

Initial Environmental Examination

August 2016

GEO: Urban Services Improvement Investment
Program – Tranche 6
(Improvement of Chiatura Water Supply System
Sub-project)

Prepared by United Water Supply Company of Georgia LLC of the Ministry of Regional Development and Infrastructure for the Asian Development Bank.

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ABBREVIATIONS

ADB	- Asian Development Bank
CA	- Cross section area
CC	- Civil Contractor
DC	- Design Consultant
EA	- Executing Agency
EIA	- Environmental Impact Assessment
EIP	- Environmental Impact Permit
EMP	- Environmental Management Plan
GoG	- Government of Georgia
GRC	- Grievance Redress Mechanism
IA	- Implementing Agency
IEE	- Initial Environmental Examination
IP	- Investment Program
IPMO	- Investment Program Management Office
kg	- Kilogram
km	- Kilometre
lpcd	- Litres per Capita per Day
M	- Metre
MFF-IP	- Multitranchise Financing Facility Investment Program
mg/l	- milligram per litre
mm	- Millimetre
MoRDI	- Ministry of Regional Development & Infrastructure of Georgia
MoE	- Ministry of Environment and Natural Resources Protection of Georgia
SSEMP	- Site Specific Environmental Management Plan
PS	- Pumping Station
UWSCG	- United Water Supply Company of Georgia
UREP	- Unit of Resettlement and Environment Protection
WS	- Water Supply
WWTP	- Waste Water treatment Plant

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A. EXECUTIVE SUMMARY

1. It is proposed to improve the water supply system in Chiatura under the Asian Development Bank (ADB) funded Urban Services Improvement Investment Program, which is under preparation stage. This Investment Program, implemented in nine towns, will develop the water and sanitation services, which will improve quality of life and optimize the social and economic development. Ministry of Regional Development and Infrastructure (MoRDI) is the Executing Agency (EA) and United Water Supply Company of Georgia (UWSCG) is the Implementing Agency (IA) of this Program. This subproject will be implemented from 2017 to 2019. All environmental impacts associated with the works are minor and can be managed through effective implementation of an environmental management plan. Since the subproject is unlikely to have significant adverse impacts, it is classified as environment Category B, and accordingly an Initial Environmental Examination has been conducted. This is a summary of the IEE Report.
2. The Investment Program will improve water supply and sanitation (WSS) services in 9 secondary towns of Georgia. The Investment Program includes (i) infrastructure improvement to rehabilitate, improve, and expand WSS services; (ii) institutional effectiveness to improve the service utility's technical and management capabilities of the key WSS service provider, United Water Supply Company of Georgia LLC (UWSCG) to provide efficient WSS services, and develop the capacity of sector regulators to regulate tariffs, services standards, environmental protection, and drinking water quality in the long-term; and (iii) Investment Program implementation support.
3. The scope of work under the consultancy services is to (i) assess the technical, financial, economic, and environmental feasibility of subprojects; (ii) conduct surveys and investigations; (iii) develop hydraulic models and (iv) prepare detailed designs, drawings, cost estimates, specifications, and bid documents for implementing water supply and sanitation schemes in the Investment Program financed by the MFF.
4. The Number of population of Chiatura Municipality (including villages) is 54.9 thousand people. Population density – 113 m/km². Georgian citizens represent the absolute majority of the population. On the basis of official data, the number of population of the municipality is stable. Currently, town population is 18.800.
5. Chiatura Municipality is located in the western Georgia, in the basin of the Kvirila River. It covers a part of Imereti highland. Sachkhere Municipality is located at North-East boarder of the municipality, Kharagauli, Zestafoni and Terjola Municipalities – at East and South-west, Tkibuli – to the West, Ambrolauri Municipality – to the North-West boarder of the Municipality. Chiatura town represents the administrative center of the Municipality. Total area of the municipality equals 542 km².
6. The project will be implemented according to the requirements of Georgian National and the same as of Asian Development Bank's Environmental Legislative Framework (SPS 2009).
7. The water supply system of Chiatura is in the same situation as it was constructed 40 to 50 years ago, with minor maintenance and replacement of pipes and electro-mechanical installations. In addition the water sources are affected by Mn ore and by turbidity during rainfall periods.
8. The present project is considering the rehabilitation of the existing water supply system with a new water supply source in Sachkhere.
9. The design of the rehabilitation works in the network included the re-calculation and analysis of the main pipenetwork.
10. The work under the present sub-project comprises the rehabilitation of the water supply network by replacing the old pipes and connecting to the used existing pipes. The construction of intake works by wells in Sachkhere area,

construction/rehabilitation of a new reservoirs and pumping stations, replacement of network pipelines and construction of new transmission lines to the reservoirs.

11. The main project features included in the present design are described below:
 - Rehabilitation of the entire water supply network
 - Rehabilitation of the following reservoirs: Bisi, Memorial, Lezhubani, Rustaveli, Perevisi and Tekhisa
 - Construction of two new reservoirs: One in Sachkhere and one close to existing one in Bisi
 - Replacement of all the existing Transmission Lines, except the one going from CPS to Perevisi Reservoir.
 - Construction of two New Transmission Lines: Sachkhere-Bisi and Perevisi-Tekhisa
 - New Well-fields in Sachkhere
 - Rehabilitation and rearrangement of Central Pumping Station;
 - Rehabilitation and rearrangement of Lezhubani and Perevisi Pumping Stations
12. At the stage of developing the present document, the sensitive receptors were identified and baseline analyses of the following components were conducted: water quality, radiation, noise and air-weighted particles.
13. However, due to the specifics of the project, it is essential to conduct a number of mitigation measures during construction and operational phases in order to avoid the potential negative impact on the environment.
14. Both, during the disassembly of the existing reservoirs and trench excavation and pipe installation, great amounts of inert waste will be accumulated. The Contractor, in agreement with the local authority, shall select due sites to locate the inert waste. A certain amount of inert waste will be placed on landfill in Sachkhere (10km distance from Chiatura).
15. The Contractor, prior to the onset of the construction, is obliged to conduct a number of studies and develop environmental plans, including (i) botanical study of the Project zone, (ii) waste management plan, (iii) Site-Specific Environmental Management Plans (SSEMPs) (iv), Reinstatement management Plan.
16. The present document has been developed a number of mitigation measures to eliminate these problems. Accordant with this, their proper and timely implementation will significantly reduce the potential negative impact.
17. At the stage of developing the Initial Environmental examination (IEE) document, a number of consultation meetings were held with the local population, local self-governing bodies and all concerned parties. On 08 June, 2016, 12:00 a.m, at the building of the Municipality of the city of Chiatura, under the organization of UWSCG, a public discussion of the present Project was held. It was attended by both, the representatives of the organizations engaged in developing the Project and other interested entities.
18. UWSCG is the executing agency of the project, which in turn hires construction and consulting companies on the basis of the tender. The above mentioned team takes full responsibility for the effective implementation of the project.
19. The overall conclusion of the IEE is that provided the mitigation and enhancement measures are implemented in full, there should be no significant negative environmental impacts as a result of location, design, construction or operation of the subproject. There should in fact be positive benefits through major improvements in quality of life and individual and public health once the scheme is in operation. Project will stimulate economic growth. The quality water is a prerequisite for tourism development. Standard of individual and public health will improve as a result of the project. Project will generate new job opportunities.

B. POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK

20. This section discusses the national and local legal and institutional framework within which the environmental assessment is carried out. It also identifies project-relevant international environmental agreements to which the country is a party.

B.1 ADB Policy

21. Superseding the previous safeguard policies (the Involuntary Resettlement Policy, 1995, the Policy on Indigenous Peoples, 1998, and the Environment Policy 2002), ADB, has adopted a comprehensive Safeguard Policy Statement in 2009 (SPS, 2009). This Statement describes common objectives of ADB's safeguards, lays out policy principles, and outlines the delivery process for ADB's safeguard policy. It applies to all ADB-financed and administered projects, and their components including investment projects funded by a loan, grant or other means.
22. Aiming on promotion and sustainability of project outcomes by protecting the environment and people from projects' potential adverse impacts, the objectives of ADB's safeguards are to:
- avoid adverse impacts of projects on the environment and affected people, where possible;
 - minimize, mitigate, and/or compensate for adverse project impacts on the environment and affected people when avoidance is not possible; and
 - help borrowers/clients to strengthen their safeguard systems and develop the capacity to manage environmental and social risks.
23. The objective of environmental safeguards is to ensure the environmental soundness and sustainability of projects and to support the integration of environmental considerations into the project decision-making process. All ADB funded projects are screened at initial stages of preparation and categorized according to significance of the project's potential environmental impacts. Projects are assigned to one of the following three categories:

Category A - Projects likely to have significant adverse environmental impacts, which are irreversible, Diverse or unprecedented and may affect an area larger than the location subject to physical works. An Environmental Impact Assessment is required.

Category B – Projects with adverse environmental impacts that are less significant than those of Category A projects, are site-specific, generally not irreversible, and in most cases can be mitigated more readily than for Category A projects. An Initial Environmental Examination (IEE) is required.

Category C - likely to have minimal or no adverse environmental impacts; EIA is not required.

24. **ADB Review and Approval.** For Category B projects the Draft IEE report is reviewed by ADB's Operational Department (in this case Central & West Asia Department) and after addressing their comments, if any, the EA then officially submits the IEE reports to ADB. Completed reports are made available on the ADB website.

B.2 Georgian Law

B.2.1 Framework Legislation

25. The basic legal document is "The Constitution of Georgia", which was adopted in 1995. While the Constitution of Georgia does not directly address environmental matters, it does lay down the legal framework that guarantees environmental protection and public access to information with regard to environmental conditions.

- Article 37, Part 3 states that “any person has the right to live in a healthy environment, use the natural and cultural environment. Any person is obliged to take care of the natural and cultural environment.” Article 37, Part 5 states that: “an individual has the right to obtain full, unbiased and timely information regarding his working and living environment.”
26. Article 41, Part 1 states that “a citizen of Georgia is entitled to access information on such citizen as well as official documents available in State Institutions provided it does not contain confidential information of state, professional or commercial importance, in accordance with the applicable legal rules.
 27. **The Law of Georgia on Environmental Impact Permit (2008)** defines the full list of activities on the territory of Georgia subject to mandatory ecological expertise. The Law defines the legal aspects of issuing an environmental permit, undertaking the ecological expertise, informing the public and participating in the given procedures. Under the Law, the environmental permit is the authorization to realize the planned activities. Under the Law, an environmental permit is issued by the Ministry of Environmental Protection and Natural Resources of Georgia based on the review/expertise of the application of an applicant for the environmental permit. The aim of the Law is to ensure the protection of a human health, natural environment, physical assets and cultural heritage during the activity.
 28. **The Law of Georgia on Environment Protection (1997)** regulates the legal relations between the state establishments and physical or legal entities in the field related to the use of territorial waters, air space, including continental shelf and special economic zones, environmental protection and natural resources on the territory of Georgia. The Law regulates the standards of the environmental protection and issues of environmental management; it describes the economic sanctions, standards and issues of environmental impact, different issues of protection of the natural ecosystems and biodiversity, and global and regional management issues. In addition to the above-mentioned, the Law considers the major principles of waste management. The law defines the ecological requirements for the waste (Article 34). According to the provision of the given Article, an entrepreneur is obliged to reduce the origination of industrial, domestic and other types of waste, ensure their treatment, utilization, placement or burying by considering the environmental, sanitary-hygienic and epidemiological standards and rules. The Law defines the requirements for the placement of toxic, radioactive and other hazardous waste and prohibits their discharge in the surface water sources.
 29. **The Law of Georgia on Licenses and Permits (2005)** defines the list of activities needing licenses or permits, including so called “Environmental permit”. It also defines the requirements for the license or permit issue. The Law, together with the normative by-laws, regulates such organized activity or action, which relates to an indefinite circle of entities, is characterized by increased hazard to the human life or health, affects particularly important state or public interests or is related to the use of a state resource. The given Law regulates the field regulated by a license or permit; it gives a thorough list of licenses and permits, and establishes the rules to issue the licenses and permits, 28 makes amendments to them or abolish them. Under the Law, a state regulation of the activity or action through a license or permit is undertaken only when the given activity or action is directly associated with the increased hazard to the human life or health or fields of state or public interests. The state regulation is undertaken only when the issuance of a license or permit is a real means to reduce the hazard in question or consider state or public interests. The aim and major principles of regulating the activity or action via licenses or permits are as follows:
 - Provision and protection of human life and health;
 - Safety and protection of a human’s residential and cultural environment;
 - Protection of state and public interests
 30. **The Law of Georgia on State Ecological Expertise (2008).** Under the given Law, the ecological expertise is a necessary measure for making decision on the issuance

of environmental and/or construction permit(s). The aim of the ecological assessment is to protect the ecological balance by considering the requirements of environmental protection, rational use of natural resources and principles of sustainable development. A positive conclusion of the ecological expertise is mandatory for obtaining an environmental and/or construction permit. In addition, the holder of environmental and/or construction permit is obliged to comply with conditions specified in the ecological expertise conclusion. The process of ecological assessment is regulated by the Ministry of Environmental and Natural Resources Protection.

31. The procedure to be observed during ecological expertise, as well as the requirements on forming the expert commission is prescribed in the Provision on the Rule for Carrying out Ecological Expertise, which is approved by the Minister of Environment and Natural Resources Protection of Georgia. The full list of the activities, subject to mandatory ecological expertise for decision making on issuance of environmental permit or building permit, is specified by the Law of Georgia on Environmental Permit³¹. The aim of new law on Waste Management – Waste Management Code (January 2015) – is to provide for the legal conditions for implementation of measures aiming at prevention of generation of waste and increased re-use, environmentally-sound treatment of waste (including recycling and extraction of secondary raw materials, energy recovery from waste, as well as safe disposal). The objective of this Law is to protect the environment and human health: by preventing and reducing the adverse impacts of the generation of waste; by introducing effective mechanisms of management of waste; by reducing damage caused by resource use and improving the efficiency of such use.
32. The state ensures protection of the environment and, correspondingly, protection of water as its main component in **The Law of Georgia on Water (1997)**. All residents of Georgia are liable to ensure the rational and sustainable use and protection of water. They have to prevent its contamination, pollution and depletion. The dumping of industrial, household and other garbage and wastes in water bodies is prohibited according to this act. The disposal of industrial, household and other effluents into water bodies is permitted on the basis of a license by the Ministry. With the objective of protecting the Black Sea and preserving its ecological system, all natural and legal persons (including foreigners) are obliged to take measures for preventing pollution of the sea with wastewater from the sources of pollution located on the land. The use of a surface water body for discharging industrial, communal-household, drainage and other wastewater is allowed only under a water use license issued on the basis of the Ministry-approved multipurpose water utilization plans and water management balance-sheet.
33. **The Law of Georgia on Cultural Heritage (2007)**. Article 14 of the Law specifies the requirements for 'large-scale' construction works. According to this Article, a decision on career treatment and ore extraction on the whole territory of Georgia, as well as on construction of an object of a special importance as it may be defined under the legislation of Georgia, is made by a body designated by the legislation of Georgia based on the positive decision of the Ministry of Culture and Monument Protection of Georgia. The basis for the conclusion is the archaeological research of the proper territory to be carried out by the entity wishing to accomplish the ground works. The entity wishing to do the ground works is obliged to submit to the Ministry the documentation about the archaeological research of the territory in question. The preliminary research should include field-research and laboratory works. In case of identifying an archaeological object on the territory to study, the conclusion of the archaeological research should contain the following information: (a) a thorough field study of the archaeological layers and objects identified on the study territory by using modern methodologies, (b) recommendations about the problem of conservation of the identified objects and planning of the building activity on the design territory, on the basis of the archaeological research.
34. **The aim of the Law of Georgia on Public Health (2007)** is as follows: Promotion of the introduction of a good health and healthy lifestyle of the population; Creation of the

environment, which is safe for a human health; Promotion of the protection of the reproductive health of a family; Prevention of infectious and non-infectious diseases. The Law defines the rights and obligations of the population and legal entities in the field of public health. Aiming at establishing the environment safe to the public health, the Ministry sets the qualitative standards for the environment safe for a human health (atmospheric air, water, soil, noise, vibration, electromagnetic radiation), including maximum permissible concentrations and rates of harmful impact. The standards are mandatory. Every person on the territory of Georgia is obliged not to carry out the activity, which causes a hazard of the infectious and non-infectious diseases to spread and helps the origination of the risks to human health; protect the sanitary and epidemiological standards; to supply the information to the public health department about all emergencies caused by the violation of the sanitary norms in the production or technological process, etc. The observance of the standards is controlled by appropriate state structures. The responsibility for the internal and external audits rests with a certified, independent laboratory.

- 35. Environmental Assessment and Review Framework (November 2010, updated in November 2013 due to changes in the scope of the USIIP, EARF)** was established for the Asian Development Bank funded Georgia Urban Services Improvement Investment Program (or the Investment Program). This is prepared to adequately address the ADB Safeguard Policy Statement (2009) requirements and is to be endorsed by the Georgian government. Projects have to be assigned to Categories A, B, and C. General Mitigation measures are listed for anticipated impacts.

B.2.2 Environmental Quality Standards and Norms

- 36.** In accordance with the Law on Public Health, environmental quality standards and norms, among them those of air quality and noise level, are set by Decrees No. 297/N dated 16.08.2001 of the Minister of Labour, Health and Social Affairs of Georgia (including the changes made to it by further decrees of the Minister Nos. 38/N of 02.24.2003, 251/N of 09.15.1006, 351/N of 12.17.2007). Atmospheric air quality standards (level of hazardous pollution) are also defined by the Decree of the Minister of Environment Protection and Natural Resources (#89, 23 October 2001) on approval of the rule for calculation of index of pollution of atmospheric air with hazardous pollutants.

Table 4: Maximum Admissible Concentrations (MAC) of harmful substances in Ambient Air

Substance	MAC, mg/m³
Nitrogen Dioxide	0.085
Sulphur Dioxide	0.5
Carbon Monoxide	5.0
Saturated Carbohydrates, C6-C10	30.0
Inorganic dust	0.3

B.1.1.2 Noise

- 37.** Noise prevention and mitigation measures should be applied where predicted or measured noise impacts from a project facility or operations exceed the applicable noise level guideline at the most sensitive point of reception. The preferred method for controlling noise from stationary sources is to implement noise control measures at source.
- 38.** In the case of noise, the WB/IFC standards will apply. Noise impacts should not exceed the levels presented in Table 5, or result in a maximum increase in background levels of 3 dBA at the nearest receptor location off-site.

Table 5: Noise Level Guidelines¹ (IFC)

Receptor	One Hour LAeq (dBA)	
	Daytime 07:00 - 22:00	Nighttime 22:00 - 07:00
Residential; institutional; educational	55	45
Industrial; commercial	70	70

39. Environmental standards regulate quality condition requirements of the environment and determine maximum allowable concentration of substances harmful for human health and environment which are contained in water, air and soil.
40. In Georgia, soil quality evaluation criteria is determined by instructions on “Level of Chemical Contamination of Soil” (MM 2.1.7. 004-02). Information on maximum admissible concentrations of various substances and elements in soils are given in Table 6.

Table 6: Maximum admissible concentrations of various substances and elements in soils

Component	Unit	Level
Arsenic	mg/kg	2-10
Copper	mg/kg	3
Mercury	mg/kg	2.1
Nickel	mg/kg	4
Lead	mg/kg	32
Zinc	mg/kg	23
Compound Hydrocarbons	mg/kg	0.1
Phenol (Compound)	mg/kg	-
Cyanide	mg/kg	-
Sulphate	mg/kg	-
Chloride	mg/kg	-
Ammonium Nitrogen	mg/kg	-
Evaporable Organic Compounds		
Benzoyl	mg/kg	0.3
Toluol	mg/kg	0.3
Ethylbenzene	mg/kg	-
Compound Xylene (ortho-, meta-, para -)	mg/kg	0.3
Semi-Evaporable Compounds		
Benzoapiren	mg/kg	0.02
Izopropilen-benzol	mg/kg	0.5
Pesticides		
Atrazin	mg/kg	0.5
Linden	mg/kg	0.1
DDT (and its metabolite)	mg/kg	0.1

41. Georgian legislation does not regulate quality standards for groundwater. Quality of groundwater is regulated by norms set for potable water.
42. Potable water quality criteria are determined by technical regulations on potable water (Government Regulation N 58 from January 15, 2014). Potable water quality criteria are given in Table 7.

Table 7: Potable Water Criteria

Index	Measuring unit	Standard not more than:
Common characteristics		
Hydrogen index	PH	6-9

¹IFC - Environmental, Health, and Safety (EHS) Guidelines. 1.7 Noise

Permanganate oxidation	mg O ₂ /L	3,0
Nonorganic substance		
Barium (Ba ²⁺)	mg/L	0.7
Boron (B,total)	mg/L	0.5
Arsenic (As,total)	mg/L	0.01
Quicksilver (Hg, nonorganic),	mg/L	0.006
Cadmium (Cd, total)	mg/L	0.003
Mangan (Mn, total)	mg/L	0.4
Milobden (Mo, total)	mg/L	0.07
Nickel(Ni, total)	mg/L	0.07
Nitrate(short impact by NO ₃ ⁻)	mg/L	50
Nitrite (long impact by NO ₂ ⁻)	mg/L	0.2
Selenium(Se, total)	mg/L	0.01
Copper(Cu, total)	mg/L	2.0
Lead (Pb, total)	mg/L	0.01
Flourine (F ⁻)	mg/L	0.7
Chromium (Cr ⁶⁺)	mg/L	0.05
Antimony(Sb)	mg/L	0.02
Cyanide(CN ⁻)	mg/L	0.07
Organic substance		
Total content of pesticides	mg/L	0,05

B.2.2 Licenses& Approvals Required

43. Environmental assessment of various activities and development projects in Georgia is governed by the Law on Environmental Impact Permits (EIP). This Law notifies the list of the activities and projects, which are subject to ecological expertise and require Environmental Impact Permit. The Law also makes the public participation mandatory in the process of environmental assessment, ecological expertise and decision making on issuance of an environmental impact permit. Under this Law, various projects/activities have been divided into four categories based on their size, importance and potential environmental impact, and sets out permitting process for each category.
44. The components of the proposed water supplysystems subproject in Chiatura are notified in the Law on EIP and therefore environmental impact permit is required.
45. The requirements related to EIA studies and the EIA report is set forth in the Order N31 of 15 May 2013 of MoENRP.
46. **The Law of Georgia “On the Red List and Red Book” (2003)** regulates the legal relations in the field of developing the Red List and Red Book, protecting and using the endangered species, except the legal issues of the international trade with endangered wild animals and wild plants, which within the limits of the jurisdiction of Georgia are regulated by virtue of the Convention ‘On the international trade with the endangered species of wild fauna and flora’ concluded on March 3 of 1973 in the city of Washington. According to Article 10 of the Law, any activity, including hunting, fishing, extraction, cutting down and hay-mowing, except particular cases envisaged by the present Law, Law of Georgia ‘On animal life’ and legislation of Georgia, which may result in the reduction in number of the endangered species, deterioration of the breeding area or living conditions, is prohibited. The Red List of Georgia was approved by the Presidential Decree No. 303 ‘On approving the Red List of Georgia’ (May 2, 2006). Below is the list of laws relevant to environmental protection.

Table 8:List of laws relevant to environmental protection

Framework Legislation	
1995	Constitution of Georgia (as amended 04.10.2013) Reg. No - 010.010.000.01.001.000.116

1996	Environmental Protection (as amended 26.12.2014) Reg. No - 360.000.000.05.001.000.184
Permitting Legislation	
2005	Licensing and Permitting (as amended 18.09.2014)
2007	Environmental Impact Permit (as amended 26.12.2014) Reg No - 360.160.000.05.001.003.078
2007	Ecological Expertise (as amended 25.03.2013) Reg. No - 360.130.000.05.001.003.079
2013	Regulation on EIA (as amended 15.05.2013 by the Decree No 31 of MoENRP)
Specific Environmental Laws	
1994	Soil Protection (as amended 26.12.2014 §) Reg. No - 370.010.000.05.001.000.080
1996	System of Protected Areas (as amended 30.04.2014) Reg. No - 360.050.000.05.001.000.127
2007	on Status of the Protected Areas (as amended 30.04.2014) Reg. No - 360.050.000.05.001.003.060
2014	Waste Management Code 26.12.2014 Reg. No -360160000.05.001.017608
1996	Minerals (as amended 26.12.2014) Reg. No - 380.000.000.05.001.000.140
1997	Wildlife (as amended 26.12.2014) Reg. No - 410.000.000.05.001.000.186
1997	Water Protection (as amended 26.12.2014) Reg. No - 400.000.000.05.001.000.253
1997	Transit and Import of Hazardous Waste within and into the Territory of Georgia as amended 11.03.2011) Reg. No - 300230000.05.001.016218
1998	Pesticides and Agrochemicals as amended 08.05.2012) Reg. No - 340120000.05.001.016723
1999	Atmospheric Air Protection as amended 5.02.2014) Reg. No - 420.000.000.05.001.000.595
1999	Forest Code as (amended 6.09.2013) Reg. No - 390.000.000.05.001.000.599
2003	Red List and Red Data Book of Georgia (as amended 6.09.2013) Reg. No - 360.060.000.05.001.001.297
Other Relevant Laws	
2007	On Cultural Heritage (as amended 26.12.2014) Reg. No - 450.030.000.05.001.002.815
2007	On Public Health (as amended 29.05.2014) Reg. No - 470.000.000.05.001.002.920
2005	On Fire Protection and Safety 24.06.2005 Reg. No - 140.060.000.05.001.000.355
2006	on Regulation and Engineering Protection of Coasts of Sea, Water Reservoirs and Rivers of Georgia – 27.12.2006 Reg. No - 330.130.000.11.116.005.130
2014	Technical Regulations: “on Drinking Water standart”. Approved by the Government decree № 58

	Reg. No- 300160070.10.003.017676
2014	Environmental Technical Regulations. Approved by the Government decree № 17 Reg No- 300160070.10.003.017608

47. Some of the **International Treaties and Conventions** Ratified or Signed by Georgia are provided in the list below:

- Short List of the Ratified or Signed Conventions:
- Ramsar Convention on Wetlands (1996);
- United Nations Framework Convention on Climate Change (UNFCCC) (1994);
- Kyoto Protocol (1994);
- Kyoto Protocol (1999);
- Basel Convention on the Control of Transboundary Movement of Hazardous Waste and Their Disposal (1999);
- Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters (Aarhus Convention) (1999);
- Convention on Biological Diversity (1994);
- Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) (1996);
- Convention on Long-range Transboundary Air Pollutants (1999);
- Stockholm Convention on Persistent Organic Pollutants (2006);
- Convention on the Conservation of European Wildlife and Natural habitats (2008);
- The Vienna Convention for the Protection of the Ozone Layer (1995);
- Montreal Protocol on Substances that Deplete the Ozone Layer (1995).
- Basel Convention on Control of transboundary movements of hazardous waste and their disposal (1999).

B.2.3 Administrative Structure in Georgia

48. Ministry of Environment and Natural Resources Protection of Georgia (MoENRP). MoENRP has the overall responsibility for protection of environment in Georgia. The Department of Permits of MoENRP is responsible for reviewing EIAs and for issuance of the Environmental Permits. MoENRP is the main state body pursuing state policy in the sphere of environment. Their functions for regulating economic or development activities with regard to environmental protection include:

- Issuing permits for project development (Environmental Impact Permit)
- Setting emission limits and issuing surface water intake and discharge consents
- Responding to incidents and complaint

49. For the projects, which do not require Construction Permit, the Environmental permit is being issued by the MoENRP on the ground of State Ecological Examination. State Ecological Examination is carried out by MoENRP upon official submission of Environmental Impact Assessment (EIA) prepared by project developers.

50. For projects requiring Construction Permit, no special permit is issued by MoENRP (according to “One window principle”, only one permit shall be issued for each activity). The Construction Permit is issued by the Ministry of Economy and Sustainable Development of Georgia, but the issuance of the Permit is subject to the consent of the MoENRP in a form of Conclusion of Ecological Expertise, as well as the Ministry of Culture (Centre of Archaeological Studies, Department of Monuments protection). Consent of the MoENRP in such cases should be issued according to the

same procedures (EIA, public consultations; SEE etc.) as for issuing Environmental Permit.

51. The Ministry of Economic and Sustainable Development as an administrative body issuing a permit ensures the involvement of the MoENRP as a different administrative body in the administrative proceedings initiated for the purpose of permit issuance, in accordance with Georgia's Law on Licenses and Permits.
52. As a rule, EIA permitting conditions contains requirement for informing MoENRP regarding fulfilment of the EIA permit conditions. This basically means giving information regarding implementation of Environmental Management and Monitoring Plans.
53. The **Ministry of Culture and Monument Protection of Georgia** is responsible for the supervision of the construction activities in order to protect archaeological heritage. In case if construction is to be carried out in a historic sites or zones of cultural heritage, consent of the Ministry of Culture is also required for issuing construction permit (if such is necessary).

B.3 Compare of the National legislation and ADB Requirements

54. The above accounts of national environmental law and ADB policy indicate that the two systems are similar but then there are certain aspects in which ADB policy is more demanding or specified than the Georgian procedure. The main differences are as follows.
55. The Bank's guidelines provide a detailed description of procedures for screening, scoping and conducting EIA and explain a complete list of stages, which are not specified under the national legislation.
56. Considering ecological risk, cultural heritage, resettlement and other factors, the Bank classifies projects supported by them under categories A, B, C and FI. However in the Georgian legislation, EIA is carried out only if a developer seeks to implement projects listed in the Law on Environmental Impact Permit. This list is compatible with the category A projects of the Bank classification. According to the Georgian legislation EIA is not required in other instances, while Asian Development Bank guidelines requires limited EIA or IEE for the B category projects, and an environmental review of projects that are not expected to produce environmental impacts (category C).
57. Georgian legislation does not specify the format of environmental management plans (EMPs) and the stage of their provision for projects requiring EIA and does not require EMPs for projects not requiring EIAs. The Asian Development Bank's guidelines require EMPs for all categories of projects and provide detailed instructions on the content
58. According to Georgian legislation MoE is responsible for monitoring of project implementation and compliance with the standards and commitments provided in the EIA, and the role of the EMP is less clearly is defined. The PIU or "Project Proponent" is responsible for implementing "self-monitoring" programs for projects requiring EIA. In contrast ADB guidelines stress the role of EMPs, which are important for all categories of projects, and the Project Proponent (in our case – MDF) is required to ensure inclusion of a monitoring scheme and plans into EMPs. Monitoring of performance compliance against EMPs is important element of ADB requirements.
59. The national legislation also does not take into account the issue of involuntary resettlement at any stage of environmental permit issuance. The Georgian legislation considers social factors only in regard to life and health safety (e.g. if a project contains a risk of triggering landslide, or emission/discharge of harmful substances or any other anthropogenic impact). While the Bank's document establishes the responsibility of a Borrower for conducting an environmental assessment, the national legislation provides for the responsibility of a project implementing unit to prepare EIA and ensure public consultation.

- 60.** The role of the Ministry is restricted to participation in EIA consultation and carrying out state ecological examination required for the adoption of a decision on issuing an EIA permit as established under the legislation of Georgia. Under ADB regulations ADB carry out project screening and categorization at the earliest stage of project preparation when sufficient information is available for this purpose, also according ADB's Public Communications Policy, ADB is committed to working with the borrower/client to ensure that relevant information (whether positive or negative) about social and environmental safeguard issues is made available in a timely manner.
- 61.** In regard with consultation: The Bank provides for consultations for A and B Category projects (at least two consultations for Category A projects) and requires a timetable of consultations from the Borrower. The national legislation until recently contained only a brief reference to this issue without providing real tools of its fulfillment. The amendments to the Governmental Decree On the Procedure and Conditions of Environmental Impact Assessment established the requirement of public consultation of the EIA, which obligates a developer (i) to ensure public consultation of EIA, (ii) publication of information, (iii) receive comments within 45 days, (iv) arrange consultation not later than 60 days from the date of publication, invite stakeholders and determine the place of consultation.

Table 9:Activities and responsibilities in EIA for national law and ADB policy

#	Action	Georgian Legislation	ADB Requirements
1	Screening	Project Proponent in consultation with MoE	Bank and Consultant hired by Project Proponent
2	Scoping	Not required. Could be conducted voluntarily by Project Proponent.	Obligatory. Bank and Consultant hired by Project Proponent
3	Draft EIA	To be prepared by Environmental Consultant.	To be prepared by Environmental Consultant.
4	Public Consultations	The EIA should be available for public review during 45 days. Publication of information in central and regional mass-media. Arrange consultation not later than 60 days from the date of publication.	At least two consultations for Category A projects – one at the scoping stage and one for the draft EIA.
5	Final EIA	Consider all comments received during public consultations, incorporate accepted remarks and explain rational when the comments are disregarded.	Consider all comments from Bank and public. Agree with the Bank on each raised point. Incorporate accepted public comments and explain rational when the comments are disregarded.
6	Management Plans	No clear guidelines on format, content and timing	Incorporate Monitoring and Management Plans in the EIA.
7	Review and Approval	MoE	Bank and separately - MoE (if the EIA is required by Georgian legislation).
8	Disclosure of final EIA	Not requested	Publication (mainly electronic) of the final EIA.

B.4 Harmonization of the ADB and Georgian Legislation Requirements

- 62.** In order to comply with the both regulations – the ADB and Georgian legislation – the content of the EIA should comprise issues required in both regulations, thus complementing each other. The EMPs should therefore be elaborated in details as

required by the ADB regulations. The assessment of the stationary sources of emission (e.g. diesel generators) should be executed according to Georgian regulations: "Inventory of the Stationary Sources of Emission" and "Approval of the Emission Limits". For the category a projects the first public consultation (requested by ADB guidelines but not by Georgian regulations) will be held at the Scoping stage. The second one will be executed according to Georgian requirements. Disclosure will be conducted as required by ADB.

C. DESCRIPTION OF THE PROJECT

C.1 Type of the Project

63. This is an urban water supply improvement sub-project. It involves the restructuring of the water supply network, the exchange/reconstruction of old transmission pipes, the construction of two new reservoirs and rehabilitation of 6 existing reservoirs and two pumping stations.

C.2 Need of the Project

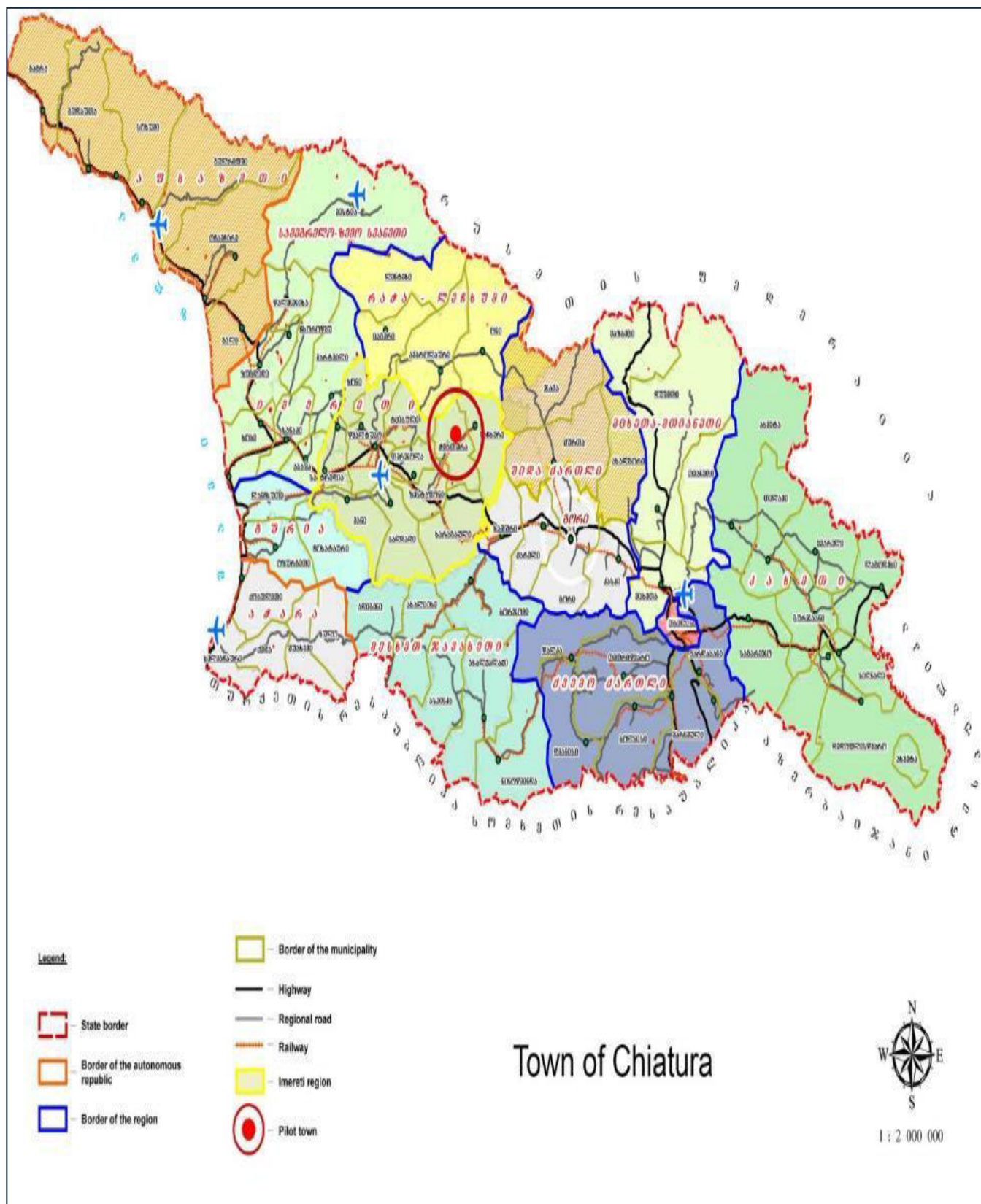
64. As discussed earlier, the service level of urban water supply and waste water treatment at present is not satisfactory in Georgia. Services are not available to the entire population and the serviced areas suffer with inefficient service levels. Systems are old and inefficient. The situation is no different in the program town of Chiatura. The WS project is needed because the present water supply infrastructure in Chiatura is inefficient and inadequate to the needs of the growing population and tourists.
65. The town of Chiatura is currently supplied by an existing water supply scheme, which due to the large topographic-level differences the water supply system of Chiatura is very complicated consisting of many intakes, pumping stations, reservoirs and separated pressure zones.
66. The water supply of Chiatura is currently provided from five sources:
- Pasknara intake located north from the city up in the mountains belongs to the mining company "Georgian Manganese". At the distance of some 5 km from City PS the Pasknara reservoir belonging to UWSCG is located. Water from Pasknara reservoir is used only during night-time (from 23:00 – 7:00) when mining industry is not using it. Water can be directed by gravity to Bisi, Rustaveli and Lezhubani reservoirs or/and to City Center WS network.
 - Monastiri intake is located on Mgvimevi Street at the distance some 600 m from City PS. Water from here is conducted by gravity to the inflow reservoir at City PS.
 - Lezhubani intake is located within the borders of Chiatura in the upper end of Rustaveli street. Water from this intake is pumped by Lezhubani PS directly to the WS network of Lezhubani and Kvemo Naguti supply areas.
 - Tiri intake is located in the distance of some 3 km from the western border of Chiatura. Water from this intake is pumped into Memorial reservoir in Chiatura. Village of Navardzeti is also supplied by this transmission pipe.
 - Sakondria intake is located in the distance of 4 km from the southern border of Chiatura. Water from this intake is pumped into Tehisa reservoir in Chiatura. Village of Skindora is also supplied by this transmission pipe.
67. In Chiatura, population receives low quality drinking water in limited time during a day.

C.3 General Information

68. The project is located in Chiatura and Sachkhere. They are located in inland Georgia Country, on the banks of the Qvirila River. The total population of Chiatura is estimated

at 18,800 people. A population growth of 20% is considered for water consumption. Most of the population are ethnic Georgians.

Map 1:Project Area



C.4 Existing Water Supply Facilities

C.4.1 Water Sources and Transmission System

69. The current Water Supply Distribution Network of Chiatura town consists of following supply areas:

- City Centre, Lev Tolstoi street and Giorgadze street areas, supplied directly from City PS either by the pump or by gravity from Bisi reservoir;
- Rustaveli area, supplied from Rustaveli reservoir;
- Lezhubani area, supplied directly from Lezhubani PS;
- Kvemo (Lower) Naguti area, supplied directly from Lezhubani PS;
- Zemo (Upper) Naguti area, supplied from Lezhubani and/or Mamoriali reservoirs;
- Perevisa area, supplied from Perevisa reservoir;
- Tehisa&Sanatoriumi area, supplied from Tehisa and Sanatoriumi reservoirs.

70. Due to the wastage of water by the consumers and high water losses from the network there was no constant(24 hours) water supply in Chiatura. For central area (multistore blocks of flats mainly) supply is for daytime (16hours) and for other areas only for 4-8 hours.

71. The photos of the current water supply scheme of Chiatura is presented below.

Central PS at the UWSCG Service Center





Bisi Existing Reservoir with capacity of 1500m³

Lezhubani Existing reservoir (3000m³), PS (170m³/h) and Access road





Rustaveli Existing Reservoir (350m³)



Tekhisa Existing Reservoir (1000m³)





Memorial Existing Reservoir (1000m³)



Perevisa Existing Reservoir (50m³) and two PS (105m³/h each)



C.5 Projected Water Demand up to 2044

72. The water supply network will cover the whole Chiatura and will guarantee 24 hours supply of the high quality drinking water.
73. Once we know the population per node (based on the building surface, and the correction coefficient applied), to determinate the water demand on each, we are taking into account the following assumptions:

Table 10: Water Demand

Specific demand per capita (l/c/d)	Growth coeff.	Maximum day coeff.	Water losses (%)	Comercial Consumption (%)
S.D	G.C	M.C	W.L	C.C
134 ¹	1.2 ²	1.5	1.1	1.1

$$Q = \left(\frac{\text{Perso}}{\text{ns}} * \text{SD} * \text{GC} * \text{MC} * \text{WL} * \text{CC} \right) \rightarrow \text{Base Demand per Node node}$$

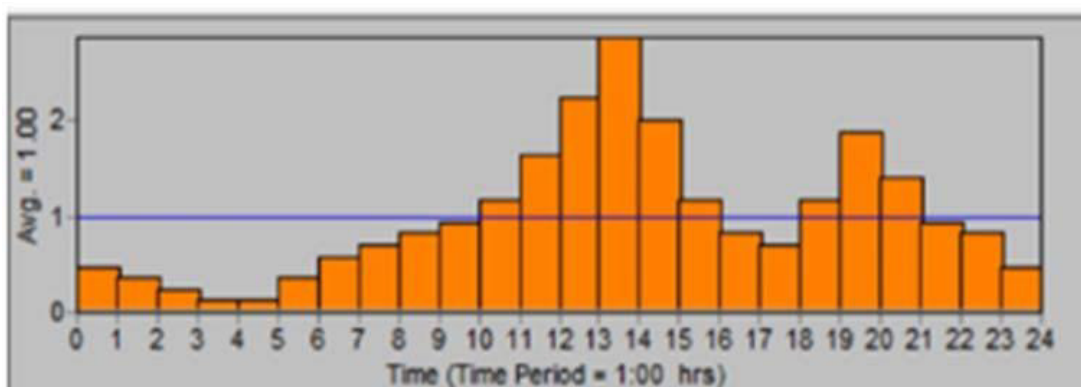
74. So, in concordance with the previous data that we are assuming, the average consumption for each area, will be:

Table 11: Water Consumption

RESERVOIR	POPULATION	AVERAGE CONSUMPTION	
		m ³ /day	l/s
BISI	68	2002	23.1
RUSTAVE	35	1025	11.8
MEMORIA	50	1476	17.0
PEREVISI	20	585	6.77
TEKHISA	13	405	4.69
TOTAL	18	5493	63.5

75. It is important to point out that calculations and hydraulic checking are performed for consumption based in a daily pattern applied. This pattern has been selected to be the most appropriated for a town as Chiatura.

Figure 1: Daily pattern applied for Water Consumption (extracted from EPANET model)



C.6 Design of Chiatura Water Supply System

76. The design of the rehabilitation works in the network included the re-calculation and analysis of the main pipe network.
77. The work under the present sub-project comprises the rehabilitation of the water supply network by replacing the old pipes and connecting to the used existing pipes. The construction of intake works by wells in Sachkhere area, construction/rehabilitation of a new reservoirs and pumping stations, replacement of network pipelines and construction of new transmission lines to the reservoirs.
78. The main project features included in the present design are described below:

- Rehabilitation of the entire water supply network
- Rehabilitation of the following reservoirs: Bisi, Memorial, Lezhubani, Rustaveli, Perevisi and Tekhisa Construction of two new reservoirs: One in Sachkhere and one close to existing one in Bisi Replacement of all the existing Transmission Lines, except the one going from CPS to Perevisi Reservoir.
- Construction of two New Transmission Lines: Saskchere-Bisi and Perevisi-Tekhisa
- New Well-fields in Sachkhere
- Rehabilitation and rearrangement of Central Pumping Station;
- Rehabilitation and rearrangement of Lezhubani and Perevisi Pumping Stations

79. The summary of characteristics of pipes, including transmission mains and water supply network are presented in the Table 12 and Table 13 below.

Table 12: Transmission Mains

Start of Transmission Main	End of Transmission Main	Material	Diameter [mm]	Length [m]
Saschkhere Reservoir	Bisi Reservoir	HDPE	400/500	12045/3813
Bisi Reservoir	Central Pumping Station	HDPE	355	1049
Central Pumping Station	Rustaveli Reservoir	HDPE	225	956
Central Pumping Station	Perevisi Reservoir	Steel	200	1180
Central Pumping Station	Lezhubani Reservoir	HDPE	160	2095
Perevisi Reservoir	Tekhisa Reservoir	Steel	100	1797
				1481
Lezhubani Reservoir	Memorial Reservoir	HDPE	225	

Table 13: Water Supply Network

Pipe Diameter (mm)	Pipe Length (m)
OD40	3557
OD 63	1815
OD 90	476
OD 110	18083
OD 160	2919
OD 225	2484
OD 250	1009
OD 315	796

D. DESCRIPTION OF THE ENVIRONMENT (BASELINE DATA)

D.1. General

80. The present chapter gives the information about the natural and social-economic conditions of the Project site. This information is based on literary sources and fund materials, statistical data, data provided by the Client and results of the field studies accomplished immediately in the study area. This information will be further used to establish the positive and negative impacts during the construction and exploitation phases of Chiaturawater-supply Project and evaluate their scales.

D.2 Physical Resources

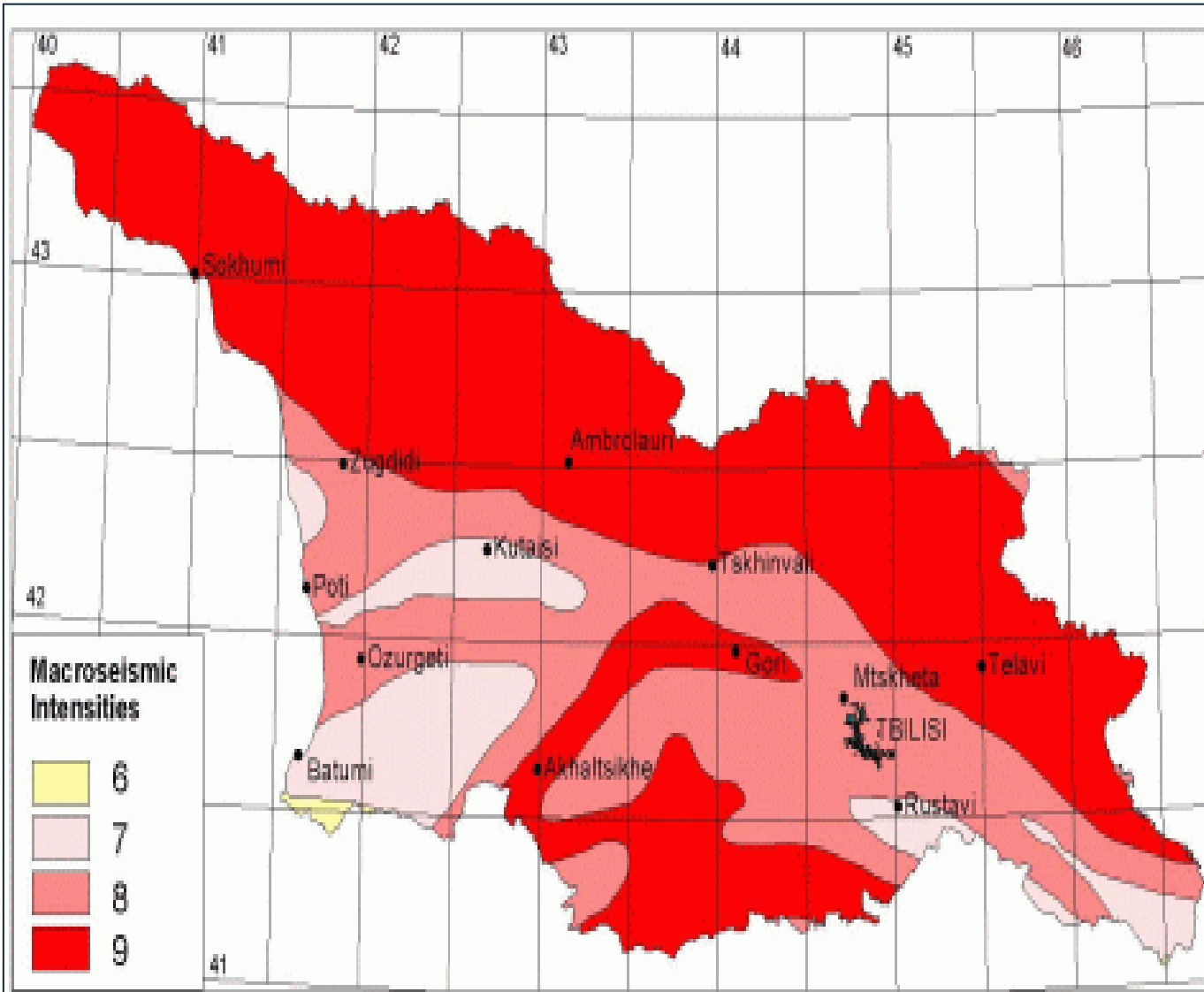
D.2.1 Relief and Geology

- 81.** Generally there were determined 3 ground layers in Chiatura. First one, from the surface is clay layer, with resistivity between 5-30 ohm and with less water permeability. Second one-main aquifer layer was divided for three sub layers, first, located in up position sub-layer “dry sand” with resistivity between 450-2500 ohm, under first second “wet sand” with resistivity between 150-450 ohm and lower “saturated sand” with resistivity between 30-150 ohm. Third layer contains again clay with resistivity between 5-30 ohm this layer extends depth 170 m.
- 82.** According 3D model was determined aquifer thickness and spreading area. Aquifer contains sand layer which is spreading on the all territory and covered by thin clay layer (about 1 m). Biggest thickness of aquifer was fixed in North-East part of territory (12-15m). Its thickness is reduced to West (2 m) and South direction (6 m).
- 83.** Aquifer layer is partly permeated by water. Geophysical surveys outlined the three sublayer in aquifer: dry, partially wet and totally saturated by water. North- East territory, of study area recharged by water from the river Kvirila and Lashura, that why the saturated sub-layer has biggest thickness.

D.2.2 Seismicity

- 84.** Chiatura area is located in the active seismic zone. Accordingly, reservoirs and pumping stations shall be designed and constructed in compliance with the requirements stipulated in the applicable Georgian construction standard Seismic Resistant Construction (PN 01.01-09). The area selected for construction of the project facility is located in the seismic intensity zone 8 (MSK 64 scale), which dimensionless seismic coefficient ‘A’ equals to 0.15.

Map 2:Seismic Zone Map of Georgia



D.2.3 Soil Covers

85. In the **Chiatura Municipality** dominant types of soils are raw humus calcareous soils that are developed on the limestone and carbonate sandstone denudation substrates. At an altitude of 1,300-1,500 m forest brown and forest brown podzolized soils are spread. On the younger lower terraces of the river Kvirila and its tributaries alluvial soils are spread and on the old terraces – sub-tropical grey podzol (greysols) and sub-tropical podzol (stagnicacrisols) are spread. In terms of soil types of various landscapes, they are as follows: forest brown acid and raw humus calcareous soils are specific to hilly plateau with oak-hornbeam forest cover; raw humus calcareous and forest brown soils are specific to the flat plateau with oak and beech forest groves; raw humus calcareous soils are specific to low karst mountains with hornbeam-oak forest cover; forest brown soils are specific to middle mountains with beech forest cover; raw humus calcareous, yellow and sub-tropical podzol soils are specific to plain-hilly foothill (piedmont) landscapes with Colchic forests.
86. Details tasks of investigation were determination the characteristics of the subsoil in the study area located in the alluvial of Kvirila and Lishura rivers. This research will be up to a depth of about 150 m in order to determine the characteristics of alluvial, its connections, and its different thicknesses and, finally, identify the most interesting sectors to propose conducting surveys of groundwater abstraction for them to be more productive.

D.2.4 Hydrogeological Investigation

87. The municipality is rich with internal waters. the River Kvirila represents the main river, that flows for about 16 km and almost separates in two halves the Chiatura region area. The tributaries to the right are: Buja, Katskhura, Rganisghele, Nekrisa, Ghruchua and others. The rivers are fed through rain, snow and underground waters. There are plenty of karst and Underground Rivers there. Vaucluse flow Ghrudo has to be mentioned (maximum flow – 346 l/sc, minimum – 150 l/sc) Goliati and Lezhubani springs of monastery (Mghvimevi) mills, that are used for town water supply purposes. The River Kvirila originates from the North Slope of Racha, Ertso Lake valley from 1711 meters height and crosses the river Rioni from left bank at the north of Vartsikhe village. The length of the is 140 km, an average inclination is 11.6, the catchment area - 3630 km², the average height - 750 m. The River is fed by snow, rain and ground waters (ground water share in the feeding process of the river is negligible). Maximal Water consumption is observed mainly in flood period and at Chiatura town equals 268 m³ / sc. Minimum water consumption at Chiatura town is observed in summer and equals 0.8 m³ /sc. Average annual water flow is 20.7 m³ /sc. The average speed of the river equals 1.2 m / sec, and the average depth - 0.9 m.
88. In order to identify the geometry, depth and limits of the alluvial aquifers of river Kvirila and define the area to perform the drilling works, a geophysical prospecting by Vertical Electrical Sounding (VES), has been done.
89. According the results, and from the hydrogeological point of view, the best option is to place the drilling boreholes between profiles #3 and #4 (please see drawing below). Observation boreholes should be placed about 25 and 50 m from the exploration borehole in the west direction along the river bank (water level in the aquifer is decreasing in the mentioned direction).
90. The area above has been visited in order to look for some public land, but according the cadastral map all the area show private properties.
91. The last decision about the negotiation with the land owners shall be taken by the members of the UWSCG. Once it has been decided, the next works for the hydrogeological investigations are:

- Drilling three investigation wells (observation and exploration);
- Testing process for assessment of the hydrodynamic characteristics of aquifers;
- Monitoring and numerical modelling of aquifer with design of production-exploitation wells

D.7 Meteorology and Climate

92. There is a humid climate in Chiatura Municipality, it is characterized with averagely cold winter and hot, drier summer. For the area up to 400-700 height, the average air temperature annually is 20-30 C, in January 2.4-4.00 C, in July 22-40 C; absolute minimum – 200 C, Absolute maximum 40-42 C. Average annual precipitation equals 1100-1200 mm (maximum observed in autumn and winter). The higher the zone gets, the more the air temperature reduces, and the more the precipitation is increasing significantly. In winter, the north-east winds are dominant, and as for summer – the south-west winds are dominant. Background winds are frequent as well. The Climatic characteristics of the investigation area are presented in the tables and diagrams below. Chiatura meteorological observation data is given in the tables (source: Construction norms and standards "Building Climatology PN 01.05-08")

D.8 Status of Atmospheric Air Pollution with harmful substances

93. The complete assessment of the Chiatura atmospheric air including all parameters last time was done by the end of 1980-s. The absolute share of the industrial emissions included the following harmful substances: suspended particles, sulfur anhydride, carbon monoxide, nitrogen oxides, hydrocarbons, hydrogen sulfide, and SO₂. It has to be mentioned, that the meteorological conditions, mostly speed and direction of Chiatura wind significantly defines (affects) the quality of the emission impact. During the last years, the opportunity to observe the condition of the atmospheric air of Chiatura town has significantly been reduced, as a result of which no data could be retrieved regarding harmful substances from ongoing investigation areas. As the investigation area is located beyond Chiatura town – nearby Darkveti village we should get the data for less than 10 000 number of population as atmospheric air background definitions.

Table 14: Background Concentration (mg /m³) Estimated meaning

Population (10 man)	Dust	Sulfur Dioxide	Nitrogen Dioxide	Carbon Monoxide
250-125	0.2	0.05	0.03	1.5
12-50	0.15	0.05	0.015	0.8
50-10	0.1	0.02	0.008	0.4
<10	0	0	0	0

Table 15: Atmospheric Air Temperature

Month Average	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	Mid Annual.	Absolute Min Annual	Max Annual.
°C	2.4	3.6	6.9	12.0	17.4	20.5	23.1	23.5	19.8	14.9	9.1	4.4	23.1	-20	42

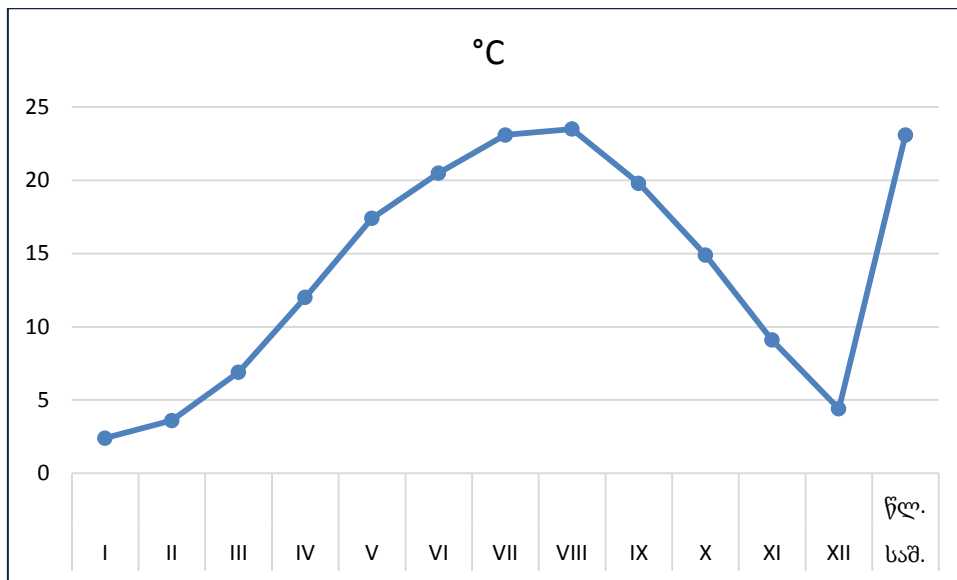
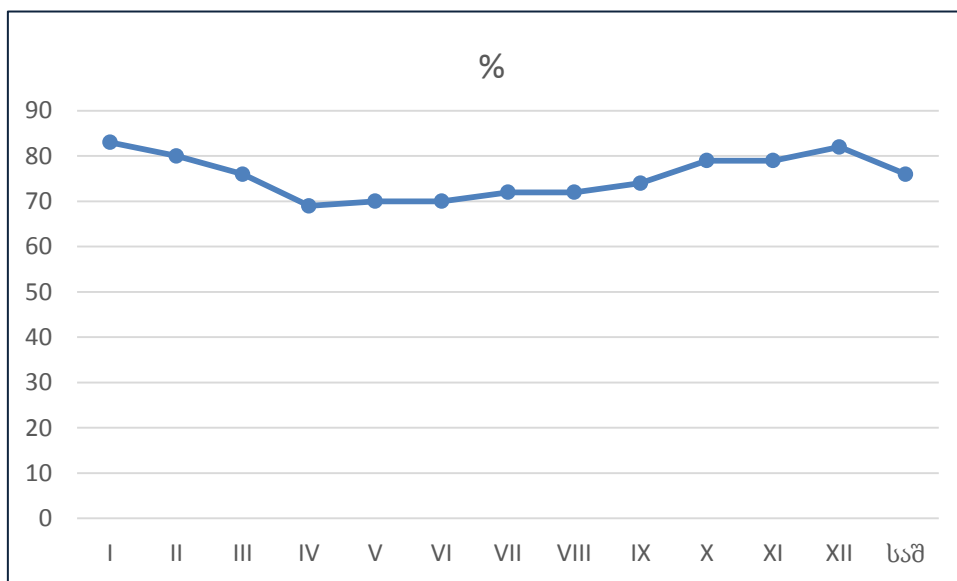


Table 16: Relative Humidity

Month	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	Aver.
%	83	80	76	69	70	70	72	72	74	79	79	82	76



Average relative humidity 13 h		Average relative humidity. Circadian amplitude	
The coldest month	The hottest month	The coldest month	The hottest month
70	55	20	30

Table 17: Quantity of rainfall

Annual precipitation mm	Maximum daily precipitation mm
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1237	100
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Table 18: Wind characteristics

The highest wind speed possible 1,5, 10, 15, 20 years, in m/s				
1	5	10	15	20
19	23	25	27	28
The average wind speed for the smallest and the largest m / s				
January		July		
4.0/0.7		3.6/1.1		

Wind direction and windless repeatability (%) per year								
North	North/East	East	South/East	South	South/West	West	North/West	windless
2	8	46	0	1	3	40	0	42

D.11 Biodiversity

D.11.1 Flora

94. Forest is destroyed and vegetation represents a result of secondary origin within Chiatura structural plateau. Agricultural land plots represent the most part of the area. The main forest stands preserved at Racha and Imereti slopes. The prevailing forest species are: beech, oak, hornbeam, chestnut, maple, ash, lime; rare coniferous. There are plenty of wild forest fruit: mazhalo trees, cranberries and more. Enterprise area is very poor in terms of vegetation. There is only grassy vegetation under the area. Several alder trees are observed under the river Kvirila banks, however a direct negative impact is not expected as a result of the type of planned activities.

D.11.2 Fauna

95. Caucasian deer, roe deer, chamois, bear are spread on Racha slope southern areas; There are wolves, foxes, jackals, Caucasian marten, wild cat, rabbit, squirrel, lynx; as for birds, there are plenty of ravens, Eurasian jackdaws, ravens, orioles, blackbirds, jays, nightingales, hoopoes, woodpeckers; Reptiles: snakes, lizards; in the Rivers: barbell, chub, goby, and in the upper parts of the river - trout. In ichthyofaunal point of view, the river Kvirila is very poor at Chiatura areas. Taking in consideration high technogenic load, there may be observe only Sinan tropic animal species.

D.12 Social Surroundings, Social-Economic Description

Location

96. Chiatura municipality from the north is bordered by Ambrolauri municipality, from the east – by Sachkhere municipality, from the south – by Kharagauli municipality and from the west – by Tkibuli, Terjola and Zestaphoni municipalities. Its total area is 542km². The municipal center is located in the city of Chiatura. The city is stretched on Chiatura plateau

and narrow gorge of the river Kvirial at an elevation of 340-500m above the seal level. The distance from Tbilisi is 220 km.

Population

97. Population of Chiatura municipality is up to 55,000 and population density – 184 persons per km². The city was established in 1879, when the extraction of manganese started in the region. On the basis of official data, the number of population of the municipality is stable. Currently, town population is 18.800.

Industry

98. Obtaining and processing of manganese ore represents the main industrial field of the region. Most of the population of the Chiatura town and Chiatura region were employed in the mining and processing enterprises of manganese ore. During the 90-s of the last century, as a result of the well-known events developed in the country, obtaining of the manganese was decreased to minimum and only small enterprises continued activities. During the last 6-7 years, rehabilitation of manganese ore mines and refineries (enrichment) as well as obtaining and processing of the ore has significantly become more intensive. Industry of construction materials has to be mentioned among the industries developed in the region (mostly quartz sand mining and enrichment) as well as transport.

Transport Infrastructure

99. Chiatura Municipality is represented by railway and vehicle main roads. Zestaponi-Sachkhere railway main road crosses Chiatura town as well as Gomi-Sachkhere-Zestaponi car road that represents a state significance. The internal roads connecting to the villages is well developed and most of them require surface rehabilitation. As for internal town transportation, buses and cableways provide service, through which mostly all the town areas are connected to the center. A ground car road is provided from the central vehicle road to the industrial enterprise area that crosses the railway line located next to the enterprise.

Cultural Heritage

100. Chiatura municipality at many historical, architectural monument, which is a town near the following: The medieval castle and the caves "Jarbela" Kldekari caves (in the village. Sveri vicinity), Sveri John the Baptist Church (XIX century), Sveri fortress (VII c.) and others. The city's health care, educational and cultural institutions (Pushkin Drama Theatre, Museum, House of Artists, Tbilisi State University and the Technical University of branches).
101. There are many historical, architectural monuments located in Chiatura Municipality, and among them, the following items are located near the town: Mghvimevi Monastery (XII c.) The medieval castle and the caves "Jarbela", Kldekari caves (nearby the village. Sveri), Sveri John the Baptist Church (XIX century.), Sveri fortress (VII c.) and others. There are health care, educational and cultural institutes in the city, (AkakiTsereteli Drama Theatre, Local Museum, House of Artists, branches of Tbilisi State University and the Technical University).

Health and Education

Education

- 102.** There are branches of Tbilisi State and Georgian Technical Universities, communication division, station of young technicians, as well as mining metallurgical institute of Chiatura in the town. There are 9 public schools and a boarding school (7), 1 private school, 1 theological school, 1 gymnasium, 3 sport schools, 3 music and 2 art schools, 13 kindergartens in the town. There are approximately 4000 pupils in Chiatura town, and about 500 teachers teach there.

Health

- 103.** The following health care facilities are active in town: the city polyclinic, sanatorium and preventive care clinic, dispensary, medical rehabilitation center for disabled and elder residents of Chiatura-Sachkhere region, 5 dental clinics, the children's polyclinic, a birth center, psycho neurological clinic, a massage center, TB dispensary, 3 old and a new multi-functional hospitals.

D.17 Procedures in Response to the Artifact Findings

Chance Finds Procedure

- 104.** Contractor engages 1 especially dedicated archaeologist (archaeological supervisor) for conducting daily supervision activities during the earthwork operations. Good practice is to agree the candidature of person assigned for that task with the Ministry of Culture and Monument Protection.
- 105.** The Ministry of Culture and Monument Protection may also assign a person or company for periodical supervision of construction works, although this is practiced only in exclusive cases of sensitive projects.
- 106.** Archaeological supervisor conducts daily monitoring at all construction sites, where the earthworks (land clearance; grading; excavations etc.) are planned according to the schedule.
- 107.** Besides that, archaeological supervisor instructs the workers to report him immediately in case of any chance finding of potential archaeological relics.
- 108.** In case of finding any artefacts of potential archaeological value, following steps are taken:
- Construction workers are obliged to stop works and immediately report to the Archaeological Supervisor.
 - Archaeological supervisor reports to the Chief Engineer at site and requests to stop activities at the site of finding. Archaeological supervisor executes first checking of the finding and the site where finding was made
 - In case the finding has no potential archaeological value, the Archaeological Supervisor reports to the Chief Engineer and the works are restarted. Appropriate record regarding the case is made in record book.
 - In case if the finding is estimated as potential archaeological relic, the Archaeological Supervisor reports to Chief Engineer of the Contractor and to UWSCG Environmental Team (and supervising company / Engineer) requesting to stop construction activities and to inform the Ministry of Culture and Monument Protection about the incident.
 - Chief Engineer of the Contractor also reports to UWSCG informing about the stopped operations and requesting immediate engagement of the Ministry of Culture and Monument Protection.

- Ministry of Culture and Monument Protection will assign expert or group of experts and conduct necessary archaeological works at the site to identify the problem.
- In simpler cases, after removal of the movable artefacts, fixing materials and conducting other required works, the experts of the Ministry of Culture and Monument Protection will issue decision on recommencement of stopped construction works.
- In exclusive cases of valuable and spatially spread findings, the Ministry of Culture and Monument Protection may issue request to relocate the RoW shifting it on a safe distance from the archaeological site.

D.3 Information About the Background Pollution

109. The analyses of background noise, radiation and levels of vibration were conducted

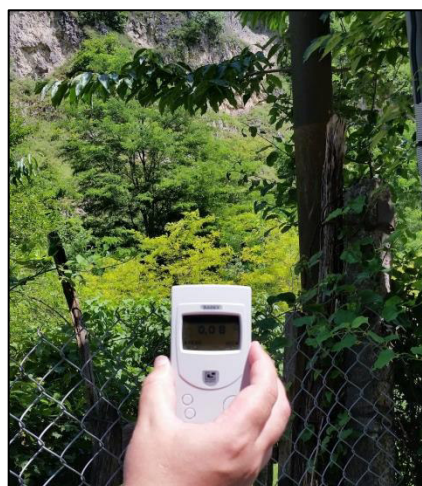
D.3.1 Existing Data About the Air Quality

110. On the territory of the city of Chiatura, no air quality monitoring is undertaken by the Environmental Agency of Georgia. The baseline data of the air quality in Chiatura calculated by using the methodology developed by the Ministry of Environment and Natural Resources of Georgia. Methodology is based on the number of population of the city.

D.3.2 Natural Radiation Background

- 111.** The existing radiation background was conducted at the project area: Near the Chiatura City Hall, Secondary School (#1 AbashidzeStr), Lezhubani Pumping Station, Church “Khareba”
- 112.** Stadium , Children's entertainment center, Medical Center “Geo Hospital”, Chiatura Central Pumping Station,by using Russian appliance RADEX (Figure 2), The measurement data are provided in Table 15.

Figure 2: Measuring the radiation background at the project site



113. The radiation background at different points of the WWTP project area varied between 8 and 11microroentgen/hr.

D.3.3 Noise

- 114.** The noise level was measured at the same points where the measurements of radiation were conducted. The noise level was measured with South Korean equipment „Digital Sound Level Meter“.
- 115.** Noise levels were measured at the construction site reservoirs and network.
- 116.** As already mentioned there is no source of noise on the territory. The measurements at all points were done in 4 hours interval. The results of the measurements are given in Table below.

Table 19: Measurement of Noise and Radiation in Chiatura (13.07.2016)

#	Place of measurement Chiatura	Coordinates	Radiation <i>Microrendg</i> <i>en/hr</i>	Noise <i>Db</i> Daytime, Nighttime 07:00 - 22:00 Industrial	Noise <i>Db</i> Daytime 07:00 - 22:00 Residential	Noise <i>Db</i> Nighttime 22:00 - 07:00
	National Environmental Standard (Maximum Permissible Level)		60	70	55	45
	Measurement Time			10:00AM	15:00PM	18:00PM
2.	Near the Chiatura City Hall	N 4217455 E 4317306	9	65,8	79,5	72,4
3.	Secondary School #1 Abashidze Str.	N 4217392 E 4316988	8	63.1	68.4	63.7
4.	Lezhubani Pumping Station	N 4217766 E 4316573	9	63.0	69.2	68.9
5.	Lezhubani Reservoir	N 4217912 E 4316566	8	54.1	57.3	59.9
6.	Church “Khareba” Stadium Children's entertainment center	N 4217315 E 4316257	11	54.4	62.2	64,5
7.	Medical Center “Geo Hospital”	N 4217132 E 4316231	9	59,6	60,7	64,8
8.	Chiatura Central Pumping Station	N 4217471 E 4317753	9	64,4	65,5	63.9

D.3.4 Analysis of the Water Quality

- 117.** The water quality of Sachkhere well fields was analyzed on August 2016. The respective samples were measured in the laboratory of the UWSCG located at UWSCG's head office in Tbilisi, #76a Vazha Pshavela Ave. Georgia standards on water quality is regulated by

the Government's Decree N 58, on Technical Regulation of Drinking Water (January 15, 2014). The results of the analysis are given in Table 20 below.

Table 20: The water quality of Sachkhere well fields

N	Parameter	Unit	Georgian Standards	Boreholes
1	Color	cobalt scale	15	5
2	Odor 20°C	NTU	2	0
3	Odor 60°C		2	0
4	Turbidity	-	3.5	3,5 FAU
5	Sulphate	mg/l	250	18,2
6	Chlorides	mg/l	250	3,9
7	Oil Products, total	mg/l	0,1	<0,1
8	Zinc (Zn ²⁺)	mg/l	3.0	0,04
9	Iron, total	mg/l	0.3	0,05
10	Total coliform	MPN	0	0
11	E-coli	MPN	0	0
12	pH		6-9	7.0
13	Total mineralization	mg/l	1000-1500	350
14	Barium	mg/l	0.7	0,02
15	Boron	mg/l	0.5	-
16	Arsenic	mg/l	0.01	0,001
17	Mercury	mg/l	0.006	0
28	Cadmium	mg/l	0.003	0
19	Manganese	mg/l	0.4	0.0007
20	Nickel	mg/l	0.07	0,0006
21	Nitrate	mg/l	50	4,8
22	Nitrite	mg/l	0.2	<0,2
23	Selenium (Se, Total)	mg/l	0.01	0
24	Copper	mg/l	2.0	0,003
25	Aluminum (Al ³⁺)	mg/l	0.1	0,03
26	Lead (Pb, Total)	mg/l	0.01	0,002
27	Antimony	mg/l	0.02	0
28	Cyanide	mg/l	0,07	n.a.
29	Pesticides	mg/l	0,05	<0,05
30	Total hardness (as CaCO ₃)	mg/l	500	>180

E. ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

E.1 Summary of Activities and Anticipated Impacts

118. Proposed water supply systems project will certainly produce some environmental impacts in project area. Activities to be performed within the scope of the Project were examined in 2 phases:

- A. Construction Phase:
 - Pre-construction activities such as contractor office set ups, necessary equipment stacks and the site preparation;

- Removal and placement of the debris left after the disassembly of the existing reservoir and waste.
 - Building the new reservoirs and pumping stations.
 - Installation of the new pipes and replacement of the old pipes on the territory of the city of Chiatura.
- B. Operational Phase:
- Drinking water quality monitoring.
 - Management of emergencies, scheduled rehabilitation and conducting repairs.
- 119.** Positive impact: after the Project is realized, the drinking water network will fully cover on the territory of the city of Chiatura and adjacent villages. Water will be supplied 24 hrs. a days.
- 120.** Negative environmental impact at the construction stage of the project is expected during the following operations:
- During the rehabilitation of the existing reservoirs in the project area, a some amount of inert waste is expected to originate.
 - Noise dust and vibration exerted during the rehabilitation of the existing concrete reservoirs in Chiatura project sites on the territory of the town of Chiatura will have a negative impact on the buildings and premises adjacent to the Project zone and local population. In order to avoid this problem, additional mitigation measures will be necessary (the relevant mitigation measures are described in Chapter E.2.3).
 - When installing the new water supply pipes or replacing the old ones, during the excavations of the trenches to install the pipes a great amount of inert waste will also be accumulated. This is mostly concrete, asphalt and ground.
 - Some streets in Chiatura are narrow and the traffic in them will be limited much during the project works.
- 121.** This paragraph provides a brief description of anticipated site-specific impacts related to the construction phase of the sub-project “Improvement of Chiatura Water Supply system”.

Table 21: Site-Specific Impacts

#	Potential Impacts During Construction	Risk	Sites
1	Rehabilitation the existing reservoirs/PS and removal of waste	High Risk	Existing Reservoir and PS sites Transportation of waste to landfill.
2	Dust, noise, vibration	High Risk	During excavation of pipe trenches and rehabilitation of reservoirs/PSs within the areas of town of Chiatura
3	Pollution of surface water during construction and rehabilitation works	Moderate Risk	Planned rehabilitation of the existing network of water supply system crosses rivers in several places.
4	Impacts on Archaeological Sites	Low Risk	No archeological monuments are expected to be touched during construction phase since pipes will run along and inside existing roads and all reservoirs and PS will be rehabilitated

#	Potential Impacts During Construction	Risk	Sites
			on existing territories. There is low probability for chance finding of archeological objects
5	Impacts on traffic	High Risk	Existing water supply system of Chiaturais almost totally replaced by the project. For the implementation of above mentioned will be necessary to cut trenches in the streets of the city which will restrict transportation by transport means or for pedestrians as well. Special problems will be created in the hilly place and narrow streets of the town
6	Landslides, slumps, slips and other mass movements.	Moderate Risk	No large scale earthworks are planned under the Project. Despite this, the landslide processes may be triggered
7	Impacts on flora and fauna	Moderate Risk	Some project sites are located within the area have been experiencing the severe human impacts. Therefore, no major influence on flora and fauna shall be expected during implementation of the Project
8	Pollution risk for ground waters	Moderate Risk	No major spills of fuel and lubricates at construction sites due to leakages are expected. The spills, which are likely to cause groundwater contamination, may occur during fuelling construction machinery at the construction sites and/or construction camps.
9	Pollution risk for air quality	High Risk	Air pollution may occur in the inhabited areas, including town of Chiatura
10	Hazardous Construction Wastes	Low Risk	Small quantities of hazardous wastes will be generated as a result of vehicle operations and the maintenance activities.
11	Impact on existing infrastructure	Low Risk	Electric power transmission systems, existing water supply and drainage channel systems and channels
12	Poor sanitation and solid waste disposal in construction camps and work sites (sewerage, sanitation, waste management)	Low Risk	Camp will not be used as living facilities because it is expected that majority of the employees would be local persons. The construction camp would be equipped with a bio toilet and other necessary infrastructure.
13	Construction Related Impacts at the Quarrying Sites	Low Risk	The exploration of the borrow pits should be conducted by the licensed companies or the Contractor has to obtain its own license. However,

#	Potential Impacts During Construction	Risk	Sites
			potential impact of the increased quarrying activities on river bed and floodplain landscape, ichthyofauna and groundwater should be considered.

E.2. Developing Environmental Documents

- 122.** Prior to the onset of the construction, the Construction Contractor will be obliged to develop the following environmental documents:
- 123.** The Site Specific Environmental Management Plan(SSEMP) must cover the following issues:
- Define boundaries
 - Identify sensitive receptors & environmental values
 - Specify construction activities
 - Conduct risk assessment
 - Assign environmental management measures
 - Prepare monitoring plan
 - Prepare site plans
 - Prepare environmental work plan
- 124.** At the stage of risk assessment the ADB risk assessment methods must be used:
- Following the specifics of the work to be accomplished, the Contractor must develop the Project Specific Waste Management Plan. This document must describe the methods to prepare the construction site and manage the waste originated during construction (collection, transportation, recycling/reuse and placement), Botanical study of the project zones, Reinstatement management plan.
- 125.** All the above-mentioned documents must be developed by the Contractor and submitted to the Project Implementing Unit (PIU) for approval. The Contractor will be entitled to start the construction works only after the above-said documents are approved by PIU.

E.3 Construction Phase

E.3.1 Inert Waste

- 126.** The existing reservoirs and PSs will be accomplished at the eithtfollowing locations:
- New (1500m3) and existing Bisireservoir(1500m3)
 - Existing Memorial reservoir (1000m3)
 - Existing Lezhubanireservoir(3000m3) and PS (170m3/h)
 - Existing Rustavelireservoir(350m3)
 - ExisitingPerevisireservoir(50m3)
 - Existing Tekhisareservoir(1000m3)
 - New Sachkherereservoir(500m3)
 - Existing Central PS (1100m3/h)

E.3.2 Waste Transportation

127. At the stage of developing the IEE document, two options of waste final placement will be considered: (i) placement of the inert waste accumulated after the rehabilitation of the existing containers on Chiatura waste disposal site and (ii) identification of the relevant location adjacent to the Project site to place inert waste on it in agreement with the local authority.

E.4 Noise, Dust and Vibration

128. Some reservoirs to be rehabilitated are located near the residential houses. Unless additional mitigation measures are taken, a negative impact on the population is expected both, during the rehabilitation of the old reservoirs and building of the new reservoirs.
129. Noise exerted by the equipment and plants loses intensity after some distance. Noise relevant mitigation measures will be implemented by the contractor.
130. Contractor should apply all mitigation measures to comply with the requirements of regulations and legislation with regard to Noise, Dust and Vibration.

E.5 Air Quality

E.5.1 Noise and Dust

Construction Phase

131. Noise and emissions of harmful substances are typical impacts of construction. Air quality will be affected during construction by emissions from vessels, equipment, and land vehicles in work activities at work locations. During the pipe replacement stage the rehabilitation works are to be carried out in Chiatura streets. The noise and dust generated in course of excavating the trenches will cause nuisance of the local residents that will further increase during summer season assuming growth of the local population on the account of holiday makers.
132. Modeling and assessment of the noise, caused by construction activities is based on existing information about operation of various equipments at various stage of construction. For example, noise level in 15 m as it is considered by the Federal Highway Administration of the ministry of transport of the USA (FHWA), California Department of transportation (CADOT) and SBAG is as follows:

Table 22: Noise levels (Administration of the ministry of transport of the USA)

Noise source	Equivalent noise level dBA
Excavator	84 - 85
Bulldozer	84 - 85
Grader	91 - 92
Compressor	80 - 88
Pneumatic drilling hummers	85 - 98
Pile boring equipments	96 - 107

Table 23: Noise levels (California Department of transportation)

Noise source	Equivalent noise level dBA
Excavator	72-92

Bulldozer	83-93
Grader	80-95
Compressor	75 - 88
Pneumatic drilling hummers	82 - 98
Pile boring equipments	72-82

- 133.** As a rule, noise caused by moving equipments is reduced at some distance. Such reduction has logarithmic properties. In case of noise caused by construction activities, noise spread pattern from the noise point is used, that can be determined as: $\text{Noise level}_1 - \text{Noise level}_2 = 20 \log r_2/r_1$, meaning that by doubling of distance noise is reduced by 6dBA.

Table 24:Noise levels

Distance from noise source, m	Calculation level of the noise Average value - dBa	Calculation level of the noise Maximum value - dBa
10	80	90
20	74	84
40	68	78
80	62	72
160	56	66
320	50	60

- 134.** Noise sources generated by excavation for WS pipes during construction period in scope of city Marneuli are mainly engineering machinery and vehicles, and they are featured by their intermittent nature with mobility and high noise level (which is 80~90 dB from a distance of 5 meters).
- 135.** The following measures are to be taken during construction engineering to reduce impacts on acoustic environment:
- Any construction engineering entity shall adopt advanced engineering equipment and technologies of low noise, and this requirement shall be a principal criterion for selecting contractors during the bidding process.
 - Any operation by such equipment as a percussion piling machine or pneumatic hammer shall be prohibited.
 - The working time and construction schedule must be arranged rationally, and all engineering entities shall make reasonable arrangements for working time, and engineering activities after 22:00 hours through 8:00 hours the next day shall be strictly prohibited, except as required by the proposed project.
- 136.** Prior to start construction activities construction contractor should prepare Noise SEMP for city Marneuli. Prepared plan should be submitted to SC for endorsement and to UWSCG for approval.
- 137.** Problems related to noise at the construction phase are basically generated during installation of waste water pipes.
- 138.** The basic sensitive receptors that will be affected by the noise generated as a result of trench excavation are schools, kindergartens and hospitals.
- 139.** There are 6 secondary schools (5 public and one private), two kindergartens and two hospitals located in Chiatura.

- 140.** Information regarding the schools and Hospitals of Chiaturais given in the tables 19 and 20. Measurement data on the selected area (Including School and hospital) are presented in Table 15.

Table 25: Schools in the Chiatura area

#	Address	Contact : Email Address
School 1	#50 Ninoshvili Street	chiatura1@mes.gov.ge
School 2	#4 Tolstoi Street	chiatura2@mes.gov.ge
School 3	#9 April Street	chiatura3@mes.gov.ge
School 4	#14 Nikopoli Street	chiatura5@mes.gov.ge
School 5	#12 Gogebashvili Street	chiatura5mes.gov.ge
School 7	#11 Tskhovrabadze Street	chiatura7@mes.gov.ge
Chiatura orthodox school of Saint Nino Andrew	#1 Eristavi Street	martmadidebluriskola@gmail.com

Table 26: Hospitals in the Chiatura area

#	Address	Contact Details
Geo Hospital Medical center of Chiatura	#20 Chiatura Street	599 85 46 03
Mukhadze Chiatura Hospital	#4 Eristavi Street	995 479 53445

- 141.** The best situation in noise point of view is near Lezhubani Reservoir, though it is located in the outside the city center of Chiatura and only the vehicles heading to the medical center occur to enter the nearby areas. Therefore, the noise level varies between 50-55 db, that is considered to be a very low indicator.

Mitigation Measures

- 142.** These impacts can be reduced by a variety of measures, many of which are common in most urban construction. These include:
- Require adherence to engine maintenance schedules and standards to reduce air pollution.
 - Use of defined, well planned haulage routes and reductions in vehicle speed where required;
 - Periodically water down temporary roads on site;
 - Cover trucks carrying cement, gravel, sand or other loose materials;

- Wet or cover trucks carrying stone/ sand/ gravel;
 - Haul materials to and from the site in off peak traffic hours;
 - Halting work during excessive winds.
 - Immediately replacing defective equipment and removing it from the work site
 - No truck movements in inhabited areas between 22:00 and 8:00.
 - The population to be informed regarding the pending works.
- 143.** As for the noise, generated during excavation of the trenches in Chiatura area, affecting the sensitive receptors disposed in the town, will require execution of additional mitigation measures.
- 144.** It should as well be taken into consideration that the source of the noise generated during the trench excavation is not in a fixed position. The excavator conducting the trench excavation or pipe installation including backfilling, is permanently moved. During the meeting with the engineers, it turned out that movement speed of the construction equipment depends on the road surface type (soil, asphalt, concrete), relief and the existing infrastructure, and the speed varies between 10-25 m/h. On the basis of the fact that no concrete roads are observed in Chiatura, therefore reducing the digging speed to minimum and increasing noise level to maximum, we have to assume that the average speed of equipment movement during trench excavation is 20-25 m. that represents 160-200 m during 8-hour work day.
- 145.** Therefore, during the project implementation phase we will have to wait averagely 2 days for increasing noise level of each sensitive receptor. On the first day, the noise will increase step by step and by the end of the day it will reach its maximum, and on the second day it will start to decrease from the maximum and will completely disappear by the end of the day.
- 146.** In spite of short-term affect, it is essential, mostly for the above mentioned work phases involving sensitive receptors, planning and implementation of the following additional mitigation actions:
- 147.** As a result of the meeting with the heads of educational institutions (such as schools, kindergartens), it was found out that the studying process, throughout Georgia take place during 5 days a week. No study process takes place on weekend in schools and kindergartens. Therefore, the request has to be included in the tender proposal, that the construction contractor company shall execute construction works during non-labor days.
- 148.** As for implementation of the works nearby medical facilities, where patients shall be disposed, the following mitigation measures have to be processed and conducted:
- 149.** Option 1: if the contractor shall conduct the works without using equipment (trenches should be dug with shovels) on the nearby area of the hospital, that will represent the best option. The method must be used for digging 400 m. long trench, for each facility approximately 200 m. Certainly, the method will increase the project price and duration of execution, but it will practically reduce to zero the noise generated as a result of works at the above mentioned areas.
- 150.** Option 2: In case the construction contractor rejects using the proposed method because of financial problems, the contractor will have to execute the following mitigation measures along the construction works area:
1. Not to allow joint operation of two or more heavy technics 100 m away from the medical facility;
 2. To use portable noise screens (barriers) that will be disposed on both sides of the construction technics, 2.– 2.5 m. away, in such way to protect direct sound emission to the medical center

3. To measure static noise level near health care facilities with noise measuring equipment continuously;
4. In case the noise level exceeds the permissible level, the construction works must be stopped and additional mitigation actions must be executed;
5. The construction works will not be resumed unless the noise level reaches the norms.

Operation Phase

151. No permanent dust emission sources will exist during operation phase. It is expected that in small quantities dust will be generated only during maintenance works.

E.6 Water Quality

E.6.1 Contaminations of Surface Water

Construction Phase

152. During implementation of the Project the risk of surface water contamination is of medium level. The surface water may be contaminated due to improper placement of the excavated soil, poor management of construction camps, and improper storage of construction materials and leakage of fuel and lubricates from construction machinery.
153. Pollution of river Algeti is also anticipated in the process of replacement of the existing water supply pipes at the river crossings.

Mitigation Measures

154. The following mitigation measures shall be implemented:
 - Where works are in progress, erosion control and sedimentation facilities including sediment traps and straw bale barriers or combinations thereof will remain in place;
 - Lubricants, fuels and other hydrocarbons will be stored at least 100 m away from water bodies;
 - Topsoil stripped material shall not be stored where natural drainage will be disrupted;
 - Solid wastes will be disposed of properly (not dumped in streams);
 - Guidelines will be established to minimize the wastage of water during construction operations and at campsites;
 - During construction, machinery and transport will be used by the contractor; both have potential of causing contamination to underground and above ground water assets. There is need to compile temporary drainage management plan before commencement of work;
 - Proper installation of temporary drainage and erosion control before works within 50 m of water bodies should be done;
 - Solid Construction material and spoil stockpiles will be covered to reduce material loss and run-off and stockpiles will not be nearer than 100 m to water bodies;
 - Borrow sites will not be close to sources of drinking water in case of runoff;
 - Water samples will be taken and analysed based on the baseline monitoring results obtained in the preconstruction stage;
 - Samples will be taken as soon after the complaint as possible and analyses immediately and again two weeks after the complaint to determine if water quality has been restored;

- The contractors will be required to maintain close liaison with the local community to ensure that any potential conflicts related to common resource utilization for project purposes are resolved quickly;
- Guidelines will be established to minimize the wastage of water during construction operations and at campsites;
- Borrow sites (if required) should not be close to sources of drinking water;
- Rock rip rap material to be used in river / stream crossings per owner/ engineer's recommendations to prevent natural soil erosion.

Operations Phase

- 155.** The risk of the pollution of surface water in operational phase is very low. Minor pollution of water can take place during maintenance and repair works. In that case the above mentioned mitigation measures shall be implemented.
- 156.** The construction of a new water supply system will increase the generation of wastewater. Works for the rehabilitation of the wastewater network and the construction of a new wastewater treatment plant will be taken up successively under the same Tranche 5 in scope of other sub project.

E.6.2 Contamination of Underground Water

- 157.** Groundwater table depth within the Project zone is 5-6 meter; therefore potential impact arises from implementation and maintenance of contractors' yard, transport, maintenance of vehicles and handling and storage of lubricants and fuel. The required provisions for contractor's yard are described in the chapter on impacts and mitigation measures concerning quality of soils.

E.7 Soils Quality and Topsoil Management

Construction Phase

- 158.** During the construction, impacts on soils are mainly due to earthworks and the operation of the contractor's yard and reservoirs demolition and construction areas.
- 159.** The works for the transmission mains comprise material excavation, pipe laying and backfill of material including compaction. Material will be stored temporarily alongside the trench and refilled after pipe laying. Therefore impacts associated with earthworks for trench laying are of temporary nature. The pipes will be placed in the trench manually.
- 160.** A sand layer of 30 cm thickness will be laid on top of the pipe, after which the trench will be refilled with excavated material and compacted manually. The excavation is expected to generate surplus material. Surplus material will be used as embankment fill as far as possible.
- 161.** Construction of the pumping station and the reservoirs may lead to disturbance or loss of topsoil. Therefore the Contractor shall implement the following measures:
- The top soil of about 1 ft depth (0.3 m) shall be removed and stored separately during excavation work, and after the construction of the main trunk the same soil shall be replaced on the top, in unpaved areas;
 - Subject to advance consent of the local self-governance authorities, the excess topsoil remained after construction of the new pumping station and reservoir will be used at other Project sites or handed over to the appropriate authorities.

Mitigation Measures

- 162.** The following practices will be adopted to minimize the risk of soil contamination and topsoil loss:

- The contractors will be required to instruct and train their workforce in the storage and handling of materials and chemicals that can potentially cause soil contamination.
- Solid waste generated during construction and at campsites will be properly treated and safely disposed of only in demarcated waste disposal sites.
- Construction chemicals will be managed properly
- Clearly labelling all dangerous products,
- Fuel tanks (diesel or oil) should be placed in a concrete pool which its perimeter walls will be at least 1.0 m high with the concrete or plastered masonry wall,
- A proper floor drain should be installed on the slab of the concrete pool for safely discharging the leakages.

Operation Phase

- 163.** During operation phase, the soil may be contaminated due to water leakage from the damage pipe. In case such damage is not detected in a due time, the area may be "bogged".
- 164.** Soil contamination may also occur during performance of the planned or emergency repair works.

Mitigation Measures

- 165.** Water pressure in the pipelines must be continuously monitored during entire operation phase. In addition, the relevant mitigation measures shall be implemented during maintenance works.

E.8 Biological Environment

Impacts during Construction

- 166.** The impacts on flora and fauna during implementation of contractor's yard, reservoirs sites and transmission mains will be minimized through site selection and installation. The following measures need to be implemented to avoid any impacts on flora and fauna:
- Avoid tree cutting;
 - In unavoidable cases, plant four trees of same species for each tree that is cut for construction; In case of Red Book trees the relevant national regulation should be followed;
 - The trench shall not be kept open in the night/after working hours. This will avoid any safety risk to wild animals.

Impacts during Operation

- 167.** Operation of the water supply components of the subproject will not have any significant impact on the biological environment.

E.9 Traffic

Impacts during Construction

- 168.** The rehabilitation of the water supply network and transmission mains will be mainly conducted along roads existing in the town. Although work will not require land acquisition it could still have economic impacts, if the presence of trenches, excavated material and workers discourage customers from visiting shops and other businesses, which lose income as a result. These losses however will be short in duration. Implementation of the following best construction measures will reduce the inconvenience and disturbance:
- Traffic management. A traffic control and operation plan will be prepared together with the local traffic management authority prior to any construction. The plan shall include

provisions for diverting or scheduling construction traffic to avoid morning and afternoon peak traffic hours, regulating traffic at road crossings with an emphasis on ensuring public safety through clear signs, controls and planning in advance;

- Information disclosure. Residents and businesses will be informed in advance through media of the road improvement activities, given the dates and duration of expected disruption;
- Construction sites. Clear signs will be placed at construction sites in view of the public, warning people of potential dangers such as moving vehicles, hazardous materials, excavations etc and raising awareness on safety issues. Heavy machinery will not be used after day light and all such equipment will be returned to its overnight storage area/position before night. All sites will be made secure, discouraging access by members of the public through appropriate fencing whenever appropriate.

169. Another aspect of the work that has economic implications is the transportation of material to the site and surplus soil from the site to locations where it can be put to beneficial use as recommended. There will be truck movements carrying material. Although this is not significant, considering the narrow roads, it could disrupt traffic in the Town. Dust generated during the transport may also impede the commercial and trade activities, which are predominantly located along the main roads. The transportation of material/waste shall be implemented by the Civil Contractor in liaison with the town authorities, and the following additional precautions should be adopted to avoid effects on traffic:

- Plan transportation routes in consultation with Municipality and Police
- Schedule transportation activities by avoiding peak traffic periods.
- Use tarpaulins to cover loose material that is transported to and from the site by truck
- Control dust generation while unloading the loose material (particularly aggregate and sand) at the site by sprinkling water/unloading inside a barricaded area
- Clean wheels and undercarriage of haul trucks prior to leaving construction site

Impacts during Operation

170. As the operation and maintenance activities would be conducted within the existing facilities no impact is envisaged on economic resources. Repairs and leaks of the water supply pipes will be minor and localized. In fact, the improvements to the water supply system will bring various benefits. Availability of good infrastructure facilities will add to the quality of life, and there will be more people interested to live and visit, which will bring new investments and boost economic development.

E.10 Hazardous Construction Wastes

171. Small quantities of hazardous wastes will be generated as a result of vehicle operations and the maintenance activities.

Mitigation Measures

172. There are no specific hazardous waste treatment facilities in Georgia, so the common construction practice accepted by the authorities is to dispose of these types of wastes at the municipal landfills. However, prior to disposal appropriate consultation and agreement of MoENRP is required, and controlling will be required to obtain the necessary approvals. To ensure good practice they will also be required to store, transport and deposit all hazardous materials in secure watertight containers.

E.11 Other Wastes from Construction Activities

E.11.1 Inert Waste

173. The amount of waste accumulated due to the destruction of existing reservoirs and the methods to manage it are given in chapter E.2 of the document.
174. Inert construction waste is also accumulated during laying the new pipes and replacing the old ones, also during implementation of transmission mains. Such waste is first of all: asphalt and ground.
175. Under the preliminary design, after the installation of the pipes, 30-cm-thick fine sand will be placed over the pipes to protect them leading to the accumulation of additional amount of soil.
176. Big amount of inert waste will be accumulated during the excavation of trenches on the territory of the town of Chiatura. The said waste will be transported and placed on the landfill in Chiatura.

E.11.2 Municipal Waste

177. Municipal waste may be generated on the Storage area. Mainly this is rubbish, plastic or glass bottles, glasses, waste food, etc. and a stationary waste. Waste should be collected both by the specially assigned personnel and the workshop workers on the area. The waste is placed into 0.24m³ plastic containers and further a local Sanitary Service takes it to landfills. The following should be taken into account:
 - Generation of dust should be avoided;
 - Plastic containers should be closed to prevent spread of the smell and also to avoid contact of rodents and insects with the waste.
178. The personnel involved in the handling of hazardous and non-hazardous waste will undergo specific training in:
 - Waste handling
 - Waste treatment; and
 - Waste storage.
179. Burning of waste on any construction site is forbidden with the exception of stub and small branches from felled trees and bushes, which is better to be burned in order to avoid pest dissemination.

E.11.3 Medical Waste

180. Medical waste is generated in the Medical Care and Control Point and belongs to hazardous waste category. This waste is collected in special plastic boxes and is transferred to a contractor for farther incineration. It is recommended that the medical waste is directly transferred to a contractor from the place of its consolidation. While disposal of the medical waste the following requirements are to be met:
 - Medical waste must be disposed in special plastic boxes, which can be hermetically closed.
 - Medical waste for farther incineration should be transferred to a certified contractor.

E.11.4 Non-Hazardous Construction Waste

181. Non hazardous construction waste may be generated on the Storage and construction area and will be collected by contractor's workers. Waste disposed first on the sites of

origin, and then moved to construction waste temporary storage facility before transferred to a contractor.

- 182.** Disposal construction wastes both on the sites and at the temporary storage facilities the following requirements are to meet:
- Place of disposal of the waste concerned must be enclosed.
 - The waste must not have access to drainage water.
 - Waste must be immediately removed from the working sites.
 - Waste must be placed in secondary protective basins.
 - This waste can be transferred only to a certified contractor.

E.12 Impacts on Archaeological Sites

- 183.** Land clearance works, grading and excavations are associated with the risks of damaging underground archaeological remnants. However in the case of the proposed Project no archaeological monuments are expected to be touched during construction phase since pipes will run along and inside existing roads as far as technically feasible. There is a low probability for chance finds of archaeological objects. However, during construction, possibility of appearance of the new archaeological findings still should be taken into account and, therefore, special care should be taken not only at the new construction sites, but also at construction camps and storage areas.

Mitigation Measures

- 184.** To avoid this risk, preliminary preventive studies and archaeological supervision during the earth-works is necessary. Supervisory procedures and all other necessary measures should be agreed with the Ministry of Culture when obtaining the construction permit, in accordance with the rules of the permit issuance. According to the article 14 of the Law on Cultural Heritage, Permit on conducting quarrying activities in Georgia, as well as construction of an object of a special importance as it may be defined under the legislation of Georgia, is issued by a competent authority based on the positive decision of the Ministry of Culture, Monument Protection of Georgia. The basis for the conclusion is the archaeological research of the proper territory to be carried out by the entity wishing to accomplish the ground works. The entity wishing to do the earth-works is obliged to submit the Ministry the documentation about the archaeological research of the territory in question. The preliminary research should include field-research and laboratory works.
- 185.** Therefore steps should be taken minimize the risk. This should involve:
- Contractor should put in place a protocol for conducting any excavation work, to ensure that any chance finds are recognized and measures are taken to ensure they are protected and conserved.
 - To comply with the previous condition, having excavation observed by a person with archaeological field training. Supervisory procedures and any other necessary measures shall be agreed with the Ministry of Culture;
 - Stopping work immediately to allow further investigation if any finds are suspected;
 - Calling in the state archaeological authority if a find is suspected, and taking any action they require ensuring its removal or protection.
- 186.** At the construction stage archaeological monitoring should be ensured by the contractor under the supervision of the Ministry of Culture, Monument Protection of Georgia. The budget necessary for the archaeological supervision and other agreed works should be fixed under the construction works appraisal.

E.13 Socio-Cultural Resources

Impacts during Construction

- 187.** There are various social-cultural resources (such as school, church, recreation and entertainment centre, etc.) in the town. The construction impact will include noise and dust, and interrupted access due to movement of heavy vehicles transporting material and waste. Mitigation will therefore be needed to protect socio-cultural resources and to enable usage by local people and visitors to continue throughout the construction work. This will be achieved through several of the measures recommended above (under the impacts on air quality), including:
- Limiting dust by removing waste soil quickly; by covering and watering stockpiles, and covering soil with tarpaulins when carried on trucks
 - Providing wooden walkways/planks across trenches for pedestrians and metal sheets where vehicle access is required
 - Increasing the workforce in to complete the work quickly
- 188.** There is invariably of safety risks when substantial construction such as this is conducted in an urban area, and precautions will thus be needed to ensure the safety of both workers and citizens. The Contractor will be required to formulate and implement health and safety measures at construction sites, which should include such measures as:
- Following standard and safe procedures for all activities - such as provision of shoring in deeper trenches (> 2 m)
 - Excluding public from the site - enclosing the construction area and provide warning and sign boards, and security personnel
 - Providing adequate lighting to avoid accidents
 - Ensuring that all workers are provided with and use appropriate Personal Protective Equipment - helmets, hand gloves, boots, masks, safety belts (while working at heights etc.)
 - Maintaining accidents records and report regularly
 - Traffic control. Irregular control of trucks by local police (radar control, safety control). Speed limits to be introduced within construction areas and on access roads.
 - Yellow / orange warning tape to protect workers and pedestrians from falling into building pits, to prevent pedestrians from entering the construction site. Warning signs to prevent accidents within the construction site and on access roads
- 189.** *Economic Benefits.* There could be some short-term socio-economic benefits from the construction work if local people gain employment in the workforce. To ensure that these benefits are directed to local people, the Contractor should be required to employ as much of his labour force as possible from the local communities in the vicinity of construction sites. Drawing of majority of workforce from local communities will avoid problems that can occur if workers are imported, including social conflicts and issues of health and sanitation due to labour camps. If temporary labour camps are to be provided, Contractor should ensure that they are maintained well with proper water supply and sanitation facilities. In unavoidable case of sourcing labour from other areas, provide adequate housing facilities so that there are no impacts and conflict with the local people. Following measures shall be followed:
- Establish temporary labour camps in consultation with the local authority
 - Construction camps shall be located away from water bodies
 - No clearance of trees vegetation shall be allowed for establishment of camp
 - Provide all basic amenities (water sanitation, waste collection & disposal, first aid facilities, etc.)

- Contractor shall provide fire wood and no worker shall be allowed to cut any tree
- Ensure regular and clean maintenance of the camp

E.14 Construction Camps

- 190.** The establishment of contractor's work camp may cause adverse impacts if various aspects such as liquid and solid waste management, equipment maintenance, materials' storage, and provision of safe drinking water are not addressed properly. The site for the work yard will be selected by the contractor in agreement with the Municipality, UWSCG and the supervisor.
- 191.** To ensure that potentially resulting impacts are kept at a minimum the contractor will be required to prepare the following plans or method statements:
- Layout plan of the work camp including a description of all precautionary measures proposed to avoid potential adverse impacts on the receiving environment (surface and ground water, soils, ambient air, human settlement);
 - Sewage management plan for provision of sanitary latrines and proper sewage collection and disposal system to prevent pollution of watercourses or groundwater;
 - Waste management plan covering the provision of garbage bins, regular collection and disposal in a hygienic manner, as well as proposed disposal sites for various types of wastes (e.g., domestic waste, used tires, etc.) consistent with applicable national regulations; and
 - Description and layout of equipment maintenance areas and lubricant and fuel storage facilities including distance from the nearest surface water body. Storage facilities for fuels and chemicals will be located at a safe distance to the water body. Such facilities will be bounded and provided with impermeable lining to contain spillage and prevent soil and water contamination.
 - These plans will be approved by the Engineer prior to beginning of construction activities.
- 192.** Prior to establishment of the work camp(s) the contractor shall conduct consultations with local authorities to identify sources of potable water for the workforce that will not compete with the needs of the local population. Potable water for the workforce shall comply with the national quality standards. Construction water should be sourced from the local water supply.

E.15 Construction Related Impacts at the Quarrying Sites

- 193.** The exploration of the borrow pits should be conducted by the licensed companies or the Contractor has to obtain its own license. However, potential impact of the increased quarrying activities on river bed and floodplain landscape, ichthyofauna and groundwater should be considered.

Mitigation Measures

- 194.** The exploration of the borrow pits should be conducted by the licensed companies. In case if the constructing company intend to perform quarrying activities, the company has to obtain related license. Potential impact of the increased quarrying activities on ichthyofauna, groundwater and landscape should be considered anyway. Validity of licenses for the abovementioned companies is a main mechanism to guarantee that most of impacts related to quarrying will be mitigated. License is provided by the MoENRP only on a basis of preliminary assessment (including limits and conditions for reinstatement). The Regional Services of the MoENRP and Environmental Inspectorate are in charge to control compliance of the quarrying company's performance. The role of the UWSCG

within this plan should be to ensure timely and permanent involvement of the MoENRP in construction supervision.

- 195.** The measures aimed on mitigation of the dust and emission impacts, as well as potential river contamination due to improper fuelling and vehicle operation should be the same as above described pollution prevention measures, but control on this sensitive site should be stricter. Contractor's environmental personnel shall pay attention to this site during monitoring.

E.16 Existing Asbestos Pipes

- 196.** At construction stage, according to the contract is considered the installation of new pipes in the whole area of the city. During excavation works of trenches it is possible to damage as existing sewer pipe network, also other legally or illegally water supply pipes. A large part of the existing pipes contains asbestos and asbestos dust in case of damage may occur, and which is very dangerous for health. All asbestos pipes will remain in place and will be covered by soil.

Mitigation Measures

- 197.** It is necessary to implement whole set of mitigation measures:
- Special training for the personnel of the contractor;
 - Environmental specialist of the consulting company must develop a special procedure and present to the water company which will be used in the process of cutting of the trenches in case of the connection with the existing Asbestos pipes;
 - Environmental specialist of the contractor must attend the process of cutting of the trenches;
 - In case of finding asbestos pipes, the excavator must stop working and cutting of the trenches must be continued by means of the blade;
 - In case of the damage of Asbestos pipes the construction works must be stopped. Environmental specialist of the consulting company should be immediately informed about this and the fact should be written down by environmental specialist of the contractor;
 - Further works to be implemented only after issuance of the permission.

E.17 Cumulative Impacts

- 198.** On the territory of Chiatura, there are the following ongoing infrastructural projects or the ones planned in the near future:
- Improvement of Chiatura Water Supply System Sub-project;
 - Improvement of Chiatura Wastewater System Sub-project;
 - Rehabilitation of roads in the center of the city.
- 199.** Chiatura Wastewater and Water Supply Systems sub-projects are considered as different sub-projects and within the scope of each of the sub-projects, two different tenders are planned to declare to select construction companies. Within the scope of the two sub-projects, the installation of the wastewater and water supply pipelines will be accomplished on the same territory of the city of Chiatura. Within the scope of the Water Supply System Improvement Sub-project, new water supply pipelines are planned to install and the failed pipelines are planned to replace, while within the scope of another sub-project, the new wastewater pipelines are planned to install and the failed pipelines are planned to replace. As per the technical documentation developed within the scope of

both sub-projects, the water supply and wastewater pipelines are planned to install side by side (giorgi, uca). Consequently, if within the scope of these two sub-projects two different tenders are declared as it is planned, and the winning companies start installing the pipelines without agreeing with one another, this will mean that in the same streets first, one company will accomplish the planned activities, in particular, they will dig out the trenches, install the pipes, fill in the trenches and lay the asphalt, and after some time, another company will do absolutely the same actions in the same streets.

200. Following the above-mentioned, aiming at avoiding the said risks, it is necessary to accomplish any of the options listed below:
 - ChiatuaraWater Supply and Wastewater System Sub-projects to be merged as a single lot and one tender is to be declared with one winning contractor.
 - Installation of the water supply and wastewater pipelines of both projects to be assigned as a separate lot, with the replacement of the outdated pipes and tender for it to be declared as an independent lot.
 - The contractors winning both sub-projects to develop the working schedule and submit it to Sakrebulo of the city of Chiaturaand UWSCG.
201. Within the scope of each sub-project, as per the preliminary estimation, the movement of the heavy techniques along the streets of the city of Chiaturawas considered as a high-risk impact. Consequently, the joint implementation of all three sub-projects in case of incorrect regulation, may complicate the traffic in the city of Chiaturaor make it impossible.
202. Above all, within the scope of the water supply and wastewater sub-projects, the traffic in all streets of the city of Chiaturawill be hampered or totally limited even though for a short time, but permanently.
203. As all three projects will be implemented under the financial assistance of Asian Development Bank, it is desirable to hire one more traffic safety specialist, who, together with a representative of the City Hall, will coordinate the regulation of this issue.

E. 18Climate Change Impact

204. The information related to the existing threats in respect of climate change in ChiaturaMunicipality was provided by the Georgian local self-governing national association. They evaluated this problem within the limits of the project financed by the USAID.

E.18. 1 Natural Threats

205. As the data of the above-stated group suggest, the natural threats in the Municipality include: Strong storms, landslides, droughts, avalanches and earthquakes represent characteristic of the territory under Chiatura Municipality. Landslide is considered to be the most important threat among the hazard events, activity of which is linked to mining works under mining enterprises. Risk of erosion and landslide may as well be increased as a result of overgrazing and forest cutting. There is approximately 150 hectares of land included in the landslide zone as well as 8 village residential houses and agricultural land plots. The estimated damage during the last 10 years as a result of landslide and earthquakes equals 300 000 GEL.

E.18.2 Conclusions

206. The following measures are recommended for adaptation to the climate change of the municipality:
 - Windbreaks recovery, forest rehabilitation and development, as well as systematization of the cutting process, in order to reduce landslide risks and also

contribute to temperature regulation during hot weathers and maintaining soil humidity during drought events;

- Work out irrigation system development project, that will reduce the damage caused by the droughts and will support (food) catering safety.

207. The following activities are required to be done for sustainable development of catering-breeding:

- evaluation of the grass and grazing lands in order to work out several norms for avoiding overgrazing
- Prepare and implement long term program for maintenance and rehabilitation of the grass and graze land
- Overview the catering-breeding feeding system and spread the information among the farmers
- In order to protect the municipality areas from erosion and pollution, development of a long-term strategy for proper close-out and re-cultivation of already mined mountainous carriers, as well as planning short-term projects and implementation for that field
- Register a database including natural hazards and the damages caused by them, regarding agriculture, water resources, forest resources and waste management, in order to have a complete picture of the challenges and have ability to plan activities responding the challenges.

F. ANALYSIS OF ALTERNATIVES (STRUCTURAL OPTIONS)

208. About Structural part, as can be seen in the BOQ, two options have been considered:

- The first one is just consisting on the rehabilitation of all of the structural elements existing in Chiatura water supply system (Reservoirs and Pumping Stations).
- The second one, proposes to remove and replace the top slab and beams from the different reservoirs.

G. INFORMATION DISCLOSURE, CONSULTATION AND PARTICIPATION

209. The main stakeholders have already been identified and consulted during preparation of this IEE, and any others that are identified during project implementation will be brought into the process in the future. Stakeholders of this project include:

- People who live, and work near construction sites of facilities in Chiatura
- UWSCG as implementing agency
- Other government regulatory institutions
- Municipality of Chiatura
- NGOs and CBOs working in the affected communities;
- Other community representatives (prominent citizens, elders, women's groups);
- The beneficiary community in Chiaturain general; and
- The ADB, as funding agency

210. This IEE Report in Georgian language will be distributed to the interested public. Report will be available for review in Tbilisi (at UWSCG Head Office), and Chiatura(at UWSCG Service Centre and the Town Hall). It will also be disclosed to public by making it available

on websites of UWSCG, MoRDI and ADB, together with the IEEs prepared for the other subprojects.

- 211.** Stakeholder consultation and participation was an important process in the preparation of this IEE. The process engaging stakeholders and affected people during the conduct of the IEE included joint site visits of IA, design and supervising consultants, on-site discussions with local population and public hearings.
- 212.** The Public Hearing was held on June 08, 2016 in Chiatura City Hall and commenced at 16:00. The Public Hearing was organized with representatives from the local government of Chiatura, local NGO, local population and representatives of UWSCG and Supervision Company "Eptisa".
- 213.** By giving advertisements in advance at Chiatura Service Centre, attendance of a wide range of related people to the meetings was encouraged. During the public hearing, citizens were informed about the activities to be carried out within the scope of the Chiatura WS sub-project. The following topics were discussed during the meeting:
- project context and rationale
 - expected start and end of the project
 - benefits of the project to local population and to the country as a whole
 - the environmental issues and mitigated measures related to the project
- 214.** Local residents and the representatives of UWSCG held discussions about particular issues during the meeting. The Minutes of the Meeting is presented in **Annex 1**.
- 215.** The residents were mainly interested in the start and the duration of the project, the impacts and benefits of the sub-project. UWSCG explained the schedule of works and explained that impacts are mainly limited to construction works are temporary and will be easily mitigated. Representatives of the UWSCG explained publicly that the principal benefit will be the 24 h supply with high quality drinking water after completion of the project.

Figure 1: Meeting with Chiatura UWSCG's representatives



H. GRIEVANCE REDRESS MECHANISM

216. For the effective implementation of a GRM system under the USIIP, UWSCG issued special order (#122) on 30 April 2014. The “Establishment of GRM within the Framework of the Asian Development Bank Funded Projects” signed by the head of UWSCG gives clear instructions to every involved stakeholder how to act when affected people are impacted by the project.
217. Any affected person can apply at a UWSCG local service centre through different ways, either by going to the service centre, sending a letter to the service centre, or calling a hotline. The operators of the service centre can respond by going directly to the affected person if they are disabled to get the written grievance from them.
218. GRM in Chiaturawill operate in three stages:
219. During the first stage, complaints are discussed within two weeks of being received by the local service centre of UWSCG (e.g. Chiaturaoffice), based on the verbal or written complaint. In the **first stage** of grievance review and resolution, an authorized representative of the local service centre is responsible for ensuring the registration of the claim and its further processing. He/she engages in the grievance review and resolution process representatives (managers and environmental specialists) of Construction and Supervision Companies, and the representatives of UWSCG central office as required. At the local service centre, the affected person is provided with a queue number and then registers the grievance at the service desk.
220. The service centre operators, who are trained² in USIIP/Reg-01 project, register all relevant grievances with support of an **online task management system**, which tracks information on the grievance review process and the responsible person. Moreover, the operators fill the ADB complaints log with the registered grievance that coincides with local internal forms. This **electronic intranet system**³ allows the UWSCG Tbilisi Office to immediately see claims. Therefore, claims submitted to any regional service centre can be monitored by the Head of the Investment Projects Management Office (IPMO), as well as the Head of the Environmental and Resettlement Division, MakaGoderdzishvili.
221. When a grievance is solved positively in the first stage, the grievance is closed through an Agreement Protocol, which is reflected in the eDocument – Task Management System.
222. The grievance enters a **second stage** if it is not solved. In that case, the authorized representative of the local service centre will help the claimant prepare a package of grievance application documents for official submission to the Grievance Redress Committee (GRC). The package contains the following information:
- Name, ID, address and contact details of the claimant

²UWSCG and Supervision Consultant (Eptisa) conducted trainings for service center operators covering general procedures of GRM functioning in order to ensure proper coordination of different departments.

³The **eDocument - Task Management System** was developed by LEPL Financial-Analytical Service of the Ministry of Finance of Georgia. It is an innovative electronic document and task management mechanism for electronically processing of documents. Used by almost all the major budgetary organizations in Georgia, the eDocument service offers an opportunity to manage, find, and track documents for information-intensive organizations. The system significantly simplifies the process of organizing and managing documents, tasks, information and processes. It thereby enables State companies, organizations and agencies to increase their efficiency and productivity. The many benefits of the eDocument service include: a) significant saving of time; b) effective management of tasks; c) flexible installation procedures; d) synchronized with MS Office; e) control of tasks implementation process; f) group working opportunities on assignments; g) automatic scanning; h) high quality security; i) electronic signature and electronic conformation; k) control of various versions of documents; and j) control of accomplished and uncompleted documents. *eDocument service is used by almost all the major budgetary organizations in Georgia.*

- Description of the essence of the complaint
- Supporting documents and evidences (photos, maps, drawings/sketches, conclusion of experts or any other documents confirming the claim)
- Brief description of the actions proposed for the grievance resolution at the first stage and the reasons why these actions were denied
- Minutes of meetings conducted at the first stage

223. The GRC should make a decision within two weeks after the registration of the grievance. The GRC is staffed as follows: (i) Representative of self-government – the head of committee; (ii) Director/ Manager of UWSCG service centre; (iii) Investments Project Management Division representative of the company; (iv) Representative of local authoritative NGO (according to the claim reference); (v) Stakeholders' female representative; (vi) Stakeholders' informal representative; and (vii) Heads of local municipalities.

224. The GRC will review the package of grievance documents, set a date for a meeting with the claimant, discuss the claim at the meeting, and set up a plan for further actions (actions, responsible persons, schedule etc.). Upon the resolution of the case, the GRC will prepare a brief resume and protocol and the protocol signed by complainant and all parties will be registered in a grievance log.

225. There is a third stage in case there is a failure to resolve the grievance. In this case, GRC will help the claimant to prepare the documents for submission to the Rayon (municipal) court. They can also apply to ADB at the address below:

*Complaints Receiving Officer, Accountability Mechanism
Asian Development Bank Headquarters
6 ADB Avenue, Mandaluyong City 1550, Philippines
Email: amcro@adb.org, Fax +63-2-636-2086*

226. Public awareness: Affected people will be fully informed of their rights and of the procedures for addressing complaints, whether verbally or in writing, through the comprehensive public awareness activities (door-to-door campaign, consultation meetings and media campaign). These PA activities will be carried out by the supervision consultant and UWSCG/UREP/PR Division.

I. ENVIRONMENTAL MANAGEMENT PLAN

227. EMP is addressed as a condition of the contract.

I.1 Introduction

228. The Environmental Management Plan (EMP) documents the impacts identified in the EIA report, the actions required to mitigate those impacts to acceptable levels in accordance with the laws of the country and the ADB safeguard policy, and the monitoring activities that are to be undertaken as part of the project to confirm that the mitigation actions have been effective in achieving their objectives or to initiate changes in the actions required.

229. The EMP also details the institutional arrangements and capacities that currently exist, or that will be put in place as part of the project implementation, to ensure that the environmental due diligence (including the EMP) has comprehensively considered both the national and ADB requirements for environmental protection, has identified all likely environmental impacts and proposed appropriate mitigation measures, and has the systems in place to ensure that effective procedures for environmental monitoring and control of the project impacts and mitigation measures are implemented throughout the life of the project

I.2 Environmental Impacts, Mitigation and Monitoring Plans

230. The environmental impacts associated with Tranches 1 and 2 projects - the Development Program, have been detailed above in the relevant sections of this EIA. Mitigation measures required to address the impacts identified in the EIA have been summarized in each of the relevant sections covering the physical, biological and socio-economic environment affected by the project. The impacts identified and the specific mitigation measures proposed to address them have been consolidated into the **environmental mitigation plan** presented in Table 33, which includes time frames, responsibilities and where applicable, estimated costs for each measures.

231. The environmental mitigation plan includes a number of standalone construction-related management plans on: health and safety; waste; sewage; soil (including topsoil and vegetation); site drainage; traffic control; noise; air pollution; dust and cultural/archeological finds. In addition, it specifies the need for the Contractor to provide method statements on spillage control and the location of fuel storage, filling stations and vehicle washing sites to be provided to ARS for approval.

232. An **environmental monitoring plan** is presented in table 34 which outlines the activities and responsibilities associated with monitoring the effectiveness of the proposed mitigation plan and ensuring compliance with the recommendations of the EIA.

I.3 Implementation Arrangements and Responsibilities

233. The main institutions that will be involved in implementation of the EMP are **UWSCG** the program executing agency (EA), the Design and Supervision Consultant (DSC) the Contractor and to a lesser extent the Ministry of Ecology and Natural Resources (MENR).

234. A Project Implementation Unit (**PIU**) **established within UWSCG** will be responsible for the day to day management of the project including implementation of the EMP. The PIU currently has one Safeguards Specialist who is responsible for management of the environmental and social aspects associated with development of **all donor funded water sector projects for which** is the responsible Executing Agency (EA).

235. The PIU (Safeguards Specialist) responsibilities in respect of implementation of the EMP are as follows:

- Ensure that all relevant EMP requirements (including environmental designs and mitigation measures) are duly incorporated into the project bidding documents.

- Obtain necessary permits and/or clearance, as required, from MENR and other relevant government agencies, ensuring that all necessary regulatory clearances are obtained before commencing any civil work on the project.
 - Ensure that contractors have access to the EMP and EIA report.
 - Ensure that contractors understand their responsibilities to mitigate environmental problems associated with their construction activities and facilitate training of their staff in implementation of the EMP.
 - Approve the Site Specific Environmental Management Plan (SEMP) before Contractor takes possession of construction site
 - Monitor the contractor's implementation of the EMP in accordance with the environmental monitoring plan.
 - Submit six monthly Environmental Monitoring Reports to ADB.
 - In case unpredicted environmental impacts occur during the project implementation, prepare and implement as necessary an environmental emergency program in consultation with MENR, any other relevant government agencies, and ADB.
- 236.** The **DSC** will include a part time international environmental specialist and fulltime site-based national environmental specialist to assist the PIU supervise and monitor implementation of the EMP during construction.
- 237.** A Non Compliance Notice will be issued to the contractor if the DSC requires action to be taken. The contractor will be required to prepare a corrective action plan which is to be implemented by a date agreed with the DSC. Non-compliance will be ranked according to the following criteria:
- Non Compliance Level I: A situation that is not consistent with requirements of the EMP, but not believed to represent an immediate or severe social or environmental risk. Repeated Level I concerns may become Level II concerns if left unattended.
 - Non Compliance Level II: A situation that has not yet resulted in clearly identified damage or irreversible impact, but which demonstrates potential significance. Level II requires expeditious corrective action and site-specific attention to prevent severe effects. Repeated Level II concerns may become Level III concerns if left unattended.
 - Non Compliance Level III: A critical situation that will result in significant social or environmental damage occurring or a reasonable expectation of very severe impending damage. Intentional disregard of Non Compliance Notices or specific prohibitions is also classified as a Level III concern.
- 238.** The failure to prepare a corrective action plan or to implement it within the required timeframe will result in the Employer undertaking the work at the Contractor's expense (as will be specified in the Contract).
- 239.** The **Contractor** will appoint a full time **Environmental Manager** (EM) to be a senior member of the construction management team based on site for the duration of the contract. The EM shall have a university degree (preferably at Masters level) in Environmental Science or related discipline and have at least 10 years work experience in environmental management of infrastructure project
- 240.** Key responsibilities of the Contractor (through the EM) are as follows:
- (i) Preparing the site specific environmental management plan (SEMP) for approval by the Employer (PIU) prior to the Contractors taking possession of the construction site (see below)
 - (ii) Ensuring the SEMP is implemented effectively throughout the construction period.

- (iii) Coordinating community relations issues through acting as the Contractor's community relations focal point (proactive community consultation, complaints investigation and grievance resolution)
- (iv) Establishing and maintaining site records of:
 - weekly site inspections using checklists based on SEMP,
 - environmental accidents/incidents including resolution activities
 - environmental monitoring data,
 - non-compliance notifications issued by the DSC
 - Corrective action plans issued to the DSC in response to non-compliance notices.
 - Community relations activities including maintaining complaints register
 - Monitoring reports
 - Routine reporting of SEMP compliance and community liaison activities (see below).
 - Adhoc reporting to the Employer's Engineer of environmental incidents/spillages including actions taken to resolve issues

1.4 Site Specific Environmental Management Plan (SEMP)

241. Following the award of the contract and prior to construction commencing the Contractor will review the EMP and develop this into a detailed Site Specific Environmental Management Plan (SEMP) that amplifies the conditions established in the EMP that are specific for the site and the tasks involved. The SEMP will identify persons who will be responsible for supervising the work within the contractor's team. The SEMP will include a matrix of mitigation measures corresponding to specific site activities. This information will be presented on a series of site plans covering the whole project site showing all environmental management requirements for all activities in the construction phase. Site plans will include:

- (i) Indication of North and scale
- (ii) Existing and planned supporting infrastructure (e.g., access roads, water supplies, and electricity supplies)
- (iii) Location of planned work (ROW/alignment, camp layout)
- (iv) Contours (as applicable)
- (v) Drainage systems
- (vi) Locations of sensitive receptors and environmental values

242. The SEMP will also include a monitoring plan and a reporting program corresponding to the requirements of the EMP. The SEMP will be submitted to UWSCG PIU for approval at least 10 days before taking possession of any work site.

1.4 Site Induction

243. Following approval of the SEMP by the UWSCG PIU, the Contractor will be required to attend a site induction meeting with the DSC's International Environmental Specialist whereby the SEMP is confirmed with the Contractor to ensure that all compliance conditions are clearly understood. Following confirmation of the SEMP with the Contractor the DSC's International Environmental Specialist advises the DSC Team Leader that the Contractor is now cleared to take possession of the Site and may commence moving equipment to the Site.

244. The Contractor will be responsible for ensuring that all sub-contractors abide by the conditions of the SEMP.

Reporting

- 245.** The Contractor will prepare a monthly concise report (Maximum 3 pages and appendices, if required) in respect of compliance with EMP/SEMP requirements that will be submitted to the PIU through the DSC. The report will contain the following sections.
- (i) Details of any environmental incidents
 - (ii) Status of all non-conformance identified during audits and inspections that are identified by non compliance notices.
 - (iii) Complaints from the public and proactive community relations activities
 - (iv) Monthly Accident Report
 - (v) Waste volumes, types and disposal
 - (vi) Details of any contaminated areas that have been identified and rehabilitated.
 - (vii) Details of any archaeological discoveries.
 - (viii) Details of any ecological issues.
 - (ix) Other relevant environmental issues.
- 246.** The Contractor will have a duty to immediately report to the Engineer if any serious environmental breach has occurred during construction e.g. clearing of sensitive areas, serious oil spills etc.
- 247.** ADBs responsibilities in regard to implementation of environmental safeguards requirements for the project include: undertaking periodic monitoring of the EMP implementation and due diligence as part of an overall project review mission; and if required, provide advice to XXXX in carrying out its responsibilities to implement the EMP for the project.

I.4 Implementation Costs

- 248.** The Costs for Environmental Management of the project shall mainly consist of the (i) monitoring of works by the EMS who will be employed by the SC; (ii) baseline and regular parametric measurements of noise, dust and emission (water quality testing may not be needed unless water supply sources will be affected by the construction works). All of the implementation of mitigation measures shall be part of the contractual works and obligation of the Contractor.
- 249.** The cost for the environmental management for construction period is tentatively estimated.

Table 27: Environmental Management Cost

Item	Quantity ⁴	Unit Cost	Total Cost	Remarks
Baseline Parametric Measurements	6	200 USD	1,200	To be conducted by the Contractor for air emissions, dust, vibratio measurements
Monthly Parametric Measurements (at least 3 sites) Noise, vibration and dust	108	200 USD	21 600	Tests to be conducted by the Contractor at 3 sites x 36 months monthly monitoring. Noise, dust and vibration should be monitored on the regular bases as well as during the peak operation of Construction Equipment and Machinery.
Environmental	36 months	2,500 USD	90 000	The costs are included in the

⁴To be established by CS Consultant and international environmental specialist.

Item	Quantity ⁴	Unit Cost	Total Cost	Remarks
Management Specialist (SC)				contract signed between UWSCG and SC and no additional costs will occur.
Environmental specialist (Contractor)	36 month	1500 USD	54.000	The costs will be included in the contract signed between UWSCG and Contractor.
E&HS Trainings	2	2500 USD	5000 USD	Training should be conducted for all prsons involved in construction process
Study of the landslide-prone areas and buildings and premises on the adjacent territories	1	15000	15000	Study should be conducted before construction activities started.
Safety Specialist	12 month	2.500	30.000	Specialist will be hired in scope of three projects took place in Chiaturaat the same time
International Environmental Consultant	50 Man/day	700	35.000	To be hired by contractor as a senior environmentalist for site env.supervision
Miscellaneous			251.80	10% for above Items
Subtotal			276980.00	Total for above

Table 28:Environmental Impacts and Mitigation Measures

Potential Negative Impacts	Mitigation measures	Responsibility	Location	Cost
Pre-Construction				Part of Construction Cost
Biological study of the project area	Prior to start construction activities, construction contractor should carry out the biological study of the project area. Results of the work submitted for consideration UWSCG.	Environmental Specialist Of Contractor	Chiatura Reservoir site; Transmission mains	Part of construction cost
Preparation of “Project Waste Management Plan”	Prior to start construction activities, construction contractor should choose the areas for disposal inert waste and prepare “Project waste management plan”. Prepared plan should be submitted to SC for endorsement and to UWSCG for approval.	Environmental Specialist Of Contractor	Chiatura Reservoir site	Part of construction cost
Preparation of “Noise Management Plan”	Prior to start construction activities construction contractor should prepare Noise SEMP for city Marneuli. Prepared plan should be submitted to SC for endorsement and to UWSCG for approval.	Environmental Specialist Of Contractor	City Marneuli	Included in Project price
SSEMP	Prior to start construction activities, construction contractor should prepare SSEMP and submit to SC for endorsement and to UWSCG for approval.	Environmental Specialist Of Contractor	Project Area	Part of construction cost
Social Issues	Put in the contract contractors responsibilities at workers hiring stage in case similar qualification to give priority local representatives.	CS	Contract documents	Project price
Possible removal of Terrestrial habitat. Loss of the top	If at the stage of the detailed biological study, there are rare or red-listed species are fixed in the project	Environmental	Construction and labour	Part of construction cost

Potential Negative Impacts	Mitigation measures	Responsibility	Location	Cost
soil	<p>area, the Construction Contractor is obliged to:</p> <ul style="list-style-type: none"> • Replant the rare or red-listed species found in the Project area and return them to their original site after the completion of the Project. • Attempt to avoid cutting down the trees in the Project zone (by considering the Project alternatives). • Develop a compensatory planting plan and submit it to the relevant bodies for approval, if it is unavoidable to cut down the trees. 	Specialist Of Contractor	camp, storage area	
A negative impact on soil, water and air may be caused because of an incorrect management of the generated inertial waste during demolishing of the existing Reservoirs. Also the generated noise, dust and vibration during demolition may cause a negative impact on the surrounding buildings and population.	<ul style="list-style-type: none"> • Before demolition of the building install dust and noise protective solid barriers; • Prohibited use of blasting equipment during the demolition process of reservoirs; • No use of heavy duty equipment is allowed; • Prior to the commencement of any activity, the Contractor shall identify whether any machinery or planned action will cause significant vibration. If the answer is yes, the Contractor is to undertake a condition survey of all structures within the zone of influence; • The Contractor shall monitor vibration at the nearest vibration-sensitive receptors at the start of and during use of non-blasting equipment causing vibration. If vibration levels are monitored and found to exceed the vibration threshold according to relevant criteria, the Contractor shall modify the construction activities until compliance with the criteria has been achieved; 	Environmental Specialist Of Contractor	Chiatura Reservoir site	Part of construction cost

Potential Negative Impacts	Mitigation measures	Responsibility	Location	Cost
	<ul style="list-style-type: none"> • Restrict demolition activities during period of the high winds or under more stable conditions when winds could nevertheless direct dust towards adjacent communities; • Using a water truck for dust suppression on all exposed areas as required; • Active areas adjacent to residents should be kept damp at all times. • Establish and enforcing vehicle speed limits to minimize dust generation; • Using tarpaulins to cover fugitive loads (for demolition concrete materials) on haul trucks moving off-site; • Select plant and equipment, design work practices, and limit hours of operation to minimize potential impacts as far as practicable; • Operators of noisy equipments or any other workers in the vicinity of excessive noisy equipment are to be provided with ear protection equipment; • Under noisy conditions, do not allow operators or other workers to be exceed the threshold that has been establish for exposure to noise; • Schedule construction so as to minimize the multiple use of the most noisy equipments near sensitive receivers; • Ensure that all equipments is in good repair and operated in the correct manner; • Consult with local residents and building owners the address community concerns; • The funds necessary for the work to be 			

Potential Negative Impacts	Mitigation measures	Responsibility	Location	Cost
	undertaken will be included in the Works contract.			
Construction				
Ambient Air and Local Dust ⁵	<ul style="list-style-type: none"> • Cover or damp down by water spray on the excavated mounds of soil to control dust generation; • Apply water prior to levelling or any other earth moving activity to keep the soil moist throughout the process; • Bring the material (aggregate and sand) as and when required; • Ensure speedy completion of work and proper site clearance after completion; • Damp down unsatisfied /bad condition roads to avoid dust generation while using for transport of waste/material • Use tarpaulins to cover loose material that is transported to and from the site by truck • Control dust generation while unloading the loose material (particularly aggregate and sand) at the site by sprinkling water/unloading inside barricaded area • Clean wheels and undercarriage of haul trucks prior to leaving construction site 	Environmental Specialist Of Contractor	Excavation areas for trenches at Chiatura town; Chiatura Reservoir site;	Part of construction cost

⁵Environmental Quality Norms approved by the Order #297N (16.08.2001) of the Ministry of Labour, Health and Social Protection (as amended by the Order No 38/n of the same Ministry of 24.02.2003). The quality of atmospheric air (pollution with hazardous matter) is also defined by the order of the Minister of Environment Protection and Natural Resources (#89, 23 October 2001) on approval of the rule for calculation of index of pollution of atmospheric air with hazardous pollution

Potential Negative Impacts	Mitigation measures	Responsibility	Location	Cost
	Don't allow access in the work area except workers to limit soil disturbance and prevent access by fencing			
	<p>The Contractor shall coordinate with local Traffic Management Department to minimize construction traffic impact in the following topics:</p> <ul style="list-style-type: none"> • Temporary parking restrictions, • Pedestrian and cyclist diversion routes where construction prevents access, • Temporary traffic signals, • One way scheme, • Maintaining local residential access at all times, • General traffic diversion routes where roads are closed. • Sound barriers should be erected at schools and hospitals if the distance to the construction site 	Environmental Specialist Of Contractor	Transportation routes of construction materials	Part of construction cost

Potential Negative Impacts	Mitigation measures	Responsibility	Location	Cost
	is less than 50 m			
Noise Pollution ⁶	<ul style="list-style-type: none"> Approximately 140 m length noise attenuation wall must be constructed at the “Marneui” and “Narimanov” reservoirs area. Maintain machinery and vehicle silencer units to minimize noise Keeps noise generating activities associated with construction activities to a minimum and within working hours. Notify the residents of Chiatura town close to the Project area prior to commencement of the construction phase. Vehicles and machinery that are used intermittently should not be left idling condition for long period of time. Equipment used on site will be quietest reasonably available. Haul routes for construction traffic entering and leaving the site will be selected to ensure noise levels at noise sensitive receptors are kept at a minimum. 	Environmental Specialist Of Contractor	Project Area	Part of construction cost
Impact on surface water bodies due to construction ⁷	<ul style="list-style-type: none"> In case of heavy rain, protect open trenches from entry of rain water by raising earthen bunds with excavated soil Confine construction area including the material 	Environmental Specialist Environmental	Project area	Part of construction cost

⁶The Georgian standards for noise control as approved by the Decree of the Minister for Health, Labour and Social Affairs (297n of August 16, 2001) upon the ‘Approval of Environmental Quality Standards’, which specify the tolerable and maximum admissible levels of noise for different zones

⁷Rules of the Protection of the Surface Waters of Georgia from Pollution

Potential Negative Impacts	Mitigation measures	Responsibility	Location	Cost
	<p>storage (sand and aggregate) so that runoff from upland areas will not enter the site</p> <ul style="list-style-type: none"> • Ensure that drains are not blocked with excavated soil 	<p>tal Specialist</p> <p>Of Contractor</p>		
Soil Contamination	<ul style="list-style-type: none"> • The contractors will be required to instruct and train their workforce in the storage and handling of materials and chemicals that can potentially cause soil contamination. • Solid waste generated during construction and at campsites will be properly treated and safely disposed of only in demarcated waste disposal sites. • Construction chemicals will be managed properly • Clearly labelling all dangerous products, • Fuel tanks (diesel or oil) should be placed in a concrete pool which its perimeter walls will be at least 1.0 m high with the concrete or plastered masonry wall, • A proper floor drain should be installed on the slab of the concrete pool for safely discharging the leakages. 	<p>Environmental Specialist</p> <p>Of Contractor</p>	<p>Construction sites</p> <p>Camp</p>	Part of construction cost
Impact on Flora and Fauna	<ul style="list-style-type: none"> • Avoid tree cutting • In unavoidable cases, plant four trees of same species for each tree that is cut for construction • In case of cut of the Red Book listed trees, Develop Compensation Action Plan and number of planted trees should be agreed on with UWSCG. 		<p>Construction site</p> <p>Camp</p>	Part of construction cost

Potential Negative Impacts	Mitigation measures	Responsibility	Location	Cost
	<ul style="list-style-type: none"> The trench shall not be kept open in the night/after working hours. This will avoid any safety risk to people, domesticated, stray or wild animals. The Contractor shall ensure that the work site be kept clean, tidy and free of rubbish that would attract animals. 			
Impact on Traffic	<ul style="list-style-type: none"> Informing all residents and businesses about the nature and duration of any work well in advance so that they can make necessary preparations if necessary; Providing wooden walkways/planks across trenches for pedestrians and metal sheets where vehicle access is required Increasing workforce to complete the work in minimum time in these stretches Initial situation of private properties has to be re-established after construction 		Construction site Access Road	Part of construction cost
Hazardous Materials	<ul style="list-style-type: none"> Comply with all national, regional and local legislation with regard to the storage, transport, use and disposal of petroleum, chemical, harmful and hazardous substances and materials. Establish an emergency procedure for dealing with spills or releases of petroleum. Storage of all hazardous material to be safe, tamper proof and under strict control. Petroleum, chemical, harmful and hazardous waste throughout the site must be stored in 		Construction site Storage Area	Part of construction cost

Potential Negative Impacts	Mitigation measures	Responsibility	Location	Cost
	<p>appropriate, well maintained containers.</p> <ul style="list-style-type: none"> Any accidental chemical / fuel spills to be corrected immediately. 			
Solid Waste	<ul style="list-style-type: none"> Place of disposal of the waste concerned must be enclosed. The waste must not have access to drainage water. Waste must be immediately removed from the working sites. Waste must be placed in secondary protective basins. This waste can be transferred only to a certified contractor. <p>The personnel involved in the handling of hazardous and non-hazardous waste will undergo specific training in:</p> <ul style="list-style-type: none"> Waste handling Waste treatment; and Waste storage. 		<p>Project area</p> <p>Storage Area</p> <p>Construction site</p> <p>Camp</p>	Part of construction cost
Loss of top soil	<ul style="list-style-type: none"> Top soil of about 1 ft depth (0.3 m) shall be removed and stored separately during excavation work, and after pipeline construction the same soil shall be replaced on the top. 	Contractor	Pipeline work in pasture lands, agricultural land	Part of construction cost
Erosion due to excavation/refilling	<ul style="list-style-type: none"> Ensure proper compaction of refilled soil and there shall not be any loose soil particles on the top; the material shall be refilled in layers and compacted properly layer by layer. In the steep slopes, local grass species shall be planted on the refilled trenches. 	Contractor	All construction sites	Part of construction cost
Impact on air quality due to	<ul style="list-style-type: none"> Ensure that all equipment & vehicles used for 	Environmen	Chiatura town	Part of construction cost

Potential Negative Impacts	Mitigation measures	Responsibility	Location	Cost
emissions from construction equipment/vehicles	<p>construction activity are in good condition and are well maintained</p> <ul style="list-style-type: none"> • Ensure that all equipment & vehicles confirms to emission and noise norms 	<p>tal Specialist</p> <p>Of Contractor</p>	Chiatura Reservoir site	
Socio-economic benefits from employing local people in construction work	<ul style="list-style-type: none"> • To the extent possible labour force should be drawn from the local community 	<p>Environmental Specialist</p> <p>Of Contractor</p>	All construction sites	Part of construction cost

Potential Negative Impacts	Mitigation measures	Responsibility	Location	Cost
Impacts due to import of labour and establishment of temporary labour camps	<ul style="list-style-type: none"> • In unavoidable case of sourcing labour from other areas, provide adequate housing facilities so that there are no impacts and conflict with the local people: <ul style="list-style-type: none"> - Establish temporary labour camps in consultation with the local authority - Shall be located away from water bodies - No clearance of trees vegetation shall be allowed for establishment of camp - Provide all basic amenities (water supply and sanitation, waste collection & disposal, first aid facilities, etc.) - Contractor shall provide fire wood and no worker shall be allowed to cut any tree - Ensure regular and clean maintenance of the camp 	Environmental Specialist Of Contractor	Temporary labour camps	Part of construction cost
Safety risk – public and worker	<ul style="list-style-type: none"> • Follow standard and safe procedures for all activities – such as provision of shoring in deep trenches (>2 m) • Exclude public from the site – enclose construction area, provide warning and sign boards, security personnel • Provide adequate lighting to avoid accidents • Ensure that all workers are provided with and use appropriate Personal Protective Equipment - helmets, hand gloves, boots, masks, safety belts (while working at heights etc.); • Maintain accidents records and report regularly • Trench construction shall be taken up in small segments, so that work (excavation, pipe laying 	Environmental Specialist Of Contractor	All construction sites	Part of construction cost

Potential Negative Impacts	Mitigation measures	Responsibility	Location	Cost
	and refilling) in each segment is completed in a day. No trenches shall be kept open in the night/after work hours.			
Historical, archaeological chance finds during excavation	<ul style="list-style-type: none"> Contractor shall put in place a protocol for conducting any excavation work, to ensure that any chance finds are recognized and measures are taken to ensure they are protected and conserved. This should involve: <ul style="list-style-type: none"> Having excavation observed by a person with archaeological field training; Stopping work immediately to allow further investigation if any finds are suspected; Calling in the state archaeological authority if a find is suspected, and taking any action they require to ensure its removal or protection in situ. 	Environmental Specialist Of Contractor	All construction sites	Part of construction cost
Cumulative impacts – repeated disturbance to roads and people	<ul style="list-style-type: none"> Schedule the construction activities in harmony with the other on-going works Schedule works before road work 	Environmental Specialist Of ContractorS C	Works on waste water supply network in the town	Part of construction cost
Climate Change	<ul style="list-style-type: none"> Restoration of the wind break belts in the area adjacent to the Project zone what will reduce the soil erosion potential and will help regulate the temperature regime during the high air temperatures; 	Environmental Specialist Of Contractor	Construction area	Part of construction cost
Operation Phase				

Potential Negative Impacts	Mitigation measures	Responsibility	Location	Cost
Health and Safety Hazards for UWSCG workers and the public	<ul style="list-style-type: none"> • Ongoing training programs for first aid and Occupational Health and Safety training to • Undertake periodic inspections of electrical equipment by qualified staff and periodic safety audits 	UWSCG	Well field, water network	Part of operating costs
Sustainability of Infrastructure Efficiency and reliability of water supply systems	<ul style="list-style-type: none"> • Provide training for water network and metering repair training • Provide O&M training for water and sewer distribution networks; maintaining pressures and detecting leaks • Provide adequate budgets and undertake planned maintenance programs in accordance with specific O&M plans • Provide vocational training for UWSCG staff • Undertake planned cleaning of town drains and dispose of sludge to designated disposal sites 	UWSCG	Well field, water network	Part of operation costs
Disturbance/ nuisance/ noise due to operation activity	<ul style="list-style-type: none"> • Consulting company has to define the noise level and its spreading area generated at the stage of pumping stations operation; • Additional changes will have to be included in the design if required and also noise reducing barriers will have to be arranged 	UWSCG	pumping stations area	Part of operation costs

I.5 Monitoring

- 250.** Monitoring describes (a) monitoring measures with technical details, including parameters to be measured, methods to be used, sampling locations that will signal the need for corrective actions; and (b) monitoring and reporting procedures to ensure early detection of conditions that necessitate particular mitigation measures and document the progress and results of mitigation.
- 251.** A program of monitoring will be required to ensure that all concerned agencies take the specified action to provide the required mitigation, to assess whether the action has adequately protected the environment, and to determine whether any additional measures may be necessary. Regular monitoring of implementation measures by Contractors will be conducted by the SC, on behalf of Implementing Agency. Monitoring during operation stage will be conducted by the UWSCG.
- 252.** Most of the mitigation measures are fairly standard methods of minimizing disturbance from building in urban areas (maintaining access, planning work to minimize public inconvenience and traffic disruptions, finding uses for waste material, etc). Monitoring of such measures normally involves making observations in the course of site visits, although some require more formal checking of records and other aspects. The regular control and inspection during general construction activities in Chiaturais needed.

Table 29:Environmental Monitoring Plan for general construction activities in Chiatura

Item	Parameter	Frequency	Action Level	Response When Action Level Exceeded	Responsibility
Pre construction					
Tender documentation	Environmental Issues	Once before bid announcement	Environmental revision of bidding documents to ensure relevant sections of the EMP have been included	The bidding document shall reflect all environmental mitigation measurements	UWSCG SC
Contract documentation with contractor	Environmental Issues	Once before contract signature	Environmental Revision of contract documents to ensure relevant sections of the EMP have been included	The contract document shall reflect all environmental mitigation measurements	UWSCG SC
Contract documentation with construction contractor	Environmental Issues	Once before contract signature	Environmental audit of contract documents to ensure relevant sections of Noice SSEMP for city Marneuli have been included.	The contract document shall reflect all environmental mitigation measurements	SC
Contract documentation with construction contractor	Social Issues	Once before contract with construction company signed	Ensure relevant section of contractorsresponsibilities to hire local population have been included in contract.	50 % of workers shoul be hired from local population.	SC
Contractor prepared all necessary environmental management plans and conducted all requested investigations	Environmental Issues	Once before contract signature	Environmental Revision of the environmental plans prepared by contractor	All environmental plans were prepared and approved by relevant organizations.	UWSCG SC

Item	Parameter	Frequency	Action Level	Response When Action Level Exceeded	Responsibility
Construction					
Ambient Air	Dust	Continual Dust should be monitored on the regular bases as well as during the peak operation of Construction Equipment and Machinery	Visual assessment during the Works Measuring at nearest potentially sensitive receivers.	If dust levels are above acceptable visual levels, implement dust suppression techniques (wetting down area) and/or assess weather conditions and maybe temporarily cease works until conditions ease	Contractor SC
Noise	Noise Levels	Periodic attended Monitoring at hourly Intervals. Noise, should be monitored on the regular bases as well as during the peak operation of Construction Equipment and Machinery	Measuring at nearest potentially sensitive receivers.	If noise action level is exceeded then review work practices and noise control procedures, including maintenance of equipment, installation of silencers, provision of noise barriers and modification of work hours.	Contractor SC
Vibration	Vibration level	Periodic attended Monitoring at hourly Intervals. Vibration should be monitored on	Measuring at nearest potentially sensitive receivers.	If vibration level is exceeded then review work practices, maintenance of equipment.	Contractor SC

Item	Parameter	Frequency	Action Level	Response When Action Level Exceeded	Responsibility
		the regular bases as well as during the peak operation of Construction Equipment and Machinery			
Water Quality	Quality/ Contaminant concentrates	Continue In rain weather after 10-15 minits rain stats.	Guideline / licence requirements (whichever is Applicable) Impact Monitoring Compliance Monitoring	If contaminant concentrations/licence conditions are exceeded, review disposal options and decide on most applicable. Report any accidences of licence (of applicable) to issuing authority.	Contractor SC
Waste Management Implications	Segregation, Storage and transport of wastes	Daily inspection	<ul style="list-style-type: none"> - Visual assessment during the Works; - Field inspection, - Report of waste volumes generated. - Report and record all leakages and spills - Impact Monitoring. - Compliance Monitoring 	Solid waste cycled as 0 % of movement of solids or liquid waste through the soil, rocks, water, atmosphere.	Contractor SC
Ground	Soil Monitoring and Erosion Control	Continual	Assess adequacy of sedimentation/environmental controls on-site Impact Monitoring	If controls have failed or are found inadequate, cease works immediately and repair to an acceptable standard	Contractor SC
Ecological Resources	Fauna and Flora	Continual	Minimal ecological impacts Impact Monitoring	Required to ensure the recommended mitigation	Contractor SC

Item	Parameter	Frequency	Action Level	Response When Action Level Exceeded	Responsibility
				measures are properly implemented.	
Landscape and Visual	Surface treatment of temporary structures	Once at the Completion of work	Minimum disturbance of the original landscape. Impact Monitoring	Required to ensure the recommended mitigation measures are properly implemented	Contractor SC
Operation					
Conduct source water quality monitoring	As per the government regulations	1 sample from each borehole	Comparison with the base values and standards as per government regulations	Required to ensure the recommended mitigation measures are properly implemented.	UWSCG
Treated water quality monitoring	As per the government regulations	At the outlet of chlorination plant; at reservoir sites; and at extreme points of network in various locations in town	Comparison with the base values and standards as per government regulations	Required to ensure the recommended mitigation measures are properly implemented.	UWSCG

K. CONCLUSION AND RECOMMENDATION

K.1 Recommendation

- 253.** The environmental impacts of infrastructure elements proposed in the water supply system improvement subproject in Chiaturahave been assessed and described in the previous sections of this document. Potential negative impacts were identified in relation to design, location, construction and operation of the sub project components. Mitigation measures have been developed to reduce all negative impacts to acceptable levels.
- 254.** Mitigation measures were discussed with engineering specialists, and some measures have already been included in the designs.
- 255.** Regardless of these and various other actions taken during the IEE process and in developing the project, there will still be impacts on the environment when the infrastructure is built and when it is operating. Appropriate monitoring measures to guarantee the long term and sustainable operation of the water supply system are presented in a monitoring plan.
- 256.** When operating, water supply components will have overall beneficial impacts to human health and the environment as it will provide the inhabitants of Chiaturawith a new water supply system
- 257.** The main beneficiaries of the improved system will be the citizens of Chiatura, who will be provided with a new water supply system. This will improve the quality of life of people as well as raising the standards of both individual and public health as the improvements in hygiene should reduce the incidence of disease. This should lead to economic gains as people will be away from work less and will spend less on healthcare, so their incomes should increase.
- 258.** Mitigation will be assured by a program of environmental monitoring conducted during both construction and operation to ensure that all measures are provided as intended, and to determine whether the environment is protected as envisaged.
- 259.** The recommendation of this Environmental Assessment process is that all mitigation, enhancement and monitoring activities proposed here shall be implemented in full. This is essential to ensure that the environmental impacts are successfully mitigated; this is the responsibility of UWSCG.

K.2 Conclusion

- 260.** The environmental impacts of the proposed water supply system components have been assessed by the Initial Environmental Examination reported in this document.
- 261.** An Environmental Management Plan (EMP) has been prepared and will be implemented during the project implementation. The EMP identifies the potential environmental impacts arising from the project along with a set of the mitigation measures to reduce the impacts to acceptable levels. It also includes the institutional arrangements for implementing the EMP to ensure its effectiveness.
- 262.** The overall conclusion of the IEE is that provided the mitigation and enhancement measures are implemented in full, there should be no significant negative environmental impacts as a result of location, design, construction or operation of the subproject. There should in fact be positive benefits through major improvements in quality of life and individual and public health once the scheme is in operation.. Project will stimulate economic growth. The water good quality is a prerequisite for tourism development.

Standard of individual and public health will improve as a result of the project. Project will generate new job opportunities.

ANNEX 1

LCC “United Water Supply Company of Georgia”

Improving the Water Supply System in Chiatura

Initial Environmental Examination
(ChiaturaCity Hall; 08 June, 2016; 12:00AM)

Minutes of Public Hearings

Chiatura

08.06.2016

Meeting Agenda

263. The Public Hearing for ChiaturaWS project was held on 08 June, 2016 in ChiaturaCity Hall, commencing at 12:00 p.m.
264. Public Hearing have been attended by the representatives of UWSCG, local Service Center, UWSCG/USSIP environmental specialist, Environmental Specialist of supervision consultant (Eptisa), local government and local population.
265. The PowerPoint presentations were held by Ketevan Chomakhidze (UWSCG/USSIP environmental specialist). The full information for local residents and attendees have been presented by consultants about projected activities and described the project nature and estimated impacts as a result of this project implementation.
266. Local government, Local NGO, local residents and the representatives of UWSCG and Environmental Specialist of supervision consultant (Eptisa) held discussions about particular issues during the meeting.
267. **Consultation with affected population was undertaken:** to ensure their informed participation in the design, implementation and monitoring of the project measures and their impacts on the environment, as well as the efforts to minimize and the mitigate impact when avoidance is not possible; to introduce the project benefits to the local population that accrue to them as a result of project implementation; to incorporate all relevant views of affected people and other stakeholders into decision making, such as project design, mitigation measures, the sharing of development benefits and opportunities, and implementation issues.
268. **The following topics were discussed during the meeting:**
 - project context and rationale
 - expected start and end of the project
 - benefits of the project to local population and to the country as a whole
 - the environmental issues and mitigated measures related to the project
269. Local residents and the representatives of UWSCG held hard discussions about particular issues during the meeting.
270. The Following questions have been asked from the local population:

#	Questions from local residents	Answers from the United Water Supply Company of Georgia
1	Is there already available tentative deadlines and timeline for project defined?	Project tentatively will start in early 2017 and finish in 2019.
2	Will local population employed by contractor?	Yes. Contractor will ensure involvement of local population in construction works.
3	What will be Socio Economic Impacts of the Project?	<p>Project will generate new job opportunities. Standard of individual and public health will improve as a result of the project.</p> <p>Improvements of hygiene conditions will reduce the incidence of diseases associated with poor sanitation.</p>
4	Does project include rehabilitation of water and sanitation system as well?	This particular public hearing is devoted to the rehabilitation of the water supply system in Chiatura. The subproject for waste water system rehabilitation is also envisaged under USIIP
5	Do we get water from Sachkhere after rehabilitation?	Yes, As of preliminary design project Chiatura will get water from Sachkherewellfields
6	Will rehabilitation cover whole town of Chiatura?	Yes. 24 hours high quality water supply for whole population of Chiatura
7	What mitigation measures will be taken to minimize the impact?	Providing prior information to public; planning transport routes/schedules carefully and awareness creation in drivers; Following standard and safe procedures for public and worker safety; avoiding nighttime construction activities; avoiding tree cutting through location alignment changes;
8	Will seismic conditions and standards followed within project design?	Yes. Project design will consider seismological condition of Chiatura
9	What type of impact on environment is associated with the project?	<p>Environmental impacts that are associated with the project are only site specific.</p> <p>Impacts are mostly confined to the construction stage of the project and are therefore temporary. For permanent environmental impacts during</p>

		operation stage, suitable mitigation measures will be implemented
10	How will the disturbance addressed coming from noise and dust during construction process?	Specific mitigation measures will be undertaken to minimize impact on the local population such as: providing prior public information; planning transport routes/schedules carefully and awareness creation in drivers; avoiding nighttime construction activities; watering of streets (sites) regularly, covering with tarpaulin of vehicles, etc.
11	Is it possible to get preliminary project documents electronically?	Yes. Project documents will be available at the UWSCG webpage. Webpage address and contact information was highlighted by Powerpoint presentation
12	Will the final project design agreed with the Municipality before its approval so that possible alternatives and complicated segments are discussed	Discussions will be continued with local government to agree on details of the design
13	Municipality has envisaged to rehabilitate some parts of infrastructure of Chiatura town by its own budget, it is desired to know project design in advance to avoid double work and expenditures (cumulative effect)	Since project design and all specifics will be agreed with local government, it is suggested that local infrastructure planning is considered and adjusted
14	Who is the project implementing body and what is the structure of project management?	Project Executive Agency is the Ministry of Regional Development and Infrastructure of Georgia. Implementing Agency is the UWSCG Project will be implemented based on the international tender by the contractor and supervised by the supervision consultant

- 271.** Local population noted the importance of the rehabilitation of the water supply system in Chiatura, however, expressed concern that it would be better that the project is carried out in conjunction with the other infrastructure rehabilitation activities such as rehabilitation of roads, wastewater supply network in Chiatura, because in this case people are less likely to be disturbed.
- 272.** Representative of local NGO – “Chiatura Union” express its high support to the topic and particular project for its implementation.

ჭიათურის წყალმომარაგების სისტემის გაუმჯობესების ქვეპროექტი
Improvement of Chiatura Water Supply System Sub-project

საჯარო განხილვა

Public Hearing

(ჭიათურის მუნიციპალიტეტის გამგეობა)

8 ივნისი 2016

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