Draft Initial Environmental Examination

July 2016

GEO: Urban Services Improvement Investment Program – Tranche 4
(Improvement of Gudauri 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.

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	**-**	Multitranche 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
WS		Water Supply
WWTP	**-**	Waste Water treatment Plant

A. EXECUTIVE SUMMARY

1. It is proposed to improve the water supply system in Gudauri under the Asian Development Bank (ADB) funded Urban Services Improvement Investment Program, which is under preparation stage. This Investment Program, implemented in eleven 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 2018. 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 11 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. Gudauri is located 120 km from Tbilisi. Gudauri is one of the most important skiing resorts in Georgia at over 2 000 meters above sea level. Resort is very popular from foreign tourists and also, as it is quite near to Tbilisi – capital of Georgia, its popularity is increased every year.

5. 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).

6. Gudauri water supply and sanitation systems were built around 40 years ago, when the first big resort was constructed, called “Marco Polo”. They constructed water supply and sanitation system.

7. Water is abstracted from surface water and drainages in two points.

8. From one point, 6 l/s is collected at 2370 meters above sea level. It comes by 200mm diameter with plastic pipe with length of 2 km.

9. At second collection point, it joins with 400mm steel pipe with length of 3 km. Finally, by 300mm diameter steel pipe with the length of 850 m, it reaches to 500 cub.m reservoir. At that point, plus 34 l/s is reaching reservoir. In total, in the winter season, 40 l/s is entered in the reservoir. In summer, abstraction is around 80 l/s, but there is no as big consumption, as in winter.

10. From 500 cub.m reservoir, several pipes are coming out.

1. Going to 100 X 2 cub.m reservoirs.
2. Going to other small reservoirs – 80 X 2, 250 X 2, 300 cub.m reservoirs.
3. Directly going to hotels.

Besides, from small reservoirs, hotels are directly connected with different diameters of pipes.

11. Pipes are not installed according to standards, acceptable depth is not ensured. In order to avoid freezing pipes and all internal water supply system.

12. As for sewage systems, there is one main collector, where hotels are connected. Originally, Sewage Treatment Plant was constructed in Gudauri, in order to ensure discharge of treated water in the River. Sewage Treatment Plant is not under operation now, because, it's not functional any more.

13. The Construction 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) Inert waste management plan, (iii) Site-Specific Environmental Management Plan (SSEMP) (iv), „Reinstatement management Plan".

14. 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.

15. 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 July 24, 2016, 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.

16. UWSCG if 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.

17. 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 wastewater 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.

B. POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK

18. 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

19. 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.

20. 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.

21.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.

22. The Gudauri WS subproject has been classified as environmental assessment category B) according to the criteria laid down in the checklist for water supply projects of the ADB's Environmental Assessment and Review Framework (November 2010) that was especially prepared for the environmental assessment of the Georgia Urban Services Improvement Investment Program.

23. *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.1.1. International Standards

B1.1.1 Ambient Air Quality

24. Projects with significant[1] sources of air emissions, and potential for significant impacts to ambient air quality, should prevent or minimize impacts by ensuring that:

- Emissions do not result in pollutant concentrations that reach or exceed relevant ambient quality guidelines and standards by applying national legislated standards, or in their absence, the current WHO Air Quality Guidelines (see Table 1), or other internationally recognized sources;Emissions do not contribute a significant portion to the attainment of relevant ambient air quality guidelines or standards. As a general rule, this Guideline suggests 25 percent of the applicable air quality standards to allow additional, future sustainable development in the same airshed.

Table 1 : WHO Ambient Air Quality Guidelines		
	Averaging Period	Guideline value in mg/m3
Sulfur dioxide (SO_2)	24-hour 10 minute	125 (Interim target) 500 (guideline)
Nitrogen dioxide (NO_2)	1-year 1-hou	40 (guideline) 200 (guideline)
Particulate Matter PM10	1-year 24-hou	70 (Interim target) 150 (Interim target)
Particulate Matter PM2.5	1-year 24-hour	35 (Interim target) 75 (Interim target)
Ozone	8-hour daily maximum	160 (Interim target) 100 (guideline)

1.1.2 Noise

25. 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.

26. Noise impacts should not exceed the levels presented in Table 2, or result in a maximum increase in background levels of 3 dBat the nearest receptor location off-site.

Table 2 Noise Level Guidelines

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

1.1.3 Water Quality Standards

[1] Significant sources of point and fugitive emissions are considered to be general sources which, for example, can contribute a net emissions increase of one or more of the following pollutants within a given airshed: PM10: 50 tons per year (tpy); NOx: 500 tpy; SO2: 500 tpy; or as established through national legislation; and combustion sources with an equivalent heat input of 50 MWth or greater. The significance of emissions of inorganic and organic pollutants should be established on a project-specific basis taking into account toxic and other properties of the pollutant;

27. Many developed countries specify standards to be applied in their own country. In Europe, this includes the European Drinking Water Directive and in the USA the United States Environmental Protection Agency (EPA) establishes standards as required by the Safe Drinking Water Act. For countries without a legislative or administrative framework for such standards, the World Health Organisation publishes guidelines on the standards that should be achieved.

28. The following table 3 provides a comparison of a selection of parameters for concentrations listed by WHO, the European Union, EPA.

Table 3 water quality standarts

parametr	World heals Organzation	European Union	EPA
Antimory	ns	5.0 µg/l	6.0 µg/l
Arsenic	10µg/l	10µg/l	10µg/l
Barium	700µg/l	ns	2 mg/L
Benzene	10µg/l	1.0 µg/l	5 µg/l
Boron	2.4mg/l	1.0 mg/L	-
Cadmium	3 µg/l	5 µg/l	5 µg/l
Chromium	50µg/l	50 µg/l	0.1 mg/L
Copper	-	2.0 mg/l	TT
Epichlorohydrin	-	0.10 µg/l	-
Fluoride	1.5 mg/l	1.5 mg/l	4 mg/l
Lead	-	10 µg/l	15 µg/l
Mercury	6 µg/l	1 µg/l	2 µg/l
Nickel	-	20 µg/l	-
Nitrate	50 mg/l	50 mg/l	10 mg/L (as N)
Nitrite	-	0.50 mg/l	1 mg/L (as N)
Pesticides (individual)	-	0.10 µg/ l	-
Pesticides — Total	-	0.50 µg/l	-
Polycyclic aromatic hydrocarbons	-	0.10 µg/	-
Selenium	40 µg/l	10 µg/l	50 µg/l
Tetrachloroethene and Trichloroethene	40µg/l	10 µg/l	“

B.2 Georgian Law

B.2.1 Framework Legislation

29. 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.

30. 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.”

31. 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.

32. 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.

33. 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 eco-systems 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.

34. 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;

35. **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 Protection and Natural Resources.

36. 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 Permit.

37. 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.

38. 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.

39. 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.

40. **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 Mitigationmeasures are listed for anticipated impacts.

B.2.2 Environmental Quality Standards and Norms

41. 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

42. Georgian standards for noise control are set in the Decree of the Minister of Labour, Health and Social Affairs (No.297n of August 16, 2001) on 'Approval of Environmental Quality Standards', which specifies the tolerable and maximum admissible levels of noise for different zones.

Table 5. Georgian Admissible Equivalent and Maximum Sound Levels, 2001

Type of area, Time	Equivalent sound levels, dBA	Maximum sound level, dBA
Areas bordering residential houses, schools and other educational institution buildings		
7 AM - 11 PM	55	70
11 PM - 7 AM	45	60
Areas bordering hospitals		
7 AM - 11 PM	45	60
11 PM - 7 AM	35	50

43. 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.

44. 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 is soils are given in the Table 6

Table 6. Maximum admissible concentrations of various substances and elements is 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

45. Georgian legislation does not regulate quality standards for groundwater. Quality of groundwater is regulated by norms set for potable water.

46. Potable water quality criteria are determined by technical regulations on potable water (Government Regulation N 58 from Jenuary 15, 2014 Potable water quality criteria are given in table7

Table 7 Potable Water Criteria

Index	Measuring unit	Standard not more than:
Common characteristics		
Hydrogen index	PH	6-9
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	O,05

B.2.3 Licenses& Approvals Required

47. 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.

48. The components of the proposed water supplysystems subproject in Gudauri are not notified in the Law on EIP and therefore environmental impact permit is not required.

49. The requirements related to EIA studies and the EIA report is set forth in the Order N31 of 15 May 2013 of MoENRP.

50. 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 end.Angered 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) Rag 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 ნ) Reg. No - 370.010.000.05.001.000.080

1996	System of Protected Ares (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

51. 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 (UNFCC) (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).

B.2.3 Administrative Structure in Georgia

52. 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

53. 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.

54. 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.

55. 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.

56. 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.

57. 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

58. The above accounts of national environmental low 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.

59. 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.

60. 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).

61. 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'sguidelines require EMPs for all categories of projects and provide detailed instructions on the content

62. 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.

63. 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.

64. 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.

65. 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	ADBRequirements
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

66. 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

67. 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 new reservoirs.

C.2 Need of the Project

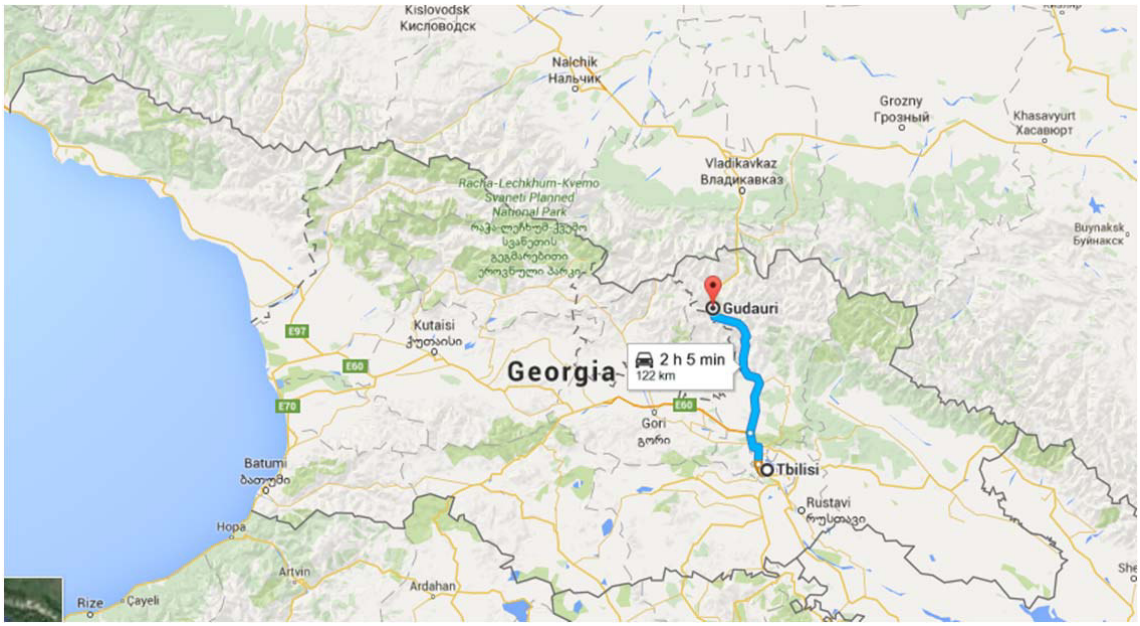
68. As discussed earlier, the service level of urban water supply and waste water treatment at present is not satisfactory in Georgia. Services are not available to the entire population and the serviced areas suffer with inefficient service levels. Systems are old and inefficient. The situation is no different in the program town of Marneili. Untreated sewage infiltrates into the underground and pollutes into rivers. The WSS project is needed because the present water supply infrastructure in Gudauri is inefficient and inadequate to the needs of the growing population and tourists.

69. The present water supply system covers about 90 % of urban and 60 % of rural population. In Gudauri, one of the reasons for dissatisfaction of tourists in Gudauri is related to intermittent water supply and sanitation problems. This is one of the reasons also, that new hotels can't work properly, which interrupts development of tourism in Gudauri.

C.3 General Information

70. Gudauri is located 120 km from Tbilisi. Gudauri is one of the most important skiing resorts in Georgia at over 2 000 meters above sea level. Resort is very popular from foreign tourists and also, as it is quite near to Tbilisi, its popularity is increased every year.

Map 1: Project Area



C.4 Existing Water Supply Facilities

C.4.1 Water Sources and Transmission System

71. Gudauri water supply and sanitation systems were built around 40 years ago, when the first big resort was constructed, called “Marco Polo”. They constructed water supply and sanitation system.

72. Water is abstracted from surface water and drainages in two points. From one point, 6 l/s is collected at 2370 meters above sea level. It comes by 200mm diameter with plastic pipe with length of 2 km. At second collection point, it joins with 400mm steel pipe with length of 3 km. Finally, by 300mm diameter steel pipe with the length of 850 m, it reaches to 500 cub.m reservoir. At that point, plus 34 l/s is reaching reservoir. In total, in the winter season, 40 l/s is entered in the reservoir. In summer, abstraction is around 80 l/s, but there is no as big consumption, as in winter.

C.4.2 Reservoirs

73. From 500 cub.m reservoir, several pipes are coming out.

1. Going to 100 X 2 cub.m reservoirs.
2. Going to other small reservoirs – 80 X 2, 250 X 2, 300 cub.m reservoirs.
3. Directly going to hotels.

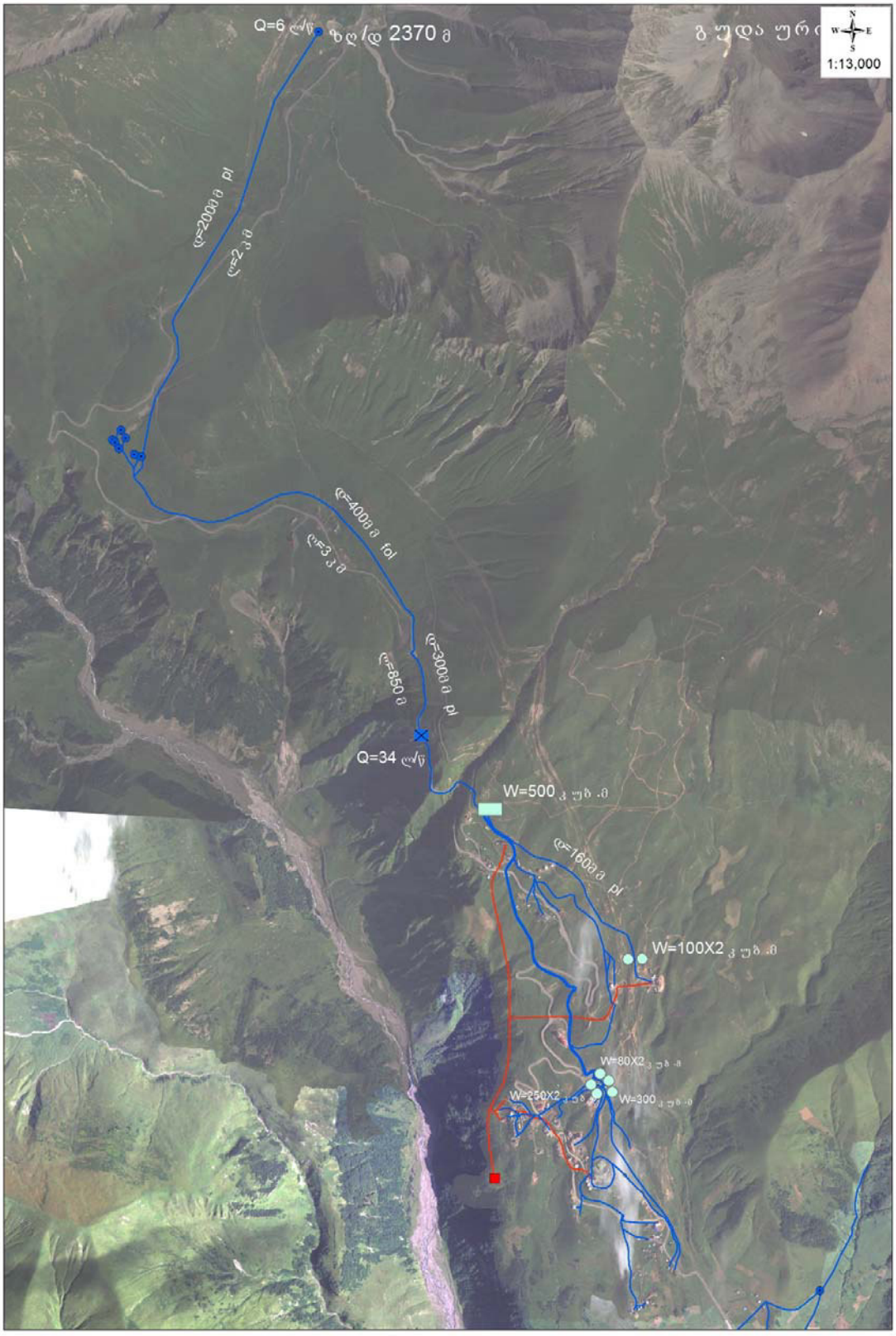
Besides, from small reservoirs, hotels are directly connected with different diameters of pipes.

Figure 1: Existing Reservoir

C.4.3 Distribution Network

74. Pipes are not installed according to standards, acceptable depth is not ensured. In order to avoid freezing pipes and all internal water supply system. Customers are not metered, therefore, consumption of big amount of water doesn't affect on their water bill.

Figure 2: Existing Water Supply Headworks, Reservoirs and Network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C.5 Projected Water Demand up to 2044

75. The water supply network will cover the whole area and also, it will be covered by sewage system, to be financed under Tranche 3.

76. Government of Georgia is working to adopt Gudauri development master plan. Currently, document is under finalization.

77. According to development plan, there will be following number of consumers:

- Local residents and employees living in Gudauri resort – 5,000.
- Overnight accommodation guests (hotels, guesthouses, apartments, townhouses, etc.) – 15,000.

78. For the calculation of the potable water requirements, applicable amount of required water is approximately 400 Litres/Day for overnight guests or local residents. This assumes that new efficient water saving fixtures are used in the hotels and apartments etc. I was assumed a peak period pillow occupancy of 75% for the calculations that we sent you last week for the potable water. Therefore, required amount of water for 20,000 pillows are:

20,000 X 75% X 400 l/day = 6,000,000 l/day.

79. Besides, overnight users, there will be day use visitors, plus parking and shuttle buses. They will go to Gudauri and come back the same day, without staying in Gudauri, either coming back to Tbilisi, or to other resort. As an average, such customers use approximately 40 l/day. According to development plan, 7,500 day users are considered in Gudauri. Water demand for them is 7,500 X 40 = 300,000 l/day.

80. In total, water demand for Gudauri, for 2045 will be 6,300,000 litres per day. To compare with existing water abstraction, there will be shortage in water supply. Namely, current abstraction is: 3,456,000 l/day. Additional 2,844,000 litres are required per day.

C.6 Design of Water Supply Network

81. The project measures for the improvement of the water supply system will include the construction of:
• Reservoir
• Transmission mains
• Distribution Network

82. The transmission mains and reservoirs connect the water source with the distribution network and ensure the constant supply of the network with sufficient pressure.

C.6.1 Reservoirs

83. In the present project, the following measures will be implemented:

- Construction of one new 1000 cub.m reservoir

C.6.2 Distribution Network

84. There will be constructed new water supply distribution network, with around 40km length, according to development plan of Gudauri.

Table 10: New Distribution Network

Pipe Diameter (mm)	Pipe Length (m)
OD 25-75	1.425
OD 110	20.785
OD 160	7.855
OD 225	2.840
OD 250	4.830

C.7 Disinfection

85. The disinfection of the raw water per chlorination is considered under sub-project.

86. Due to long flow time of the raw water, additional chlorination stations are foreseen at the reservoir site.

87. Sodium hypochlorite or Mixed Oxygen System can be used for disinfection.

88. The appropriate dosages have to be set up in the initial operation period, The chlorine will be dosed at the inflow of the clear water tank, controlled by a chlorine measuring device (measuring point e.g. situated at the outflow), Dosage amounts of 0.2 – 0.5 mg/l chlorine should be sufficient, in order to guarantee chlorine residues of > 0.1 mg/l in the distribution system.

D. DESCRIPTION OF THE ENVIRONMENT (BASELINE DATA)

D.1. General

89. 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 Gudauri water-supply Project and evaluate their scales.

D.2 Physical Resources

D.2.1 Atmosphere

90. Gudauri is located in mountainous area and is ski resort.

Table 11: Atmospheric air temperature, C^0

Month	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	average	Max	Min
	-1	-2	0	5	10	15	19	21	18	9	2	-4	7.6	21	-4

D.2.2. Ambient Air Quality

91. According to the visual audit results, no stationary sources contributing to ambient air contamination are located within the study area. The quality of the ambient air in the study area may be affected by exhaust gases produced by machinery and transportation means operating in the sites of the nearby container terminals and production facilities, as well as by the vehicles moving along the city bypass road. It is obvious that no air quality gauging stations exist in Gudauri for years, and therefore practically no air quality data are available for the project impacted area. Due to such situation, it was found reasonable to apply the methodology approved by the Ministry of Environment and Natural Resources of Georgia (РД 52.04,186-89). This methodology recommends application of the population-based approach for evaluating the baseline ambient air condition for the areas lacking any observation data (**Table 26**).

Table 12: Recommended baseline pollution levels by population quantities

Population ('000 persons)	Baseline pollution level, mg/m^3			
	NO_2	SO_2	CO	Dust
250-125	0.03	0.05	1.5	0.2
125-50	0.015	0.05	0.8	0.15
50-10	0.008	0.02	0.4	0.1
<10	0	0	0	0

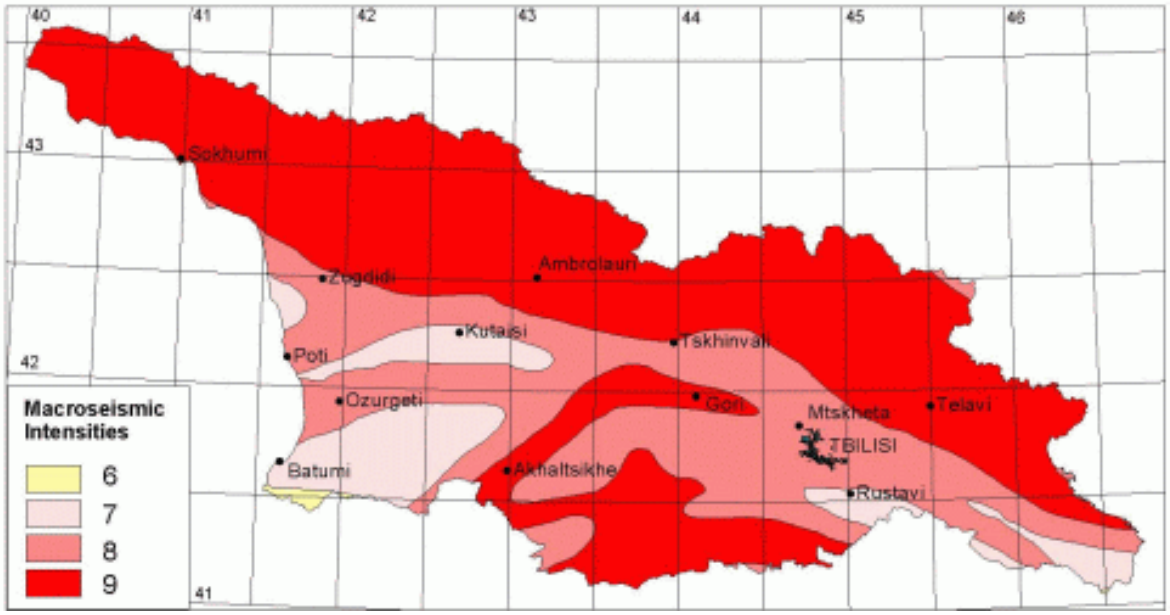
92. The baseline pollution data required for estimating the ambient air impact were determined based on the above methodology with consideration of Gudauri's population and tourists (50-10 thousands, specifically:

- Nitrogen dioxide: 0.008 mg/m^3;
- Sulphur dioxide: 0.02 mg/m^3;
- Carbon oxide: 0.4 mg/m^3;
- Dust: 0.1 mg/m^3.

D.2.3.Seismicity

93. Gudauri area is located in the active seismic zone. Due to this, the facility 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 9 (MSK 64 scale).

Map 2: Seismic Zone Ma p of Georgia



D.2.4 Soil Covers

94. Brown soils (Eutric cambisols Calcic kastanozems) are spread at 500-1200 masl, mostly on carbonate rocks, and are carbonate consequently. These soils have a clearly formed profile, with a dark accumulative or humus horizon with the depth of 20-30 cm. The soil structure is bean-cloddy, with a heavy loamy content, skeletal, with favorable drainage, highly productive and intensely cultivated. Due to inexpedient exploitation (excess irrigation, mistakes during the land cultivation) the brown soils are being degraded intensely.

95. Solonchaks. This type of soils on the territory of Gudauri is presented by solonchaks and solonetzs. The solonchaks contain more or less solubale salts in the profile, while the absorbed sodium is accumulated in the colloid complex of solonetzs. These two soil categories of salination are closely associated in a genetic respect. Most of the salinated soils contain both, soluble salts and sodium cation accumulated in the absorbing complex. The salination process is associated with the delluvial-prolluvial phenomena taking place here in the past – the weathering products removed from the salt-containing rocks of lagluja ridge by the temporal water currents cause soil salination on the inclined surface of the piedmont zone. As a result, solonchaks are formed. As for the solonetz formation, this process is associated with the desulfitation of the sulphates accumulated in the soil in great amounts. Within the limits of Gudauri, there are slightly, averagely and intensely salinated soils spread.

96. Most of the soils on the territory of Gudauri Municipality have lost their natural appearance and are being degraded to various degrees. This, first of all, is seen in their degraded physical-mechanical, chemical and microbiological properties and reduced productivity.

D.2.5 Hydrographic Network

97. The river Aragvi flows on the territory of the Gudauri. The river Aragvi penetrates the territory of the Gudauri from north-west and it crosses this part of mountainous region.

98. There are no lakes on the territory of the Gudauri.

D.2.6 Biodiversity

99.**Flora**: More plain and valley vegetation dominates on the territory of the Gudauri. The vegetation of beard-and-feather-grass and thornbush-thorny steppes, sparse hemixelous vegetation and floodplain and semi-desert vegetation is spread here.
Petrosimonia brachiata, wormwood and Salsola dendroides are typical for semi-deserts. The sub-forest is formed by tamarisk, medlar, sea-buckthorn, cornel, wild plum, hawthorn, etc. The vegetation cover on Gudauri plain is dominated by beard-grass, beard-grass- wormwood, beard-grass and thornbush-thorny and Salsoleta nodulosae vegetation. At some places, there is semi-desert vegetation growing here as well. Iagluja hillock is covered with beard-grass and beard-grass- Festuca supine-feather-grass steppe grasses, as well as xerophytic bushes. Small pine plantations also grow over Loki ridge. The slopes are covered with a hardwood forest with oak and hornbeam dominating in its lower part and beech in its upper part. Box elder, Georgain oak, oriental hornbeam and blackthorn dominate on Babakari hillock.

100.**Fauna**: Fauna in Gudauri is not much diverse. Wild boar, badger, stone marten, Least Weasel live in the forest; jungle cat, rabbit, wolf, jackal are met almost everywhere. Ornitofauna is numerous: Common pheasant, lark, redleg, partridge, quail, etc. Reptiles are also many in numbers. Different kinds of lizards are particularly common with Iajluga upland. Tortoise, grass snake, sheltopusik and sand boa (rarely) are also common. Barbel, mursa, khramulya and stone loach are common in the river Debeda.
Most of the Project site covers the territory of the city of Gudauri and is consequently, under a strong anthropogenic impact. The impact on flora and fauna both, in the construction and operation phases of the Project, is low.

D.3 Information About the Background Pollution

101. Teritorry of Gudauri is not polluted much. It is only polluted along main road, which connects capital of Georgia with northern border of the country and heavy trucks are moving.
Project will be implemented during the period, when there will be no snow and therefore, no winter season. At such periods, there are no much people moving in Gudauri, therefore, there will be no negative affect to big number of population.

D.3.1 Existing Data About the Air Quality

102. On the territory of the city of Gudauri, no air quality monitoring is undertaken by the Environmental Agency of Georgia. The nearest town where the Agency holds permanent observations over the air quality is Tbilisi.

103. At the Project implementation stage, in respect of air pollution (noise, dust), the most sensitive are the areas where new reservoir is planned to build.

D.3.2 Noise

104. The noise level was measured at the three different points.

Table 13: Noise level at three sites

	5 Min	10 Min	15 Min	20 Min	25Min	30 Min	medium
Main Road	**55.2**	**55.0**	**55.7**	**55.5**	**56.2**	**57.0**	**55.7**
Reservoir	**42.2**	**42.0**	**42.8**	**42.1**	**42.3**	**42.1**	**42.3**
Network	**41.7**	**42.0**	**42.2**	**42.4**	**42.7**	**42.2**	**42.2**

D.4SocialSurroundings, Social-Economic Description

105. Gudauri is located in the Northern Part of Georgia. The administrative center of the Gudauri is the city of Stepantsminda. The distance between Gudauri and Tbilisi is 120 km.

D.4.1 Population

106. Population of Gudauri is 800 people and tourists 5500 per day and one day tourists around 500.

107. According to development plan, there will be 5000 local population, 15 000 tourists and on day tourists 7500.

D.4.2 Industry and Trade

108. There are no industries in Gudauri, but there are some markets and shops, mainly acting for tourism goods, such as, ski, winter jackets, etc.

D.4.3 Agriculture

109. There are no agriculture activities in Gudauri.

D.4.4Health and Education

110. There are 1 polyclinics operating in the Gudauri. There is no public school, but there are many sport schools existing for skiing sport.

D.4.5 Infrastucture

111. The territory of Gudauri is totally in the “Magticom”, “Geocell” and “Beeline” coverage zones. In respect of electrification, Gudauri is totally electrified. Electrical power is supplied by ,,ENERGO-PRO GEORGIA“.

D.4.6 Historical and Archeological Monumnets

112. There are no historical and archeological monuments in Gudauri.

113. At the construction stage archaeological monitoring should be ensured by the constructing contractor under the supervision of the Ministry of Culture and Monument Protection of Georgia. The budget necessary for the archeological supervision and other agreed works should be fixed under the construction works appraisal.

D.4.7 Proceduresin Response to the Artifact Findings

Chance Finds Procedure:

114. Construction 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.

115. 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.

116. Archaeological supervisor conducts daily monitoring at all construction sites, where the earthworks (land clearance; grading; excavations etc.) are planned according to the schedule.

117. Besides that, archaeological supervisor instructs the workers to report him immediately in case of any chance finding of potential archaeological relics.

118. In case of finding any artefacts of potential archaeological value, following steps are taken:

1. Construction workers are obliged to stop works and immediately report to the Archaeological Supervisor.
2. 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
3. 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.
4. In case if the finding is estimated as potential archaeological relic, the Archaeological Supervisor reports to Chief Engineer of the Construction Contractor and to MDF Environmental Specialist (and supervising company / Engineer) requesting to stop construction activities and to inform the Ministry of Culture and Monument Protection about the incident.
5. Chief Engineer of the Construction Contractor also reports to UWSCG informing about the stopped operations and requesting immediate engagement of the Ministry of Culture and Monument Protection.
6. 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.
7. 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.
8. 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.4.8 Tourism

119. The region has significant potential of winter tourism. Government of Georgia is planning a lot of activities to attract many tourists in Gudauri. This sub-project is one part of these activities.

E. ANTICIPATEDENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

E.1 Summary of Activities and Anticipated Impacts

120. 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 Gudauri.

B. Operational Phase

- Drinking water quality monitoring.
- Management of emergencies, scheduled rehabilitation and conducting repairs.

121. Positive impact: after the Project is realized, the drinking water network will fully cover on the territory of Gudauri. Water will be supplied 24 hrs.a days.

122. Negative environmental impact at the construction stage of the project is expected during the following operations:

1. 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. The methods to calculate the amount of waste and alternatives of transportation are considered in chapter E.9.1.
2. Some streets in Gudauri are narrow and the traffic in them will be limited much during the project works.

123. This paragraph provides a brief description of anticipated site-specific impacts related to the construction phase of the sub-project “Improvement of Gudauri Water Supply system”.

Table 14: Site-Specific Impacts

	Construction Phase. Potential Impacts During Construction Works	Risk	Sites
1	Dust, noise, vibration	High Risk	Main Road and reservoir sites During excavation of pipe trenches within the areas of main road.
2	Pollution of surface water during construction and	Low Risk	Planned rehabilitation of the existing network of watersupply system

	rehabilitation works		doesn't affect on surface water.
3	Impacts on Archaeological Sites	Low Risk	No damage to any archaeological site shall be expected. The pipe laying sites in Gudauri is located in the areas of extensive on-going human impact.
4	Impacts on traffic	High Risk	Existing water supply system of Gudauri is almost totally replaced by the project. For the implementation of above mentioned will be necessary to cut trenches in the streets of the town and main road which will restrict transportation by transport means or for pedestrians as well.
5	Landslides, slumps, slips and other mass movements.	Moderate Risk	No large scale earthworks are planned under the Project.
6	Impacts on flora and fauna	Low Risk	All Project sites are located within the area have been experiencing the severe human impacts. Therefore, no influence on flora and fauna shall be expected during implementation of the Project.
7	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.
8	Pollution risk for air quality	Moderate Risk	Air pollution may occur in the inhibited areas, including town of Gudauri
9	Poaching by construction workers	Low Risk	Aragvi river
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
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 impact of the increased

			quarrying activities on river bed and floodplain landscape, ichthyofauna and groundwater should be considered.

E.2. Developing Environmental Documents

124. Prior to the onset of the construction, the Construction Contractor will be obliged to develop the following environmental documents:

125. 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

126. At the stage of risk assessment the ADB risk assessment methods must be used:

1. Following the specifics of the work to be accomplished, the Construction Contractor must develop the Site 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).
2. Following the location of the construction site, the Construction Contractor prior to the onset of the construction must develop the Site Specific Noice Management Plan. This document must give the model of the sources and distribution of the noise originated at the construction stage, and possible impact on the adjacent facilities, as well as all mitigation measures and methods to monitor them.

127. All the above-mentioned documents must be developed by the Construction Contractor and submitted to the Project Implementing Unit (PIU) for approval. The Construction Contractor will be entitled to start the construction works only after the above-said documents are approved by PIU.

E.3 Pre-Construction Phase

E.3.1 Inert Waste

128. There will be no big amount of inert waste.

E.4 Noise, Dust and Vibration

129. Noise exerted by the equipment and plants loses intensity after some distance. However, as per the data of „Federal Highway Administration of the ministry of transport of the USA (FHWA)“, the reduction of noise level at the distance f 40-80 m is insignificant.

130. In the given surroundings, installing noise attenuating barriers on both construction sites seems most acceptable. Noise attenuating barriers in each case must be installed by considering the necessity for them.

131. Because of the relief on the territory of Gudauri, the existing reservoirs are located on the top of a hill. Installing the noise attenuating barriers is expedient on the territory adjacent to the sensitive receptors. In this case, the length of the noise attenuating barriers will be 120 m and their height shall be 2.5 m following the requirements of the relief.

132. The noise attenuating barrier near “Narimanoff” reservoir is better to install near the reservoirs. In such a case, the total length of the noise attenuating barrier will be 40 m and their height shall be 2 m.

133. This kind of barrier must be considered both, in the construction and operation phases. In addition to the noise attenuating barrier, the following mitigation measures are absolutely necessary:

- Prohibited use of blasting equipment during the demolition process of reservoirs;
- Restrict demolition activities during period of the high winds or under more stabile conditions when winds could nevertheless direct dust towards adjacent communities;
- Using a water truck for dust suppression on all exposed areas as required;
- 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;
- Ensure that all equipments is in good repair and operated in the correct manner;
- The funds necessary for the work to be undertaken will be included in the Works contract.

E.5 Air Quality

E.5.1 Noise and Dust

Construction Phase

134. 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 Gudauri 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.

135. 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 15: 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 16: 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

136. 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: Noise level1-Noise level2=20 log r2/r1, meaning that by doubling of distance noise is reduced by 6dBA.

Table 17: 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

137. Noise sources generated by excavation for WS pipes during construction period in scope of city Gudauri 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).

138. The following measures are to be taken during construction engineering to reduce impacts on acoustic environment:

(1) 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.

(2) Any operation by such equipment as a percussion piling machine or pneumatic hammer shall be prohibited.

(3) 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.

139. Prior to start construction activities construction contractor should prepare Noice SSEMP for city Gudauri. Prepared plan should be submitted to SC for endorcemnet and to UWSCG for approval.

140. Problems related to noise at the construction phase are basicly generated during installation of waste water pipes. According to the design proposal, the existing wastewater pipes are replaced approximately at every street of the town, or in the areas where there is no waste water system, the new ones shall be installed. Total length of the pipes is approximately 30 km and it covers mostly the whole town.

Mitigation Measures

141. 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 airpollution.
- 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.

142. As for the noise, generated during excavation of the trenches in Gudauri area, affecting the sensitive receptors disposed in the town, will require execution of additional mitigation measures.

143. 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 Gudauri, 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 excavationis 20-25 m. that represents 160-200 m during 8-hour work day.

144. 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.

145. As for implementation of the works nearby medical facilities, where patients shall be disposed, the following mitigation measures have to be processed and conducted:

146. Option 1: if the contractor shall conduct the works without using equipment (tranches should be dug with shovels) on the nearby area of the dense area, that will represent the best option. 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.

147. 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 continously;
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

148. 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

149. 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.

Mitigation Measures

150. 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

151. The risk of the pollution of surface water in operational phase is very low. Minor pollutionof water can take place during maintenance and repair works. In that case theabove mentioned mitigation measures shall be implemented.

152. The construction of a new water supply system will increase the generation ofwastewater. Works for the rehabilitation of the wastewater network and the constructionof a new wastewater treatment plant will be taken up successively under the same Tranche5 in scope of other sub project.

E.6.2 Contamination of Underground Water

153. Groundwater table depth within the Project zone is 15-16 meter; therefore potential impactarises from implementation and maintenance of contractors' yard, transport,maintenance of vehicles and handling and storage of lubricants and fuel. The requiredprovisions for contractor's yard are described in the chapter on impacts and mitigationmeasures concerning quality of soils.

E.7Soils Quality and Topsoil Management

Construction Phase

154. 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.

155. The works for the transmission mains comprise material excavation, pipe laying and backfill of material including compaction. Material will be stored temporary alongside the trench and refilled after pipe lying. Therefore impacts associated with earthworksfor trench laying are of temporary nature. The pipes will be placed in the trench manually.

156. A sand layer of 30 cm thickness will be laid on top of the pipe, after which thetrench will be refilled with excavated material and compacted manually. The excavationis expected to generate surplus material. Surplus material will be used as embankmentfill as far as possible.

157. 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

158. The following practices will be adopted to minimize the risk of soil contamination andtopsoil loss:

- The contractors will be required to instruct and train their workforce in the storageand handling of materials and chemicals that can potentially cause soilcontamination.
- Solid waste generated during construction and at campsites will be properlytreated 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 perimeterwalls 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 forsafely discharging the leakages.

Operation Phase

159. During operation phase, the soil may be contaminated due to water leakage from thedamage pipe. In case such damage is not detected in a due time, the area may be"bogged".

160. Soil contamination may also occur during performance of the planned or emergencyrepair works.

Mitigation Measures

161. Water pressure in the pipelines must be continuously monitored during entire operationphase. In addition, the relevant mitigation measures shall be implemented duringmaintenance works.

E.8 Biological Environment

Impacts during Construction

162. 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 two trees of same species for each tree that is cut for construction;
- 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

163. Operation of the water supply components of the subproject will not have any significantimpact on the biological environment.

E.9 Traffic

Impacts during Construction

164. 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.

165. 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

166. 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

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

Mitigation Measures

168. 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

169. The amount of waste accumulated due to the destruction of existence reservoirs and the methods to manage it are given in chapter E.2 of the document.

170. 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.

171. In total a length of around 40 kilometres of distribution network has to be newly laid.

172. Under the project, approximately 40-km-long trenches must be excavated during laying the new water supply pipes and replacing the old ones. The width of the trenches depends on the pipe diameter and varies from 70 to 100 cm.

40000m X 0.85m X 0.15 m = 5 100 m^3

173. 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 10 200 m^3soil.

174. Total 15 300 m^3inert waste will be accumulated during the excavation of trenches on the territory of the city of Gudauri. The said waste will be transported and placed on the landfill in Gudauri.

E.11.2 Municipal Waste

175. 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 0.24m^3 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.

176. The personnel involved in the handling of hazardous and non-hazardous waste will undergo specific training in:

- Waste handling
- Waste treatment; and
- Waste storage.

177. 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

178. 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

179. 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.

180. 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

181. 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

182. 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.

183. 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 in situ.

184. 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

185. 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

186. 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

187. *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

188. 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.

189. 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 save 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.

190. 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

191. 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

192. 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.

193. 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 Pips

194. At construction stage, according to the contract is considered the installation of newpipes in the whole area of the city. During excavation works of trenches it is possibleto damage as existing sewer pipe network, also other legally or illegally water supplypipes. 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

195. It is necessary to implement whole set of mitigation measures:

- Special training for the personnel of the contractor;
- Environmental specialist of the consultingcompany 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.17Cumulative Impacts

196. On the territory of Gudauri, there are the following ongoing infrastructural projects or the ones planned in the near future:

- Improvement of Gudauri Water Supply System Sub-project;
- Improvement of Gudauri Wastewater System Sub-project
- Construction of new Gudauri Sewage Treatment Plant;

197. Implementation of the these projects are planned in Gudauri. It is not known who will implement these projects and it is possible scenario, depended on tender procedures, that different companies execute these sub-projects.

198. A similar situation was observed previously in the city of Kutaisi, when two different companies accomplished the water supply projects without any agreement with one another. Within the scope of the water supply sub-project in the city of Kutaisi, the paved roads were demolished in some streets of the city and water supply pipes were installed. Under the decision of the City Hall, in order to protect the area against the erosive processes, they laid a 16-mm-thick concrete layer in some streets. After some months, another sub-project to improve the wastewater system of Kutaisistarted planning to demolish the laid concrete layer and install the relevant pipes.

199. Following the above-mentioned, aiming at avoiding the said risks, it is necessary to accomplish any of the options listed below:

1. Gudauri Water Supply and Wastewater System Sub-projects to be implemented simultaneously;
2. The contractors winning both sub-projects to develop the working schedule and submit it to Governor of the Gudauri and UWSCG and works to be coordinated with each other.

200. 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 Gudauri was 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 Gudauri or make it impossible.

201. Above all, within the scope of the water supply and wastewater sub-projects, the traffic in all streets of the city of Gudauri will be hampered or totally limited even though for a short time, but permanently.

202. 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 Governor, will coordinate the regulation of this issue.

E. 18Climate Change Impact

203. The information related to the existing threats in respect of climate change in Gudauri 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

204. As the data of the above-stated group suggest, the natural threats in the Municipality include: intense rain, flood/flashflood, mudflow, drought and hail. Flood/flashflood, river-bank erosion and hail have been more frequent in recent year.

205. The workgroup has not provided any information about the areas damaged by the catastrophes.

206. As per the information of the Board, the Municipality has the Emergency Management Plan covering fire, drought and hail.

E.18.2 Conclusions

207. Based on the analysis of the survey results of the employees of Gudauri Municipality Board, the vulnerability of Gudauri Municipality to the climate changes can be formed as follows:

208. Natural threats: the natural threats in Gudauri Municipality include: intense rain, flood/flashflood, mudflow, drought and hail. River-bank erosion and hail have been more frequent in recent year. However, as it seems, the natural calamities are made more frequent due to the anthropogenic impact, such as destruction of the wind break belts, cutting down the forests, etc.

209. The expected climate changes in Gudauri Municipality are not assessed yet. However, following the general trends, we may consider that the climate changes in the future will further aggravate the above-listed issues and will make Gudauri more vulnerable to the natural threats.

210.**Agriculture:** at present, agriculture is not a leading economic branch in Gudauri, as it is mountainous area and due to climat conditions

211. Agricultural service in the Gudauri is not predicted to be developed.

212.**Forest resources:** the forest resources in Gudauri are poor. The major problems with the forest resources are forest cutting, including illegal cutting and serious destruction of the wind

break belts since the 1990s. In addition, virtually, no restoration or growing of forests is accomplished.

213.**Water resources and water use:** there are bulk of surface and underground waters in Gudauri; the water resources or their quality are not monitored. As the employees of the Municipality Board consider, the intensity of floods has reduced for the last 2 years, but the discharge of the rivers has increased during the floods. However, they have no objective proof of this.

214. The water resources in the Municipality are sufficient to fully meet the existing demand. However, the problem of water supply still exists in the Municipality (including the problem of drinking water) following the poor condition of water supply/irrigation systems. The water supply and irrigation systems need rehabilitation.

215. The settlements of the Municipality have no discharge water collecting and treatment structures what may cause the pollution of water resources.

216.**Local government bodies**: in the Municipality, certain activities of adaptation to the climatic changes are being accomplished. However, such activities are quite small-scaled and are mostly reactions, i.e. they are oriented in the elimination of the results. A number of preventive measures are undertaken in the Municipality: rehabilitation of the irrigation systems, rehabilitation of the water supply, etc. In order to mitigate the climate changes, the awareness of the methods to improve the waste management was improved. As a rule, the Board of the Municipality is not fully informed about the issues determining the sensitivity of the Municipality to the climate changes, as well as natural catastrophes, agriculture water resources, water supply and forest resources. This limits their possibility to analyze the expected threats and plan and realize preventive measures.

E.18.3 Recommendations

217. For the purpose of adaptation to the climatic changes in the Municipality, the following measures are recommended:

- Restoration of the wind break belts (what was the priority of the self-government, too), what will reduce the impact of winds and promote the regulation of the temperature regime during high temperatures.
- Prevention of the erosion of hey-making meadows and pastures. This can be done by using several methods. First of all, the exact number of grazing cattle on some or other pastures is desirable to fix, and the fixed rates are to be observed. In addition, it is desirable to introduce alternating grazing mode; the number of heads of the introduced cattle must be identified and limited and the cattle-breeders must shift to partially trough-feeding (what will have its affect on the milk yield.
- Restoration of the eroded pastures. For this purpose, grass may be sown, grazing on the eroded sections must be limited, etc.
- Evaluation of the riverbed management methods to identify the most efficient methods to reduce the risks of the expected catastrophes.
- Obtaining the information about the volume of the inert material obtained from the rivers; fixing the facts of the riverbank washout and high-risk sites; submitting this information to the body issuing the license for mining the inert materials so that to review the available resources of the inert material and regulate the mining volumes as necessary.
  Managing the database about the natural threats and damage inflicted by them, as well as about the agriculture, water resources, forest resources and waste management to provide a full picture of the challenges to the Municipality and plan due responses.

F. Analysis of Alternatives

218. The present Project envisages the construction of new reservoir and water supply network. No new water intake units will be built within the scope of the Project.

219. As the construction of the new reservoirs is planned on the locations of the old reservoirs and the water supply pipes will be replaced where there are old pipes already, no alternatives of the project implementation sites was considered within the limits of the present Project. Zero alternative analysis was done only.

F.1. Zero Alternative Project

220. As per the present situation with the water-supply in the city of Gudauri:

- There is intermittent water supply during tourist season, which affects very much to the tourism development;
- New hotels are not constructed, because they have no real access on water supply system;
- Hotels decide to connect illegally and without standards to the existing system and reservoir;

221. Following the above-mentioned, non-implementation of the Project will be much harmful for the city of Gudauri what will further aggravate the social conditions in the city of Gudauri.

G. Information Disclosure, Consultation, and Participation

222. 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 Gudauri
- UWSCG as implementing agency
- Other government regulatory institutions
- Municipality of Gudauri
- NGOs and CBOs working in the affected communities;
- Other community representatives (prominent citizens, religious leaders, elders, women's groups);
- The beneficiary community in Gudauri in general; and
- The ADB, as funding agency

223. 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 Gudauri (at municipality hall). It will also be disclosed to public by making it available on websites of UWSCG and ADB, together with the IEEs prepared for the other subprojects.

224. Stakeholder consultation and participation was an important process in the preparationof this IEE. The process engaging stakeholders and affected people during theconduct of the IEE included joint sites visits of IA, design and supervising consultants, onsite discussions with local population and public hearings.

225. Local residents and the representatives of UWSCG held discussions about particular issues during the meeting.

H. Grievance Redress Mechanism

226. 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.

227. After issuance of the special order, a GRM was first set up by UWSCG in Gudauri under the REG-01 project of USIIP. The GRM allows affected people to appeal any disagreeable decision, practice or activity arising from project implementation.

228. 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..

229. GRM in Gudauri will operate in three stages:

230. During the **first stage**, complaints are discussed within two weeks of being received by the local service centre of UWSCG (e.g. Gudauri office), 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.

231. The service centre operators, who are trained[2] 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, Maka Goderdzishvili.

232. 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.

[2] UWSCG 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.

[3]The **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 eDocumentservice offers an opportunity to manage, find, and trackdocuments 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.*

233. 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
- 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

234.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.

235. 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.

236. 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

237. **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/DREP/PR Division.

I. Environmental Management Plan

238. EMPis addressed as a condition of the contract.

I.1 Institutional Arrangements

239. Following agencies will be involved in the Investment Program:

(i) Ministry of Regional Development and Infrastructure (MoRDI) is the Executing Agency (EA) responsible for:

- oversee progress and provide guidance on the InvestmentProgram implementation
- meet regularly until Investment Program completion
- responsible for Investment Program oversight and administration
- hold monthly meetings with UWSCG to review progress
- ensure compliance with Investment Program covenants
- submit Investment Program documents to ADB on time

(ii) United Water Supply Company of Georgia (UWSCG) is the project Implementing Agency (IA), which will be responsible for:

- prepare the periodic financing requestoversee Investment Program implementation andmanagement
- oversee Investment Program accounting
- coordinate with all line ministries to ensure smooth andefficient implementation of investment program
- secure technical and environmental approvals for all civilworks prior to bidding
- implement the environmental management plan for eachsubproject
- ensure compliance with Investment Program covenants
- comply with social safeguards requirement detailed in thePAM
- invite bids, evaluate and prepare bid evaluation reports forADB's approval

(iii) UWSCG as responsible IA for the project recruited a Supervision Consultant (SC). The national and international team of consultants will assist UWSCG as project supervisor for the construction of Gudauri WS project. The SC will also provide capacity building training to contractor staff for management and opera-tion and maintenance for the Project. The SC will assist UWSCG in assuring that the project is implemented according to the specified standards. This SC assignment will include the supervising of the implementation of the environmental management plan.

(iv) All mitigation measures during construction have to be implemented by the contractor that will be monitored by the supervision consultant (SC). Implementation of EMP of this project require an experienced Environmental Management Specialist (EMS), employed by the SC, to spend a total of around 36 months for project construction period, conducting routine observations and surveys, and preparing quarterly reports.

(v) The Contractor has the following obligations:

- to employ Environmental consultant responsible for developing and implementing the construction phase EMP and for provision of corresponding information to UWSCG and SC;

- to prepare SSEMP;
- to develop, if required, a Spoil Disposal Plan and Construction Waste Disposal Plan agreed with the MoENRP and Local government;
- to prepare and update Construction Schedule;
- The SSEMP implementation costs should be included into the construction budget

I.2 Reporting

- The Contractor is responsible for the preparation of monthly environmental monitoring report that should be sent to SC.

- The Supervision Consultant is responsible for the preparation of quarterly environmental monitoring reports that should be sent to UWSCG

- The USIIP Environmental Specialist is responsible for the preparation of bi-annual and quarterly environmental monitoring reports and will provide to ADB and MoRDI. Semi-annual environmental monitoring reports will be posted in ADB website, and available in GEO in Georgian language.

I.3 Inspection

240. The Employer will regularly inspect works undertaken by the contractor to check on the implementation of environmental management and monitoring requirements. A non-compliance notice will be issued to the contractor if the employer requires action to be taken. The contractor is required to prepare a corrective action plan which is to be implemented by a date agreed with the employer. The non-compliances will be ranked according to the following criteria:

241. **Non-compliance Level I:** A noncompliance situation not consistent with the requirements of the concession agreement, 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.

242. **Non-compliance Level II:** A noncompliance situation that has not yet resulted in clearly identified damage or irreversible impact, but which potential significance requires expeditious corrective action and site-specific attention to prevent severe effects.

243. **Non-compliance Level III:**A critical situation, typically includingobserved significant social or environmental damage or a reasonable expectation of very severe impending damage, intentional disregard of specificprohibitions is also classified as a level III concern. The failure to prepare a corrective action plan or to implement it within the required time frame will result in the owner undertaking the works and the cost, and 20% will be recovered from the final payment to the Contractor.

244. The contractor will have a system for recording and communicating any complaints received by any person employed by or contracted to the Contractor. All complaints will be communicated in writing to the Employer within one working day of their receipt.

I.4 Implementation Costs

245. 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.

246. The cost for the environmental management for construction period is tentatively estimated.

Table 18: Environmental Management Cost

Item	Quantity[4]	Unit Cost	Total Cost	Remarks
Baseline Parametric Measurements	24	200 USD	4 800	To be conducted by the Contractor for air emissions, dust, vibratio measurements
Monthly Parametric Measurements (at least 3 sites) Noise, vibration and dust	72	200 USD	14 400	Tests to be conducted by the Contractor at 3 sites x 24 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 Management Specialist (SC)	24 months	2,500 USD	60 000	The costs are included in the contract signed between UWSCG and SC and no additional costs will occur.
Environmental specialist (Contractor)	24 months	1500 USD	36.000	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	15 000	15 000	Study should be conducted before construction activities started.
Traffic Specialist	12 month	2.500	30.000	Specialist will be hired in scope of three projects took place in Gudauri at the same time
Construction dust and noise barriers	140 m	250	35.000	To be installed by Contractor at the various construction site
Miscellaneous			20 020	10% for above Items

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

Item	Quantity[4]	Unit Cost	Total Cost	Remarks
Subtotal			220 220	Total for above

Table 19: 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.	**Construction Contractor**	Reservoir site, main road, distribution network	Included in Project price
Preparation of "Inert Waste Management Plan"	Prior to start construction activities, construction contractor should choose the areas for disposal inert waste and prepare "Inert waste management plan". Prepared plan should be submitted to SC for endorcemnet and to UWSCG for approval.	**Construction Contractor**	Reservoir site	Included in Project price
Preparation of "Noise Management Plan"	Prior to start construction activities construction contractor should prepare Noice SSEMP for city Gudauri. Prepared plan should be submitted to SC for endorcemnet and to UWSCG for approval.	**Construction Contractor**	Gudauri	Included in Project price
SSEMP	Prior to start construction activities, construction contractor should prepare SSEMP and submit to SC for endorcement and to UWSCG for approval.	**Construction Contractor**	Project Area	Included in Project price
Social Issues	Put in the contract contructors resposobilities at workers hiring stage in case similar qualification to give priority local representatives.	**CS**	Contract documents	Project prise
Possible removal of Terrestrial habitat. Loss of the top soil	If at the stage of the detailed biological study, there are rare or red-listed species are fixed in the project area, the Construction Contractor is obliged to:	Construction Contractor	Construction and labour camp, storage area.	Part of construction cost

Potential Negative Impacts	Mitigation measures	Responsibility	Location	Cost
	• 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.		WS Pipe construction	
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.	• 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 is 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; • Restrict demolition activities during period of the high winds or under more stabile conditions when winds could nevertheless direct dust towards adjacent communities;	Construction Contractor	Reservoir site	Included in Project price

Potential Negative Impacts	Mitigation measures	Responsibility	Location	Cost
	• 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 undertaken will be included in the Works contract.			
Construction of noise attenuation wall	Prior to the onset of the civil works, the Construction Contractor is obliged to construct the noise attenuating barriers.	Construction Contractor	Reservoir	Included in Project price
Construction				

Potential Negative Impacts	Mitigation measures	Responsibility	Location	Cost
Ambient Air and Local Dust[5]	• 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 Don't allow access in the work area except workers to limit soil disturbance and prevent access by fencing	Constructor Company	Excavation areas for trenches at main road .	Part of construction cost
	The Contractor shall coordinate with local Traffic Management Department to minimize construction traffic impact in the following topics: • 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,	Construction Contractor	Transportation routes of construction materials	Part of construction cost

[5]Environmental 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
	• General traffic diversion routes where roads are closed. • Sound barriers should be erected at schools and hospitals if the distance to the construction site is less than 50 m			
Noise Pollution[6]	• Approximately 140 m length noise attenuation wall must be constructed at the 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 Gudauri 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.	Constructor Company	Project Area	Part of construction cost
Impact on surface water bodies due to construction[7]	• 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 storage (sand and aggregate) so that runoff from upland areas will not enter the site • Ensure that drains are not blocked with excavated soil	Civil Contractor	Project area	Part of construction cost
Soil Contamination	• 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.	Construction	Construction sites	Part of constructio

[6]The 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

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

Potential Negative Impacts	Mitigation measures	Responsibility	Location	Cost
	• 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 property • 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.	Contractor	Camp	n cost
Impact 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 cut of the Red Book listed trees, Develop Compensation Action Plan and number of planted trees should be agreed on with UWSCG. • 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.		Construction sate Camp	Part of constructio n cost
Impact on Traffic	• 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 constructio n cost

Potential Negative Impacts	Mitigation measures	Responsibility	Location	Cost
Hazardous Materials	• 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 appropriate, well maintained containers. • Any accidental chemical / fuel spills to be corrected immediately.		Construction site Storage Area	Part of construction cost
Solid Waste	• 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. The personnel involved in the handling of hazardous and non-hazardous waste will undergo specific training in: • Waste handling • Waste treatment; and • Waste storage.		Project area Storage Area Construction camp	Part of construction cost
Loss of top soil	• 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	Civil Contractor	Pipeline work in pasture lands, agricultural	Part of construction cost

Potential Negative Impacts	Mitigation measures	Responsibility	Location	Cost
	top.		land,	
Erosion due to excavation/refilling	• 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.	Civil Contractor	All construction sites	Part of construction cost
Impact on air quality due to emissions from construction equipment/vehicles	• Ensure that all equipment & vehicles used for construction activity are in good condition and are well maintained • Ensure that all equipment & vehicles confirms to emission and noise norms	Civil Contractor	Gudauri project sites	Part of construction cost
Socio-economic benefits from employing local people in construction work	• To the extent possible labour force should be drawn from the local community	Civil Contractor	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	• 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: ○ 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	Civil Contractor	Temporary labour camps	Part of construction cost
Safety risk – public and worker	• 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 and refilling) in each segment is completed in a day. No trenches shall be kept open in the night/after work hours.	Civil Contractor	All construction sites	Part of construction cost
Historical, archaeological chance finds during excavation	• 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: ○ Having excavation observed by a person with	Contractor	All construction sites	Part of construction cost

Potential Negative Impacts	Mitigation measures	Responsibility	Location	Cost
	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..			
Cumulative impacts – repeated disturbance to roads and people	• Schedule the construction activities in harmony with the other on-going works • Schedule works before road work	Civil Contractor, SC	Works on waste water supply network in the town	Part of construction cost
Climate Change	• 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;	Contractor	Construction area	Part of construction cost
Operation Phase				
Health and Safety Hazards for UWSCG workers and the public	• 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	water network	Part of operating costs
Sustainability of Infrastructure Efficiency and reliability of water supply systems	• 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	water network	Part of operation costs

Potential Negative Impacts	Mitigation measures	Responsibility	Location	Cost
Disturbance/ nuisance/ noise due to operation activity	• 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	reservoir area	Part of operation costs

I.5 Monitoring

247. 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. All parameters (Water quality, noise) should be monitored against international standards.

248. 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 Civil Contractors will be conducted by the SC, on behalf of Implementing Agency. Monitoring during operation stage will be conducted by the UWSCG.

249. 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 Gudauri is needed.

Table 20: Environmental Monitoring Plan for general construction activities in Gudauri

Item	Parameter	Frequency	Action Level	Response When Action Level Exceeded	Responsibility
Pre construction					
Tender documentation	Environmental Issues	Once before bid announcement	Environmental audit of bidding documents to ensure relevant sections of the EMP have been included	The bidding document shall reflect all environmental mitigation measurements	SC
Contract documentation with construction contractor	Environmental Issues	Once before contract signature	Environmental audit of contract documents to ensure relevant sections of the SSEMP have been included	The contract document shall reflect all environmental mitigation measurements	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 Gudauri 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 contructors resposobilities to hire local population have been included in contract.	30 % of workers shoul be hired from local population.	SC
Construction company prepared all necessary environmental management plans and conducted all requested investigations	Environmental Issues	Once before contract signature	Environmental audit of the environmental plans prepared by construction contractor	All environmental plans were prepared and approved by relevant organizations.	SC
Construction					
Ambient Air	Dust	Continual	Visual assessment	If dust levels are above	SC

Item	Parameter	Frequency	Action Level	Response When Action Level Exceeded	Responsibility
		Dust should be monitored on the regular bases as well as during the peak operation of Construction Equipment and Machinery	during the Works Measuring at nearest potentially sensitive receivers.	acceptable visual levels, implement dust suppression techniques (wetting down area) and/or assess weather conditions and maybe temporarily cease works until conditions ease	
Noise	(15 minute) 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.	SC
Vibration	(15 minute) Vibraition level	Periodic attended Monitoring at hourly Intervals. Vibration should be monitored on the regular bases as well as during the peak operation of Construction Equipment and	Measuring at nearest potentially sensitive receivers.	If vidration level is exceeded then review work practices, maintenance of equipment.	SC

Item	Parameter	Frequency	Action Level	Response When Action Level Exceeded	Responsibility
		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.	SC
Waste Management Implications	Segregation, Storage and transport of wastes	Daily Monthly inspection	- 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.	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	SC
Ecological Resources	Fauna and Flora	Continual	Minimal ecological impacts Impact Monitoring	Required to ensure the recommended mitigation measures are properly implemented.	SC
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	SC
Operation					

Item	Parameter	Frequency	Action Level	Response When Action Level Exceeded	Responsibility
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

250. The environmental impacts of infrastructure elements proposed in the water supply system improvement subproject in Gudauri have 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.

251. Mitigation measures were discussed with engineering specialists, and some measures have already been included in the designs.

252. 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.

253. When operating, water supply components will have overall beneficial impacts to human health and the environment as it will provide the inhabitants of Gudauri with a new water supply system

254. The main beneficiaries of the improved system will be the citizens and tourists of Gudauri, 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.

255. 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.

256. 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

257. The environmental impacts of the proposed water supply system components have been assessed by the Initial Environmental Examination reported in this document.

258. 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.

259. 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.