass westward and bulbous barley and saryndyz to the east. At 3,000 masl there are juniper forests and woodlands in combination with fescue-feather grass and meadow steppes are located. Above 3,000 masl subalpine and meadow steppe begin interspersed with rocks. In the east, where there is more rainfall, fescue-feather grass steppes are followed by alpine meadows. Above there is the forest zone, where there are walnut-fruit (mainly on the slopes of the Fergana ridge), maple, juniper and fir forests. At an altitude of 3,000 m, subalpine meadow and meadow steppe, dominated by the rocky ridges and rocky slopes appear. To the south, in the Alai Valley, in the lower parts (up to 3000 m) there are subalpine and alpine meadows, prairies, grasslands and alpine desert steppes.

c. Protected Areas

77. There are 17 State Reserves and Natural Parks that represent the national system of Specially Protected Areas in the KR (Table IV.2).

d. Special Protected areas in the subproject area

78. As noted in Table IV.2, there is one State Reserve (Zapovedniks) in Osh Oblast, namely Kulun-Ata. In addition, there are two National Natural Parks, Kara-Shoro and Kyrgyz-Ata. In addition, approximately 20-30 km southeastward from Osh City there is the Ak-Bura Wildlife (Zoological) Refuge covering an area of 13.5 thousand ha. However, none of these State Reserves, Parks or Wildlife Refuges will be affected by any subproject activity.

D. Local Environment at Intake Site

1. General Description

79. The Plotina water intake is located approximately 7 km upstream of the Ak-Bura River from the outskirts of the city of Osh (12.7 km from the city center, Sulaiman-Too).

2. Fauna and Flora

80. The flora at the water intake is typically mountain meadow vegetation which has undergone substantial anthropogenic impacts. The following plants are as present: clover, milfoil, rocket-cress (*Barbarea vulgaris*), thistle, bluegrass, foxtail (*Alopecurus*), etc. There is also artificially planted vegetation at the subproject site such as (Rosa) briar and fruit trees. There are no rare and endangered flora and fauna at the site.

Table IV.2: List of Natural Specially Protected Areas

#	Name of Protected Area	Square (ha)	Year of Establishment	Province/ Oblast	Distance from Subproject Area
State Reserves					
1	Besh-Aral	81,600	1979	Jalal-Abad	
2	Sary-Chelek	23,868	1959	Jalal-Abad	
3	Padysha-Ata	15,846	2003	Jalal-Abad	
4	Karatal-Japyryk	21,264	1994	Naryn	
5	Naryn	36,969	1983	Naryn	
6	Sarychat-Ertash	72,080	1995	Issyk-Kul	
7	Issyk-Kul	19,086	1948	Issyk-Kul	
8	Kulun-Ata	24,000	2004	Osh	90 km
9	Kara-Buura	68,495	2006	Talas	
National Natural Parks					
1	Besh-Tash	32,411	1997	Talas	
2	Saimaluu-Tash	32,000	2002	Jalal-Abad	
3	Ala-Archa	4,000	1976	Chui	
4	Chong-Kemin	126,514	1997	Chui	
5	Salkyn-Tor	10,000	2001	Naryn	
6	Kara-Kol	38,256	1997	Issyk-Kul	
7	Kara-Shoro	8,450	1996	Osh	30 km
8	Kyrgyz-Ata	11,172	1992	Osh	43 km

Sources: State Agency on Environmental Protection and Forestry, 2006; The Kyrgyz Republic: Environment and Natural Resources for Sustainable Development. Bishkek. 2007.

Figure 10: Flora at the water intake

3. Soils

81. Soils at the subproject site are serozems (grey-brownish soil) with no visible signs of erosion.

4. Infrastructure

82. At the water intake, there is a 110/35 kW power transmission line, some lighting units, and a small building for water intake staff.

5. Potential pollution sources

83. In the upper reaches of the Ak-Bura River there are young unconsolidated Neogene-Paleogene sediments, erosion of which results in high turbidity which averages 200 mg/l. This leads to abundant mudslides and floods, which makes the water even more turbid. The problem is further exacerbated during high rainfall events, leading to turbidity levels of up to 19,000 mg/l (2012). In such situations, Vodokanal closes the water intake and suspends water supply to the city.

84. There are no industrial enterprises in the vicinity of the water intake which can cause water pollution in the river. There are also no any crops in the immediate surroundings of the water intake.

E. Social, Cultural and Economic Resources

1. Demography and Ethnic Groups

a. Population in the Republic

85. The population of the KR was 5.5 million at the end of 2012. One third of the population lives in towns; the rest lives in rural areas. There are about 90 ethnic groups with the largest being Kyrgyz (68 %), Uzbeks (14 %), and Russians (10 %). Other communities are Dungan (Chinese Muslim), Tajik, Korean, Ukraine, Uygur, Tatar, Kazakh and Turkish. Demographically the population of the country is young. At the end of 2012, 32.45 % of the total population was comprised of children and adolescents, about 60.95 % of the population was of an employable age, and elderly (retired) people comprised approximately 6.6 %.⁴

b. Population in Osh

86. As of January 2011 the population of Osh Oblast was 1.13 million people, representing 20.6% of the KR population. Average population density for the Oblast is 38.9 persons/km², though in mountainous areas the population density is lower than the valleys and the border area with Uzbekistan where the population density can reach 300-400 persons/km². Most of the Oblast's population, about 70%, lives in rural areas.

87. It should be noted that in recent years, there has been a reduction in mortality and an increase in life expectancy at birth (69.6 years). Demographically the population is young: as of the beginning of 2011, 35.9 % of the total population were children and teenagers, 57.2 % were of working age, and 6.7 % were of retirement age.

2. Economics

a. Osh Economy

88. During the Soviet period Osh became a major industrial center, hosting cotton and silk plants, clothing and footwear factories, and food processing, engineering, and metalworking enterprises. Manufacturing, electric-power, fuel, construction materials, food processing, and flour, cereal and feed mill industries remain important. Textile and tailoring

⁴ Source: Kyrgyz Republic National Statistical Committee

industries are the most significant light industries, and Osh has a leading role in the production of cotton cloth in the country.

a. Agriculture in Osh

89. Over 2,200 farms are registered in Osh's agricultural sector, specializing in the cultivation of grain, cotton, tobacco, potato, vegetables, watermelon, and other melons and gourds. Agricultural land area amounts to only 8,966 hectares. Activity in livestock farming is associated with small-scale breeding of cattle, sheep, and goats, and poultry production. Agricultural exports to Uzbekistan, Kazakhstan, and Russia include potatoes, apples, tobacco, tomato paste, and rice.

a. Employment

90. As in the country as a whole, the transition to a market economy generated profound changes in living standards in Osh when workers lost their places in the state economy with its guaranteed employment and stable income. While some social sectors prospered, others suffered and were impoverished. The able-bodied population of Osh City is reported as 164,900 people; and its economically active population as 93,500. In October 2011, more than 7,000 thousand job-seekers were registered by the state employment agency. Official employment statistics, however, disguise actual circumstances, particularly for women; and the unemployment rate is significantly higher than reported. Unemployment has led to an increase of poverty among the urban population in Osh and escalating out-migration. People, even whole families, are leaving to work in other regions of the country, particularly Chui and to Bishkek City and its suburbs. The young and able-bodied portion of the population, as well as some families, have also left the KR pursuing employment in Russia, the United States, England, Italy, Germany, South Korea and other countries.

91. The KR Government has extended support programs for the poor in the form of payment of state social benefits, compensation for payment of municipal services, and other benefits. Social assistance targets low-income families and individuals, as well as the disabled and elderly. Monthly benefits for low-income families and individuals are allocated to children, students, pensioners, disabled citizens, when the total per capita income of the family is less than the guaranteed minimum consumption level (GMCL). The current GMCL is 370 soms per person, per month. Osh City Department of Social Protection is responsible for the performance of the city's social support programs. 3492 families in Osh City, about 6% of all families, have incomes below the GMCL and receive monthly allowances.

92. Families with incomes less than 1,744.8 soms per person per month are classified as poor, although only those with incomes below the GMCL receive social benefits. 2012 figures from the KR Ministry of Social Development show that 19.2% of Osh City's 57,392 families are classified as poor. Poverty rates are much higher (50.3%) in Osh Oblast, excluding Osh City. Poverty levels in Osh City are well below the overall national figure of 29.5%, but still close to three times greater than in Bishkek (6.9%).

3. Health and Hygiene

93. Health care for the population of Osh Oblast is provided by a combination of interregional, regional, district, and other medical centers. These health facilities employ 1,690 doctors and 6,171 nurses, and operate 5,276 beds.

94. Data on waterborne diseases is shown in the tables 3 and 4 for both Osh Oblast and City.

Table IV.3: Registered number of patients in Osh Oblast

Types of diseases	Registered patients TOTAL			
	Adults and adolescents		Children up to 14 years old	
	Absolutely	For 100 thousand people	Absolutely	For 100 thousand people
Total for 2011	318,912	42,177.2	133,340	34,796.9
Some infection and parasitogenic diseases in 2011	8,578	1,134.5	15,173	3,959.6
Intestinal infections	2,341	309.6	7,916	2,065.8
Acute intestinal infections	1,919	253.8	6,486	1,692.6
Total for 2010	301,198	40,361.5	125,130	33,092.8
Some infection and parasitogenic diseases in 2010	8,444	1,131.5	13,370	3,535.9
Intestinal infections	2,077	278.3	7,270	1,922.7
Acute intestinal infections	1,766	236.6	5,706	1,509.1
Total for 2009	281,727	38,420.2	119,838	31,851.9
Some infection and parasitogenic diseases in 2009	8,409	1,146.8	12,476	3,316
Intestinal infections	2,304	314.2	6,714	1,784.5
Acute intestinal infections	1,832	249.8	5,212	1,385.3

Source: Ministry of Health in the KR

Table IV.4: Registered number of patients in Osh City

Types of diseases	Registered patients TOTAL			
	Adults and adolescents		Children up to 14 years old	
	Absolutely	For 100 thousand people	Absolutely	For 100 thousand people
Total for 2011	65,758	35,462.4	38,842	55,160.0
Some infection and parasitogenic diseases in 2011	1,578	851	4,112	5,839.5
Intestinal infections	384	207.1	2,014	2,860.1
Acute intestinal infections	193	104.1	945	1,342
Total for 2010	57,782	30,917.0	34,778	49,272.5
Some infection and parasitogenic diseases in 2010	1,557	833.1	4,118	5,834.3
Intestinal infections	195	104.3	1,448	2,051.5
Acute intestinal infections	140	74.9	887	1,256.7
Total for 2009	60,500	32,280.6	39,729	55,847
Some infection and parasitogenic diseases in 2009	1,357	724	3,365	4,730.2
Intestinal infections	224	119.5	1,654	2,325
Acute intestinal infections	158	84.3	1,286	1,807.7

Source: Ministry of Health in the KR

4. Infrastructure and Transportation

95. The geographical location of the KR in Central Asia provides favorable conditions to develop the country's existing transport networks as transit corridors. The road network in KR comprises 34,000 km roads of which 18,000 km are commonly used motorable roads. In terms of the highway network, arterial highways are of special importance for the national

economy. One of the most strategically important arterial roads is the Bishkek-Osh highway with a length of about 678 km. It connects the North and South of the country and supports common economic and political activities.

96. The KR has an extensive network of electricity transmission lines with a length of 6,600 km and 190 substations. The National transmission company “JSC National Electric Grid of Kyrgyzstan” provides electric supply generated by the internal hydropower generating plants to four national distribution companies and 68 direct consumers. The company also imports and exports electricity through various cross-border transmission lines to the neighboring countries of Kazakhstan, Uzbekistan and Tajikistan.

97. The Osh Airport, one of two international airports in the country, is located in the northern part of the city. It is 840 masl and has a runway of 2,600 m. From this airport flights to the CIS and other countries are operated.

98. Rail transport is represented by branch lines of the Uzbek railways in the cities of Osh and Kara-Suu. These are important for transporting trucks cargo to and from the region.

5. Historical and archaeological sites

99. The KR from the earliest times was a part of the Central Asian civilization. Being located right along the Silk Road, it took in cultural achievements of different ancient civilizations. Numerous archaeological objects in the KR form an integral part of the World’s cultural heritage. In Jalal-Abad Oblast, there are several important places of worship and historical monuments dating back to the XI-XII and XVII centuries. Rock paintings (petroglyphs) in “Saimaluu-Tash” represent a large concentration of petroglyphs of the Bronze, Sak, Hun and Sarmat epochs (II-I millennium B.C.). However, there are no known historical archaeological resources within or adjacent to the subproject sites.

V. ANALYSIS OF ALTERNATIVES

100. An analysis of subproject alternatives was undertaken during the subproject design to determine the best way of achieving the subproject objectives while minimizing environmental and social impacts. The following alternatives were considered:

- A surface intake approximately 2 km upstream of the existing Plotina intake was considered. However, the construction of a new surface water intake was not considered viable from both economic and technical points of view.
- Construction of a system of sedimentation tanks and rapid sand filters and/or a slow sand filter at the Plotina water intake was considered but was not viable because of the unavailability of sufficient land.
- Rehabilitation and/or reconstruction of the WTP at Ozgor was considered as was construction of a separate chlorination plant at the reservoir in the Brick Factory. These options were not considered viable from both economic and technical points of view.

101. In addition, not undertaking the subproject - the "No Action Alternative" - was also considered. However, not undertaking the subproject would not realize the objective of improving municipal services through a more reliable water supply, and the "No Action Alternative" was deemed neither a reasonable nor prudent course of action.

VI. ASSESSMENT OF ANTICIPATED ENVIRONMENTAL IMPACTS ASSESSMENT AND MITIGATION MEASURES

A. Methodology

102. A subproject environmental impact is any change in physical, biological, and socio-economic conditions, and physical cultural resources resulting from subproject activities. The methodology for identifying potential subproject impacts and associated mitigation measures has included the following steps:

- collection of subproject information and screening of subproject preconstruction, construction and operational stage activities to identify those with the highest potential for environmental impacts;
- characterization of potential environmental impacts based on information on the proposed subproject and on available environmental data, surveys and site visits undertaken by national and international environmental specialists; and
- identification of appropriate mitigation measures based on experiences in similar projects in the region and the expertise of the national and international environmental and other specialists.

103. Potential impacts of the subproject have been assessed under the following categories:

Direction

- Positive impact: results in a positive effect on physical, biological, and socio-economic conditions, and physical cultural resources.
- Negative impact: results in a negative effect on physical, biological, and socio-economic conditions, and physical cultural resources.

Type

- Direct: impacts which occur through direct interaction of a subproject activity on physical, biological, and socio-economic conditions, and physical cultural resources.
- Indirect: environmental impacts that cannot be immediately traced to a subproject activity but can be causally linked.

Duration

- Short term: impact does not result in a permanent alteration in conditions. In general the impact is short-lived (less than a year).
- Long term: impact results in a permanent alteration, or duration of impact is more than one year.

Accumulation

- Simple: impacts that if occurring over a prolonged time period do not lead to worsening consequences.
- Accumulative: impacts that if prolonged over time increase in severity.

104. Based on an assessment of the above, the magnitude of subproject impacts on physical, biological, and socio-economic conditions and physical cultural resources have been classified as follows:

- **No Impact:** no adverse consequences.
- **Low Impact:** a minor impact from which recovery is immediate or short-term, and which requires either no or limited and typical mitigation measures.
- **Moderate Impact:** a moderate impact from which recovery to initial conditions will occur over time and which requires typical mitigation measures.
- **High Impact:** a significant impact from which recovery requires significant mitigation measures over a long period, and/or where there will likely be a failure to re-establish initial conditions.

B. Screening of Key Subproject Activities

105. A screening of subproject activities identified the key subproject activities most likely to result in potential impacts:

- Earthworks refer to the earthworks needed for the construction of infrastructure, i.e. excavation, trench filling, constructing embankments, etc.
- Felling and clearing of vegetation: refers to all actions for the removal of existing vegetation by mechanical or manual means, including the fertile soil layer.
- Construction of new infrastructure: mainly wells, reservoirs, the pipe bridge and transmission pipelines; also included are other smaller civil works such as water measuring chambers, some buildings like chlorination plant, and works for power supply connection.
- Construction machinery and vehicles: includes actual operation of the machinery at the work sites and truck traffic on roads.
- Construction of temporary site facilities: temporary occupation of land next to the site; this includes the use of land for stock piling of materials, machinery park, offices and toilets.

C. Preconstruction Phase Potential Environmental Impacts

106. Preconstruction phase impacts are related to subproject siting and associated land acquisition and resettlement. All other impacts are addressed in the construction and operation phase impact assessment (sections VI.D and VI.E, respectively).

1. Subproject Siting

a. Land Acquisition and Resettlement

107. The physical works do not require any land acquisition or resettlement. The water transmission pipelines from Plotina to Ozgor will require clearing of 51 trees in the first 50 m of the route exiting from the Plotina Water Intake. Although planted on public land, these trees are owned by two households living adjacent to the affected area in Ozgor Village of Tuleiken A/O. Compensation for these impacts has been addressed through a separate Resettlement Plan (RP).⁵

108. Overall negative land acquisition and resettlement impacts from subproject siting are considered “**Low Impact**”, and are mitigatable through the RP.

⁵ Kyrgyz Republic: Emergency Assistance for Recovery and Reconstruction, Resettlement Plan, Component 3A Water Supply and Sanitation: Osh Subproject, Sept 2013.

D. Construction Phase Potential Environmental Impacts

1. Impact on the Physical Environment

a. Climate

Potential Impacts

109. Construction phase activities under the subproject will not result in the release of greenhouse gases and are not predicted to have any negative impacts on climate or climate change. Therefore, in relation to climate, the subproject is expected to have **“No Impact”**.

Mitigation Measures

- Not required.

b. Geology

Potential Impacts

110. Potential impacts on geology are most likely to occur during the construction stage due to subproject-induced demand for construction materials such as rock, sand and other building materials. Construction materials sourced from informal or illegal quarries can result in negative impacts including loss of vegetation and erosion and sedimentation of surface water resources.

111. Only existing permitted quarries will be used to source construction materials, and the material demand will be moderate; the risk is therefore considered to be **“Low Impact”**.

Mitigation Measures

- Contractors will be required to obtain basic construction materials from existing quarries which have official permits for their operation.

c. Topography

Potential Impacts

112. Potential impacts on area topography are most likely to occur during the construction phase due to earthworks and the construction/rehabilitation of the intake, reservoir and the transmission line.

113. The earthworks will only take place during the construction phase and once pipelines have been placed all trenches will be covered. Some new embankments (no more than 5m in height) will be constructed, associated with the construction of the new reservoir and the flood protection embankment.

114. Overall it is expected that the topography will not change except for a few areas where the reservoir will be constructed and the flood protection embankment, and with appropriate mitigations spoil disposal and erosion can be managed. Therefore, the risk is considered to be **“Low Impact”**.

Mitigation Measures

- Final forming and replanting of earthworks in backfilled sections will be completed as soon as possible to facilitate the regeneration of a stabilizing ground cover.
- Reservoir, pipeline and other works will be re-vegetated to facilitate regeneration and slope stabilization.

d. Soil and Land Resources

Potential Impacts

115. Potential impacts on soil are most likely related to soil contamination during the construction stage caused by accidental spillages of petroleum products and other hazardous contaminants. This may also affect flora, fauna and human health, and be conducive for accumulation of heavy metals and toxic substances in the soil. However, this risk can be effectively mitigated through good materials handling and storage practices. Excavation can also lead to soil erosion and sedimentation, though this can be minimized through good management practices.

116. It is expected that some soil and rock disposal will be required. If the disposal is not done properly, there will be a risk of unsightly spoil dumps, which can also lead to sedimentation and water pollution. However, most of the spoil material will be utilized in the works.

117. No loss of productive soil is expected as most of the land in the subproject area is urban land or wasteland with only limited productive capacity. Furthermore, no land acquisition will be undertaken. Overall soil and land resource impacts are considered to be “**Low Impact**”.

Mitigation Measures

Contamination from Spillage

- Good management practices will be adopted to prevent spills of fuels, oils and hazardous materials.
 - Fuels, oils and hazardous materials will be stored in a secure bunded area with impermeable floor and weatherproof roof.
 - Refueling of vehicles will be undertaken at existing stationary gas stations and maintenance, washing and repairs undertaken at existing repair stations.
 - Construction machinery will be maintained in good condition and any leaks will be quickly repaired.
 - Spill response equipment will be provided at construction sites, and all spills will be cleaned-up immediately.
- Soil contaminated by oily products and other substances will be removed for disposal at a permitted site agreed to by the Territorial Environmental Protection Department in Osh City and relevant Osh City and Kara-Suu District Authorities.

Soil Loss, Erosion and Sedimentation, Spoil Disposal

- Soil clearance will be minimized to the extent possible.
- Topsoil will be separated from subsoil during excavation works, and topsoil will be reused as a top layer.
- Remaining excavated materials will be reused wherever possible, e.g. for backfilling.
- Spoil disposal sites, if required, should avoid sensitive locations such as water sources, wetlands, etc. Site should be selected in consultation with the Territorial Environmental Protection Department in Osh City and relevant Osh City and Kara-Suu District Authorities.

- Clearing and/or excavation activities will be scheduled taking weather conditions into account (e.g. minimize excavation activities during rainy weather).
- Slopes for reservoirs and embankments will be stabilized to reduce slips or erosion.
- Completed earthwork areas will be replanted to facilitate the regeneration of flora and for stabilizing the ground cover.
- Low maintenance landscaping will be implemented along the roadside of the transmission line.

e. Hydrology and Surface Water Quality

Potential Impacts

118. Potential impacts during the construction phase relate to surface water quality. Earthworks activities and the construction activities may increase soil erosion and some sediment may enter into the Ak-Bura River. Accidental spills could also occur and the Ak-Bura River and other watercourses could be contaminated.

119. Considering that the river is highly regulated (weir upstream, river channeling, agriculture in the flood plain, etc.), and preventive measures will be adopted during the construction activities to minimize sediment entry and other pollutants into the river, no substantial increase in contamination of the Ak-Bura River and other watercourses is anticipated. Furthermore, in case contamination does occur, it will be temporary. Therefore, the risk is considered “**Low Impact**”.

Mitigation Measures

- In addition to the measures below, see above for good management practices to be adopted to prevent spills of fuels, oils and hazardous materials.
- All necessary permits will be obtained to carry out works in the river bed.
- Construction work for the river bank protection will be implemented in the Ak-Bura River low-flow season.
- Where pumping of water is to be carried out, filters will be used at the intake points and the discharge will be through a sediment trap to avoid the entry of sediments in watercourses and the river.
- Water quality in the Ak-Bura River will be monitored by a qualified consultant of agency (DO, BOD₅, COD, SS, hydrocarbons, conductivity, turbidity, TDS, pH, temperature) if deemed necessary after visual inspection by the Engineer or DSC National Environmental Specialist).
- Appropriate material stockpiles storage management will be implemented to prevent sediment-laden storm run-off entering watercourses. This includes:
 - Allowing the establishment of vegetation on the exposed soil;
 - Surrounding stockpiles with cut-off ditches to contain any run-off;
 - Not siting stock stockpiles within 50 m of any watercourse, and not siting stockpiles and other construction materials in flood prone areas.
- As noted above, fuels, oils and hazardous materials will be stored in a secure bunded area with impermeable floor and weatherproof roof, and good management practices will be adopted to prevent spills of fuels, oils and hazardous materials. In addition, waste water associated with concrete mixing and placement (including wash-down

water) will be contained and treated in settling ponds so as to prevent pollution of watercourses.

- Perimeter drainage will be provided around construction sites and drainage will be directed to a settling pond.
- Construction camps will be properly sited and provided with drainage and wastewater facilities to collect run-off and, if necessary, treatment of the run-off.

f. Hydrogeology and Ground Water Quality

Potential Impacts

120. Potential impacts are most likely to occur in the construction stage on groundwater resources where water tables are high. Because of the significant depth of groundwater no significant pollution is expected; therefore, the risk is considered to be **“Low Impact”**.

Mitigation Measures

- See construction phase mitigation actions “Hydrology and Water Quality Mitigation Measures”.

g. Wastes

Potential Impacts

121. Wastes such as construction and domestic debris will be generated during the construction activities, and can cause water and soil contamination. There is also the potential for encountering asbestos during dismantling of existing pipes, and special care will need to be taken. Overall, this impact is temporary in duration and can be effectively mitigated, and is considered **“Low Impact”**.

Mitigation Measures

- The Contractor will prepare and implement a Waste Management Plan to be approved by the DSC, the SAACC SU, the Territorial Environmental Protection Department in Osh City, relevant Osh City and Kara-Suu District Authorities, and the State Center for Sanitary and Epidemiological Surveillance. It will include:
 - Appropriate temporary waste storage containers will be provided at construction sites and worker camps.
 - All wastes will be reused or recycled to the maximum extent possible. Wastes will be regularly sorted into what can be reused or recycled. Waste which cannot be reused or recycled will be transported on a regular basis to approved landfill sites.
 - There should be no final waste disposal on site.
 - Waste incineration at or near the site is strictly prohibited.
 - Special care shall be taken in the dismantling of pipes to avoid the creation of asbestos dust by cutting operations. Pipe should be disposed in accordance with the Technical Specifications and should be provided with adequate soil cover.
- The Contractor will be held responsible for proper removal and disposal of any significant residual materials, wastes, and contaminated soils that remain on the site after construction.

h. Air Quality

Potential Impacts

122. Anticipated sources of air pollution from construction activities include: (i) dust generated from earth excavation, filling, loading, hauling and unloading; (ii) dust generated from disturbed and uncovered construction areas, especially on windy days; (iii) dust generated by the movement of vehicles and heavy machinery on unpaved access and haul roads; (iv) dust from aggregate preparation and concrete-mixing; and (v) emissions from construction vehicles (gaseous CO and NO₂) and heavy diesel machinery and equipment.

123. Air pollution may affect the population near the water supply transmission pipeline route and the reservoir site, and to a lesser extent at the intake site, but this will be localized and temporary; it is considered a **"Moderate Impact"**.

Mitigation Measures

- During construction activities, dry soil surfaces should be watered to avoid dust generation. Watering activities should be performed regularly with due consideration to weather conditions.
- Transport vehicles should travel at low speeds in the construction site to reduce dust.
- Construction activities should be halted during high wind events if dust levels are high.
- All vehicles delivering dusty construction materials to the site or removing debris should have their loads covered;
- Exhaust systems of vehicles, trucks and machineries should be in good working order and well maintained to minimize noise and air pollution. Equipment should be placed as far as possible away from inhabited areas.
- Prefabricated structures will be used to the extent possible.
- Concrete mix should be delivered to the site in a truck mixer from a host plant, and with the help of concrete pump or auto-crane to the work places.
- Welding should be carried out with electric welding.
- Air quality (particulate matter) shall be monitored by a qualified consultant or agency at least three times, i.e. before the construction starts, during the construction and after the construction is finished, or as when instructed by the Engineer or DSC National Environmental Specialist.

i. Noise

Potential Impacts

124. Noise will be generated from the movement of vehicles and trucks, physical works, and the transportation of construction materials. Noise pollution will affect the population near the water supply transmission pipeline route and the reservoir site, and to a lesser extent at the intake site, but this will be a localized and temporary **"Moderate Impact"**, and can be minimized through good management practices.

Mitigation Measures

- Noisy construction activities will be limited to daytime hours in the vicinity of houses and other sensitive sites in accordance with KR regulations.
- Equipment and high noise activities should be sited as far as possible away from inhabited areas.

- Exhaust systems of vehicles, trucks and machineries should be in good working order and well maintained to minimize noise pollution;
- Nearby community will be informed regarding schedule and duration of construction works.
- If required, noise barriers will be installed around high noise sources.
- Noise levels will be monitored by a qualified consultant or agency once before the start of works and then weekly during construction activities to ensure construction noise is less than 65 dB in the daytime for inhabited areas, and 55 dBA at schools and healthcare centers.
- See Section VI.D.3 for measures to protect workers from high noise activities.

2. Impact on the Biological Environment

a. Flora

Potential Impacts

125. The area at the water intake is a heavily modified environment characterized by crops, pastures and introduced species with little natural remnant vegetation. There are no threatened or endangered plant species, and no significant impacts on flora are anticipated.

126. Construction of the new water transmission line from Plotina to Ozgor will require clearing of 51 trees in the first 50 m exiting the Plotina Water Intake Area. Although planted on public land, these trees are owned by 2 households living adjacent to the affected area in Ozgor Village of Tuleiken Ayil Okmotu (A/O). No rare or endangered flora is present in the water supply transmission pipeline, reservoir and the intake area.

127. Considering that no rare or endangered or important natural flora will be affected, and that compensation will be paid to tree owners, the impact on flora is considered to be **“Low Impact”**.

Mitigation Measures

- Vegetation removal should be minimized to the extent practical.
- Cutting of trees that are not required to be cleared or removed will be forbidden. Sanctions will be imposed on any worker cutting down trees unnecessarily for the subproject works.
- Temporary use areas such as construction camps sites will be replanted utilizing appropriate native species. As noted above, topsoil will be separated from subsoil during excavation works, and topsoil will be reused as a top layer.
- Compensation will be provided to tree owners in accordance with KR and ADB requirements through the RP (see Section VI.D.3).

b. Fauna

Potential Impacts

128. The subproject is located in an area strongly impacted by anthropogenic factors. There are no wildlife reserves and/or sanctuaries nor significant animal habitat in the vicinity of the subproject sites. There are also no reports of rare or endangered fauna at the subproject sites. There is the potential for workers to engage in opportunistic hunting in the surrounding area. Overall however, the impact is considered to be **“Low Impact”** and readily mitigatable.

Mitigation Measures

- Hunting or poaching of fauna by workers will be forbidden, and sanctions will be imposed on any worker poaching fauna at or near the subproject sites.

c. Protected Areas and Nature Reserves

Potential Impacts

129. The subproject is not located near any specially protected area or nature reserve; impact on these resources is considered to be **“No Impact”**.

Mitigation Measures

- Not required.

3. Impact on the Socio-economic Conditions and Physical Cultural Resources

a. Community Health, Socio-cultural and Economic Impacts

Potential Impacts

130. Some adverse impacts on the population in the subproject area are expected during the construction phase (in some cases these impacts have been previously described):

- Dust will be generated by vehicles and trucks, mainly during execution of earthworks, reducing air quality. Vehicles and other machinery will also release exhaust gases.
- Noise will be generated from the movement of vehicles and trucks, physical works, and the transportation of construction materials.
- Two households will be affected by loss of minor assets (trees/fences) along transmission pipelines.
- Construction activities may disrupt public services.
- Construction activities, especially the excavation of trenches, will disrupt access to private properties and businesses.

131. Considering that there will be disturbance from dust and noise, and disruption of access to public services and private properties and businesses (especially during the earthworks), but also considering that this disturbance will be temporary and localized, the impact is considered as a **“Moderate Impact”**.

Mitigation Measures

Dust

- See Section VI.D.1.

Noise

- See Section VI.D.1.

Access to Public Services, Private Properties and Businesses

- Local authorities will be consulted to minimize disruption of public services such as telephone, water, gas and power supply.
- The Contractor shall take measures to minimize disruption of access to private properties and businesses where possible.
- The local communities will be informed about the planned construction activities including schedule and duration of construction works, and expected disruptions.

- Temporary access to affected private properties, businesses and public service buildings will be provided including temporary crossings over pipeline trenches, and subsequently good quality permanent access will be provided.
- Road sections used for laying the water transmission pipelines and sewer collector will be resurfaced.

Public Safety and Traffic Management

- Warning signs, cones and signal lights will be installed along the road to protect workers and people in the neighborhood.
- As far as practical, movements of construction vehicles will be limited within peak hours of traffic.
- Public access to construction sites and other areas of danger will be restricted and temporary barriers installed.

Social Disruption from Construction Workers and Camps and Housing

- The location of construction camps and other worker housing will be agreed in consultation with local authorities. Camps will not be located near sensitive areas (schools, hospitals, etc.).
- Construction camps will be equipped with adequate water supply and sanitation facilities, and will be maintained in clean/hygienic conditions (see above for mitigations related to waste management plan and water quality).
- Employees will be trained on appropriate interactions with local community and awareness program about sanitation and communicable diseases will be instituted.
- A HIV awareness raising and prevention campaign (including HIV in the workplace) will be implemented.

b. Worker Safety

Impacts

132. Use of heavy construction machinery, tools, and materials may cause physical hazards to workers, which could be caused by noise and vibration, dust, handling heavy materials and equipment, falling objects, work on slippery surfaces, fire hazards, chemical hazards such as toxic fumes and vapors, and others. This poses a **“Moderate Impact”** to workers.

Mitigations

- The Contactor is responsible for providing a safe construction site. To achieve this, the Contractor will prepare an environment, health and safety (EHS) plan for the construction works on the basis of the EMP and in compliance with relevant KR laws and regulations. The EHS Plan will be submitted to the Engineer for approval. The EHS plan will include the following:
 - An EHS officer will be appointed by the Contractor to implement and supervise the EHS management plan.
 - Workers will be training on occupational health and safety during construction, especially with respect to using potentially dangerous equipment, handling and disposal of hazardous materials including asbestos pipe, and use of personal protective equipment.
 - A first aid facility will be provided onsite.

- Fire extinguishers and other safety response devices will be provided onsite.
- All equipment will be maintained in a safe operating condition.
- Material stockpiles or stacks, such as, pipes must be stable and well secured to avoid collapse and possible injury to site workers.
- Appropriate personal protective equipment will be provided to workers to minimize risks, including ear protection, hard hats, dust masks, and safety boots.
- Adequate signage in risk areas will be posted, and access to construction sites will be restricted.
- Training will be provided to workers on the storage, handling and disposal of hazardous materials.

c. Physical Cultural Resource Impacts

Potential Impacts

133. There are no known physical cultural resources in the subproject area, and no impacts to physical cultural resources are anticipated; the risk is considered to be **“Low Impact”**.

Mitigation Measures

- If a previously unknown physical cultural resource is discovered the following chance find procedure will be implemented:
 - All works at the find site will be halted and the appropriate local authorities will be notified.
 - The find will be assessed by an archaeologist from the local authority.
 - Procedures to avoid, minimize or mitigate impacts to the physical cultural resources will be developed by the archaeologist.
 - Construction will resume only after permission from the appropriate local authority has been obtained.

E. Operation Phase Potential Environmental Impacts

1. Impact on the Physical Environment

a. Climate

Potential Impacts

134. The operation phase activities under the subproject will not result in the release of greenhouse gases and are not predicted to have any negative impacts on climate or climate change. Therefore, in relation to climate, the subproject is expected to have **“No impact”**.

Mitigation Measures

- Not required.

b. Geology

Potential Impacts

135. There are no anticipated operation phase impacts on geology. Therefore, the subproject is expected to have **“No impact”**.

Mitigation Measures

- Not required.

c. Topography

Potential Impacts

136. The presence of new infrastructure will cause some permanent but minor changes to the topography, primarily in relation to the reservoir construction and the flood protection embankment. The pipeline for water supply will be underground. For the reservoir construction, there is also risk of unstable or eroding slopes and for the flood embankment there is the risk of erosion of the river side of the embankment due to river action. As topography changes are minimal, the height of the slopes is moderate and the embankment on the riverside will be protected through gabions and/or rip rap, and the risk is manageable, the impact is considered as **“Low Impact”**.

Mitigation Measures

- Measures to maintain slope stability at the reservoir will be implemented on an as need basis.

d. Soil and Land Resources

Potential Impacts

137. Loss of soil is not expected during operational phase; therefore the impact is considered to be **“No impact”**.

Mitigation measures

- Not required.

e. Hydrology and Surface Water Quality

Potential Impacts

138. Potential impacts are most likely to occur in the operation stage due to river flooding. At present the right bank of the Ak-Bura River tends to erode with sediment deposition on the left bank. With the construction of the flood protection embankment, this may change with the dominant river flow shifting from the right bank to the left bank which may result in erosion of this bank. Restriction of the river may also lead to localized elevated water levels and flow rates. Erosion rates on the left bank will be monitored.

139. Potential impacts may also occur in the operation stage due to a decrease in the flow of the Ak-Bura River. Assuming a direct connection between the aquifer and the river, and considering a design extraction rate from the infiltration gallery of 0.8 m³/s, it represents 3.7 % of the average annual flow, and 10.1 % of the average flow during the lowest flow month (based on over 40 years of hydrological data). Overall, operation of the subproject is not expected to have a significant impact on the Ak-Bura hydrology, though in low flow months short-term impacts may occur, and careful monitoring of river water levels will be required.

140. Considering that the changes in the river behavior will be gradual, and that there will be some decrease of the river flow because the amount of water drained through the gallery, and that these will take place in an already modified zone and in a small stretch of the river, the impact is considered to be a **“Moderate Impact”**.

Mitigation Measures

- Construction of an earth fill protection embankment with a length of 350 m and a height of up to 3 m. The embankment shall be constructed with excavated and

supplied material. Rock-filled gabions and/or riprap shall be placed on the river side of the embankment.

- Monitoring of river water levels and left bank erosion (see EMoP).

f. Hydrogeology and Ground Water Quality

Potential Impacts

141. Potential impacts are most likely to occur in the operation stage due to impacts on groundwater resources from extraction and potential contamination. The impact from water extraction will be localized to an already modified portion of the river, and will not affect any nearby wells as there are no other users of the aquifer in that area. SPZs will be established to control land use and potential pollution sources, and drinking water will be disinfected through chlorination. The overall impact is considered as a **“Moderate Impact”**.

Mitigation Measures

- The following SPZs will be established in accordance with sanitary and epidemiologic rules and regulations (SanPin) 2.1. 4.015-03, based on an analysis of the geological structure and hydrogeological and groundwater conditions at the Plotina intake site:⁶

SPZ I

- SPZ I has strict conditions for the protection of underground water sources. The belt is designed to provide maximum protection from intentional or accidental contamination. Within this zone, the following is strictly prohibited:
 - human habitation, and the construction and placement of any structures and buildings that have no direct relation to the operation of the water intake;
 - the presence of unauthorized people, pets and farm animals; the use of pesticides and organic fertilizers for crops and plantations.
 - SPZ I will extend in a radius 25 m from the outer well and is to be fenced off (Figure 11). It should be noted that the right bank will be fenced as the infiltration gallery is located in the right bank. Extend of SPZ I on the left bank will be within the riverbank therefore there is no fencing proposed for the left bank.

SPZ II

- The purpose of the SPZ II is to protect a groundwater source from microbial contamination. Within this zone, the following is strictly prohibited:
 - to construct all types of buildings, to locate cemeteries, burial grounds, warehouses, fuel depots, landfills, livestock and poultry farms, etc.
- The proposed SPZ II boundary will be a zone encompassing 500 m upstream of the intake, 100 m downstream of the intake, and 200 m in width from the center of the intake (Figure 11).

SPZ III

- The purpose of the SPZ III is to protect a groundwater source from chemical pollution. Within this zone:

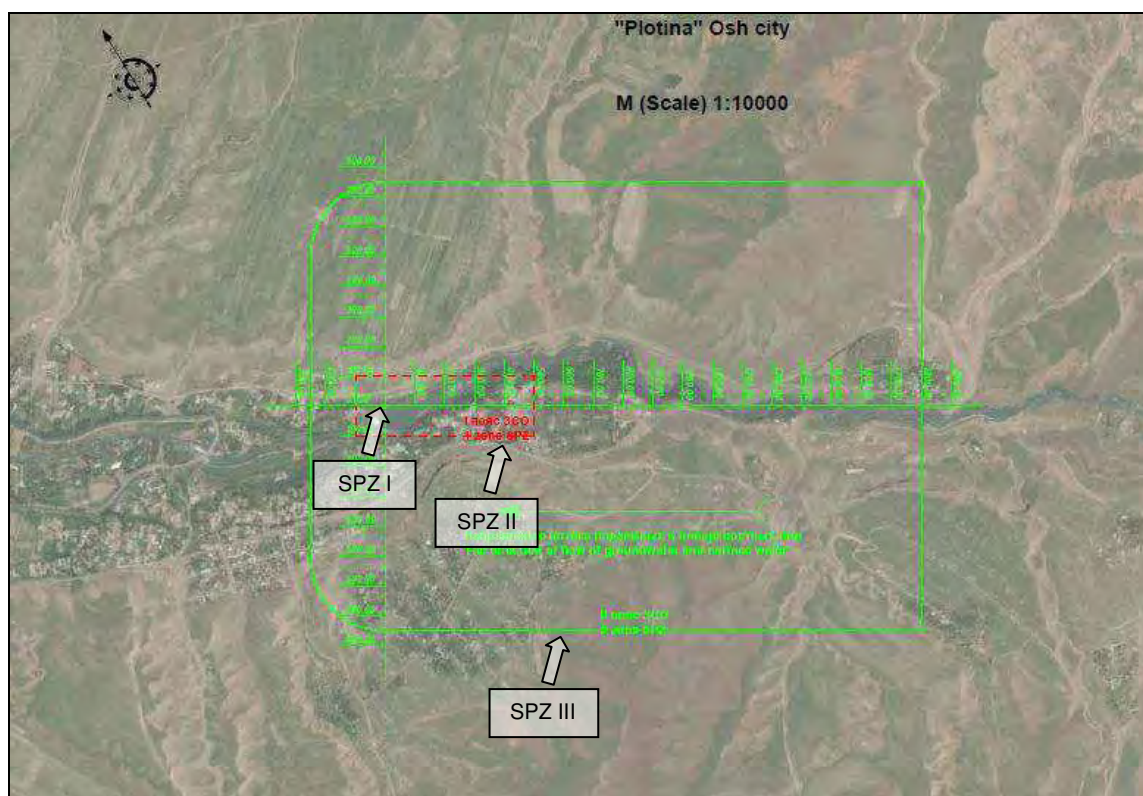
⁶ Based on “Project of sanitary zones of infiltration under-flow water intake “Plotina” in the flood plain of the Ak-Bura River for water supply of Osh city” Bishkek, 2013”.

- it is strictly prohibited to place objects that can cause chemical contamination; these objects include storage facilities for fertilizers, pesticides, and fuel; sludge ponds, etc.
- The proposed SPZ III boundary will be a zone encompassing 1,800 m upstream of the intake, 250 m downstream of the intake, and 750 m in width from the center of the intake (Figure 11).

The local government has provided a commitment that they will establish the above SPZs, see Appendix 3.

- In addition, drinking water will be chlorinated in the Ozgor WTP, and regularly tested by Vodokanal.

Figure 11: Proposed Delineation of SPZ I, II and III



g. Wastes

Potential Impacts

142. During the operation, the water intake facilities will not generate effluent. Under normal operation the chlorination plant also does not generate wastes. Nonetheless a chlorine energy response plan will be developed. These impacts are therefore considered as

an “**Low Impact**” because they are temporary in duration and mitigatable with good management practices.

Mitigation Measures

- See Worker Safety, below.

h. Air Quality

Potential Impacts

143. Operation is not anticipated to result in air quality emissions, and is expected to have “**No Impact**” on air quality.

Mitigation Measures

- Not required

j. Noise

Potential Impacts

144. Operation of the subproject facilities is not anticipated to result in significant noise levels and is expected to have “**No Impact**” on local residents.

Mitigation Measures

- Not required.

2. Impact on the Biological Environment

a. Flora

Potential Impacts

145. Operational activities will not affect flora. The impact on flora is therefore considered to be “**No Impact**”.

Mitigation Measures

- Not required.

b. Fauna

Potential Impacts

146. Potential impacts are most likely to occur in the operation stage due to reductions in river flow. As no significant decrease in the river flow is expected and as there are no protected aquatic fauna in the river, the impact is considered as “**No Impact**”.

Mitigation Measures

- Not required.

c. Protected Areas

Potential Impacts

147. The subproject is not located near any protected areas or nature reserves, and operation is considered to have “**No Impact**”.

Mitigation Measures

- None required.

3. Impact on the Socio-economic Conditions and Physical Cultural Resources

a. Community Health, Socio-cultural and Economic Impacts

Potential Impacts

148. Currently there are significant problems with water supply and the operation of the water supply system.

149. The subproject aims to improve municipal services through the provision of a more reliable water supply, and the affected population will gain important benefits from this. The subproject impact in terms of health and population is therefore considered to be a **“High Positive Impact”**.

Mitigation Measures

- Not required.

b. Worker Safety

Potential Impacts

150. Operation will pose some occupational safety risks to workers; this is considered to be a **“Moderate Impact”**

Mitigation Measures

- An operational phase EHS plan will be developed in compliance with relevant KR laws and regulations prior to the commencement of operation. The plan will include:
 - Chlorine storage and handling procedures.
 - Provision of adequate ventilation.
 - Chlorine emergency spill response procedures in case of accidental release.
 - Provision of appropriate personal protective equipment.
 - Regular worker training on EHS implementation, including safe chlorine storage and handling.

c. Cultural Heritage Impacts

Potential Impacts

151. No impacts to archaeological and historic resources are anticipated; the subproject's operational impact on these resources is considered to be **“No Impact”**.

Mitigation Measures

- Not required.

F. Summary of Environmental Impacts

152. The subproject will generate environmental impacts during the preconstruction, construction and operation phases.

153. The physical works do not require any land acquisition or resettlement. The water transmission pipelines from Plotina to Ozgor will require clearing of 51 trees. Although planted on public land, these trees are owned by 2 households living adjacent to the affected area in Ozgor Village. Compensation will be provided to tree owners in accordance with KR and ADB requirements through the RP.

154. Construction phase impacts are low to moderate in magnitude and are typically temporary and localized in nature. There are no high magnitude construction phase impacts. All impacts can be adequately addressed through typical mitigation measures including good construction and health and safety practices.

155. The operation phase is expected to have limited negative impacts. Potential threats to drinking water quality will be addressed the delineation of SPZ zones I to III and through chlorination and ongoing drinking water quality laboratory analysis. Worker health will be protected through appropriate health and safety practices. On the other hand, subproject operation will create high positive impacts on public health and hygiene. Provision of good quality water is expected to significantly enhance the quality of life of affected peoples.

Table VI.1: Impact Assessment Summary

PREDICTED IMPACTS		PRE-CONSTRUCTION PHASE	CONSTRUCTION PHASE	OPERATION PHASE
Physical	Climate	Not Applicable	No Impact	No impact
	Geology	Not Applicable	Low Impact	No impact
	Topography	Not Applicable	Low Impact	Low Impact
	Soil	Not Applicable	Low Impact	No impact
	Hydrology and Surface Water Quality	Not Applicable	Low Impact	Moderate Impact
	Hydrogeology and Ground Water Quality	Not Applicable	Low Impact	Moderate Impact
	Wastes	Not Applicable	Low Impact	Low Impact
	Air Quality	Not Applicable	Moderate Impact	No Impact
	Noise	Not Applicable	Moderate Impact	No Impact
Biological	Flora	Not Applicable	Low Impact	No Impact
	Fauna	Not Applicable	Low Impact	No Impact
	Protected Areas	Not Applicable	No impact	No impact
Socio-economic and Physical Cultural Resources	Community Health, Socio-cultural and Economic	Low Impact	Moderate Impact	High Positive Impact
	Worker Safety	Not Applicable	Moderate Impact	Moderate Impact
	Physical Cultural Resources	Not Applicable	Low Impact	No impact

VII. ENVIRONMENTAL MANAGEMENT PLAN

A. Objective

156. The objectives of the EMP are to ensure (i) implementation of identified mitigation and management measures for anticipated adverse environment impacts; (ii) implementation of monitoring and reporting; and (iii) subproject compliance with the KR's relevant environmental laws, standards and regulations and ADB's Safeguard Policy Statement (SPS). Organizational responsibilities and budgets are clearly identified for implementation, monitoring and reporting.

B. Implementation Arrangements

157. The Ministry of Finance (MoF) is the EARR executing agency (EA). The State Agency for Architecture, Construction, and Communal Services (SAACCS) is the subproject IA under the overall guidance of its Director, with the Deputy Chief Architect of Osh City responsible for technical aspects related to subproject implementation.

158. The responsibilities for environmental management and monitoring are based on Project Administration Manual (PAM) September 2010 and its revisions (latest revision July 2012). These responsibilities are as follows.

- SAACCS through its EARR Safeguards Unit (SAACCS SU) has overall responsibility to ensure that Government and ADB environment related safeguard policies are adopted. The SAACCS SU is also responsible to ensure full implementation of the RP, and in conjunction with the National Environment Specialist (NES) of the Design and Supervision Consultant (DSC), for coordinating and supervising the mitigation compliance monitoring presented in the EMoP. The SAACCS also prepares quarterly environmental progress reports for submission to ADB, as it is mentioned in the Financing (Loan) Agreement.
- The Project Management Consultant (PMC) is responsible to ensure that the implementation of supervision, monitoring and reporting is undertaken according to the EARR guidelines and manuals and in compliance with the Financing Agreement and the EMoP.
- The DSC is responsible for incorporation of mitigation measures into engineering design and technical specification, and into relevant clauses in the contract documentation.
- The DSC NES, in conjunction with the SAACCS SU, is responsible for mitigation compliance monitoring presented in the EMoP and for preparing monthly environmental progress reports submitted to the SAACCS SU.
- The Regional State Environment Protection Department is responsible for general environment monitoring activities during operation.
- The Contractor is responsible for:
 - Construction phase mitigation implementation; water, air and noise monitoring; and reporting, as outlined in the EMP and contract specifications.
 - All mitigation measures will be incorporated in the Technical Specifications of the Works Contract and should be implemented by the Contractor. The costs to implement the measures excluding the ambient monitoring of noise, water and air quality are to be included in the rates of the relevant items in the Bill of Quantities (BOQ). Ambient monitoring is included as a provisional sum in the BOQ to ensure that the monitoring will be implemented as required.

- The Contractor will recruit a health, and safety environmental (HSE) Officer, who will be responsible for implementing the Contractors' environmental responsibilities and liaise with the Client, the PMC, DSC and district administration. The HSE Officer will also be responsible for health and safety aspects of work sites.
 - The Contractor will submit bi-weekly environmental progress reports to the DSC NES, the DSC will validate reports then submit to SAACCS SU.
 - Osh Oblast authorities will be responsible for establishing SPZs II and III for the water intake before it becomes operational.
 - After subproject completion, Vodokanal will be responsible for operation and maintenance of the subproject. Vodokanal in cooperation with the district/regional administrations will undertake monitoring and analyze samples in SAEPF's analytical control laboratory in Bishkek.
159. Implementation responsibilities by construction phase are summarized in Table VII.1.

Table VII.1: Environmental Management Responsibilities

Subproject Phase	Responsible Organization	Responsibilities
Preconstruction / Detailed Design	DSC	Incorporation of mitigation and monitoring measures into engineering design and technical specification. Translation of mitigation and monitoring measures into clauses in contract documentation.
	SAACCS SU and SAEPF	Review and approve environmental mitigation, monitoring and management measures.
Construction	Contractors	Implementation of required environmental mitigation measures. Recruitment of qualified consultants or agencies to undertake air, water and noise monitoring as presented in the EMoP. Submission of bi-weekly environmental management reports to the DSC NES.
	DSC's supervision engineers assisted by DSC NES	Supervise implementation of the environmental mitigation measures, which are carried by the Contractors, through environmental inspections as presented in the EMoP, carried out in conjunction with the SAACCS SU, and through review of air, water and noise monitoring data provided by the Contactor. Provision of awareness/training to employees and technology transfer to Contractors.
	SAACCS SU	In conjunction with DSC National Environmental Specialist, verify Contractor compliance with EMP the through environmental compliance inspections as presented in the EMoP. Preparation of quarterly environmental progress reports to ADB Verify compliance with Government legal environmental requirements.
Operation	SAEPF	Ensure compliance with Government legal environmental requirements.
	Osh Oblast Authorities	Establish SPZs
	SAACCS SU and the Regional Department on Environment Protection	Ensure the establishment of the SPZs
	Vodokanal in cooperation with the district/regional administrations	Undertake routine and random monitoring and analyze samples.

C. Potential Impacts and Mitigation Measures

160. Potential impacts of the subproject during preconstruction, construction and operation and appropriate mitigation measures including responsibility for implementation are presented in Table VII.2.

D. Environmental Monitoring Plan

161. The EMoP to monitor the environmental impacts of the subproject and assess the effectiveness of mitigation measures is presented in Table VII.3. The EMoP includes both compliance monitoring and ambient monitoring.

162. Compliance monitoring typically involves inspections to verify compliance with EMP mitigation requirements and with relevant laws and regulations, and will be undertaken by the SAACCS SU and the DSC NES. The PMC will ensure that the compliance monitoring will be undertaken. Prior to the start of construction, the SAACCS SU will develop an implementation protocol for the compliance inspection monitoring that clarifies the day to day roles and responsibilities of the SAACCS SU and the DSC NES, and the specific locations at which monitoring will be undertaken.

163. Ambient monitoring will include air, noise and water quality, and will be undertaken by a qualified consultant or agency to be recruited by the Contractor. All other inspections and monitoring will be undertaken by the DSC with SAACCS/ PMC supervision. Additional details on the sites for ambient monitoring will be specified in the Environmental Protection Section of the Detailed Design Report. A budget of \$30,000 has been included in the provisional sum in the BOQ for subproject ambient monitoring.

Table VII. 2: Environment Impacts and Mitigation Measures

Predicted Impacts		Mitigation Measures	Responsibility	Budget Source
PRECONSTRUCTION PHASE				
Land Acquisition and Resettlement	Loss of assets (trees)	<ul style="list-style-type: none"> • Compensation to be provided through RP. 	<ul style="list-style-type: none"> • SAACCS SU 	<ul style="list-style-type: none"> • Subproject Budget
CONSTRUCTION PHASE				
Geology	Sourcing of construction materials such as rock, sand and other building materials	<ul style="list-style-type: none"> • Contractors will be required to obtain basic construction materials from existing quarries which have official permits for their operation. 	<ul style="list-style-type: none"> • Contractor 	<ul style="list-style-type: none"> • Contractor's Budget
Topography	Changes in topography due to intake, reservoir and transmission line construction/rehabilitation.	<ul style="list-style-type: none"> • Final forming and replanting of earthworks in backfilled sections will be completed as soon as possible to facilitate the regeneration of a stabilizing ground cover. • Reservoir, pipeline and other works will be re-vegetated to facilitate regeneration and slope stabilization. 	<ul style="list-style-type: none"> • Contractor 	<ul style="list-style-type: none"> • Contractor's Budget
Soil and Land Resources	Soil contamination from accidental spillages of petroleum products and other hazardous contaminants	<ul style="list-style-type: none"> • Good management practices will be adopted to prevent spills of fuels, oils and hazardous materials. <ul style="list-style-type: none"> ◦ Fuels, oils and hazardous materials will be stored in a secure bunded area with impermeable floor and weatherproof roof. ◦ Refueling of vehicles will be undertaken at existing stationary gas stations and maintenance, washing and repairs undertaken at existing repair stations. ◦ Construction machinery will be maintained in good condition and any leaks will be quickly repaired. ◦ Spill response equipment will be provided at construction sites, and all spills will be cleaned-up immediately. • Soil contaminated by oily products and other substances will be removed for disposal at a permitted site agreed to by the Territorial Environmental Protection Department in Osh City and relevant Osh City and Kara-Suu District Authorities. 	<ul style="list-style-type: none"> • Contractor 	<ul style="list-style-type: none"> • Contractor's Budget
	Soil loss, erosion and sedimentation,	<ul style="list-style-type: none"> • Soil clearance will be minimized to the extent possible. 	<ul style="list-style-type: none"> • Contractor 	<ul style="list-style-type: none"> • Contractor's

Predicted Impacts		Mitigation Measures	Responsibility	Budget Source
	spoil disposal	<ul style="list-style-type: none"> Topsoil will be separated from subsoil during excavation works, and topsoil will be reused as a top layer. Remaining excavated materials will be reused wherever possible, e.g. for backfilling. Spoil disposal sites, if required, should avoid sensitive locations such as water sources, wetlands, etc. Site should be selected in consultation with the Territorial Environmental Protection Department in Osh City and relevant Osh City and Kara-Suu District Authorities. Clearing and/or excavation activities will be scheduled taking weather conditions into account (e.g. minimize excavation activities during rainy weather). Slopes for reservoirs and embankments will be stabilized to reduce slips or erosion. Completed earthwork areas will be replanted to facilitate the regeneration of flora and for stabilizing the ground cover. Low maintenance landscaping will be implemented along the roadside of the transmission line. 		Budget
Hydrology	Surface water pollution	<ul style="list-style-type: none"> In addition to the measures below, see above for good management practices to be adopted to prevent spills of fuels, oils and hazardous materials. All necessary permits will be obtained to carry out works in the river bed. Construction work for the river bank protection will be implemented in the Ak-Bura River low-flow season. Where pumping of water is to be carried out, filters will be used at the intake points and the discharge will be through a sediment trap to avoid the entry of sediments in watercourses and the river. Water quality in the Ak-Bura River will be monitored by a qualified consultant or agency (DO, BOD₅, COD, SS, hydrocarbons, conductivity, turbidity, TDS, pH, temperature) if deemed necessary after visual inspection by the Engineer or DSC NES. Appropriate material stockpiles storage management will be implemented to prevent sediment-laden storm run-off entering watercourses. This includes: <ul style="list-style-type: none"> allowing the establishment of vegetation on the exposed soil; 	<ul style="list-style-type: none"> Contractor Qualified consultant or agency recruited by the Contractor 	<ul style="list-style-type: none"> Contractor's Budget Contractor's Budget and provisional sum

Predicted Impacts		Mitigation Measures	Responsibility	Budget Source
		<ul style="list-style-type: none"> ○ surrounding stockpiles with cut-off ditches to contain any run-off ○ not siting stockpiles within 50 m of any watercourse, and not siting stockpiles and other construction materials in flood prone areas. • As noted above, fuels, oils and hazardous materials will be stored in a secure bunded area with impermeable floor and weatherproof roof, and good management practices will be adopted to prevent spills of fuels, oils and hazardous materials. In addition, waste water associated with concrete mixing and placement (including wash-down water) will be contained and treated in settling ponds so as to prevent pollution of watercourses. • Perimeter drainage will be provided around construction sites and drainage will be directed to a settling pond. • Construction camps will be properly sited and provided with drainage and wastewater facilities to collect run-off and, if necessary, treatment of the run-off. 		
Hydrogeology	Groundwater pollution	<ul style="list-style-type: none"> • See Hydrology mitigations, above. 	<ul style="list-style-type: none"> • Contractor 	<ul style="list-style-type: none"> • Contractor's Budget
Wastes	Construction and domestic waste disposal	<ul style="list-style-type: none"> • The Contractor will prepare and implement a Waste Management Plan to be approved by the DSC, the SAACC SU, the Territorial Environmental Protection Department in Osh City, relevant Osh City and Kara-Suu District Authorities, and the State Center for Sanitary and Epidemiological Surveillance. It will include: <ul style="list-style-type: none"> ○ Appropriate temporary waste storage containers will be provided at construction sites and worker camps. ○ All wastes will be reused or recycled to the maximum extent possible. Wastes will be regularly sorted into what can be reused or recycled. Waste which cannot be reused or recycled will be transported on a regular basis to approved landfill sites. ○ There should be no final waste disposal on site. ○ Waste incineration at or near the site is strictly prohibited. ○ Special care shall be taken in the dismantling of pipes to avoid the creation of asbestos dust by cutting operations. Pipe should be disposed in accordance with the Technical Specifications and 	<ul style="list-style-type: none"> • Contractor 	<ul style="list-style-type: none"> • Contractor's Budget

Predicted Impacts		Mitigation Measures	Responsibility	Budget Source
		<p>should be provided with adequate soil cover.</p> <ul style="list-style-type: none"> The Contractor will be held responsible for proper removal and disposal of any significant residual materials, wastes, and contaminated soils that remain on the site after construction. 		
Air Quality	Pollution from dust and vehicle emissions	<ul style="list-style-type: none"> During construction activities, dry soil surfaces should be watered to avoid dust generation. Watering activities should be performed regularly with due consideration to weather conditions. Transport vehicles should travel at low speeds in the construction site to reduce dust. Construction activities should be halted during high wind events if dust levels are high. All vehicles delivering dusty construction materials to the site or removing debris should have their loads covered; Exhaust systems of vehicles, trucks and machineries should be in good working order and well maintained to minimize noise and air pollution. Equipment should be placed as far as possible away from inhabited areas. Prefabricated structures will be used to the extent possible. Concrete mix should be delivered to the site in a truck mixer from a host plant, and with the help of concrete pump or auto-crane to the work places. Welding should be carried out with electric welding. Air quality (particulate matter) shall be monitored by a qualified consultant or agency at least three times, i.e. before the construction starts, during the construction and after the construction is finished, or as when instructed by the Engineer or DSC NES. 	<ul style="list-style-type: none"> Contractor Qualified consultant or agency recruited by the Contactor 	<ul style="list-style-type: none"> Contractor's Budget and provisional sum Contractor's Budget
Noise	Noise impacts on local residents	<ul style="list-style-type: none"> Noisy construction activities will be limited to day time hours in the vicinity of houses and other sensitive sites in accordance with KR regulations. Equipment and high noise activities should be sited as far as possible away from inhabited areas. Exhaust systems of vehicles, trucks and machineries should be in good working order and well maintained to minimize noise pollution; Nearby community will be informed regarding schedule and duration of construction works. 	<ul style="list-style-type: none"> Contractor 	<ul style="list-style-type: none"> Contractor's Budget

Predicted Impacts		Mitigation Measures	Responsibility	Budget Source
		<ul style="list-style-type: none"> If required, noise barriers will be installed around high noise sources. Noise levels will be monitored by a qualified consultant or agency once before the start of works and then weekly during construction activities to ensure construction noise is less than 65 dB in the daytime for inhabited areas, and 55 dBA at schools and healthcare centers. See "Worker occupational health and safety" below for measures to protect workers from high noise activities. 	<ul style="list-style-type: none"> Qualified consultant or agency recruited by the Contactor 	<ul style="list-style-type: none"> Contractor's Budget and provisional sum
Biological Impacts	Flora: Loss of vegetation	<ul style="list-style-type: none"> Vegetation removal should be minimized to the extent practical. Cutting of trees that are not required to be cleared or removed will be forbidden. Sanctions will be imposed on any worker cutting down trees unnecessarily for the subproject works. Temporary use areas such as construction camps sites will be replanted utilizing appropriate native species. As noted above, topsoil will be separated from subsoil during excavation works, and topsoil will be reused as a top layer. Compensation will be provided to tree owners in accordance with KR and ADB requirements through the RP 	<ul style="list-style-type: none"> Contractor 	<ul style="list-style-type: none"> Contractor's Budget
	Fauna: hunting and poaching	<ul style="list-style-type: none"> Hunting or poaching of fauna by workers will be forbidden, and sanctions will be imposed on any worker poaching fauna at or near the subproject sites. 	<ul style="list-style-type: none"> Contractor 	<ul style="list-style-type: none"> Contractor's Budget
Health, Socio-cultural and Economic Impacts	Air pollution	<ul style="list-style-type: none"> See above. 	<ul style="list-style-type: none"> Contractor 	<ul style="list-style-type: none"> Contractor's Budget
	Noise	<ul style="list-style-type: none"> See above. 	<ul style="list-style-type: none"> Contractor 	<ul style="list-style-type: none"> Contractor's Budget
	Interference with access to public services, private properties and businesses	<ul style="list-style-type: none"> Local authorities will be consulted to minimize disruption of public services such as telephone, water, gas and power supply. The Contractor shall take measures to minimize disruption of access to private properties and businesses where possible. The local communities will be informed about the planned construction activities including schedule and duration of construction works, and expected disruptions. Temporary access to affected private properties, businesses and public service buildings will be provided including temporary crossings over pipeline trenches, and subsequently good quality permanent access will be provided. 	<ul style="list-style-type: none"> Contractor 	<ul style="list-style-type: none"> Contractor's Budget

Predicted Impacts		Mitigation Measures	Responsibility	Budget Source
		<ul style="list-style-type: none"> Road sections used for laying the water transmission pipelines and sewer collector will be resurfaced. 		
	Public safety and traffic management	<ul style="list-style-type: none"> Warning signs, cones and signal lights will be installed along the road to protect workers and people in the neighborhood. As far as practical, movements of construction vehicles will be limited within peak hours of traffic. Public access to construction sites and other areas of danger will be restricted and temporary barriers installed. Employees will be trained on appropriate interactions with local community and awareness program about sanitation and communicable diseases will be instituted. A HIV awareness raising and prevention campaign (including HIV in the workplace) will be implemented. 	<ul style="list-style-type: none"> Contractor 	<ul style="list-style-type: none"> Contractor's Budget
	Social disruption from construction workers and camps and housing	<ul style="list-style-type: none"> The location of construction camps and other worker housing will be agreed in consultation with local authorities. Camps will not be located near sensitive areas (schools, hospitals, etc.). Construction camps will be equipped with adequate water supply and sanitation facilities, and will be maintained in clean/hygienic conditions (see above for mitigations related to waste management plan and water quality). Employees will be trained on appropriate interactions with local community and awareness program about sanitation and communicable diseases will be instituted. A HIV awareness raising and prevention campaign (including HIV in the workplace) will be implemented. 	<ul style="list-style-type: none"> Contractor 	<ul style="list-style-type: none"> Contractor's Budget
	Worker occupational health and safety	<ul style="list-style-type: none"> The contractor is responsible for providing a safe construction site. To achieve this, the Contractor will prepare an EHS plan for the construction works on the basis of the EMP and in compliance with relevant KR laws and regulations. The EHS Plan will be submitted to the Engineer for approval. The EHS plan will include the following: <ul style="list-style-type: none"> An EHS officer will be appointed by the Contractor to implement and supervise the EHS management plan. Workers will be training on occupational health and safety during construction, especially with respect to using potentially dangerous equipment, handling and disposal of hazardous materials including 	<ul style="list-style-type: none"> Contractor 	<ul style="list-style-type: none"> Contractor's Budget

Predicted Impacts		Mitigation Measures	Responsibility	Budget Source
		asbestos pipe, and use of personal protective equipment. <ul style="list-style-type: none"> ○ A first aid facility will be provided onsite. ○ Fire extinguishers and other safety response devices will be provided onsite. ○ All equipment will be maintained in a safe operating condition. ○ Material stockpiles or stacks, such as, pipes must be stable and well secured to avoid collapse and possible injury to site workers. ○ Appropriate personal protective equipment will be provided to workers to minimize risks, including ear protection, hard hats, dust masks, and safety boots. ○ Adequate signage in risk areas will be posted, and access to construction sites will be restricted. ○ Training will be provided to workers on the storage, handling and disposal of hazardous materials. 		
Physical Cultural Resources	Unexpected discovery of Physical Cultural Resources	<ul style="list-style-type: none"> • If a previously unknown physical cultural resource is discovered the following chance find procedure will be implemented: <ul style="list-style-type: none"> ○ All works at the find site will be halted and the appropriate local authorities will be notified. ○ The find will be assessed by an archaeologist from the local authority. ○ Procedures to avoid, minimize or mitigate impacts to the physical cultural resources will be developed by the archaeologist. ○ Construction will resume only after permission from the appropriate local authority has been obtained. 	<ul style="list-style-type: none"> • Contractor / Local Authority 	<ul style="list-style-type: none"> • Contractor's Budget
OPERATION PHASE				
Topography	Unstable or eroding slopes at reservoir	<ul style="list-style-type: none"> • Measures to maintain slope stability at the reservoir will be implemented on an as need basis. 	<ul style="list-style-type: none"> • Relevant local government department (to be determined) 	<ul style="list-style-type: none"> • Operating Budget
Hydrology	Flooding, erosion	<ul style="list-style-type: none"> • Construction of an earth fill protection embankment with a length of 350 m and a height of up to 3 m. The embankment shall be 	<ul style="list-style-type: none"> • Contractor (to have been 	<ul style="list-style-type: none"> • Contractor's Budget

Predicted Impacts		Mitigation Measures	Responsibility	Budget Source
		constructed with excavated and supplied material. Rock-filled gabions and riprap shall be placed on the river side of the embankment.	undertaken during construction phase)	
	Water extraction impacts on river	<ul style="list-style-type: none"> Monitoring of water levels (see EMoP) 	<ul style="list-style-type: none"> See EMoP 	<ul style="list-style-type: none"> See EMoP
Hydrogeology		<p>Establishment of Sanitary Protection Zones</p> <ul style="list-style-type: none"> SPZ I, II and III will be established in accordance with sanitary and epidemiologic rules and regulations (SanPin) 2.1. 4.015-03, as shown in Figure 11.⁷ <p>SPZ I</p> <ul style="list-style-type: none"> SPZ I has strict conditions for the protection of underground water sources. The belt is designed to provide maximum protection from intentional or accidental contamination. Within this zone, the following is strictly prohibited: <ul style="list-style-type: none"> human habitation, and the construction and placement of any structures and buildings that have no direct relation to the operation of the water intake; the presence of unauthorized people, pets and farm animals; the use of pesticides and organic fertilizers for crops and plantations. SPZ I will extend in a radius 25 m from the outer well and is to be fenced off. <p>SPZ II</p> <ul style="list-style-type: none"> The purpose of the SPZ II is to protect a groundwater source from microbial contamination. Within this zone, the following is strictly prohibited: <ul style="list-style-type: none"> to construct all types of buildings, to locate cemeteries, burial grounds, warehouses, fuel depots, landfills, livestock and poultry farms, etc. The border of all three zones of sanitary protection of the 	<ul style="list-style-type: none"> Osh City and Kara Suu District authorities based on the provisions in the Kyrgyz Legislation / SanPiN 2.1.4.015-03 	<ul style="list-style-type: none"> Government Budget

⁷ Based on "Project of Infiltration under-flow water intake "Plotina" for water supply of Osh city" Sanitary Protection Zones Calculation Bishkek, 2013".

Predicted Impacts		Mitigation Measures	Responsibility	Budget Source
		<p>water intake Plotina in all three directions downstream, up and in the sides taking into account the river water area. The SPZ minimum sizes of the strict regime are determined 600m in length taking into account drain extent 300m and 200m in width (without river width in summer-autumn low period) (Figure 11).</p> <p>SPZ III</p> <ul style="list-style-type: none"> The purpose of the SPZ III is to protect a groundwater source from chemical pollution. Within this zone: <ul style="list-style-type: none"> It is strictly prohibited to place objects that can cause chemical contamination. These objects include storage facilities for fertilizers, pesticides, and fuel; sludge ponds, etc. Borders of possible microbic pollution of underground waters much more and make 1500m up on the stream of underground waters from the southern point of the horizontal drain and 250m down on the stream with a width of II zones from the water intake center of gravity 750m. <ul style="list-style-type: none"> Drinking water will be chlorinated in the Ozgor WTP, and regularly tested by Vodokanal. 	<ul style="list-style-type: none"> Vodokanal 	<ul style="list-style-type: none"> Operating Budget
Health, Socio-cultural and Economic Impacts	Worker Safety	<ul style="list-style-type: none"> An operational phase EHS will be developed in compliance with relevant KR laws and regulations prior to the commencement of operation. The plan will include: <ul style="list-style-type: none"> Chlorine storage and handling procedures. Provision of adequate ventilation. Chlorine emergency spill response procedures in case of accidental release. Provision of appropriate personal protective equipment. Regular worker training on EHS implementation, including safe chlorine storage and handling. 	<ul style="list-style-type: none"> Vodokanal 	<ul style="list-style-type: none"> Operating Budget

Table VII.3: Environmental Monitoring Plan

Predicted Impacts	Location	Inspection / Ambient Monitoring	Frequency	Institutional Responsibility ¹
CONSTRUCTION PHASE				
Sourcing of construction materials such as rock, sand and other building materials	Quarries	Inspection to ensure: <ul style="list-style-type: none"> Contractors obtain basic construction materials from existing quarries which have official permits for their operation. 	At the beginning of construction, and then monthly during construction activities.	DSC / SAACCS SU
Changes on topography due to reservoir and bridge construction.	Excavation areas; Embankments;	Inspection to ensure: <ul style="list-style-type: none"> Final forming and replanting of earthworks in backfilled sections completed as soon as possible to facilitate the regeneration of a stabilizing ground cover. Reservoir, pipeline and other works will be re-vegetated to facilitate regeneration and slope stabilization. 	Weekly during related construction period.	DSC / SAACCS SU
Soil contamination from accidental spillages of petroleum products and other hazardous contaminants	All Subproject Sites	Inspection to ensure: <ul style="list-style-type: none"> Good management practices adopted to prevent spills of fuels, oils and hazardous materials. Soil contaminated by oily products and other substances is removed for disposal at a permitted site agreed to by the Territorial Environmental Protection Department in Osh City and relevant Osh City and Kara-Suu District Authorities. 	Weekly during construction activities, and at end of construction phase.	DSC / SAACCS SU
Erosion and land stability	Excavation areas; Embankments;	Inspection to ensure: <ul style="list-style-type: none"> Soil clearance is be minimized to the extent possible. Topsoil is separated from subsoil during excavation works, and topsoil is reused as a top layer. Remaining excavated materials reused wherever possible, e.g. for backfilling. Spoil disposal sites, if required, should avoid sensitive locations such as water sources, wetlands, etc. Site should be selected in consultation with the Territorial Environmental Protection Department in Osh City and relevant Osh City and Kara-Suu District Authorities. Clearing and/or excavation activities scheduled taking weather conditions into account (e.g. minimize excavation activities during rainy weather). Slopes for reservoirs and embankments stabilized to 	Weekly during construction activities, and at end of construction phase.	DSC / SAACCS SU

Predicted Impacts		Location	Inspection / Ambient Monitoring	Frequency	Institutional Responsibility ¹
			reduce slips or erosion. <ul style="list-style-type: none"> Completed earthwork areas replanted to facilitate the regeneration of flora and for stabilizing the ground cover. Low maintenance landscaping implemented along the roadside of the transmission line.		
Water pollution		Directly downstream of any observed pollution event	Water quality sampling and analysis: <ul style="list-style-type: none"> DO, BOD₅, COD, SS, hydrocarbons, conductivity, turbidity, pH, temperature 	Monitoring will be undertaken by the DSC with SAACCS supervision when requested by DSC NES or Project Engineer	Qualified Consultant or Agency recruited by Contractor
		Any site where pumping is carried out	Inspection to ensure: <ul style="list-style-type: none"> Filters used at the intake points and the discharge 	Weekly during construction involving pumping	DSC / SAACCS SU
		Stockpiles	Inspection to ensure: <ul style="list-style-type: none"> Appropriate material stockpiles storage management implemented 	Weekly during construction	DSC / SAACCS SU
		All sites	Inspection to ensure: <ul style="list-style-type: none"> Good management practices adopted to prevent spills of fuels, oils and hazardous materials. Perimeter drainage provided around construction sites and drainage directed to a settling pond. 	Weekly during construction	DSC / SAACCS SU
		Construction Camps	Inspection to ensure: <ul style="list-style-type: none"> Construction camps properly sited and provided with drainage and wastewater facilities to collect run-off and, if necessary, treatment of the run-off 	At the time of camp siting, and then weekly during camp operation	DSC / SAACCS SU
Waste disposal problems from construction and domestic waste disposal		Subproject areas Construction camps	Inspection to ensure: <ul style="list-style-type: none"> Proper implementation of Contractor's "Waste Management Plan". 	At the beginning of the sub project, then weekly during construction activities.	DSC / SAACCS SU
Air Quality	Exhaust gas from trucks and equipment	Construction site and inhabited areas	Inspection to ensure: <ul style="list-style-type: none"> Exhaust systems of vehicles, trucks and machinery in good working order and well maintained. Equipment placed as far as possible away from inhabited areas. 	Weekly during construction	DSC NES / SAACCS SU
	Dust from the	Construction site and	Inspection to ensure:	Weekly during construction	DSC NES /

Predicted Impacts		Location	Inspection / Ambient Monitoring	Frequency	Institutional Responsibility ¹
	site traffic and excavation works	inhabited areas	<ul style="list-style-type: none">Dry soil surfaces watered to avoid dust generation. Watering activities should be performed regularly with due consideration to weather conditions.Transport vehicles travel at low speeds in the construction site to reduce dust.Construction activities halted during high wind events if dust levels are high.All vehicles delivering dusty construction materials have their loads covered.		SAACCS SU
	Dust and Exhaust emissions	Construction site and inhabited areas	Air quality sampling and analysis: <ul style="list-style-type: none">Particulate matter.	At least three times, i.e. before the construction starts, during construction and after the construction is finished, and when instructed by the Engineer or DSC.	Qualified Consultant or Agency recruited by Contractor
Noise		All residential areas adjacent to construction sites	Inspection to ensure: <ul style="list-style-type: none">Noisy construction activities limited to day time hours in the vicinity of houses and other sensitive sites in accordance with KR regulations.Equipment and high noise activities sited as far as possible away from inhabited areas.Exhaust systems of vehicles, trucks and machineries in good working order and well maintained to minimize noise pollution.Nearby community informed regarding schedule and duration of construction works.If required, noise barriers installed around high noise sources.	Weekly during construction	DSC / SAACCS SU
			Ambient noise monitoring: <ul style="list-style-type: none">Monitoring with decibel-meters to ensure construction noise is less than 65 dB in the daytime for inhabited areas, and 55 dBA at schools and healthcare centers.	Noise levels will be monitored once before the start of works and then weekly during construction activities	Qualified Consultant or Agency recruited by Contractor
Flora: loss of vegetation		Clearance Areas	Inspection to ensure: <ul style="list-style-type: none">Vegetation removal minimizedNo cutting of trees that are not required to be cleared or removed. Sanctions imposed on any worker cutting down	At the beginning of subproject. Monthly during construction.	DSC / SAACCS SU

Predicted Impacts	Location	Inspection / Ambient Monitoring	Frequency	Institutional Responsibility ¹
		<p>trees unnecessarily.</p> <ul style="list-style-type: none"> Temporary use areas replanted utilizing appropriate native species. Topsoil separated from subsoil during excavation works, and topsoil reused as a top layer. Low maintenance landscaping implemented <p>Compensation provided to tree owners</p>		
Fauna: hunting and poaching	All subproject areas	<p>Inspection to ensure:</p> <ul style="list-style-type: none"> Hunting or poaching of fauna by workers forbidden. Sanctions imposed on any worker poaching fauna at or near the subproject sites. 	Monthly	DSC / SAACCS SU
Interference with access to public services, private properties and businesses	All subproject areas	<p>Inspection to ensure:</p> <ul style="list-style-type: none"> Local authorities consulted. Temporary access to affected properties and public service buildings provided, and subsequently good quality permanent access to affected properties provided. Nearby community notified as to the schedule and duration of construction works. Contractor providing temporary crossings across pipeline trenches. Road sections used for laying the water transmission pipelines resurfaced. 	Weekly during construction activities.	DSC / SAACCS SU
Public Safety and Traffic Management	All subproject traffic areas	<p>Inspection to ensure:</p> <ul style="list-style-type: none"> Warning signs, cones and signal lights installed along the road to protect workers and people in the neighborhood. Movements of construction vehicles limited within peak hours of traffic. Public access to construction sites and other areas of danger restricted and temporary barriers installed. Employees trained on appropriate interactions with local community and awareness program about sanitation and communicable diseases instituted. A HIV awareness raising and prevention campaign (including HIV in the workplace) will be implemented. 	Weekly during construction activities.	DSC / SAACCS SU
Social Disruption from Construction Workers and Camps and Housing	Construction Camps and Housing	<p>Inspection to ensure:</p> <ul style="list-style-type: none"> Construction camps equipped with adequate water supply and sanitation facilities, and maintained in clean/hygienic 	Weekly during construction activities	DSC / SAACCS SU

Predicted Impacts	Location	Inspection / Ambient Monitoring	Frequency	Institutional Responsibility ¹
		conditions (see above for mitigations related to waste management plan and water quality).		
Occupational Health and Safety	Subproject Area Construction Camps	Inspection to ensure: <ul style="list-style-type: none"> Ensure Contractor has an "Occupational Health and Safety Plan", and all aspects are properly implemented. 	Weekly during construction activities	DSC / SAACCS SU
Unexpected discovery of Physical Cultural Resources	All Subproject Areas	Inspection to ensure: <ul style="list-style-type: none"> Chance find procedure properly implemented 	When chance finds of Physical Cultural Resources occur	DSC / SAACCS SU
Operation Phase				
Unstable or eroding slopes	Reservoir River Banks at Intake	Inspection to: <ul style="list-style-type: none"> Assess slope stability at reservoir and erosion of river banks at the intake Ensure measures to maintain slope stability and protect river banks are implemented on an as needed basis. 	As required	Vodokanal
Groundwater Pollution	SPZ II and III	Inspection to ensure: <ul style="list-style-type: none"> SPZ II and III operational and effective Chlorination effective, Water quality testing 	At the discretion of the Regional State Environment Protection Department Continuously	Regional State Environment Protection Department Vodokanal
Reduced river flows	Water intake site	Monitoring of: <ul style="list-style-type: none"> River flows at the water intake 	Continuously (particularly during low flow months)	Vodokanal
Interception of groundwater	Water intake site	Monitoring of: <ul style="list-style-type: none"> Groundwater levels in the water intakes 	Continuously	Vodokanal

1. The DSC responsibility for inspections will be fulfilled jointly by the DSC construction supervision engineers and the NES. In terms of the SAACCS SU, this responsibility will be fulfilled by the Environmental Expert during monthly visits.

E. Environmental Reporting

164. Environmental reporting will be undertaken as follows:

- The Contactor will submit bi-weekly progress reports on mitigation implementation and the results of any monitoring undertaken in that period to the DSC, with a copy also sent to the SAACCS SU.
- The DSC NES will submit monthly environmental progress reports to the SAACCS SU based on environmental monitoring undertaken in that period and the Contactors' bi-weekly progress reports.
- The SAACCS SU will submit quarterly environmental progress reports to the ADB documenting the environmental management measures and monitoring results. If the monitoring has identified a weakness or deficiency in the implementation of the EMP that has already been addressed, the report should explain the manner by which the issue was resolved. If the monitoring has identified a weakness or deficiency in the implementation of the EMP that has not yet been addressed, a corrective action plan (CAP) should be developed. The CAP should describe actions necessary to address each area of concern; prioritize these actions; identify responsibilities for implementation of each corrective action; identify a time-line for their implementation; and, present a schedule for communicating the results of plan implementation to affected communities.

VIII. INFORMATION, DISCLOSURE, CONSULTATION AND PARTICIPATION

165. ADB's SPS has specific requirements for information disclosure and public consultation. Information disclosure involves delivering information about a proposed project to the general public and to affected communities and other stakeholders, beginning early in the project cycle and continuing throughout the life of the project. Information disclosure is intended to facilitate constructive engagement with affected communities and stakeholders over the life of the project.

166. In addition, the KR is a member of the United Nations Economic Commission for Europe (UNECE) Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters (Aarhus Convention) that also has provisions to ensure that project objectives and environmental considerations are made public.

167. In this regard, two public hearing/consultation meetings were held on 20 June and December 3, 2013. The first public consultation hearing performed in the Osh Mayor House with the participation of 16 people representing the local communities, local state Departments and Services.

168. The second one conducted again in the Osh Mayor House according to the earlier distributed agenda with the attendance 28 people representing the local communities, including affected persons (APs), NGOs, local Departments and Services.

169. For both of the public consultation meetings, at the start of the consultation, importance of the project was emphasized by the vice-mayor and then, project's experts explained that the development of the IEE the impacts on the air, soil, topography, flora and, fauna, groundwater and surface water, and social/economic conditions were assessed. Also, sites of historical heritage, natural reserves and Red Data Book species inhabiting Jalal-Abad vicinities were taken into account. Based on the assessments, it was concluded that there will be some low and moderate adverse impacts during the construction such as noise and dust. For the operation phase, there will be none or low adverse impacts except for hydrogeology and that there will be a highly positive impact in terms of health. Following these explanations, the participants mostly raised on Grievance Redress Mechanism, tendering stage, technical issues related to the subproject's design and some environmental impacts. The project's representatives from various parties responded to these questions.

170. The experts also provided Information about ADB's environmental safeguards requirements and the objectives of the IEE, the EMP, EMoP and GRM.

171. The summaries of the public consultation hearings are presented in Appendix 2.

IX. GRIEVANCE REDRESS MECHANISM

A. Grievance Redress Functions and Process

172. A grievance redress mechanism (GRM) responsive to ADB Safeguard requirements was established for EARR Component 2 by the original Implementing Agency (IA), the State Directorate for Reconstruction and Development of Osh and Jalal-Abad (SDRD), and extended with appropriate adaptations to Component 3A at the outset of subproject design-associated impacts assessment activities in 2012. Following the transition in EARR implementation from SDRD to the State Agency for Architecture, Construction, and Communal Services (SAACCS) in early 2013, the GRM was revalidated by SAACS and the GRM's Grievance Redress Group (GRG) was adjusted accordingly.

173. The GRM provides a basis for receiving, managing, reviewing, and facilitating the resolution of issues, concerns, complaints, or grievances raised by affected people (APs) regarding EARR's environment performance. Based on this mechanism, aggrieved APs may access the GRM through local points of contact (LPC) and will be assisted by the SAACCS Safeguard Unit (SAACCS SU) and the GRG tasked with all activities needed to discuss a grievance, validate and assess the scope of impacts, decide on redress actions needed, and instruct and facilitate the functioning of the GRM. The GRG is composed of a core group and an independent observer (Oblast Ombudsman) to make informed and balanced decisions on complaints lodged.

174. Citizen complaint and grievance redress procedures have been developed in compliance with the Law of the Kyrgyz Republic "On procedure of processing complaints of citizens" as well as ADB Safeguard Policy. As shown in Figure 12, the grievance redress process involves the following steps:

- Complaints/appeals received from affected persons are registered by SAACCS Correspondence Department. After review by the Deputy Chief Architect (DCA) of Osh City (responsible for technical project implementation matters), complaints are passed to the appropriate department for review. Received complaints are divided into complains/appeals related to EARR subprojects and those not related to EARR subprojects.
- Complains/appeals related to EARR subprojects are received and registered by the SAACCS SU and acknowledged by letter signed by the DCA to the complainant within 7 days of registration.
- Complains/appeals related to EARR subprojects which are possible to solve under authority of the DCA will be studied and decided. SAACCS SU provides internal review of the grievance, determines eligibility, and advises the DCA accordingly. A response letter will be prepared by the SAACCS Social Safeguards Specialist signed by the CDA and sent to the complainant within 14 days of complaint registration.
- In the event an eligible complaint cannot be resolved within SAACCS immediate authority, the GRG is triggered. The CDA will convene the Grievance Redress Group (GRG) which will consider the balance between the complainant and the public interest. Members of GRG will review the complaint and meet with the complainant. If necessary, they may consult with legal expertise and/or request for additional information from the complainant, local authorities (LAs), or governmental agencies.
- After the GRG completes its investigation, a letter will be prepared by the SAACCS Social Safeguards Specialist signed by the CDA, and sent to the complainant advising of GRG decision and associated action within 21 days after registration.

- If the complainant does not agree with the decision, he/she will have 5 days to request the reconsideration of his/her complaint. If reconsideration (appeal) is not requested, the case will be closed. This will be clearly stated in the response letter.
- Complaints found ineligible or disputed decisions may also be taken by complainants to the courts.
- If the AP is not satisfied with the Court judgment, there may be an opportunity for appealing to a higher level of court. The AP may also choose to approach ADB under the Accountability Mechanism.⁸

175. For managing the subproject complaint handling system, SAACCS, with support from the Project Management Consultant (PMC), has furnished the GRM with necessary staff and facilities and will provide administrative and financial support as required. Although the GRM provides an integrated complaints handling system, separate data bases will be maintained containing information about complaints related to the ADB Safeguard Policies on environment and involuntary resettlement. All grievance-related documentation will be kept until the EARR is formally closed. SAACCS will include summary data on complaint processing and results in progress reports submitted to ADB.

176. SAACCS, with assistance from local leaders, and community representatives, will inform the presence of the GRM to the public and subproject area communities through dissemination of subproject information through local media, in consultations with affected persons and the public, and the EARR website (www.earr.kg).

B. Local Point of Contact

177. Affected people may lodge complaints for registration through a personal visit, call or letter to designated local points of contact (LPC) established at the local government level in each subproject Area. LPCs nominated by LAs have been presented by SAACCS and trained on environmental issues to monitor implementation, respond to AP queries, and receive AP complaints. Upon receiving complaints, the LPC will promptly forward them to SAACCS, activating the GRM process described above. The GRM LPC for the subproject is the Senior Specialist of Tuleiken A/O.

C. Grievance Redress Group

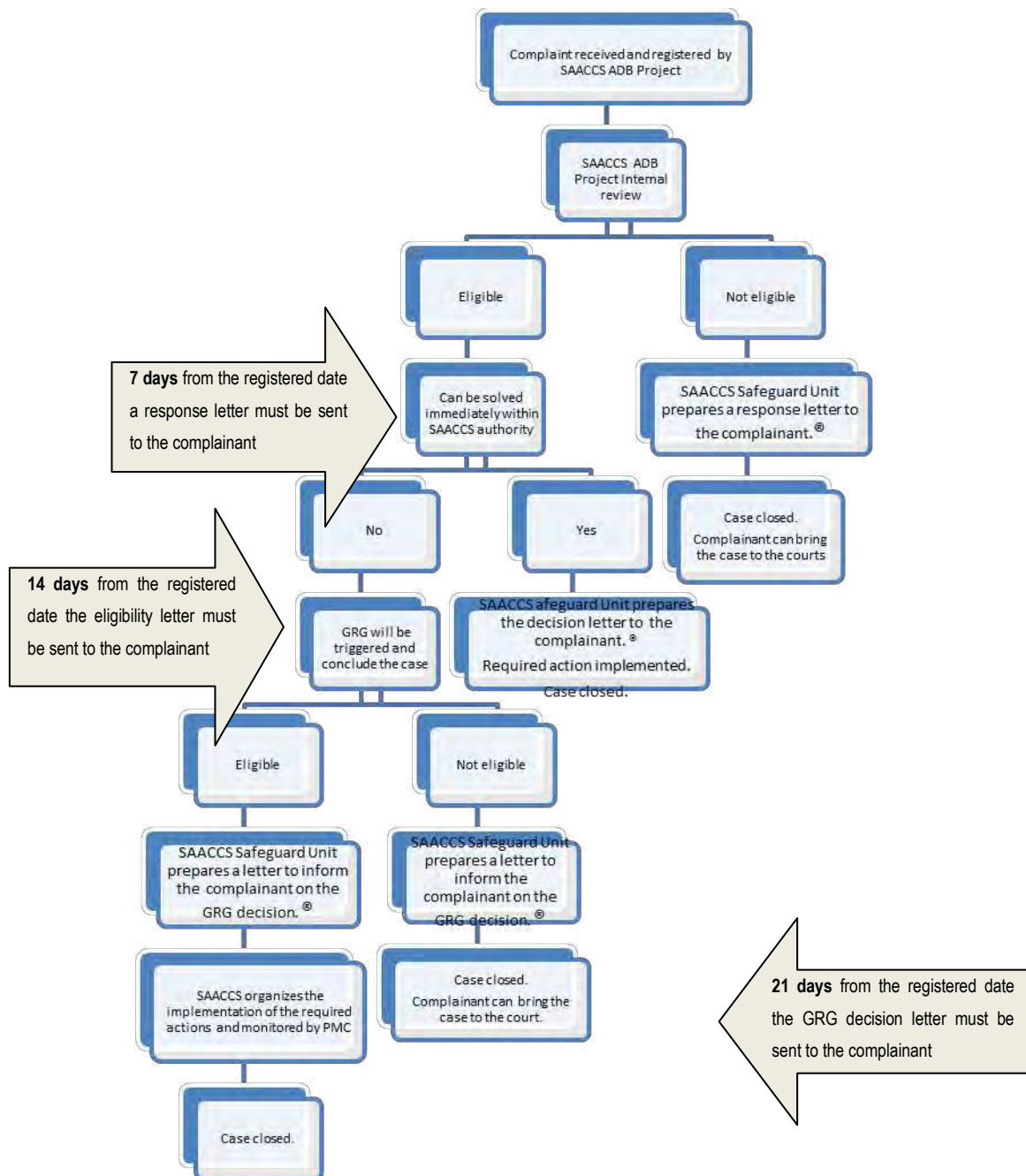
178. The GRG for the subproject includes the following:

1. DCA of Osh City (chairperson);
2. Representative(s) from involved subproject area local governments: Osh City Mayor's Office and/or Tuleiken Ayil Okmotu (member);
3. SAACCS Social Safeguard Specialist; (member);
4. Representative of the Ombudsman of Osh City/Oblast (independent observer)
5. Technical specialist(s) from the relevant organizations as required by the nature of the complaint filed. The technical expertise to objectively review and resolve the case may be solicited from the following state and non-state organizations:

⁸ The ADB Accountability Mechanism provides a forum where people adversely affected by ADB-assisted projects can voice and seek solutions to their problems and report alleged noncompliance of ADB's operational policies and procedures. It consists of two separate but complementary functions: consultation phase and compliance review phase. For more information see: <http://beta.adb.org/site/accountability-mechanism/main>

- PMC/DSC
- State Registration Services (Gosregister)
- Ministry of Agriculture
- State Agency for Environment and Forestry
- Ministry of Justice
- Other agencies

Figure 12: GRM Flow Chart



® A signed receipt of the letter will be required from the complainant

X. CONCLUSIONS

179. The proposed subproject will improve water supply infrastructure in Osh City.

180. Preconstruction phase impacts are low and are related to project siting. The subproject will not require any land acquisition, and the water supply transmission pipelines will only affect a narrow band of vegetation adjacent to existing roads, requiring the clearing of 51 trees in the first 50 m of the route exiting from the Plotina Water Intake. The affected private assets all occur on public land, and compensation for these impacts has been addressed through a separate Resettlement Plan.

181. Construction phase impacts are low to moderate in magnitude and are typically temporary and localized in nature. All impacts can be adequately addressed through typical mitigation measures including good construction and health and safety practices.

182. The operation phase is expected to have limited negative impacts. Potential threats to drinking water quality will be addressed the delineation of SPZ zones I to III and through chlorination and ongoing drinking water quality laboratory analysis. Worker health will be protected through appropriate health and safety practices. On the other hand, subproject operation will create high positive impacts on public health and hygiene. Provision of good quality water is expected to significantly enhance the quality of life of affected peoples. .

183. Based on the analysis undertaken in this report, it is concluded that

- i) the proposed subproject will have no significant adverse impacts, and will result in significant positive socioeconomic and environmental benefits. Any minimal adverse environmental impacts associated with the subproject can be addressed through the application of appropriate mitigation measures;
- ii) the subproject's categorization as ADB environment category B is confirmed; and
- iii) this IEE is considered sufficient to meet ADB's environmental safeguard requirements for the subproject, and no additional studies are required.

APPENDIX 1: Rapid Environment Checklist

RAPID ENVIRONMENTAL ASSESSMENT (REA) CHECKLIST – WATER SUPPLY

Country/Project Title:

Kyrgyz Republic/Emergency Assistance for Recovery and Reconstruction - Component 3A: Osh City subproject

Sector Division:

SCREENING QUESTIONS	Yes	No	REMARKS
A. PROJECT SITING			
Is the project area...			
• Densely populated?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Water intake will take place outside but conduits to the connection points will take place inside the city.
• Heavy with development activities?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
• Adjacent to or within any environmentally sensitive areas?			
• Cultural Heritage Site	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
• Protected Area	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
• Wetland	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
• Mangrove	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
• Estuarine	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
• Buffer zone of protected area	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
• Special area for protecting biodiversity	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
• Bay	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
B. POTENTIAL ENVIRONMENTAL IMPACTS			
Will the project cause...			
• Pollution of raw water supply from upstream wastewater discharge from communities, industries, agriculture, and soil erosion runoff?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
• Impairment of historical/cultural monuments/areas and loss/damage to these sites?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
• Hazard of land subsidence caused by excessive	<input type="checkbox"/>	<input checked="" type="checkbox"/>	

ground water pumping?			
• Social conflicts arising from displacement of communities?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
• Conflicts in abstraction of raw water for water supply with other beneficial water uses for surface and ground waters?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
• Unsatisfactory raw water supply (e.g. excessive pathogens or mineral constituents)?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
• Delivery of unsafe water to distribution system?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
• Inadequate protection of intake works or wells, leading to pollution of water supply?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
• Over pumping of ground water, leading to salinization and ground subsidence?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
• Excessive algal growth in storage reservoir?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
• Increase in production of sewage beyond capabilities of community facilities?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
• Inadequate disposal of sludge from water treatment plants?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
• Inadequate buffer zone around pumping and treatment plants to alleviate noise and other possible nuisances and protect facilities?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
• Impairments associated with transmission lines and access roads?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Local impairments during construction.
• Health hazards arising from inadequate design of facilities for receiving, storing, and handling of chlorine and other hazardous chemicals.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
• Health and safety hazards to workers from handling and management of chlorine used for disinfection, other contaminants, and biological and physical hazards during project construction and operation?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
• Dislocation or involuntary resettlement of people?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
• Disproportionate impacts on the poor, women and children, indigenous people or other vulnerable groups?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
• Noise and dust from construction activities?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	

<ul style="list-style-type: none"> Increased road traffic due to interference of construction activities? 	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<ul style="list-style-type: none"> Continuing soil erosion/silt runoff from construction operations? 	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Soil erosion at Ak-Bura river
<ul style="list-style-type: none"> Delivery of unsafe water due to poor O&M treatment processes (especially mud accumulations in filters) and inadequate chlorination due to lack of adequate monitoring of chlorine residuals in distribution systems? 	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
<ul style="list-style-type: none"> Delivery of water to distribution system, which is corrosive due to inadequate attention to feeding of corrective chemicals? 	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
<ul style="list-style-type: none"> Accidental leakage of chlorine gas? 	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
<ul style="list-style-type: none"> Excessive abstraction of water affecting downstream water users? 	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
<ul style="list-style-type: none"> Competing uses of water? 	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
<ul style="list-style-type: none"> Increased sewage flow due to increased water supply? 	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<ul style="list-style-type: none"> Increased volume of sullage (wastewater from cooking and washing) and sludge from wastewater treatment plant 	<input checked="" type="checkbox"/>	<input type="checkbox"/>	WWTP has enough capacity for the new volume.
<ul style="list-style-type: none"> Large population influx during project construction and operation that causes increased burden on social infrastructure and services (such as water supply and sanitation systems)? 	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
<ul style="list-style-type: none"> Social conflicts if workers from other regions or countries are hired? 	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
<ul style="list-style-type: none"> Risks to community health and safety due to the transport, storage, and use and/or disposal of materials such as explosives, fuel and other chemicals during operation and construction? 	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
<ul style="list-style-type: none"> Community safety risks due to both accidental and natural hazards, especially where the structural elements or components of the project are accessible to members of the affected community or where their failure could result in injury to the community throughout project construction, operation and decommissioning? 	<input type="checkbox"/>	<input checked="" type="checkbox"/>	

RAPID ENVIRONMENTAL ASSESSMENT (REA) CHECKLIST - BUILDINGS

Country/Project Title:

Kyrgyz Republic/Emergency Assistance for Recovery and Reconstruction - Component 3A: Osh City subproject

Sector Division:

SCREENING QUESTIONS	Yes	No	REMARKS
A. PROJECT SITING			
Is the project area adjacent to or within any of the following areas?			
• Underground Utilities	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
• Cultural Heritage Site	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
• Protected Area	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
• Wetland	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
• Mangrove	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
• Estuarine	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
• Buffer zone of protected area	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
• Special area for protecting biodiversity	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
• Bay	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
B. POTENTIAL ENVIRONMENTAL IMPACTS			
Will the project cause...			
• Encroachment on historical/cultural areas?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
• Encroachment on precious ecology (e.g. sensitive or protected areas)?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
• Impacts on the sustainability of associated sanitation and solid waste disposal systems?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
• Dislocation or involuntary resettlement of people?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
• Disproportionate impacts on the poor, women and children, Indigenous Peoples or other vulnerable groups?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	

<ul style="list-style-type: none"> Accident risks associated with increased vehicular traffic, leading to loss of life? 	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
<ul style="list-style-type: none"> Increased noise and air pollution resulting from increased traffic volume? 	<input checked="" type="checkbox"/>	<input type="checkbox"/>	There will be increase of noise and air pollution during the works.
<ul style="list-style-type: none"> Occupational and community health and safety risks? 	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
<ul style="list-style-type: none"> Risks and vulnerabilities related to occupational health and safety due to physical, chemical, biological, and radiological hazards during project construction and operation? 	<input checked="" type="checkbox"/>	<input type="checkbox"/>	It will be use chlorine at the water disinfection facilities. The workers won't be in contact with the chlorine. Could be injured worker in case of accident but is not expected.
<ul style="list-style-type: none"> Generation of dust in sensitive areas during construction? 	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
<ul style="list-style-type: none"> Requirements for disposal of fill, excavation, and/or spoil materials? 	<input type="checkbox"/>	<input checked="" type="checkbox"/>	It will be insignificant.
<ul style="list-style-type: none"> Noise and vibration due to blasting and other civil works? 	<input checked="" type="checkbox"/>	<input type="checkbox"/>	There will not be blasting but there will be noise during construction.
<ul style="list-style-type: none"> Long-term impacts on groundwater flows as result of needing to drain the project site prior to construction? 	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
<ul style="list-style-type: none"> Large population influx during project construction and operation that causes increased burden on social infrastructure and services (such as water supply and sanitation systems)? 	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
<ul style="list-style-type: none"> Social conflicts if workers from other regions or countries are hired? 	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
<ul style="list-style-type: none"> Risks to community safety caused by fire, electric shock, or failure of the buildings safety features during operation? 	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
<ul style="list-style-type: none"> Risks to community health and safety caused by management and disposal of waste? 	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
<ul style="list-style-type: none"> Community safety risks due to both accidental and natural hazards, especially where the structural elements or components of the project are accessible to members of the affected community or where their failure could result in injury to the community throughout project construction, operation and decommissioning? 	<input type="checkbox"/>	<input checked="" type="checkbox"/>	

APPENDIX 2: Public Consultation

1. PUBLIC CONSULTATION HEARING IN OSH, 20 JUNE 2013

1. The public consultation hearing for Osh subproject was conducted on 20 June 2013, in the Osh Mayor House.
2. Totally, 16 people representing the local community, local state Departments and Services, attended the meeting. The list of them is provided below in the Table 1.2:

Table 1.2: List of participants

Invited people		
No.	Name	Position
1	Mirzamatov R.	Vice-Mayor of Osh
2	Ergeshov, Abdrasul	Chief Engineer of Municipal services of Osh
3	Muratov, Tairbek	Department Chief, Osh Mayor Office
4	Osmonov, Ormon	Chief Engineer of the Osh Vodokanal
5	Jumabaev, Kubanychbek	Department Chief, sanitary and epidemiological service
6	Akhmedov, Nusratilla	Representative of NGO "Interbilim", Osh Branch
7	Amatov, Torobek	Osh City Hospital, Chief of Department of Medical Service
8	Aitbaev, S.T.	Deputy Head of the local Statistical Department
9	Boronbaev, Koshbai	Chief specialist, Osh Mayor Office
10	Tokoshev, Altynbek	Deputy Head of the Osh Oblast Department of State Agency for Architecture, construction and housing construction under the KR Government (Gosstroy)
11	Aitbaev, Bakytbai	Specialist, Mayor Office, Osh
12	Yusupov, Marat	Leading Specialist, Mayor Office, Osh
13	Pieter Smidt	Team Leader, PMC
14	Dinesh Nath Chalise	Project Team Leader, EPTISA
15	Djamila Aitmatova	Environmental Specialist, EPTISA/RAM Engineering
16	Nasiba Nazirkulova	Environmental Expert, Gosstroy's Safeguards Unit

Figure 1: Project group and Vice-Mayor

3. The event was facilitated by Vice-mayor of Osh City. In his introductory speech, he noted that there are problems with the supply of clean drinking water in Osh. This is a very important issue that requires an urgent attention. During the rainy season in Osh, the water is cut off due to the fact that water treatment plants cannot reduce the amount of suspended materials in water. In this regard, ADB has provided assistance for the rehabilitation of existing water intake on the river Ak-Bura. He also mentioned that the preliminary preparation of project documentation is under the development. According to ADB procedures, it is necessary to conduct public hearings to agree on all the issues with local communities and stakeholders. Therefore, knowledge regarding to subproject will be transferred by the representatives of the project organization within this public hearing. Pieter Smidt, PMC Team Leader; Nasiba Nazirkulova, Environmental Expert at Gosstroy's Safeguards Unit; Dinesh Nath Chalise, Project Team Leader at Eptisa, and Djamila Aitmatova, Environmental Specialist at EPTISA/Ram Engineering are the participants of this event as project related parties.

Figure 2: Participant of the meeting discussing some aspects of water supply

4. Then the floor was given to Pieter Smidt, who reported on the main provisions of the Policy ADB's safeguard measures on environmental issues. He mentioned that, the water supply project, which is the subject of this meeting, is financed by the ADB. Both ADB and Kyrgyz Republic attach great importance to protect and improve the country's environment. For this reason, the project needs to comply with both ADB and Government environmental safeguards.

5. ADB's environmental safeguards require that each investment under the water supply component is subjected to an Initial Environment Examination (IEE). Similar examinations are also required as per Governmental environmental legislation and regulations. The purpose of an IEE is to determine the environmental impacts of the planned investment and, in the case of negative impacts, to determine what kind of measures need be taken to prevent and/or to mitigate such impacts before and during implementation. The outcome of the IEE is to be made public and shared through a public consultation process with concerned stakeholders.

6. A presentation was made by EPTISA to highlight the expected impacts and also list the main measures that are required to mitigate a number of negative impacts. These measures are summarized in the so-called Environment Management Plan (EMP). It was underlined that, monitoring of the implementation of the EMP will be important during the construction phase. The first-level monitoring will be undertaken by EPTISA. Furthermore, SAACCS has an environmental specialist who will visit project sites on regular basis to check the compliance of the EMP by the Contractor.

7. It was also mentioned that, during construction activities, local people might notice some environmental negative impacts associated with the construction. They could experience themselves some negative impacts and therefore have complaints or "grievances". For this reason, a mechanism has established, namely Grievance Review Mechanism (GRM), which includes a Grievance Review Group (GRG).

Figure 3: Attendants of the Public Hearings

8. Project's Team Leader Dinesh Nath Chalise noted that the project is also important in terms of technical aspect. The project is envisaged to provide safe and reliable water an additional amount of 70 million liters per day. This will be achieved through the construction of an infiltration gallery at the upper part of the existing water intake dam. The project also provides comprehensive rehabilitation of chlorination unit as well as the existing reservoir in the area of the old Brick Factory Plant. He declared that, EPTISA spent a lot of time to discuss all the possible alternatives and different engineering solutions to improve the project and in addition to these; environmental issues are being taken into consideration by the team.

9. Environmental Expert from SAACCS' Safeguards Unit, Ms. Nasiba Nazirkulova, specifically noted that the project is of great importance for the city of Osh, since the main goal of it is an uninterrupted supply of good quality water. Therefore must adhere to existing legal provisions of the Kyrgyz Republic on the environment and the safe drinking water supply: the Law on Drinking Water, Law on the Sanitary Conditions of the Population, SanPin "Zones of sanitary protection of water sources and water supply for drinking purposes". Nasiba Nazirkulova focused her attention on the rules of SPZs arrangement, which are to be organized in the three zones. First zone is strict control zone. The second and third zones are organized to prevent the chemical and biological contamination of water sources. The second and third zones are usually set during the development of general plans for communities. It will be implemented in the existing water intakes. Therefore, local authorities will need to review the SPZs jointly with the project team, in order to enforce the rules of SPZ water sources.

10. National Environmental Expert Djamila Aitmatova, EPTISA/RAM Engineering, informed participants on the environmental impacts that were defined during the preliminary studies and environmental assessment. It is expected that, most of the impacts will occur during the construction stage and the most significant impacts are related on the hydrology.

11. There will be some flow decrease because of the water abstraction and the construction of the earth fill protection embankment implies changes in the river behavior. On the other hand, there is a positive impact due to planned water supply system in Osh

subsequently improving the social welfare of the population, which will provide important benefits.

12. Vice-Mayor informed that all the relevant agencies will be involved into the solution of SPZs issues and all the planned activities will be passed through the official procedures, especially where roads, pipelines and water intakes are located. He also informed that all the relevant bodies have perused the working documentation and the Osh Mayor Office will make effort to facilitate solving all the possible issues that can arise during pre-construction and construction activities.

13. The attendees of the meeting asked a question regarding Grievance Redress Mechanism (GRM). As per provided information by the Vice-Mayor, there are no problems in this sphere in previous. In addition, proposed documentation had no any claims from the part of State Agency of Environmental Protection. All the compensations will be paid off. A special board is established by SAACCS order. This group will be working permanently to deal with the local citizens' complaints. If something happens, the board will solve everything based on legislation.

14. Pieter Smidt also clarified that at the early stage of the Project, the GRM was established at the time houses were reconstructed. This mechanism will also be used for the Project's water supply component. Experts, specialists, representatives of Ombudsman office are part of the GRM. All the complaints will be received in their response. If the response does not satisfy the complainant, he or she can apply again as was sometimes the case during the house reconstruction phase.

2. FOLLOW-ON PUBLIC CONSULTATION IN OSH – 3 DECEMBER, 2013

15. A follow on Public Consultation was conducted in the Osh Mayor House at the date of 03.12.2013 using the earlier distributed agenda.

16. In total 28 people attended the meeting. They represented local communities including affected persons (APs) and local the Departments and Services. The list of participants is provided below in Table 2.1:

Table 2.1: List of participants

Invited People		
No	Name	Position
1	Tokoshev Altynbek	Deputy Head of Osh City Department for Architecture
2	Junusov Ularbek	UMS, Deputy Head
3	Moldokeeva Jedimkul	Social Development Specialist, PMC
4	Osmonov A.	TS#3, "Sulaiman-Too"
5	Ismailov Abdurasul	Japalak Village council Head
6	Kamalov Nurbek	Ozgor Village council Head
7	Seitbekova Asylgul	Social Safeguard Specialist, PMC
8	Karakojoev S.	Chief Specialist of the Department on drinking water
9	Amatov R.A.	Territorial Council #10 "Kyzyl-Dyikan", Chairman of the quarter committee #3, telephone 2-48-37
10	Saitbaev T.H.	Territorial Council #1, "Turan", responsible secretary
11	Osmonov O.	OshGorVodoCanal, Engineer
12	Ashurov N.	Territorial Council-2, "Dostuk", chairman of the quarter committee #7
13	Ergashev A.	Territorial Council-2, "Dostuk", chairman of the quarter committee #6
14	Kaparov Aziz	0779098905
15	Jumabaev Kubanychbek	Osh Sanitary and Epidemiological Control Dept., Unit Head
16	Sainazarova Parida	Village Council #11 "Jibek Jolu", responsible secretary
17	Akhmatjanov M.	Micro-District "Amir-Temur", Territorial Council #9
18	Israilova M.	Village Council #9, "Kerme-Too"
19	Aliev Yrypek	Public Fund "DIA", Project Assistant
20	Isabaev Kanybek	Director "Aarhus Center" (Osh), Aarhus@ktnet.kg
21	Mirzamatov R.	Vice-Mayor of Osh city
22	Tokoshev Altynbek	Deputy Head of Osh City Department for Architecture
23	Atabaev Anvar	Senior Engineer, PMC
24	Dinesh Nath Chalise	Team Leader, Eptisa
25	Aitmatova Djamilia	National Environmental Expert, Eptisa/RAM Engineering
26	Sultanaliyev Abdykadyr	Engineer, PMC
27	Ukukov Rustam	PR Specialist, PMC
28	Kaparova Djamilia	PMC

17. The meeting was opened by the Osh City vice Mayor Mr. Rustam Mirzamatov. He noted the importance of providing the Osh City population with drinking water and the urgency of the issues associated with safe water supply. In this regard, the ADB project "Improvement of Water Supply in Osh" plays a significant role. He informed that another water reservoir at the Brick Plant would be built that would create more stable conditions for

water supply. Where the cutting of trees and/or moving fences is required, the agreed compensation will be paid by the Project. The construction works will begin by the early next year since all design work have been accomplished and the process of getting the official approvals is complete. He then introduced Mr. Altynbek Tokoshev, Representative of Gosstro Agency in Osh, and described his responsibilities in the framework of the Project. The vice-mayor also emphasized that in accordance with the Kyrgyz Republic's environmental legislation and ADB environmental policy, the project team must inform the local community about the environmental and social impact of construction works.

Figure 4: Vice-Mayor Mr. Rustam Mirzamatov noted the urgency of the issues associated with safe water supply



18. Mr. Tokoshev A., after welcoming the participants, handed the floor to Mr. Atabaev A.

19. Mr. Atabaev A., the PMC Senior Engineer, explained why this second round of the public consultations was needed. He noted that some time ago, design engineers were working on the elaboration of the Ak-Bura water intake design solutions and at that time some details were not yet clarified. Now the final decisions on the subproject have been made and for this reason there was a need to hold a second round of public consultations to inform the local communities including the APs on the final decisions. Mr. Anvar Atabaev informed the participants about the technical characteristics of the subproject and noted that rehabilitation and improvement works would be carried out at the water intake, which will also include the installation of fencing and exterior lighting for the water intake, so that employees could provide a good protection and, consequently leading to a secure operation of the facility. Mr. Anvar Atabaev also briefed the participants on the expected impact of the subproject. In particular, he noted that the rehabilitation work is temporary inconvenience for vehicle transport and access to the property sites (real estate). To facilitate access for the local communities, this will be done through a bypass road to be used by the residents of houses located in the vicinity of construction sites. It is important to bring to the local communities' notice that the inconvenience will be temporary and that access to their property will be restored.

Figure 5: Participants of the Public Consultation

20. Then Ms. Djamila Aitmatova, the national environmental expert, EPTISA, took the floor. Ms. Djamila Aitmatova recalled that in accordance with ADB Statement on Safeguards (SPS - 2009) and the environmental legislation of the Kyrgyz Republic, each project should pass an environmental expertise at the SAEP&F and reveal the full range of impacts of Project activity. Based on this, measures are to be developed to mitigate identified negative impacts. She further explained in what specific way the local environment will be exposed to the impacts of the subproject, and what specific measures will be required to mitigate the identified negative impacts. She also noted that the subproject has developed a special grievance redress mechanisms (GRM) for the local population and explained its basic principles.

Figure 6: Ms. Djamila Aitmatova reports on outcomes of IEE for water supply system rehabilitation measures

21. Next, Mr. Rustam Mirzamatov, the Vice Mayor of Osh, took the floor, and stressed that the local population and local environmentalists would do everything possible to ensure that the Project staff and the PMC would be informed on all unexpected environment related circumstances. The Mayor's office has committed itself to provide full support to contractors and companies who carry out design and supervision functions. Since some subproject activities will take place at the Kara-Suu district, the Mayor's office received a written notice from the akim (head) of the Kara-Suu district in which it is said that they would support and monitor all activities for the rehabilitation and improvement of the water supply of the city of Osh.

22. Following the presentations, the participants had the following questions and comments.

- **During rainfall, there is dirty water in the water pipes for several days. The question is: the water that will be accumulated in the new reservoir, will it be supplied to the city during the rainy days when the water gets high turbidity?**

23. Mr. Anvar Atabaev: In case of the floods when the water is highly turbid, with the new intake the town will still receive clean water for at about 50% of water supply they receive during the normal supply period to ensure a minimum water supply by an hourly schedule.

- **Is the participation of local companies in the tender ensured?**

24. Mr. Anvar Atabaev: Currently an international bidding process is under way: the bidding was announced on November 15. The procedure is for international competitive bidding and local companies are eligible to participate.

- **Will be local people be employed during the construction works and how many?**

25. Mr. Anvar Atabaev: We cannot guarantee the number of local workers who may be hired by the companies. If a foreign company wins the bid, we do not know how many people from the local population they will involve. However, they will naturally employ local services and some local companies will possibly be subcontracted. Upon the further question why the construction company would not use the local enterprise, Mr. Atabaev A. further clarified that we can encourage them to hire local enterprises but we cannot force them to do that.

26. Further, Djamila Aitmatova explained that different companies have different salary levels. If a winning company provides acceptable level of salary to the local expertise (local workers and specialists) and if they agree, then local services can be hired.

27. Vice Mayor concluded the meeting by noting: "The ADB project has been running for three years now, preparing documents and project documentation. Many of the problems in the process were resolved. Now we must do our best to support this project so that after the New Year the work would begin. The ecological problems should not arise; nobody will be affected negatively by this project. So, everything is going to be well and, let's work together."

**APPENDIX 3: Local Government
Commitment – Establishment of SPZs**

(Original Letter)

КЫРГЫЗ РЕСПУБЛИКАСЫ**ОШ ШААРЫНЫН
МЭРИЯСЫ**

723500, Ош шаары, Ленин көчөсү, 221

**КЫРГЫЗСКАЯ РЕСПУБЛИКА****МЭРИЯ
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Тел: (03222) 55151, 55551, 55144, факс (03222) 55204, www.oshcity.kg, e-mail: org@oshcity.kg, control@oshcity.kg№ 358/13 от 23-ИЮНЯ 2013 г.
на № _____

**Директору Государственного
агентства архитектуры,
строительства и жилищно-
коммунального хозяйства при
Правительстве КР
Нарбаеву К.Ж.**

Мэрия города Ош ставит Вас в известность о том, что в рамках проекта «Улучшение системы водоснабжения города Ош» предусмотрена реконструкция головного водозабора ул села Озгор со строительством дренажного водозабора. Данный объект является муниципальной собственностью мэрии города Ош. Однако по истечении времени с момента сдачи его в эксплуатацию почти все основополагающие проектно-сметные документы утеряны, а имеющиеся схемы указания границ I и II поясов санитарно-охранной зоны устарели в связи с расширением границ рядом расположенных селений, тем более, что о III поясе охранной зоны никаких данных не существует.

В связи с расширением границ водозаборного сооружения и проектирования инфильтрационного дренажа на этой площадке, мэрия города Ош просит Вас включить в реализуемый проект раздел исследования и разработки зон II и III поясов санитарно-охранной территории водозаборного сооружения, который будет рекомендован к исполнению.

В свою очередь, после вычисления границ II и III поясов Санитарно-охранных зон мэрия города обязуется исполнить все необходимые юридические и административные действия по созданию соответствующих СОЗ II и III поясов до ввода в эксплуатацию водозаборного сооружения, предусмотренной по компоненту 3А.

Вице-мэр города Ош**Р.Мирзаматов**

(Translation of Original Letter)

**KYRGYZ REPUBLIC
MAYOR'S OFFICE OF OSH CITY**

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358/08-13 of July 23, 2013

To # _____

**Director of the State Agency for
Architecture, Construction and
Communal Services under the
Government of the Kyrgyz Republic
Narbaev K. J.**

The Mayor's Office of Osh City brings to your notice that the Improvement of the Water Supply System for Osh City Project envisages the reconstruction of the main water intake facility near Ozgor village involving the construction of the drainage water intake. This facility is the municipal property of the Mayor's Office of Osh City. However, with the passage of time since its commissioning, almost all basic design estimate documentation has been lost, while the existing schemes indicating boundaries of Sanitary Protection Zones I and II have become outdated due to the expansion of boundaries of the nearby settlements, especially as there are no data on Sanitary Protection Zone III.

Due to the expansion of boundaries of the water intake facility and the design of the infiltration drainage at this site, the Mayor's Office of Osh City asks you to include in the ongoing project a section on the research and design of Sanitary Protection Zones II and III of the water intake facility, which will be recommended for implementation.

After the calculation of boundaries of Sanitary Protection Zones II and III, the Mayor's Office of Osh City in turn commits itself to take all necessary legal and administrative actions to establish the respective Sanitary Protection Zones II and III before the commissioning of the water intake facility envisaged under Component 3.

Sincerely,

Vice-Mayor of Osh City

R. Mirzamatov