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Georgia: Urban Services Improvement Investment Program

Improvement of Ureki Water Supply System Sub-project (Tranche 3)

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

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ABBREVIATIONS

ADB	-	Asian Development Bank
BOD	-	Biochemical Oxygen Demand
CA	-	Cross section area
CC	-	Civil Contractor
COD	-	Chemical Oxygen Demand
DC	-	Design Consultant
EA	-	Executing Agency
EIA	-	Environmental Impact Assessment
EIB	-	European Investment Bank
EIP	-	Environmental Impact Permit
EMP	-	Environmental Management Plan
GoG	-	Government of Georgia
GRC	-	Grievance Redress Mechanism
HDPE	-	High Density Poly Ethylene
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
MC	-	Management Contractor
MDF	-	Municipal Development Fund
MFF-IP	-	Multitranché Financing Facility Investment Program
mg/l	-	milligram per litre
mm	-	Millimetre
MoRDI	-	Ministry of Regional Development & Infrastructure
PS	-	Pumping Station
RCC	-	Reinforced Cement Concrete
UPVC	-	Un-plasticized Poly vinyl Chloride
UWSCG	-	United Water Supply Company of Georgia
WS		Water Sanitation
WSS	-	Water Supply & Sanitation
WTP	-	Water Treatment Plant
WWTP	-	Waste Water Treatment Plant

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EXECUTIVE SUMMARY

1. It is proposed to improve the water supply in Ureki and Shekvetili under the Asian Development Bank (ADB) funded Urban Services Improvement Investment Program, which is under preparation stage. This Investment Program, implemented in secondary towns of Georgia, including Ureki - Shekvetili, 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 2014 to 2019. 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, which was prepared in July 2013 and further updated in December 2018 due to changes in the design of the project (please see the paragraph 6 below).
2. Ureki - Shekvetili is located at the Black Sea and lies some 360 km to the west from the capital city of Tbilisi. It is designed to meet the projected demand of 2040. This will be achieved by: (i) construction of a water supply system, which is subject of this IEE, (ii) construction of a new sewer system; and (iii) construction of a new wastewater treatment plant (WWTP).
3. Ureki and Shekvetili are surrounded by agriculturally used land. Animal husbandry for meat and milk products, as well as farming exists within the project area and its vicinity. Potato and corn are the important crops in the area. Industrial activities in Ureki and Shekvetili are of only minor importance. The project area shall be further developed as tourism resorts. Number of tourists in the Borough Ureki during one year on average equals to 50,000 persons. Ureki is equipped with 80 hotel-recreation and retreat centres for the tourists and family hotels of the private sector. The number of tourists in Shekvetili accounts for approximately 2,000 persons. Currently Shekvetili has hotel-recreation and retreat centres and family hotels as well. Further investments are planned in the future.
4. Ureki and Shekvetili do not have a centralized water supply system. Population mainly takes water from wells in their yards. The water does not have drinking water quality as it is partly brackish due to its small distance to the Black Sea and it is polluted from the septic tanks located in the direct vicinity of the wells. For this reason, the implementation of complete water piping centralized system is required for the further functioning of the resorts.
5. Water supply project measures consist of construction of a new well fields (7) along river Natanebi approximately 2 km to the north of the village Laituri, construction of a major transmission main (length 14 km) from Laituri well field to pumping station at Ureki and additional smaller transmission mains within the water supply area of Ureki and Shekvetili. Additional water supply facilities are the pumping station at Ureki, 2 reservoirs.
6. According to project requirements, installation of additional Deep Well has been determined and planned at the same location of well field and installation of Gabion wall as river bank protection is considering; based on this additional construction activities. Natanebi river crossing Aqueduct will be located also 6 km away from the protective wall to connect Laituri reservoir to the pumping station by means of transmission main.
7. Location of above described water supply facilities is within the village areas and vicinity of Ureki and Shekvetili. The well field is located along the River Natanebi, approximately 2 km to the north of the village Laituri. It is connected to the pumping station in Ureki by means of a transmission main, exhibiting a length of 14 km and a DN 600 Diameter.
8. Most of the predicted impacts are associated with the construction process. Impacts mainly arise from the generation of dust from soil excavation and refilling; disturbance of residents, traffic and activities in the town; increase of silt load in the river; loss of top soil, removal of trees, and from the disturbance to wildlife due to trenches. These are common impacts of construction, and following methods are suggested for their mitigation: (i) Utilizing surplus soil for beneficial purposes; (ii) Measures to reduce/control dust generation (cover/damp down by water spray; consolidation of top soil, cover

during transport etc); (iii) Providing prior public information; (iv) conducting no construction in the river bed in fishbreeding season; (v) restoring the top soil after construction, (vi) avoiding tree cutting through location alignment changes, and (vii) to avoid safety hazards construction site will be secured at critical segments.

9. Environmental Effects occurred during the construction phase will have short term effects and they cannot deteriorate the existing landscape and visual conditions. No possible environmental effects will arise during the operational phase as well.
10. The main recipients of impact will be local residents, travellers/tourists, commuters using the road with open trenches in the city. Effect on commuters will be short term and limited to the travel time only. With regards of night time working, lighting of the trenches will have minor impact on the landscape. However, lighting will be limited in proximity of the trench backfilling.
11. The visual impact following to completion of works will be mitigated by clean up and cultivation of all sites temporarily disturbed for the needs of the project and revegetation of spoil disposal areas, by short excavation and immediate backfilling of sections upon completion of works; If night lighting is required for the open trenches, the light source should be directed away from the residential units.
12. The Contractor, prior to the onset of the construction, is obliged to conduct a number of studies and develop environmental plans, including (i) biodiversity study of the Project zone, (ii) Site Environment Management Plan (SEMP) and further Site Specific EMPs and Topic Specific EMPs including: Waste Management Plan, Reinstatement Management Plan, Traffic Management Plan, Protected Species Management Plan, Water Management Plan, etc.
13. At the development stage of the IEE, a number of Public Consultations were held with representatives of the local population, local authorities and all relevant stakeholders.
14. Public Hearing was also held during the initial stage of the project implementation as part of the proposed IEE on July 7, 2013. The meeting was attended by more than 100 representatives of the local community and local government (Please see Appendix 1 - Minutes of meetings; Photos; List of participants).
15. To ensure that all the mitigation measures as suggested are implemented, a program of environmental monitoring is prepared. The Department of Environmental Protection and Permits (DEP) of UWSCG will oversee and be responsible for implementation of mitigation and monitoring measures. Provided the mitigation and enhancement measures are implemented in full, there should be no significant negative environmental impacts as a result 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.
16. 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.
17. 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 be improved as a result of the project. Project will generate new job opportunities.

1.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.

1.1 Georgian Law

1.1.1 Framework Legislation

Table 1 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)
Specific Environmental Laws	
1994	Soil Protection (as amended 26.12.2014) Reg. No - 370.010.000.05.001.000.080
1996	System of Protected Areas (as amended 30.04.2014) Reg. No - 360.050.000.05.001.000.127
2007	on Status of the Protected Areas (as amended 30.04.2014) Reg. No - 360.050.000.05.001.003.060
2014	Waste Management Code 26.12.2014 Reg. No -360160000.05.001.017608
1996	Minerals (as amended 26.12.2014) Reg. No - 380.000.000.05.001.000.140
1997	Wildlife (as amended 26.12.2014) Reg. No - 410.000.000.05.001.000.186
1997	Water Protection (as amended 26.12.2014) Reg. No - 400.000.000.05.001.000.253
1997	Transit and Import of Hazardous Waste within and into the Territory of Georgia as amended 11.03.2011) Reg. No - 300230000.05.001.016218
1998	Pesticides and Agrochemicals as amended 08.05.2012) Reg. No - 340120000.05.001.016723
1999	Atmospheric Air Protection as amended 5.02.2014) Reg. No - 420.000.000.05.001.000.595
1999	Forest Code as (amended 6.09.2013) Reg. No - 390.000.000.05.001.000.599
2003	Red List and Red Data Book of Georgia (as amended 6.09.2013) Reg. No - 360.060.000.05.001.001.297

Other Relevant Laws	
2007	On Cultural Heritage (as amended 26.12.2014) Reg. No - 450.030.000.05.001.002.815
2007	On Public Health (as amended 29.05.2014) Reg. No - 470.000.000.05.001.002.920
2005	On Fire Protection and Safety 24.06.2005 Reg. No - 140.060.000.05.001.000.355
2006	on Regulation and Engineering Protection of Coasts of Sea, Water Reservoirs and Rivers of Georgia – 27.12.2006 Reg. No-330.130.000.11.116.005.130
2014	Technical Regulations: “on Drinking Water standart”. Approved by the Government decree № 58 Reg. No-300160070.10.003.017676
2014	Environmental Technical Regulations. Approved by the Government decree № 17 Reg No-300160070.10.003.017608

19. 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.
20. 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.” 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.
21. Environmental Assessment Code was adopted in June 2017 and entered into force from January 2018. The new code replaced law on Environmental Impact Permit and Ecological Expertise. Environmental Assessment Code sets up regulations and procedures for Environmental Impact Assessment, Strategic Environmental Assessment, Trans-boundary Environmental Assessment, Public Participation and Expertise in the Decision-Making Process. The EIA shall be subject to the activities envisaged by the Annex I of this Code and the activities envisaged by the Annex II of the same Code, which will be subject to EIA on the basis of screening procedure set out in Article 7 of this Code (Article 5 of Chapter 2).
22. The Law of Georgia on Environment Protection (1996) 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.
23. **The Law of Georgia on Licenses and Permits (2005)** defines the list of activities needing licenses or permits, including so called “Environmental Decision”. 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

24. 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.

25. The aim of new law on Waste Management – **Waste Management Code** (January 2015) – is to provide for the legal conditions for implementation of measures aiming at prevention of generation of waste and increased re-use, environmentally-sound treatment of waste (including recycling and extraction of secondary raw materials, energy recovery from waste, as well as safe disposal). The objective of this Law is to protect the environment and human health: by preventing and reducing the adverse impacts of the generation of waste; by introducing effective mechanisms of management of waste; by reducing damage caused by resource use and improving the efficiency of such use. In accordance with the new Waste Management Code in Georgia, any individual and legal entity that produces more than 200 tons of non-hazardous and/or more than 1,000 tons of inert waste or 120 kilograms of hazardous waste is required to prepare a waste management plan that must be submitted to Ministry of Environmental Protection and Agriculture of Georgia for approval. It is also necessary to identify an environmental manager and provide information to MEPA. The rule for collecting and processing municipal waste is determined by the Code, as well as the prohibitions related to the management of hazardous waste. The Code obliges to develop a system of segmentation and collection of hazardous waste in the case of the production of more than 2 tons of hazardous waste during the year.

26. The following summarizes the key points of the code.

Article 7 - General waste management requirements

- Waste, depending on its type, properties and composition, shall be collected, transported and treated in a manner not impeding its further recovery.
- Waste shall be collected, transported and treated in a manner which excludes, to the maximum extent possible, pollution of the environment and risks for human health.
- In case of waste pollution caused by waste transport activities, the waste transporter shall be responsible for taking clean up measures.
- The producer and holder of waste is obliged to treat their waste
- on their own or hand it over for collection, transport and treatment to persons entitled to carry out such operations in accordance with this Law and legislation of Georgia.

- Where waste has been submitted for recovery or disposal, the original producer's and/or holder's responsibility shall remain until recovery or disposal is completed.
- Persons who collect and transport waste shall hand it over for treatment to appropriate facilities, holding the relevant permit or registration.
- The burning of waste outside permitted incinerators shall be prohibited.

Article 14 - Company waste management plan

- Legal and natural persons that produce more than 200 tons of non-hazardous waste or 1000 tons of inert waste or any amount of hazardous waste annually, shall prepare a company waste management plan.

Article 15 – Environmental Manager

- The persons under Article 14 of this Law shall nominate a suitable person as a company environmental manager.

Article 17 - General obligations for hazardous waste management

- The production, collection and transportation of hazardous waste, as well as its storage and treatment, shall be carried out in conditions providing protection for the environment and human health. It shall be prohibited to:
 - discard hazardous waste outside waste collection containers;
 - discharge it into the sewerage systems or underground or surface waters, including the sea;
 - burn it outside waste incinerators permitted for that purpose;
 - treat it outside waste treatment facilities permitted to treat such type of waste

Article 18 - Special obligations for hazardous waste management

- Waste producers that produce more than 2 tons of hazardous waste per year shall
 - create and implement a suitable separation and collection system for such waste;
 - designate an environmental manager, pursuant to Article 15 of this Law, responsible to make arrangements for the safe management of said waste;
 - make arrangements for briefing and training for staff handling hazardous waste.
- Until the exact content of waste is unknown, the waste shall be regarded as hazardous.
- Hazardous waste for which no appropriate treatment techniques and/or technologies are available in accordance with the requirements of this Law within the territory of Georgia shall be exported for treatment. Until the export is carried out, the waste shall be safely stored at temporary storage facilities.
- The Ministry may exceptionally once allow for an extended storage period of up to one year if this is justified and does not harm human health or the environment.
- Hazardous waste may only be collected and transported by a natural or legal person after its registration pursuant to this Law.

Article 29 - Obligations for keeping records and reporting on waste

- Records on waste shall be kept and waste reports shall be submitted to the Ministry by natural and legal persons:
 - dealing professionally with collection, transport and/or treatment of waste;
 - which produced more than more than 2 tones non-hazardous (excluding municipal waste) waste or any amount of hazardous waste per year.

27. 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 or 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.

28. **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. Endangered species, deterioration of the breeding area or living conditions, is prohibited. The Red List of Georgia was approved by the Presidential Decree No. 303 ‘On approving the Red List of Georgia’ (May 2, 2006).
29. **The Forest Code (1999)** regulates the legal relations to the maintenance, protection, restoration and use of forest resources of Georgia. The Forest Code of Georgia aims to: maintenance, protection and restoration of forests for the maintenance and improvement of climate, water regulation, protective, cultural, recreational and other useful natural properties;
30. **Law on atmospheric air protection** (1999) regulates the protection of atmospheric air from the harmful anthropogenic influence on the entire territory of Georgia. The objective of the law is to ensure the safe environment for the atmospheric air of human health and the natural environment;
31. 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.
32. **Environmental Assessment and Review Framework** (November 2010, updated in November 2013 due to changes in the scope of the USIIP, EARF) was established for the Asian Development Bank funded Georgia Urban Services Improvement Investment Program (or the Investment Program). This is prepared to adequately address the ADB Safeguard Policy Statement (2009) requirements and is to be endorsed by the Georgian government. Projects have to be assigned to Categories A, B, and C. General Mitigation measures are listed for anticipated impacts.

1.1.2 Environmental Regulations and Standards

33. Georgia has a large set of specific standards that refer to emission, effluent, and noise standards, as well as standard to handle and dispose specific wastes ranging from sewage to hazardous wastes. The following summarizes these laws and standards along with IFC and EU standards.

Ambient Air Quality Standards

34. Environmental Quality Standards and Norms In accordance with the Law on Public Health, environmental quality standards and norms, among them those of air quality and noise level, are set by Decrees No. 297/N dated 16.08.2001 of the Minister of Labor, 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 2 Maximum Admissible Concentrations (MAC) of harmful substances in Ambient Air

Substance	MAC, mg/m ³
Nitrogen Dioxide	0.085
Sulphur Dioxide	0.5
Carbon Monoxide	5.0
Saturated Carbohydrates, C6-C10	30.0
Inorganic dust	0.3

35. 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.
36. In the case of noise, the WB/IFC standards will apply. Noise impacts should not exceed the levels presented in Table 2, or result in a maximum increase in background levels of 3 dBA the nearest receptor location off-site.

Table 3 Noise Level Guidelines¹ (IFC)

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

37. 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.
38. Soil Quality: In Georgia, soil quality evaluation criteria is determined by instructions on “Level of Chemical Contamination of Soil” (MM 2.1.7. 004-02). Information on maximum admissible concentrations of various substances and elements in soils are given in the Table 4.

Table 4 Maximum admissible concentrations of various substances and elements in soils

Component	Unit	Level
Arsenic	mg/kg	2-10
Copper	mg/kg	3
Mercury	mg/kg	2.1
Nickel	mg/kg	4
Lead	mg/kg	32
Zinc	mg/kg	23
Compound Hydrocarbons	mg/kg	0.1

Phenol (Compound)	mg/kg	-
Cyanide	mg/kg	-
Sulphate	mg/kg	-
Chloride	mg/kg	-
Ammonium Nitrogen	mg/kg	-
Evaporable Organic Compounds		
Benzoyl	mg/kg	0.3
Toluol	mg/kg	0.3
Ethylbenzene	mg/kg	-
Compound Xylene (ortho,meta, para)	mg/kg	0.3
semi-Evaporable Compounds		
Benzoapiren	mg/kg	0.02
Izopropilen-benzol	mg/kg	0.5
Pesticides		
Atrazin	mg/kg	0.5
Linden	mg/kg	0.1
DDT (and its metabolite)	mg/kg	0.1

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

40. Potable water quality criteria are determined by technical regulations on potable water (Government Regulation N 58 from January 15, 2014 Potable water quality criteria are given in Table 5.

Table 5 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 (Cr6+)	mg/L	0.05
Antimony(Sb)	mg/L	0.02
Cyanide(CN-)	mg/L	0.07
Organic substance		
Total content of pesticides	mg/L	0,05

1.1.3 Sanitary Wastewater

41. Sanitary wastewater from industrial facilities may include effluents from domestic sewage, food service, and laundry facilities serving site employees. Miscellaneous wastewater from laboratories,

medical infirmaries, water softening etc. may also be discharged to the sanitary wastewater treatment system. Recommended sanitary wastewater management strategies include:

- Segregation of wastewater streams to ensure compatibility with selected treatment option (e.g. septic system which can only accept domestic sewage);
- Segregation and pretreatment of oil and grease containing effluents (e.g. use of a grease trap) prior to discharge into sewer systems;
- If sewage from the industrial facility is to be discharged to surface water, treatment to meet national or local standards for sanitary wastewater discharges or, in their absence, the indicative guideline values applicable to sanitary wastewater discharges shown in Table 5;
- If sewage from the industrial facility is to be discharged to either a septic system, or where land is used as part of the treatment system, treatment to meet applicable national or local standards for sanitary wastewater discharges is required.
- Sludge from sanitary wastewater treatment systems should be disposed in compliance with local regulatory requirements, in the absence of which disposal has to be consistent with protection of public health and safety, and conservation and long term sustainability of water and land resources.

Table 6 Indicative Values for Treated Sanitary Sewage Discharges

Pollutants	Units	Standard
pH	pH	6-9
BOD	mg/l	35
COD	mg/l	125
Total phosphorus	mg/ l	2
Total nitrogen	mg/l	15
Total suspended solids	mg/l	60

1.1.4 Licenses & Approvals Required

42. Environmental Assessment Code was adopted in June 2017 and entered into force from January 2018. The new code replaced law on Environmental Impact Permit and Ecological Expertise. Environmental Assessment Code sets up regulations and procedures for Environmental Impact Assessment, Strategic Environmental Assessment, Trans-boundary Environmental Assessment Public Participation and Expertise in the Decision-Making Process. The EIA shall be subject to the activities envisaged by the Annex I of this Code and the activities envisaged by the Annex II of the same Code, which will be subject to EIA on the basis of screening procedure set out in Article 7 of this Code (Article 5 of Chapter 2).
43. 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:
 - Ramseur Convention on Wetlands (1996);

- United Nations Framework Convention on Climate Change (UNFCCC) (1994);
- Kyoto Protocol (1994);
- Kyoto Protocol (1999);
- Basel Convention on the Control of Transboundary Movement of Hazardous Waste and Their Disposal (1999);
- Convention on Access to Information, Public Participation in Decision- making and Access to Justice in Environmental Matters (Aarhus Convention) (1999);
- Convention on Biological Diversity (1994);
- Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) (1996);
- Convention on Long-range Trans boundary 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).

1.2 ADB Policy

44. 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.
45. 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.
46. 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.

- 47.** The Ureki 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, Updated in May 2015) that was especially prepared for the environmental assessment of the Georgia Urban Services Improvement Investment Program.
- 48.** 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.

1.3 Comparison of the National legislation and ADB Requirements

49. The above accounts of national environmental law and ADB policy indicate that the two systems are similar but then there are some aspects in which ADB policy is more specified than the Georgian procedure. The main differences are as follows.
50. Considering ecological risk, cultural heritage, resettlement and other factors, the Bank classifies projects supported by them under categories A, B, C and FI. In the Georgian legislation, EIA is carried out within the scope of the activities provided for by Annex I to the New Environmental Assessment Code, and of the activities provided for by the Annex II to the same Code, according to a screening decision. Asian Development Bank guidelines require EIA for category A projects, IEE for the B category projects, and an environmental review of projects that are not expected to produce environmental impacts (category C), while according to the Georgian legislation IEE is not required.
51. Georgian legislation does not specify the format of environmental management plans as well (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 guidelines require EMPs for all categories of projects and provide detailed instructions on the content.
52. According to Georgian legislation MEPA 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 defined. The IPMO 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 – UWSCG) is required to ensure inclusion of a monitoring scheme and plans into EMPs. Monitoring of performance compliance against EMPs is an important element of ADB requirements.
53. 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.
54. Ministry is participating in public consultation required for the adoption of a decision on issuing an EIA permit as established under the new Code of Georgia. ADB carry out project screening and categorization at the earliest stage of project preparation when sufficient information is available for this purpose, also according to 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.
55. 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.
56. 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.
57. The Environmental Assessment Code, which was adopted in June 2017 and entered into force in January 2018 includes screening, scoping, preparing an EIA report, public participation, carrying out consultations and preparing an expert opinion on the basis of the evaluation of the results obtained, and taking account of the expert opinion in issuing an environmental decision under this Code and/or a respective enabling administrative act as provided for by the legislation of Georgia.

58. Environmental impact assessment fall within the scope of the activities provided for by Annex I to this Code, and of the activities provided for by the Annex II to the same Code, according to a screening decision.
59. Screening Stage: A person carrying out activities shall, as early as possible at the stage of planning an activity, submit to the Ministry an application for the screening of the planned activity and obtain from the Ministry a decision on whether the planned activity is subject to an EIA.
60. Within three days after a screening application has been registered, the Ministry shall have the application placed on its official website and on the notice board of the executive body and/or representative body of a respective municipality, and upon request, shall make a printed copy available under a procedure established by the legislation of Georgia. The public may, within seven days after the screening application has been placed on the website and the notice board, submit to the Ministry opinions and comments with respect to the application under the procedure established by Article 34(1) of this Code. The Ministry shall review the opinions and comments submitted by the public and, if there are appropriate grounds, shall take them into account when making a decision on the screening.
61. Scoping Stage: A person carrying out activities shall, as early as possible at the stage of planning an activity, file with the Ministry a scoping application along with a scoping report.
62. Within three days after a scoping application has been registered, the Ministry shall have the scoping application and the scoping report placed on its official website and on the notice board of the executive body and/or representative body of a respective municipality, and upon request, shall make printed or electronic copies available under a procedure established by the legislation of Georgia.
63. The public may, within 15 days after the placement of the scoping application submits to the Ministry opinions and comments with respect to the scoping report. When issuing the scoping opinion, the Ministry shall ensure a review of the opinions and comments submitted by the public and, if there are appropriate grounds, take them into account.
64. Not earlier than the 10th day and not later than the 15th day after the placement of the scoping application under the procedure established by Article 8(2) of this Code, the Ministry shall ensure the holding of a public review of the scoping report. The Ministry shall be responsible for organizing and holding public reviews. Public reviews shall be led, and the minutes of public reviews shall be drafted, by a representative of the Ministry. Information on the public review shall be published not later than 10 days before the public review is held, in accordance with Article 32 of this Code. Public reviews shall be open and any member of the public may participate in them.
65. After the Ministry approves the scoping opinion, the person carrying out activities and/or an adviser shall ensure the preparation of an EIA report. The person carrying out activities shall ensure the reimbursement of the costs necessary for preparing an EIA report. the Ministry shall have EIA information on its official website and on the notice board of the executive body and/or representative body of a respective municipality.
66. The public may, within 40 days after the placement of the application, submit to the Ministry opinions and comments under the procedure established by Article 34(1) of this Code with respect to the EIA report, the planned activity and the conditions to be included in the environmental decision. When making an environmental decision or a legal act refusing the carrying out of the activity, the Ministry shall ensure the review of the opinions and comments submitted and, if there are appropriate grounds, take them into account.
67. Not earlier than the 25th day and not later than the 30th day after the placement of the application under the procedure established by Article 11(3) of this Code, the Ministry shall hold a public review of the EIA report. The Ministry shall be responsible for organizing and holding reviews. Public reviews shall be led, and the minutes of public reviews shall be drafted, by a representative of the Ministry. The Ministry shall be responsible for the accuracy of the minutes. Information on the public review shall be published not later than 20 days before the public review is held, in accordance with Article 32 of this Code.

- 68.** Not earlier than the 51st day and not later than the 55th day after the registration of an application for obtaining an environmental decision, the Minister shall issue an individual administrative act on the issuance of an environmental decision or, if there exist grounds provided for by Article 14 of this Code, on the refusal of the carrying out of the activity. When making environmental decisions, the guideline document on Environmental Impact Assessment may be used.

Table 7. Activities and responsibilities in EIA for national law and ADB policy

#	Action	Georgian Legislation	ADB Requirements
1	Screening	Consultant hired by Project Proponent	Bank and Consultant hired by Project Proponent
2	Scoping	Consultant hired 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	Not earlier than the 25th day and not later than the 30th day after the placement of the application under the procedure established by Article 11(3) of this Code, the Ministry shall hold a public review of the EIA report. Public reviews shall be led, and the minutes of public reviews shall be drafted, by a representative of the Ministry. Information on the public review shall be published not later than 20 days before the public review is held, in accordance with Article 32 of this Code.	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	clear guidelines content and timing on format	Incorporate Monitoring and Management Plans in the EIA
7	Review Approval and	MEPA	Bank and separately – MEPA (if the EIA is required by Georgian legislation)
8	Disclosure of the final EIA	Not requested	Publication (mainly electronic) of the final EIA

1.3.1 Harmonization of the ADB and Georgian Legislation Requirements

69. 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.

1.3.2 Administrative Structure in Georgia

70. Ministry of Environmental Protection and Agriculture of Georgia (MEPA). MEPA has the overall responsibility for protection of environment in Georgia. The Department of Permits of MEPA is responsible for reviewing EIAs and for issuance of the Environmental Permits. MEPA 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 Decision)
 - Setting emission limits and issuing surface water intake and discharge consents
 - Responding to incidents and complaint
71. The Ministry of Culture and Sport 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).
72. Ministry of Regional Development and Infrastructure (MoRDI) is the Executing Agency (EA) responsible for management, coordination and execution of all activities funded under the loan/ADB/USIIP. MoRDI has overall responsibility for compliance with loan covenant.
73. United Water Supply Company of Georgia (UWSCG) is the implementing agency (IA), which is responsible for administration, implementation (design, construction and operation) and all day-to-day activities under the loan. Investment Program Management Office (IPMO) under UWSCG is Project Management Department. The name of the Department of Environmental Protection, Resettlement and Permits was also changed to the Department of Environmental Protection and Permits, the head of the department remains Ms. Maka Goderdzishvili. Ms. Ketevan Chomakhidze, Environmental Specialist of the USIIP, has moved from the Project Management Department to the Department of Environmental Protection and Permits from September 2018 as well.
74. All mitigation measures during construction have to be implemented by the contractor and these are monitored by the supervision consultant (SC). Environmental Management Specialist of SC conducts routine observations and surveys of project sites, issues non-compliance notes, prepares quarterly environmental reports and submits these to UWSCG.
75. The Contractor has the following obligations:
- to prepare SEMP;
76. to employ Environmental Consultant responsible for developing and implementing the construction phase SEMP and for providing the corresponding information to UWSCG and SC;
- to develop Solid Waste Disposal Plan and agreed the MEPA and Local Government

77. Within the framework of the Ure-01 project, SEMP's were originally prepared by the contractor, approved by supervision consultants and approved by IPMO/UWSCG for the following components:
- Ureki Well field;
 - Pumping station;
 - Reservoir No. 1;
 - Reservoir No. 3.
78. Additional SEMP's were prepared for the Deep Well and Gabion installation to protect the Natanebi River and the construction of the Aqueduct after making changes to the project.
79. Although the SEMP for Deep Well and Gabion installation as well as for Aqueduct construction was already approved by the UWSCG it needs to be updated to include all necessary mitigation measures to avoid any possible impact on River contamination and biodiversity. In particular, it is requested to conduct preliminary simple Otters Survey alongside the River Natanebi by the contractor prior to construction of Aqueduct. This will be a visual inspection of about 1.2 km along the bank of the Natanebi River.
80. The environmental specialist (ES) is hired by UWSCG under the USIIP to assist and advise the DEPRP in USIIP program implementation in compliance with the ADB Safeguard Policy Statement 2009 and National Legislation, and oversee the work of DCs and SCs in safeguards compliance. ES supports DEPRP in EARF implementation, in particular, reviewing IEE/EIA Reports and overseeing implementation of EMP/SEMP's and in training and capacity-building activities. The ES prepares bi-annual and annual environmental monitoring reports and submits to ADB.
81. ADB is the donor financing the Investment Program Environmental management organization is shown in Figure 1 and Figure 2.

Figure 1 Structure Diagram of the Environmental Management Unit of UWSCG

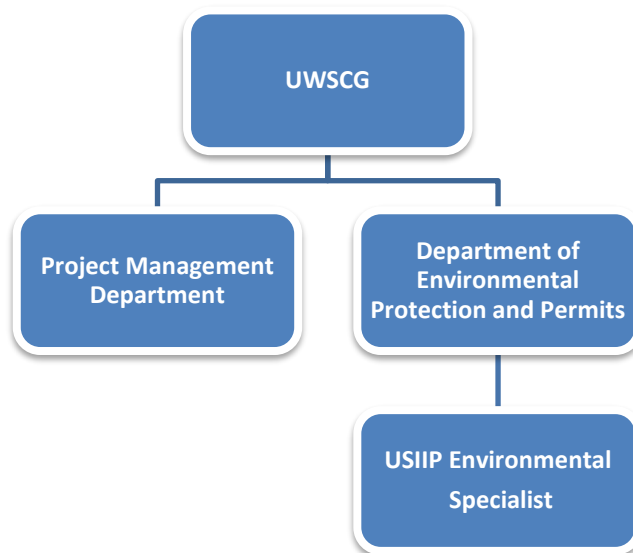
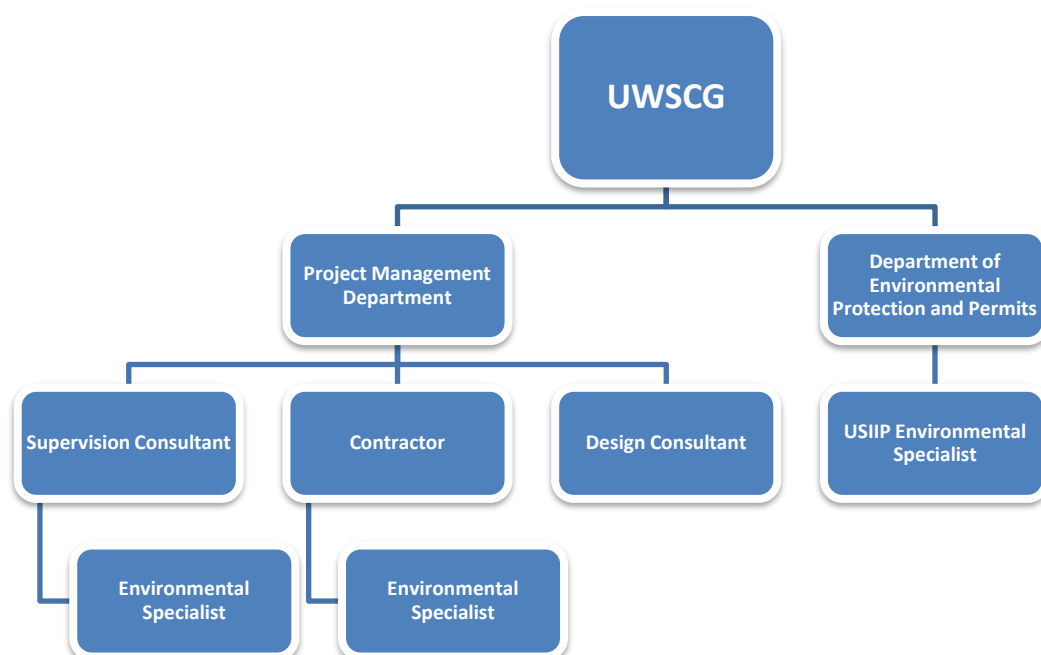


Figure 2 Structure Diagram of the Agencies Involved in Investment Program Implementation



2. DESCRIPTION OF PROJECT

2.1. Type of the Project

82. This is an urban water supply sub-project. It involves the development of a new well field (7) alongside Natanebi River, approximately 2 km north of the village of Laituri, construction of transmission mains, reservoirs, pumping stations and water supply network. According to project requirements, installation of additional deep well has been determined and planned at the same location of well field and installation of gabion wall as river bank protection is considering. Within the proposed project Natanebi River crossing Aqueduct will be constructed also 6 km away from the Gabion to connect Laituri reservoir to the Pumping Station by means of transmission main.

2.2. Need of the Project

- 83.** The service level of urban water supply and wastewater treatment at present is not satisfactory in Georgia. Services are not available to entire population and the serviced are as suffer from inefficient service levels. Systems are old and inefficient. The situation is not different in the project area, comprising the villages of Ureki and Shekvetili. This subproject is needed because the present water supply infrastructure in Ureki and Shekvetili is inefficient and inadequate to the needs of the population and the tourists, especially when considering that both villages, Ureki and Shekvetili, shall be further developed to tourism resorts. Therefore the project is needed.
- 84.** Ureki and Shekvetili do not have a centralized water supply system. Population mainly takes water from wells in their yards. The water does not have drinking water quality as it is partly brackish due to its small distance to the Black Sea and it is polluted from the septic tanks located in the direct vicinity of the wells. For this reason, the implementation of complete water piping centralized system is required for the further functioning of the resorts.
- 85.** The present sub-project is designed to improve the service standards of water supply in Ureki-Shekvetili. It is designed to meet the maximum desired water demand by the year 2040 at an amount of 15.078 m³ per day. The development of the demand level in Ureki-Shekvetili based on the estimated number of inhabitants and tourists are indicated in the following table.

Table 8 Water Demand Development

Description	Unit	2010	2020	2030	2040
Consumers TOTAL	capita	9,100	20,000	30,000	40,000
Consumers Ureki	capita	6,700	15,000	20,000	25,000
Consumers Shekvetili	capita	2,400	5,000	10,000	15,000
Inhabitants Ureki (permanent stay)	capita	1,700	2,154	2,894	3,889
Inhabitants Shekvetili (permanent stay)	capita	400	591	963	1,568
Specific water demand (according UWSCG)	l/(c*d)		140	140	140
Minor commercial/institutional demand	%		10	10	10
Real losses (leakage, existing network)*	%		10	15	20
Transmission losses*	%		2	2	2
Subtotal specific water demand (inhabitants)	l/(c*d)		171	178	185
Subtotal water demand (inhabitants)	m³/d		469	686	1,009

Description	Unit	2010	2020	2030	2040
Tourists Ureki (non-permanent stay)	capita	5,000	12,846	17,106	21,111
Tourists Shekvetili (non-permanent stay)		2,000	4,409	9,037	13,432
Specific water demand (according UWSCG)	l/(c*d)		170	170	170
Minor commercial/institutional demand	%		10	10	10
Real losses (leakage, existing network)*	%		10	15	20
Transmission losses*	%		2	2	2
Subtotal specific water demand (tourists)	l/(c*d)		207	216	224
Subtotal water demand (tourists)	m³/d		3,579	5,644	7,751
Total average daily water demand	m³/d		4,048	6,330	8,760
Peak factor daily demand	-		1.90	1.85	1.85
Peak factor hourly demand	-		4.0	3.5	3.5
Total maximum daily water demand	m³/d		7,392	11,075	15,078
Total maximum daily water demand	l/s		86	128	175
Total maximum hourly water demand	m³/h		675	923	1,277

*real losses: without consideration of daily peak factor, as agreed on with UWSCG

86. The population figures are calculated under the consideration of the following annual population growth:

- Ureki: 3 %
- Shekvetili: 5 %

2.3. Location

87. This sub-project is located in Ureki borough, Guria region, Ozurgeti Municipality in West Georgia. The regional location of Ureki is shown below.



Map 1 Location of Ureki

88. The water supply project measures consist of the development of a new well field along Natanebi river approximately 2 km to the north of the village Laituri, the construction of a major transmission main (length 14 km) from Laituri well field to a pumping station at Ureki and additional smaller transmission mains within the water supply area of Ureki and Shekviteli. Construction of pumping station at Ureki and 2 reservoirs. Additional water supply facilities are the installation of additional Deep Well, installation of Gabion wall as river bank protection and Natanebi river crossing Aqueduct.
89. The locations of above described water supply facilities are within the village areas and in the vicinity of Ureki and Shekviteli.

2.3.1. Location of Pumping Station

90. Construction site located within 0,1-0,2 km distance to south from Ozurgeti-Natanebi - Ureki Road; Adjacent to the road and close to the construction site was an old post-soviet municipal building, which was abandoned without any living or operational features.
91. Construction site area is approximately 1 900 m² and about at the 16 -17 m height of sea level.
92. The site generally bounded by the following coordinates:

	N	E
1	41575267	41472762
2	41575225	41472922
3	41575163	41472927
4	41575099	41472879
5	41575086	41472812

Map 2 Construction Site Location



2.3.2. Location Reservoirs

Reservoir #1

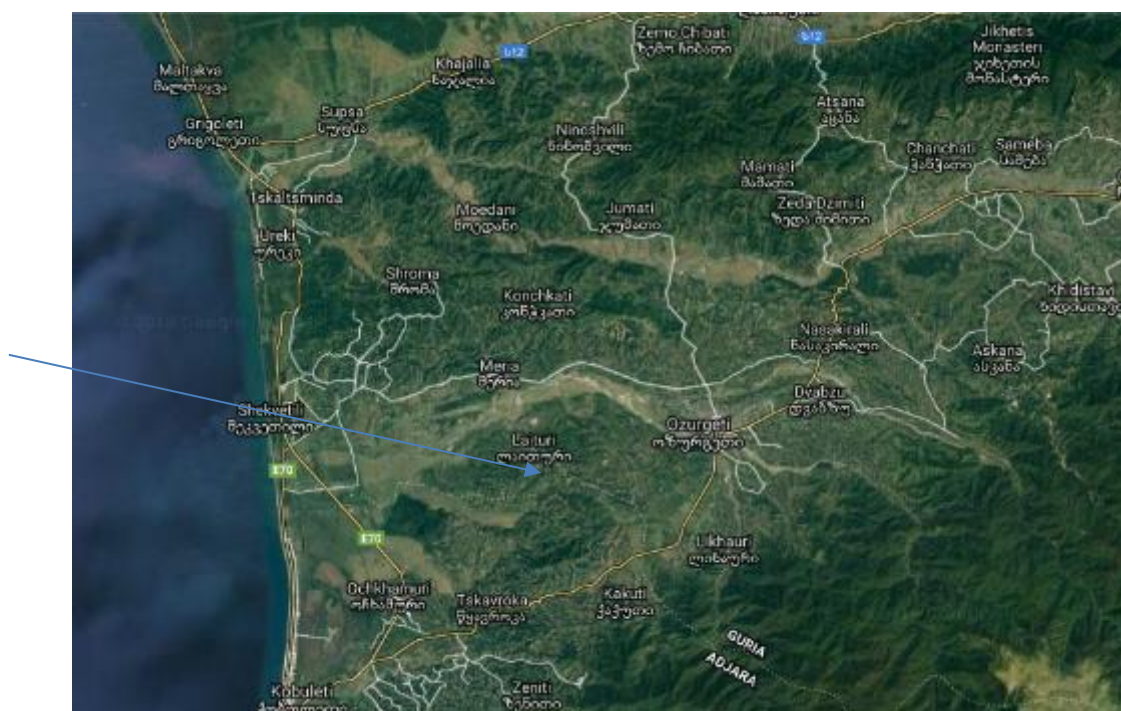
93. R1 Construction site is located at the Tsvermaghala hill, to south-east and 5 km distance from Ureki. Construction site located within 1.2 km distance to south from Ozurgeti-Natanebi - Ureki Road; on the hill where abandoned building observed. Building presented post-soviet municipal buildings, that has been abandoned and no living or operational features has been found during the survey. Demolition of building has been performed on the reason of project requirement and with agreement local municipality. Demolition activities and disposal of waste has been conducted by Municipality.
94. Construction site area is approximately 2 300 m² and about at the 101-110 m height of sea level.
95. The site generally bounded by the following coordinates:

	N	E
1	41575267	41472762
2	41575225	41472922
3	41575163	41472927
4	41575099	41472879
5	41575086	41472812
6	41575134	41472728
7	41575267	41472762

96. Capacity of tsvermaghala reservoir is 5000 m³. Chlorination station will be installed also. Reservoir structure will be reinforced concrete.

Laituri Reservoir

97. The project Site is located in Laituri village, Ozurgeti Municipality, Guria Region. Laituri located in the medieval rivers of Choloki and Natanebi, 80m from the sea level, 5 km from the nearest railway station, 14 km from Ozurgeti.
98. R2 Construction site is located alongside the road to west and 550 m distance from Meria – Laituri Main road (see below Photos 1 and 2 for better illustration of the site).



Map 3 Location of Laituri Reservoir

99. Construction site of Laituri reservoir area is approximately 1 280 m² and about at the 36-40 m height of sea level.

100. The site generally bounded by the following coordinates:

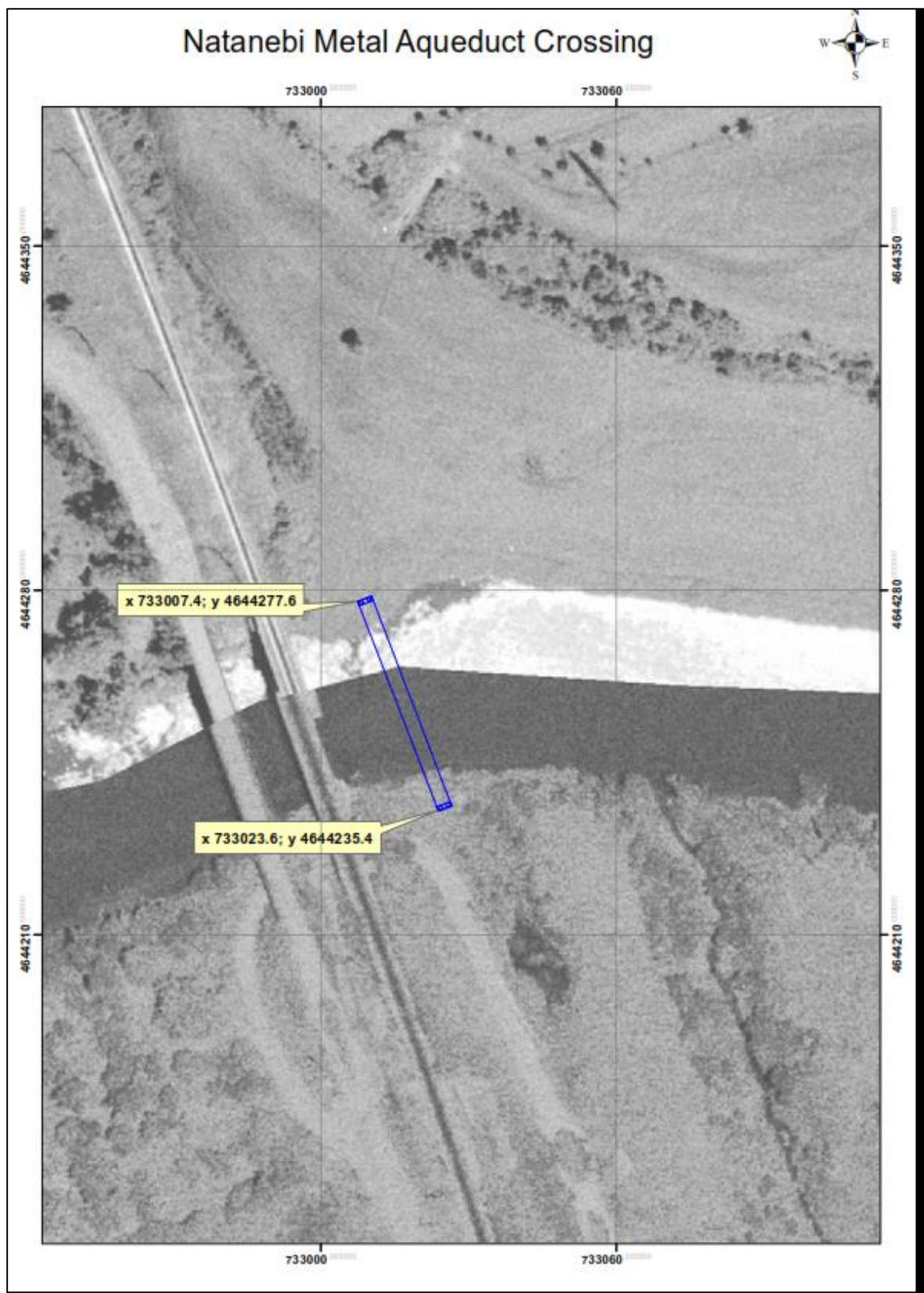
	E	N
1.	4645430	739980
2.	4645450	740000
3.	4645470	740020
4.	4645490	740040

Location of Aqueduct

101. The Natanebi river crossing is located along the new route for OD 710 PS-WF main transmission pipelines in Ozurgeti region.

102. The site generally bounded by the following coordinates

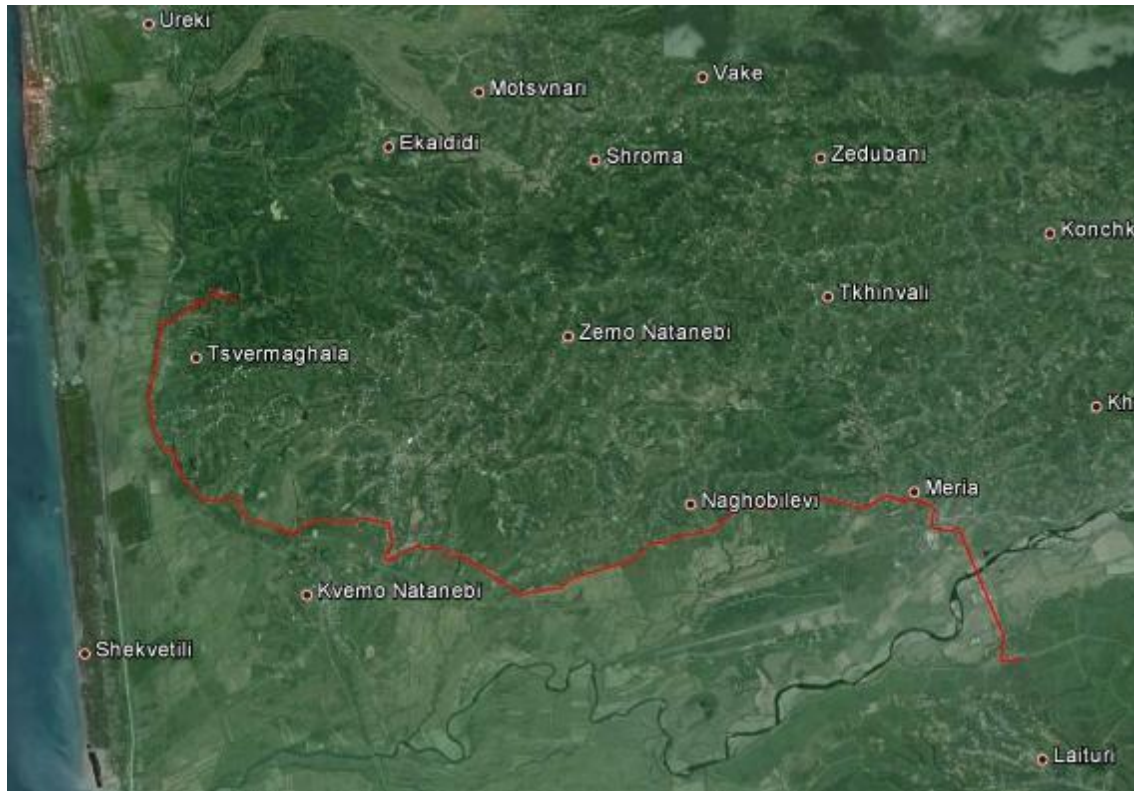
#	X	Y
1	73 3007.4	46 44 277.6
2	73 3023.6	46 44 235.4



Map 4 Location of Aqueduct

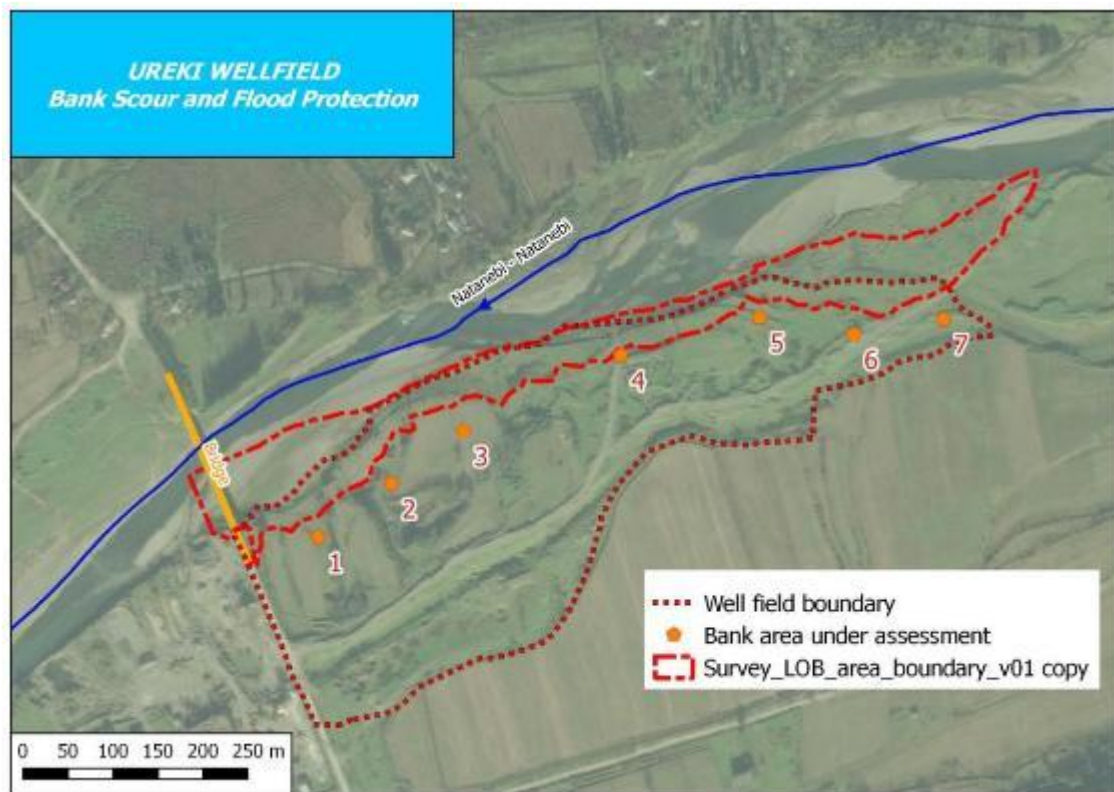
2.2.3. Location of Transmission Main, Well fields and Gabion Wall River Bank Protection

- 103.** The well field is located along the River Natanebi, approximately 2 km to the north of the village Laituri. It is connected to the pumping station in Ureki by means of a transmission main, exhibiting a length of 14 km and a nominal diameter of 600 mm. The alignment is shown in the following satellite image.



Map 5 Transmission main (red line) from Laituri well field to Ureki

- 104.** The aforementioned wellfield and Gabion wall for River bank protection will be located on the left margin of the river, immediately upstream from the road bridge crossing across Natanebi River that connects the village of Laituri with the National Road 46 (Ureki-Natanebi-Ozurgeti).
- 105.** Up to seven wells will be drilled and equipped close to the bank of the river. The distance from these wells to the actual edge of the alluvial terrace ranges from 25 m to 100 m. The band along Natanebi River will be approximately 840 m.
- 106.** The following figure shows the plan view of the area where the wellfield will be located, and more precisely, the band along the bank of the river where flood protection structures are required:



Map 6 Location of well fields and Natanebi River Flood Protection Gabion

3. IMPLEMENTATION SCHEDULE

107. The design of the subproject will be completed by August 2013. The construction will begin in 2014. The initial date for completion of works was 2017, but due to additional components of the project construction works will be completed by mid-2019.
108. A feasibility study was conducted for the construction a water supply and sanitary system in Ureki and Shekvetili to meet the design year demand (2040) and the project is formulated for implementation under the proposed ADB funded Investment Program. Works are proposed to be implemented through multi tranche funding. Table 2 shows the subproject and components selected for implementation in Ureki and Shekvetili, for which, according to ADB requirement, this IEE is conducted.

3.1. Sub Project Components

109. This subproject focuses on the construction of a new well field, transmission mains, pumping stations and reservoirs, Gabion wall as Natanebi River bank protection, Natanebi river crossing.

Table 9 Proposed Subproject & Components Water Supply System and Waste Water System

Infrastructure	Function	Description	Location
Water Supply components of the sub-project			
Laituri well field	To provide constant supply of potable water	Investigation (pilot drilling, pumping tests) and construction of Laituri well field.	Along Natanebi river, approximately 2 km north of Laituri
Transmission main from Laituri well field to pumping station Ureki	Convey water from the well field to Ureki pumping station	Laying of new transmission main DN 600, with a length of 14.3 km	In between Laituri well field and Ureki
Transmission main from pumping station to Water Supply Area Ureki/Shekvetili I and Reservoir 2	Convey water	Laying of a new transmission main ID 290.6, with a length of 7.7 km	Village area of Ureki
Transmission main from pumping station to Reservoir 1	Convey water	Laying of a new transmission main DN 500, length 1.4 km	Village area of Ureki
Transmission main from Reservoir 1 to Hotel Area Ureki/Shekvetili	Convey water	Laying of a new transmission main DN 600, length 2.5 km	Village area of Ureki
Transmission main from Reservoir 1 to water supply area Shekvetili II	Convey water	Laying of a new transmission main ID 290,6, with a length of 3.5 km	Village area of Ureki and Shekvetili
Pumping station	Sufficient pressure for water supply areas Ureki and Shekvetili 1 (north) and feeding of reservoir Ureki 1 for water supply area Shekvetili 2 (south)	Construction of new pumping station with 2 different pump groups	Ureki
2 new Reservoirs	Provide secure water supply for Ureki and Shekvetili	2 new reservoirs with a total volume of 7,200 m ³ , Ureki 1 with 2 x 3,000 m ³ , Ureki 2 with 1,200 m ³	Ureki 1 is located appr. 3 km (linear distance) from the beach of Shekvetili north. Ureki 2 is located around 2.5 km west (linear distance) of Ureki

Infrastructure	Function	Description	Location
			beach.
Gabion Protection wall	To protect well fields from flooding	The structure designed for local flood and slope erosion protection is a narrow levee all along the river bank of the section of the Natanebi River. Thus it will be 840 m long structure covering the whole face of the well field	Village Laituri
Aqueduct	To connect Laituri reservoir with Pumping Station	Natanebi River crossing with Ureki Water Supply OD710 pipe is established by use of aqueduct.	Village Laituri
Deep Well	To provide constant supply of potable water	Installation of additional eighth Deep Well has been determined at the same location of well field	Along Natanebi river, approximately 2 km north of Laituri

110. An overview of the distribution network is presented in Annex 3. The new transmission mains and the distribution network will comprise the following pipes:

Table 10 Pipe lengths and diameters

Pipe Diameter	Pipe Length
	m
OD 63	467
OD 75	3,851
OD 90	1,021
OD 110	13,547
OD 125	214
OD 160	2,059
OD 180	2,543
OD 200	697
OD 225	913
OD 250	372
OD 280	186
OD 450	212
OD 560	504
DN 600	3,872

3.2. Construction Activities

111. There are the following main elements in water supply components of the subproject:

- construction of Laituri well fields

- construction of transmission mains
- construction of pumping stations
- construction of reservoirs
- Construction of Gabion protection wall
- Construction of Natanebi metal Aqueduct crossing

112. Construction practices of these works are described below:

113. Construction of Laituri well field consists of drilling activities and electrical installations. No major earthwork activities are involved.

114. Laying of Transmission Mains. Transmission main will be laid to connect Laituri well field with Ureki pumping station. Additional transmission mains will be laid to connect Ureki and Shekvetili village with the pumping station. Pipes for laying will have a diameter of ID 290.6 to DN 600. Trenches for new pipe sections will be dug using a backhoe digger, supplemented by manual digging.

115. Excavated soil will be placed alongside, and the pipes will be placed in the trench. Pipes will be joined, after which excavated soil will then be replaced on beneath and sides. The trench will be refilled with excavated soil and sand and compacted manually. The depth of trench will be 1 m – 4 m depending on topographical conditions. Minimum width of the trench will be between 0,8 and 0,9 m. After construction part of trench will be occupied by pipe and sand layer, and trench is refilled with the excavated material.

116. Construction of Reservoir. This work will involve excavation for foundations, placing of reinforcement rods in wooden shutters and pouring of concrete in voids to form foundations, floor, walls and roof. Cement mortar plaster will be applied to walls (outside and inside), floor and roof for smooth finish. Inlet and outlet pipes and fixers/valves will be installed. Excavation for foundation will be done by backhoe digger or manually, where required. Concrete will be mixed in concrete mixer and needle (pen) vibrator will be used for compaction of concrete around the reinforcement. The quantity waste/surplus soil generated from this activity will be insignificant and can be used within the site to level the ground surface.

117. Source of construction materials. Sand and aggregates will be sourced from licensed borrow areas. There is no designated disposal site for construction waste. It is generally disposed in low lying areas.

118. Water needed for civil works comprises potable water and construction water. Potable water shall comply with the national quality standards and shall not compete with the needs of the local population. Construction water and water to be used for dust suppression measures may be taken from the Sepa River or from ground water. Quantity of these resources is not a critical issue.

3.2.1. Construction of Gabion Protection Wall

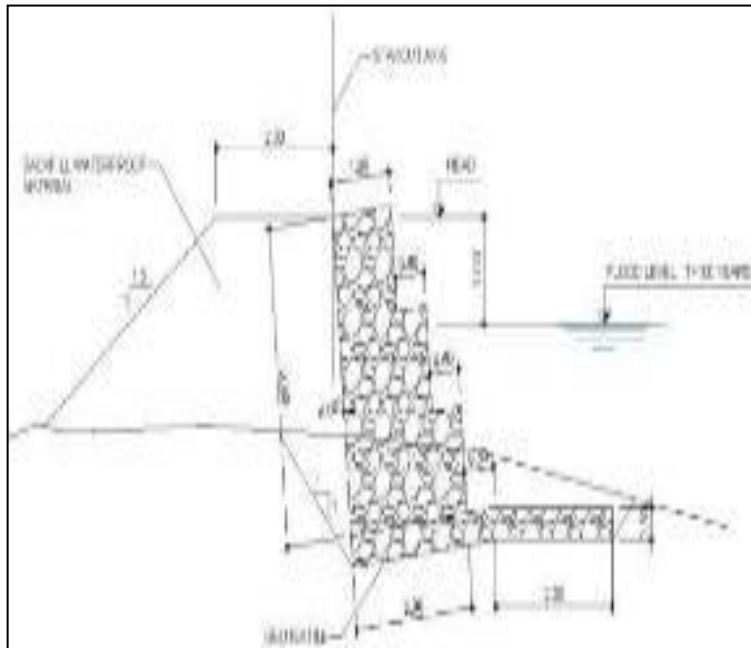
119. The structure designed for local flood and slope erosion protection is a narrow levee all along the river bank of the section of the Natanebi River close to the projected wellfield. The bank stabilization will rely on the construction of a gabion lining attached to the side of the aforementioned levee. Thus it will be necessary to construct a 840 m long structure covering the whole face of the well field.

120. The elevation of the crown of the head of the levee will coincide with the top of the gabions in such a way that a 1 m freeboard is achieved for the design flood event, i.e. 100 year event. (total discharge of 840 m³/s).

Cross Sectional Types

121. In order to comply with the assumptions regarding freeboard and at the same time fine tune the cut and fill figures that the work will involve, a set of five different typologies of gabion walls were defined. The gabion walls will be stepped on the front face (water side) and the width of those steps will be 0.5 m. The back face (soil side) will have an inland inclination of 6 degrees. See the following figure with all the types of designed cross sections for the gabion based gravity retaining walls:

Figure 3: Example of Gabion Based Gravity Retaining Wall

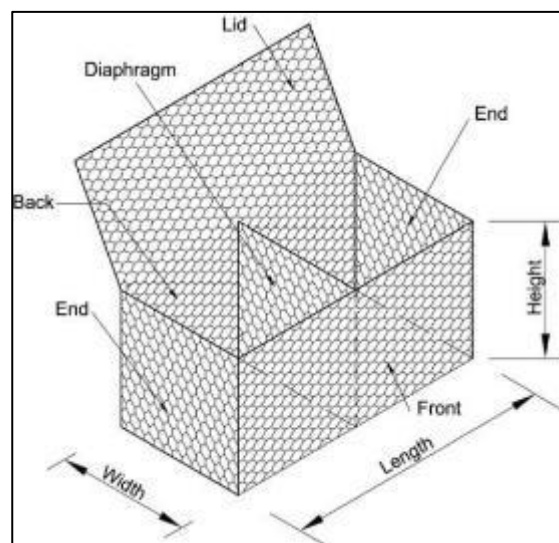


122. It can be noticed that the composition of the baskets or the layer of baskets will define walls will pile up from three to five layers. The base of this pile will rest on a wider mattress of gabions 30 cm thick (RENO gabion). This mattress of gabions will extend for 2,5 m from the toe of the bottom gabion in order to cope with possible erosion effects. In fact as a result of the calculations shown on Annex 3 the section of the river is located where the riverbed is in equilibrium in terms of scour. But in order to cope with the uncertainties derived from the fact of inferring grain size for the riverbed materials from one sieve analysis conducted in the adjacent terrace (the wellfield itself), the design team has opted to include this mattress. This should adapt to the terrain in front of the gabion wall just like a layer of big sized rocks (not present in the area) would do for scour protection.

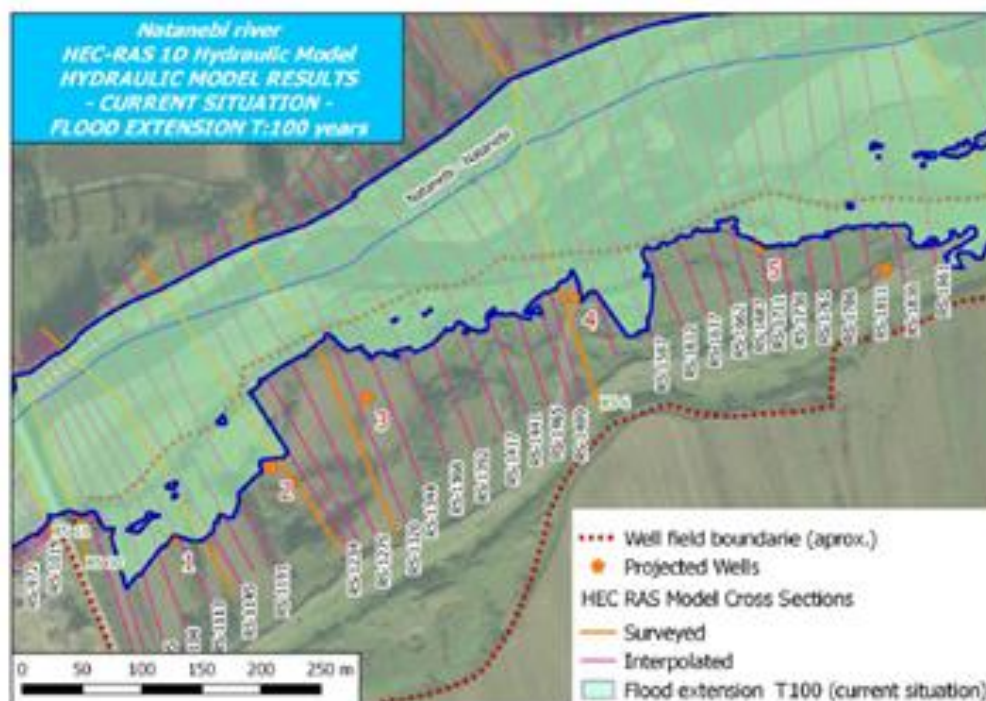
Gabion features

123. Woven mesh gabions will be utilized. These are manufactured from a mesh that has a hexagonal opening which is formed by twisting pairs of galvanized wire together with one and a half turns, also referred to as double twist. The wire diameter of the mesh will be 2,7 mm (3,4 mm at the edges).
124. Size of baskets:

Length 2.00 m, 3.00 m, 4.00 m, 5.00 m
 Width 1,00 m, 1.50 m
 Height 0.50 m, 1.00 m



- 125. Gabion:** The alignment of the gabion wall is located more than 150 m away from the houses (see photo below). The works will not be executed during raining season when the river flow level is high, so during the works it will not be required diverting of the river flow and no works will be performed in the river.
- 126.** As shown below on the scheme, which is part of the approved project, in the rainy season, the distance from Gabion to the river is reduced, but as the methodology suggests, the contractor is not going to work when the water level is high; Consequently, during the construction of the Gabion wall, the distance from the river to the construction site varies from 5-45 m.



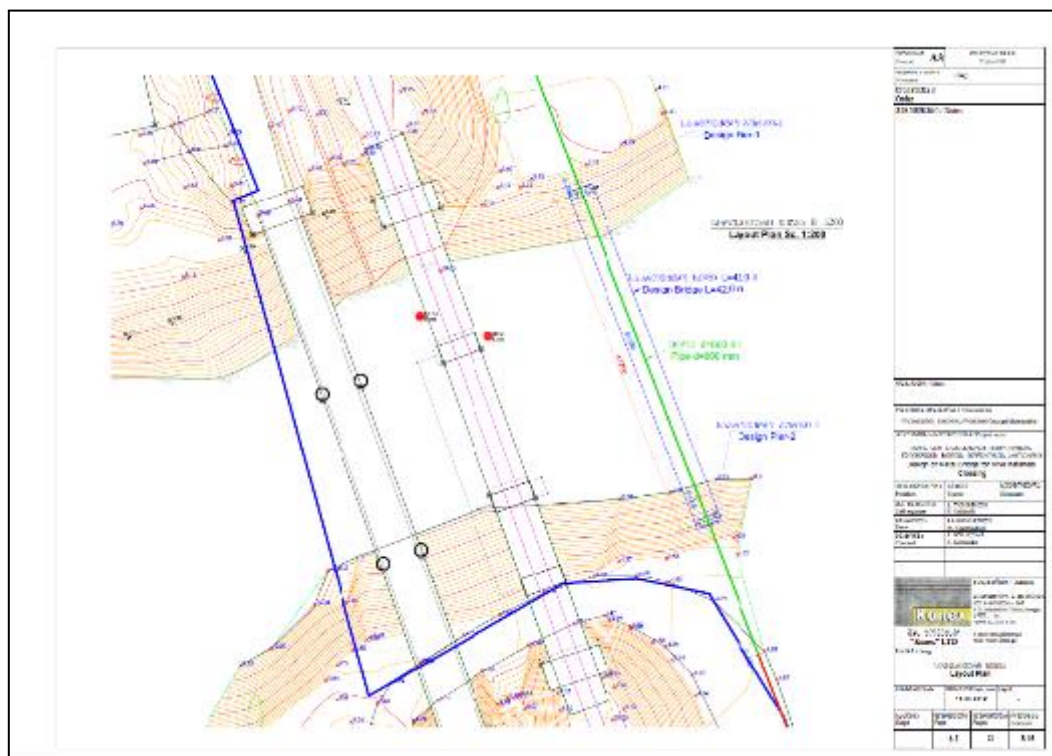
- 127.** The filling material of the gabion baskets shall be made out of stones of regular form with nominal grading size in the interval of fifteen to twenty centimeters (15 to 20 cm), having the material to be reasonably graduated between both limits.

Backfill

- 128.** The backfill soil behind the retaining wall shall conform the levee that should provide protection against flood overtopping for the long term return period event (100 years as design time frame).
- 129.** The levee crown is designed to be 2 m wide for constructive reasons and it will show a graded slope of 3H:2V on the side opposite from the river down to the line where it meets the natural terrain.
- 130.** Backfill material for the levee will show at least a 95% value for Modified Proctor test. A needle punche non-woven geotextile separator film will cover the whole surface between the gabion basket and the backfill material.

3.2.2. Brief Description of Aqueduct over Natanebi River

- 131.** Natanebi River crossing with Ureki Water Supply OD710 pipe is established by use of aqueduct.
- 132.** On both banks of river are installed two R/C cast-in place piers with diameter of 800mm. Depth of cast-in place pile is 18 meters (9.04 m³ each). Above piers are installed R/C pile caps with dimensions 3.0X1.5X1.0 m (4.5m³). No piers will be constructed in the river bed and there will be no permanent footprint in the river as a result of the construction process.
- 133.** On caps aqueduct is anchored with use of M36 anchors, four on each side. Dimensions of structure is 44.1m length, 2.44 width and height. Length of span is 42.3 m.
- 134.** Aqueduct structure is assembled by square profiles and steel sheets. For easy access of UWSCG maintenance crews is foreseen paths and handrails assembled with steel rods.
- 135.** Aqueduct steel structure consists of 3 parts which are connected by bolts and welding.
- 136.** Total weight of structure is approximately 13 tons.
- 137.** HDPE 710 pipe will be transformed to DN 600 steel pipe with flanges. Steel pipe will be installed on structure. For safety reasons client added gates on both ends of aqueduct which will be locked by padlock due to the safety reasons.



Map 7 General layout of the Natanebi Bridge Crossing

- 138.** For construction of the Aquaduct, the Contractor shall employ an approved Licensed Surveyor who will set up the positions of the Aqueduct structures on the both sides of the river so that the river will not be affected by construction activities. The Contractor shall be responsible for the accuracy of location and positioning on each side.
- 139.** Cranes and material shall be located on the untouchable location to the river so that the lift is safe and within the crane manufacturer's rated capacity for all required positions.
- 140. Aqueduct:** Since the construction of the Aqueduct is carried out on the Natane River, as in the case

of Gabion, the distance from the piles to the river is changing according to the season; In particular, the distance from the river to the ground up to 5-20 meters and during the construction period up to 10-20 meters. Accordingly, as it is proposed in the methodology, construction will have no impact on the river.

3.2.3. Operation of Improved Water Supply System

- 141.** Water supply infrastructure will require repair and maintenance activities like detection and repair of leaks. Since good quality pipes are being used breaks are very rare, and leaks will be mainly limited to joints between pipes. Repair work will be conducted in the same way the pipe was laid, by locating the leaking section.

4. ANALYSIS OF ALTERNATIVES

4.1. Water Supply System

- 142.** The project measures regarding the water supply system will ensure the provision of drinking water to the population and the tourists of Ureki and Shekvetili with a design horizon of 2040 in sufficient quantity and quality. Based on the design criteria different project options were investigated and are presented in detail in the Feasibility study. The following chapter provides an overview of the 3 options that were investigated and the result of the evaluation.

4.2. Option Analysis

Option 1

- 143.** In Option 1, the raw water is pumped from the well field into a reservoir with a maximum water level of 95 masl. From there, the water supplies the water supply areas of Ureki and Shekvetili.

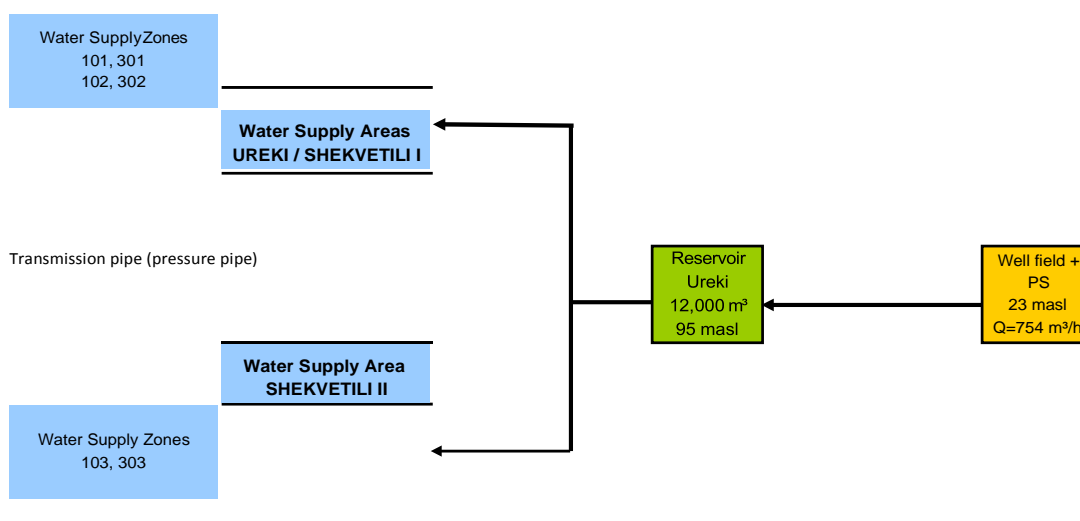


Figure 4 Simplified Water Supply Flow Scheme – Option 1

144. This option has the advantage that there would only be one reservoir site. Later topographical surveys showed that the road alignment does not allow for a reservoir of sufficient size for the whole system. Another disadvantage is the high elevation that requires higher pumping than necessary for the supply of Ureki and Shekvetili.

Option 2

145. From the well field north of Laituri, the water is pumped into the reservoir. Option 2 considers the reservoir west of Ureki, which has a maximum water level of 50 masl. The limited size of the land plot causes the minor reservoir volume of 4,000 m³. The water supply areas Ureki and Shekvetili are supplied with drinking water from the reservoir by gravity.

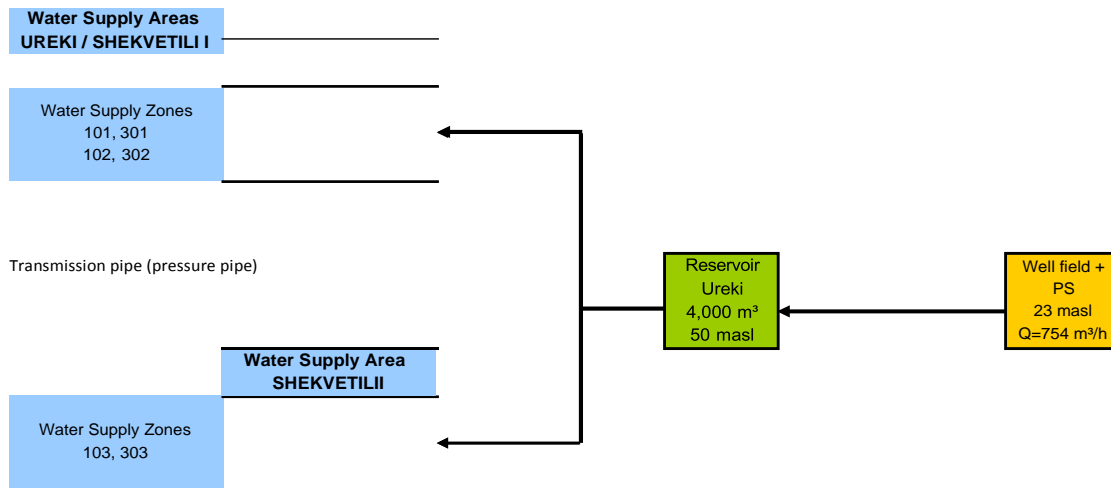


Figure 5 Simplified Water Supply Flow Scheme – Option 2

146. The advantage of this option is the reduced pumping cost to a level that is about 45 m lower than in Option 1. The pressure in the network is still sufficient to supply all water supply zones. Hotels would be required to install their own booster pumps for buildings with more than 4 floors. The disadvantage is the limited available area at the site that only allows a reservoir of about 4,000 m³, a volume that is not enough for the water supply system. Therefore this option is discarded and investment and operation costs are not determined.

Option 3

147. In Option 3, the hotel zone in Ureki is supplied from the high reservoir at 100 m asl, guaranteeing sufficient pressure also for buildings with more than four floors. The dwelling zones of Ureki / Shekvetili I (water supply areas 101 / 102) are supplied from the pumping station and are connected to the Reservoir "Ureki 2" (max. height 55 masl). The latter will be used as balancing reservoir in order to enhance the water supply security.

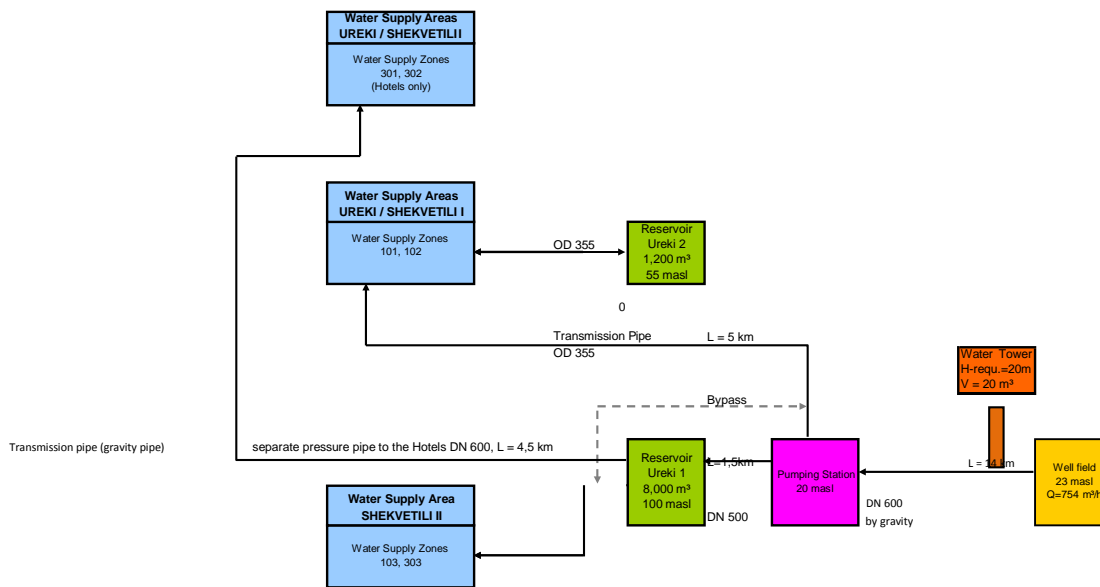


Figure 6 Simplified Water Supply Flow Scheme – Option 3

148. This option requires a high number of installations but has two major advantages:

- only part of the drinking water is pumped to the higher reservoir
- the additional pumping station with a by-pass provides a higher security in supply.

7.3. Alternative of Natanebi River Crossing

149. The Natanebi river crossing is located along the new route for OD 710 PS-WF main transmission pipelines in Ozurgeti region. It was decided by parties to cross the river by a bridge instead of HDD crossing under the river bed, in order to avoid a siphon condition under river because this is gravity pipeline.

150. The purpose of the new Natanebi bridge crossing design was to use a truss steel structure in order to get the lightest bridge with the highest structural efficiency (self weight got is less than 350 kg per meter lengths of the bridge); Embankments in both sides; abutments on river bank and no piles into the river bed. Aqueduct will be located 6km away from the Gabion protection wall.

7.4. Evaluation

151. In Option 2, the limited size of the land plot offers only a reservoir size of 4,000 m³ which is too small for the water supply system. Hence this option was excluded. From environmental point of view no significant difference arises in between the option 1 and 3. Therefore the chosen alternative is due to economic considerations. By applying the Net Present Value (NPV) method option 3 turned out to be the best possible solution.

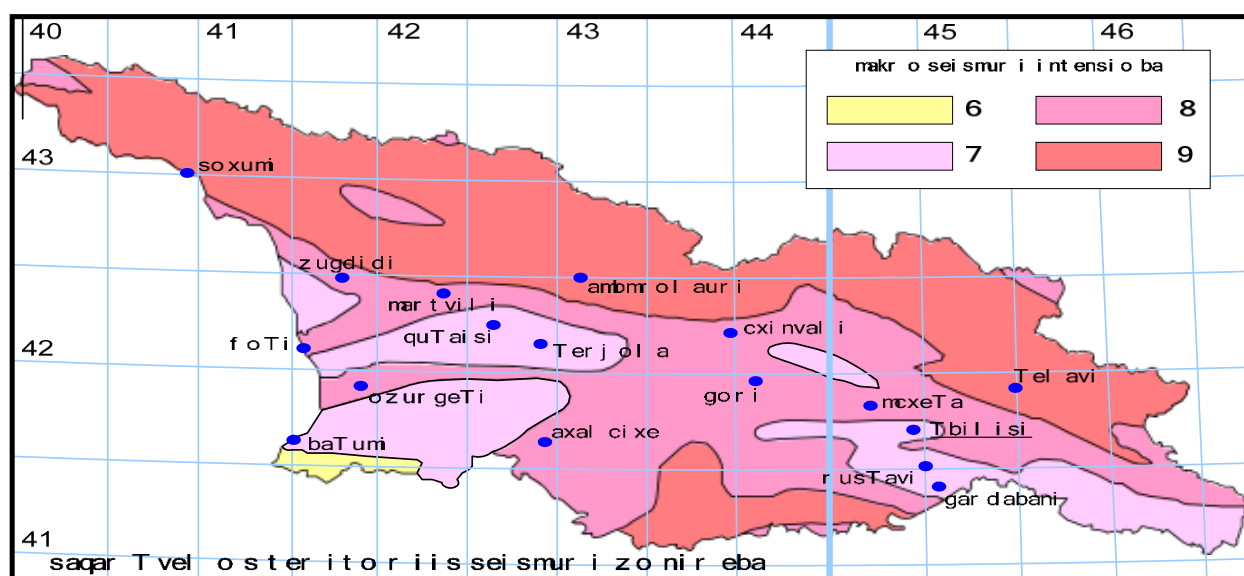
4. DESCRIPTION OF THE ENVIRONMENT (BASELINE DATA)

4.1 Topography, Geology & Soils

152. Topography: Ureki is located in the Ozurgeti District in the Guira region of Western Georgia on the Black Sea coast, approximately 20 km to the south of the city of Poti. It is a seaside resort stretching

along the coast. Topography is flat with a mean altitude above sea level of approximately 4 m. It lies approximately 360 km to the west from the capital Tbilisi. At the southern edge of Ureki the Sepa River discharges into the Black Sea. To the north of Ureki the River Supsa discharges into the Black Sea. The total population of Ureki amounts to approximately 1,700 inhabitants (2010).

153. The settlement and seaside resort of Shekvetili is located approximately 8 km to the south of Ureki. The village belongs to the municipality of Natabeni. It has about 400 inhabitants.
154. **Geology:** The City itself is located at sea level on the sea end of an alluvial plain of the Kolkheti lowland. By geomorphological viewpoint, the investigated territory is located on the west ending of Kolkheti Plain, on accumulative seaside plains and partly on river terraces. According to seismic zoning map, Georgia is classified into Zone 6 to Zone 9 (in increasing order of seismic intensity, Fig. 5) and Ureki falls under Zone 7 (high seismic intensity zone). There has been no history of major earthquakes in Ureki



Map 8 Seismic Zones of Georgia

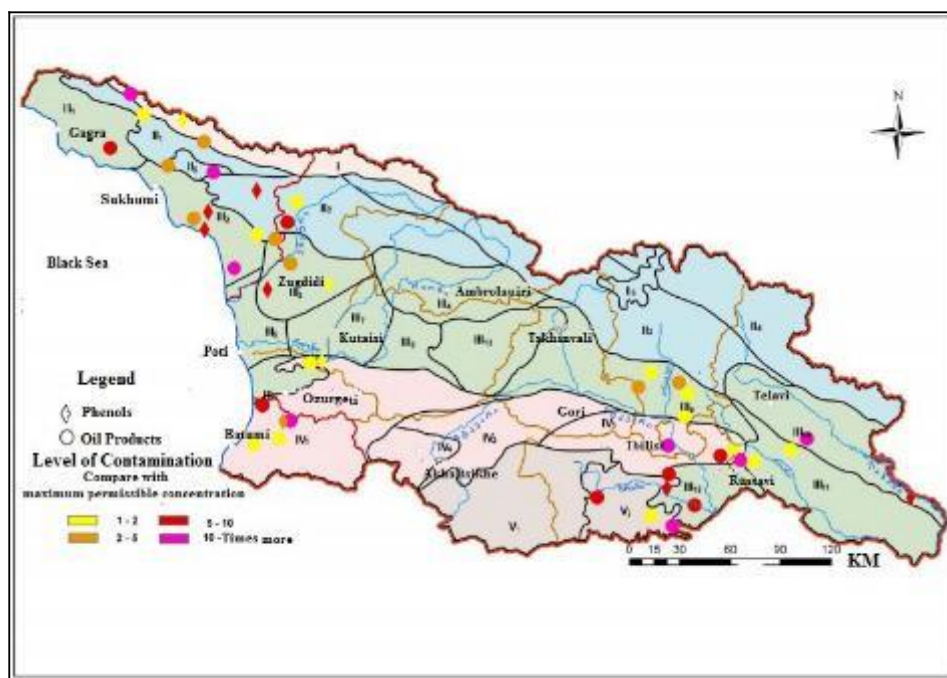
4.2 Surface Water and Groundwater

155. **Surface Water.** Georgia is rich in water resources; there are in all 26,060 rivers with a total length of ~ 59,000 km. Besides, there are many thermal and mineral water springs, lakes and man-made water reservoirs. These however are distributed unequally, with a major concentration in the western part of the country. Nearly all rivers of East Georgia flow into the Caspian Sea while the rivers in the west join the Black Sea. These two basins are separated by Likhi Ridge. The project area, Ureki, and Shekvetili in Osurgeti municipality, is situated approximately 25 km to the south of the estuary of Rioni River. The project area is drained by River Natanebi, discharging into the Black Sea south of Shekvetili, River Sepa, flowing along the southern edge of Ureki and River Supsa. River Supsa discharges into the Black Sea north of Ureki.
156. Originating in the Caucasus Range, Rioni River is the main river in western Georgia draining around 20 % of the country (0). The length of the river is 327 km. The catchment area is around 13,400 km². The spring is located at 2,960 masl.



Map 9 River Network in Western Georgia

157. Water Quality Data on quality of the country's surface waters is extremely limited. Tentative observations that have been made in previous studies (UNECE 2003) are that:
- Surface water quality of Rioni and Supsa River probably exceeds Georgian (and comparable international) norms many times. Data on the smaller rivers within the Project area, Sepa River and Natanebi River were not available during conduct of the study. Due to agricultural use of river floodplain surface water quality of these rivers is also expected to be critical.
158. **Groundwater.** Based on the groundwater characteristics, Georgia is divided into five hydro-geological zones, which are further defined into sub-zones/districts. The project area, Ureki and Shekvetili, is in Zone – III6. The water bearing strata is of contemporary alluvial deposits characterized by a free groundwater table declining along the general flow of the rivers. The water table depths vary from 0.2 m to 2.0 m. At some locations, near the riverbeds and groves, groundwater is of very shallow depths (0.2 m). The aquifer is characterized by rich water resources. The aquifer is mainly fed from Rioni River and precipitation. Despite the aquifer is rich with water, its practical water use is limited. Groundwater quality at source is believed to be very good. Data are insufficient to assess whether more vulnerable groundwater (such as in alluvial deposits) is being contaminated by municipal, agricultural or industrial pollution;
159. **Groundwater quality.** While groundwater at deeper sources is expected to be very good, quality of shallow ground water that is currently used as a potable water source in Ureki and Shekvetili is very critical. Ureki does not have centralized water supply system. The population mainly takes water from private wells. This water cannot be used for drinking and is used only for technical means. The absence of a sewage network and nearby septic tanks aggravates the situation. Therefore the implementation of a complete piped water centralized system is necessary for the further functioning of the resorts in Ureki and Shekvetili.



Map 10 Hydro-geological Zones of Georgia

4.3. Climate & Air Quality

- 160. Air Quality.** Ambient air quality monitoring is conducted at only seven locations in Georgia. As there are no major air polluting sources like industries, none of these are located in Ureki.
- 161. Climate.** Ureki and Shekvetili have temperate cold and warm seasons. August is the warmest month with an average temperature of almost 28 °C at noon. January is the coldest month with an average temperature of around 1 °C at night. The average annual temperature is around 14 °C. Rainfall is abundant and reaches almost 2,000 mm per annum.

4.4. Biological Environment

- 162.** About 40 per cent of the total geographical area of the country accounts for forests. The average density of forests is 163 m² per ha. 97 per cent of forests is located on mountains, the remaining 3 % are low-lying and flood plain forests in Kolokheti Region and in Western Georgia.
- 163.** The construction will not pose any hazard to the possible existence of the species included in the Red List since pipes will be laid in existing roads and the pumping station and the reservoirs on currently already used land.
- 164.** Biodiversity Georgia is located in the southern Caucasus. The Caucasus is recognized as one of the world's 25 biodiversity hot spots and Georgia is recognized to have a rich biodiversity. Georgia's flora and fauna are also characterized by a high degree of endemic, sub-endemic and relict species. According to the actual biodiversity index (ABI) and the average biodiversity index (BDI), Georgia ranks first in Europe and 36th in the world in terms of biodiversity (Fig. 8). The study area is, located on the Black sea coast within the Kolokheti lowland, a very humid, Mediterranean-type refugial zone.



Map 11 Bio-geographic regions of Georgia

4.5. Geomorphology of Well Fields and Gabion Protection Wall:

165. The whole area is located on the south-western edge of Colchis Lowland (on Ureki flat accumulation plain) and on the rolling area of Guria foothill (Guria low-hill terrain).
166. In terms of geomorphology, it is located in the inundation zone of the Pliocene-Quaternary alluvial and marine sediment accumulation relief of the Colchis Lowland.
167. The site is zone of contemporary Quaternary sediments horizontal terrace relief which is subject to human impact today (rubble supply for crushers and construction purposes) pits and ravines, dumping of technological wastes (construction debris, etc).

4.6. Geological Structure and Seismic Conditions

168. Structurally the area of the works fits within Guria sub-zone of Ajara-Trialeti fold system. It is confined between Ajara-Trialeti north frontal mounting and utmost north active deep-seated faults.
169. In terms of geology, the area is mainly represented by Quaternary alluvial and marine-alluvial formations (gravelly soils, clays and sands)
170. Based on the construction norm currently effective in Georgia - Antiseismic Construction (PN 01.01-09), seismicity of the survey site is intensity 8 by MSK64 scale. Nonmetric coefficient of seismicity for settlement Ureki is $A=0.14$

4.7. Hydrology - Discharge

171. River Natanebi is 60km long, its water catchment basin area is 657km², the average height 830m, the run-off modules 37.3l/sec per square km.

172. The peak discharge values to be taken into account for the hydraulic assessment and design of the

Return Period (years)	Avg. Annual	10	20	50	100
Discharge (m ³ /s)	33.5	475	560	725	840

4.8. Topographic Works

173. The field observations have been made with GPS techniques: for topographical work has started a series of Bases of reconsideration, so that it has been able to cover the entire area up. The calculation of coordinates of the layout and local calibration bases have been performed in office, from static observations of them.

174. The final outcome of the field observations is a cloud of points defined by a number of registration, UTM coordinates, elevation and a descriptive code.

175. The following tasks were completed:

- Sixteen cross sections of the river bed and river bank, along 3 kilometers. Geometry of the bridge located downstream of the wellfield.
- Topography along the border of the wellfield where the revetment will be designed.

176. The results of the completed tasks is presented in Annex 1 – Topographic Works

177. The following picture shows an overview of the set of points surveyed:

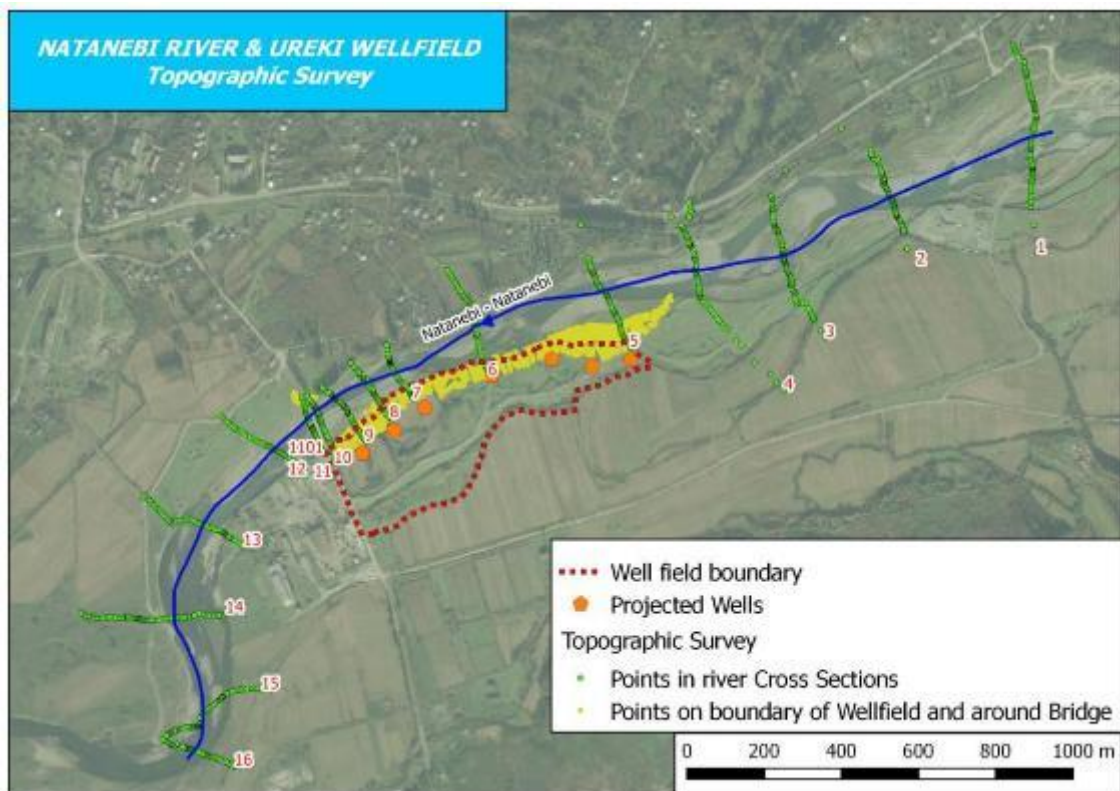


Figure 7 Topographic survey

4.9. Discharges

178. The main source of information regarding discharges along the river reach has been provided by the client and it shows the following table of values for different return periods:

Return Period (years)	10	20	50	100
Discharge (m ³ /s)	475	560	725	840

179. We will be considering the value corresponding to 100 years return period for the assessment and design.

4.10. Geology Aqueduct River Crossing

Geological Condition

180. There is no information regarding earlier geotechnical survey works within the construction site. For general description of the region's environment, existing archive and literary data have been employed.

4.11. Biodiversity

Flora:

- 181.** Aqueduct and River Bank protection Gabion: Construction Area is not covered with vegetation, therefore no additional botanical study is required. The following photos present the construction areas.



Photo: Construction area for Natanebi River Bank protection



Construction Area for Aqueduct, which will be located 12 m. from existing bridge

Fauna:

- 182.** During the working activities on the well field in the framework of the project Ure-01, which has been continuing since 2015, no animals like otters, beavers etc. have been observed, although at pre-construction stage of Aqueduct and Gabion, the Contractor is required to conduct a simple survey of otters, including visual inspection along the river Natanebi at a distance of about 1.2 km. and updated the corresponding SSEMP respectively.

Natabeni River

- 183.** Natanebi is the river in Guria region of Georgia. Located on the northern slope of the Meskheta Range, at the highest point of 2548 m above sea level, it is connected to the Black Sea in the village of Shekvetili. The length of the river is 60 km, the River basin area is 657 km². The river is fed by rain, snow and groundwater. There are flooding in the spring, the water is shallow in July-August.
- 184.** The average annual flow is 33,5 m³/s. River water is used for mills and irrigation. The important tributaries are the Bzhuzhi and Choloki. Natanebi is characterized by the mountain river features in the upper course, and is a typical river in the lowland.



Photo of Natanebi River

Fish Survey of Natanebi River

- 185.** For general description of the environment of the Natanebi River in the course of the proposed IEE, research was not conducted, only existing archive and literary data have been used. Biodiversity of the River Natanebi, ichthyofauna and water pollution was obtained from the study carried out by the Ilia State University of Georgia, and Institute of Zoology in 2012.
- 186.** Based on the above study the most abundant fish was Caucasian river goby, followed by colchic bittering, south minnow and Caucasian gudgeon; then stone morocco, Batumi shamaia, colchic minnow, lochic nase, chub and spined loach. Very few amount of trout and colchic barb were caught. Morphometric measurements of different fish species is given in table 11.

Table 11 Mean morphological characters of fish

Spice\Measurement	Total length (mm)	Standard length (mm)	Head length (mm)	Eye diameter (mm)	Body depth (mm)	Caudal perduncle depth (mm)
<i>Rhodeus colchicus</i>	55.05	45.25	10.56	2.97	17.79	5.94
<i>Phoxinus colchicus</i>	60.76	50.2	11.75	2.72	12.3	5.92
<i>Chondrostoma colchicum</i>	61.09	49.61	12.5	3.23	12.4	5.46
<i>Neogobius constructor</i>	76.21	63.62	17.86	3.37	12.75	6.18
<i>Cobitis taenia</i>	77.64	68.26	12.7	2.3	11.41	7.03
<i>Alburnoides fasciatus</i>	84.56	70.26	15.14	3.81	20.17	7.92
<i>Gobio caucasicus</i>	30.59	26.12	6.76	1.82	5.59	2.71
<i>Pseudorasbora parva</i>	67.92	56.62	13.53	2.82	14.15	6.44
<i>Barbus tauricus</i>	210.32	180.79	32.11	4.78	42.72	18.21
<i>Chalcalburnus chalcoides</i>	161.78	134.66	24.58	6.62	31.07	12.01
<i>Salmo trutta fario</i>	179.97	150.76	41.57	7.79	39.12	15.96
<i>Squalius cephalus</i>	212.72	175.92	45.92	7.70	43.05	18.31

- 187.** No additional surveys of fish was conducted for both Aqueduct and Gabion construction, since in

accordance with the Method of Statement, River Natanebi will not be affected by the construction.

Chemical contamination of Natanebi River

188. As it was mention in para 170, based on the study carried out by the Ilia State University of Georgia, and Institute of Zoology in 2012, water mineralization in Natanebi River is low (80-103 mg/l), dissolved oxygen is within the accepted range (6-8.1 mg/l), permanganate and bi-chromatic oxidation is high, but doesn't exceeds limited permissible norms. Natanebi river water is sodium hydrocarbon type. Chemical contamination of the River is provided in the Table 12 below:

Table 12 Chemical contamination of River Natanebi

Season	April			June			November		
Parameter\Site	I	II	III	I	II	III	I	II	III
Water temperature °C	12	16	22	14.5	20.5	21	6	14	9
pH	7.9	7.9	7.7	6.9	7.1	7.8	8.3	6.9	6.9
Turbidity cm	24	24	24	30	30	30	17	17	17
conductivity	120,2	120	122,5	156,2	149,9	150,2	147,8	140,5	149,2
Dissolved oxygen mg/l	8	8,2	8,1	6,4	6,4	7,2	6	6,1	6,5
(NH ₄ ⁺) mg/l	0,2	0,2	0,2	0,2	0,2	0,2	0,15	0,15	0,15
(NO ₂ ⁻) mg/l	0,1	0,1	0,15	0,001	0,001	0,001	0,001	0,001	0,001
(NO ₃ ⁻) mg/l	0,2	0,2	0,2	0,2	0,2	0,2	0,1	0,1	0,1
(Cl ⁻) mg/l	8,2	8	8,1	8,2	8,1	8,1	8	8	8,1
(SO ₄ ²⁻) mg/l	10	11	12	10	12	11	5,5	6	6
(HCO ₃ ⁻) mg/l	40,2	40	40	61,24	61	61	61	61	48,8
(Ca ²⁺) mg/l	8,4	8,4	8,4	9,4	9,4	9,4	9,1	8,9	8,8
(Mg ²⁺) mg/l	2,6	2,6	2,6	2,16	2,36	2,36	2,76	2,76	2,76
(Na ⁺ , K ⁺) mg/l	10,58	10,58	10,58	10,4	10	10,3	10	10	10
hardness	0,65	0,65	0,65	0,65	0,66	0,66	0,68	0,68	0,67
(Fe ⁺² , +3) mg/l	0,2	0,2	0,21	0,2	0,2	0,1	0,15	0,1	0,1
Mineralization mg/l	79,78	79,58	81,68	101,4	102,86	102,16	96,36	96,66	84,46
Permanganatic-ox mg/l	2,4	2,5	2,3	3,2	3,68	3,84	2,4	2,8	2,8
Bichromatic ox (COD) mg/l	10	10,2	10	15	19	21	12,1	12,2	12
(BOD ₅) mg/l	1,1	2,1	2,2	1,2	2,1	2,4	1	2,1	2,5
TOC mg/l	3,75	4,69	5,02	5,63	7,13	7,88	3,45	4,5	4,5

5. GENERAL DESCRIPTION OF ENVIRONMENT

5.1. Climate Condition

- 189.** Climatological assessment of the survey area is based on the data of Natanebi meteorological station. The data have been obtained from multiyear Climatology Reference Books. According to construction climatic region Natanebi is attributed to climatic region III.
- 190.** According to the climate conditions associated with atmospheric processes, the survey region has the properties characteristic of an excessively moist sub-zone of subtropical sea climate with warm winter and hot summer; on-shore winds dominating all the year round and maximum precipitation during fall and winter. In Tables below, characteristics of the main meteorological elements of the region are given.

Table 11 Main climatic properties of the climate sub-district

Climate district	Climate sub-district	Average temperature in January, °C	Average wind velocity for 3 winter months, m/s	Average temperature in July, °C	Relative humidity in July, %
III	IIIb	From +2 to +6	-	From +22 to +28	50 and more

Table 12 Air temperature and humidity

#	Climatic property	By month												Annual
		I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	
1	Average Monthly and Yearly Air Temperature, °C	4.6	5.3	7.7	11.3	16.0	19.7	22.3	22.4	19.3	15.3	10.6	6.7	13.4
2	Absolute Minimum Air Temperature, °C	-15												
3	Absolute Maximum Air Temperature, °C	40												
4	Mean Maximum of the hottest month, °C	-	-	-	-	-	-	26.5	-	-	-	-	-	-
5	Range of air temperature, °C	7.7	7.7	8.1	8.1	8.1	8.7	8.8	9.2	9.7	10.1	8.5	8.5	-
6	Relative air humidity, %	80	80	79	80	80	82	83	84	84	84	82	80	79

Table 13 Amount of precipitation and snow cover

Amount of precipitation in a year, mm	Amount of precipitation in 24 hours, mm	Weight of snow cover, kPa	Number of days with snow cover	Water content of snow cover, mm
2092	247	0.50	8	-

Table 14 Standard values of wind pressure

W ₀ Once in 5 years, kPa	W ₀ Once in 15 years, kPa
0.48	0.60

Table 15 Greatest wind velocity with probability once in 1, 5, 10, 15, 20 years, m/s

in 1 year	in 5 years	in 10 years	in 15 years	in 20 years
24	29	30	31	33

Table 16 Standard depth of soils seasonal freezing, cm

Clay and sandy clay soils	Fine sand and sandy silt, clayey sand	Fine and coarse sand, gravelly sand	Macro fragmental soil
0	0	0	0

5.2 Geomorphology

- 191.** The survey area is located on the south-western edge of Colchis Lowland on the rolling area of Guria foothill (Guria low-hill terrain). In terms of geomorphology, it is located in the inundation zone of the Pliocene-Quaternary alluvial and marine sediment accumulation relief of the Colchis Lowland. This relief emerged in the nearest geological past due to multiple transgressive and regressive processes of the sea, as well as erosion and accumulation processes of the rivers (Supsa, Natanebi, Sefa and their tributaries).

Geological Structure and Seismic Condition

- 192.** In terms of geology, the area is mainly represented by Quaternary alluvial and marine-alluvial formations (gravelly soils, silty clays, clay-containing silt and sands).
- 193.** Structurally the survey region fits within Guria sub-zone of Ajara-Trialeti fold system. It is confined between Ajara-Trialeti north frontal mounting and utmost north active deep-seated faults. On the western edge of this tectonic block, at 50-150 m depth in the downward section, the above-mentioned Quaternary sediments are arranged with big angular and erosive non-conformity on the Mio-Pliocene marine molasses sediments (N12-N13). The latter are part of the structure of the sub-latitudinal Trialeti open-spread syncline.
- 194.** Based on the construction norm currently effective in Georgia - Antiseismic Construction (PN 01.01-09), seismicity of the survey site is intensity 8 by MSK64 scale. Nonmetric coefficient of seismicity is $A=0.14$ (vil. Natanebi).

Geotechnical Condition of Crossing Construction Site

Soils Composition and Physical-Mechanical Properties

- 195.** Within the construction site in accordance with the technical specifications, 2 boreholes were drilled by Geo Engineering Ltd with 15 m depth.
- 196.** Based on the field tests and laboratory study of borehole soil samples, under topsoil layer, 5 strata of different composition and state are distinguished in the lithology of the construction site. The strata are graphically shown on the geotechnical section of the construction area (Drw. #GC-1746-2). Strata distribution in depth and their thicknesses by borehole are given in Table19.

Table 17 Strata in-depth distribution and thickness by borehole

STRETUM #	GENETIC TYPE	STRATUM NAME	BOREHOLE #	
			1	2
1	Topsoil layer	Slightly moist, brown, stiff, slightly sandy, silty CLAY with plant roots – topsoil layer	0.0-0.3	0.0-0.3
2	Man Made Soil tQIV	sSlightly moist, yellowish-brown, silty, slightly clayey medium- grained SAND – Fill	0.3-1.1 1.8-2.4	-
3		Slightly moist, yellowish-brown, very sandy, silty, slightly clayey GRAVEL. Gravel is rounded and sub-rounded – Fill	1.1-1.8	-
4	Lower Quaternary, alluvial-marine deposits – aQIV	Very moist, bluish-gray, slightly silty, sandy, slightly gravelly stiff CLAY, with organic content	4.5-15.0	0.3-14.0
5		Saturated, bluish-gray, dense, silty, slightly clayey, slightly gravelly, fine-grained SAND	-	14.0-15.0

197. The said soil types are described individually below, in accordance with their geotechnical properties:

STRATUM-1 – Slightly Moist, brown, stiff, slightly sandy, silty CLAY with plant roots – topsoil layer. The said stratum is found on the whole area of the surveyed site and its thickness is 0.3 m.

STRATUM-2 – Slightly moist, yellowish-brown, silty, slightly clayey medium-grained SAND – fill - tQVI. The said stratum revealed in two ranges of Borehole #1. Its spread on the riv. Natanebi right bank erosion control construction territory.

198. The samples from boreholes were laboratory analyzed. Laboratory analyzes results for the samples are given in Annex 2 and Annex 3, as well as in table 20 below.

Table 18 Stratum-2 Particle-size distribution

Borehole and trial pit #	Sampling depth range, m	Fraction content in mass, %					
		Gravel 63.0- 2.0 mm	Sand			Silt 0.063– 0.002mm	Clay < 0.002m m
			Coarse 2.0- 0.600mm	Medium 0.6- 0.212mm	Fine 0.212- 0.063mm		
BH-1	0.5-0.7	-	1.4	38.6	33.8	22.5	3.7

199. Soil physical properties parameter values:

- Moisture content $W=26.7\%$;
- Density $\rho=1.51 \text{ g/cm}^3$

STRATUM-3 - Slightly moist, yellowish-brown, very sandy, silty, slightly clayey GRAVEL. Gravel is rounded and slightly-rounded - fill - tQVI. The said stratum revealed in Borehole #1 and its thickness is 0.7 m. Its spread on the riv. Natanebi right bank erosion control construction territory.

200. The samples from boreholes were laboratory analyzed. Laboratory analyzes results for the samples are given in Annex 2 and Annex 3, as well as in table 21 below.

Table 19 Stratum-3 Particle-size distribution

Borehole and trial pit #	Sampling depth range, m	Fraction content in mass, %					
		Gravel 63.0-2.0 mm	Sand			Silt 0.063–0.002mm	Clay < 0.002mm
			Coarse 2.0-0.600mm	Medium 0.6-0.212mm	Fine 0.212-0.063mm		
BH-1	1.2-1.5	51.2	4.1	13.3	11.9	15.1	4.4

201. Soil physical properties parameter values:

- Moisture content $W=17.7\%$;
- Density $\rho=1.76 \text{ g/cm}^3$

202. In the Borehoe #1 under the stratum-3 in the range of 2.4-4.5 m reveals diabase angular boulder (river bank erosion conctoller).

STRATUM-4 - Very moist, bluish-gray, slightly silty, sandy, slightly gravelly stiff CLAY, with organic content. The said stratum is alluvial-marine deposit, reveals in both boreholes and its thickness is between 10.5-13.7 m.

203. The samples from boreholes were laboratory analyzed. Laboratory analyzes results for the samples are given in Annex 2 and Annex 3, as well as in tables 22 and 23 below.

Table 20 Stratum-4 Particle-size distribution

Borehole and trial pit #	Sampling depth range, m	Fraction content in mass, %					
		Gravel 63.0-2.0 mm	Sand			Silt 0.063–0.002mm	Clay < 0.002mm
			Coarse 2.0-0.600mm	Medium 0.6-0.212mm	Fine 0.212-0.063mm		
BH-1	5.1-5.5	7.3	15.2	13.2	21.5	27.0	15.8
BH-1	11.7-12.0	-	-	3.1	5.8	58.9	32.2
BH-1	14.7-15.0	-	1.0	3.1	6.0	53.4	36.5
BH-2	1.3-1.5	-	0.9	2.8	8.2	48.8	39.0
BH-2	3.0-3.4	-	-	3.0	5.0	57.1	34.9
BH-2	4.7-4.85	-	5.4	1.0	6.4	56.9	30.3
BH-2	7.0-7.4	-	-	0.4	1.0	57.5	41.1
BH-2	9.7-10.0	-	0.3	16.2	24.1	30.0	29.4
BH-2	12.0-12.3	-	1.4	5.9	15.9	43.9	32.9

Table 21 Stratum-4 physical properties parameter values

Borehole #	Sampling depth range, m	Moisture content, W%	Atterberg Limits			Liquidity Indet, IL	Particle density g/cm ³ , ρ_s	Natural Density g/cm ³ , ρ	Dry g/cm ³ , ρ_d
			Liquidity limit, WL%	Plasticity limit, Wp%	Plasticity number, Ip				
BH-1	5.1-5.5	28.4	31.0	22.3	8.7	0.71	2.70	-	-
BH-1	6.7-7.0	30.0	37.5	21.5	16.0	0.53	2.71	1.94	1.49
BH-1	8.7-9.0	32.0	39.5	22.2	17.3	0.57	2.73	1.92	1.46
BH-1	11.7-12.0	35.4	43.7	24.2	19.5	0.57	2.73	1.79	1.32
BH-1	14.7-15.0	40.0	56.0	25.6	30.4	0.47	2.74	1.53	1.09
BH-2	1.3-1.5	46.9	51.1	29.7	21.4	0.81	2.73	1.74	1.18
BH-2	3.0-3.4	34.0	45.0	25.8	19.2	0.43	2.72	1.89	1.41

Borehole #	Sampling depth range, m	Moisture content, W%	Atterberg Limits			Liquidity Indet, IL	Particle density g/cm ³ , ρ_s	Natural Density g/cm ³ , ρ	Dry g/cm ³ , ρ_d
			Liquidity limit, WL%	Plasticity limit, Wp%	Plasticity number, Ip				
BH-2	4.7-4.85	33.6	36.6	25.2	11.4	0.74	2.71	1.84	1.37
BH-2	7.0-7.4	33.0	53.2	24.7	28.5	0.29	2.74	1.62	1.21
BH-2	9.7-10.0	27.8	44.6	22.4	22.2	0.24	2.74	1.97	1.54
BH-2	12.0-12.3	29.0	44.5	22.8	21.7	0.29	2.73	1.66	1.29

Stratum-4 Sample was tested on Standard Penetration [SPT]. Testing results are given in the table – 24

Table 22 Stratum-4 Standard Penetration [SPT] values

Borehole #	Penetration depth, m	Penetration range, cm			N=B+C
		A	B	C	
		0-15	15-30	30-45	
BH-1	4.5-4.95	1	2	2	4
BH-1	6.0-6.45	2	2	2	4

BH-1	7.5-7.95	2	3	2	5
BH-1	9.0-9.45	2	2	2	4
BH-1	10.5-10.95	2	3	2	5
BH-1	12.0-12.45	2	2	3	5
BH-1	13.5-13.95	2	3	3	6
BH-1	15.0-15.45	2	3	2	5
BH-2	1.5-1.95	2	1	2	3
BH-2	3.4-3.85	1	1	2	3
BH-2	4.5-4.95	2	2	2	4
BH-2	6.3-6.75	2	2	2	4
BH-2	7.5-7.95	2	3	2	5

Borehole #	Penetration depth, m	Penetration range, cm			N=B+C
		A	B	C	
		0-15	15-30	30-45	
BH-2	10.5-10.95	2	3	3	6
BH-2	12.3-12.75	3	2	3	5
BH-2	13.5-13.95	2	3	3	6

204. According to the laboratory testing results STRATUM-4 is lightly silty, sandy, slightly gravelly stiff CLAY.

205. Proceeding from the data given in the tables, the soil's physical parameters average values are as follows:

- Natural moisture content $W=33.7\%$;
- Natural density $\rho=1.79 \text{ g/cm}^3$;
- Particle density $s=2.73 \text{ g/cm}^3$;
- Porosity $n=50.98\%$;
- Voids ratio $e=1.063$;
- Moisture degree $S_z=0.894$;
- Plasticity number $I_p=19.7$;
- Organic content varies from 3.4% to 7.1%, according to which the soil has organic content;
- Free swelling index – 0.012-0.018, according to which the soil is swellable;
- Based on standard penetration test results, number of N impacts varies from 3 to 6, according to which STRATUM-4 is soft and stiff.

206. Based on the shear test results, (see Annex-3.8), STRATUM-4 standard values for strength properties in natural state are as follows:

- Cohesion $c=0.010\text{-}0.021 \text{ MPa}$, average value $c=0.016 \text{ MPa}$

- Internal friction angle $\varphi=7.1-11.30$; average value $\varphi=9.20$

207. As per odometric tests results, consolidation coefficient on 2 kg/cm² $C_v=0.24-1.09$ m²/yr.

208. According to difficulty of treatment (Construction Norms and Regulations SNIP IV-5-82, Vol.1), the soil is attributed to Group 8-a.

STRATUM-5 - Saturated, bluish-gray, dense, silty, slightly clayey, slightly gravelly, fine-grained SAND. The said stratum is alluvial-marine deposit and reveals in Borehole # 2 only from 14.0 m till studied 15 m.

209. The samples from boreholes were laboratory analyzed. Laboratory analyzes results for the samples are given in Annex 2 and Annex 3, as well as in table 25 and 26 below.

Table 23 Stratum-5 Particle-size distribution

Borehole and trial pit #	Sampling depth range, m	Fraction content in mass, %					
		Gravel 63.0- 2.0 mm	Sand			Silt 0.063– 0.002mm	Clay < 0.002m m
			Coarse 2.0- 0.600mm	Medium 0.6- 0.212mm	Fine 0.212- 0.063mm		
BH-2	14.7-15.0	3.6	12.1	25.7	40.1	13.8	4.7

Table 24 Stratum-5 physical properties parameter values

Borehole #	Sampling depth range, m	Moisture content, W%	Atterberg Limits			Liquidity Indet, IL	Particle density g/cm ³ , ρ_s	Natural Density g/cm ³ , ρ	Dry g/cm ³ , ρ_d
			Liquidity limit, WL%	Plasticity limit, Wp%	Plasticity number, Ip				
BH-2	14.7-15.0	33.8	38.4	24.7	13.7	0.66	2.71	1.89	1.41

Stratum-5 Sample was tested on Standard Penetration [SPT]. Testing results are given in the table – 27.

Table 25 Stratum-5 Standard Penetration [SPT] values

Borehole #	Penetration depth, m	Penetration range, cm			N=B+C
		A	B	C	
		0-15	15-30	30-45	
BH-2	14.7-15.0	10	17	16	33

210. According to the laboratory testing results STRATUM-5 is SAND. Proceeding from the data given in the tables, the soil's physical parameters average values are as follows:

- Natural moisture content $W=33.8\%$;
- Natural density $\rho=1.89$ g/cm³;

- Particle density $\rho_s=2.71 \text{ g/cm}^3$;
 - Porosity $n=47.87\%$;
 - Voids ratio $e=0.918$;
 - Moisture degree $S_z=0.998$;
 - Plasticity number $I_p=13.7$;
 - Organic content is up to 1.0%, according to which the soil has no organic content;
 - Based on standard penetration test results, number of N impacts is 33, according to which STRATUM-5 dense.
- 211.** Based on the shear test results, (see Annex-3.8), STRATUM-5 standard values for strength properties in natural state are as follows:
- Cohesion $c=0.025 \text{ MPa}$,
 - Internal friction angle $=29.50$
- 212.** According to difficulty of treatment (Construction Norms and Regulations SNIP IV-5-82, Vol.1), the soil is attributed to Group 27-a.

5.3. SOIL

- 213.** According to laboratory testing results the soil characteristics for Gabion wall protection are: very moist, bluish-grey, slightly dusty, sandy, slightly gravely rigid clay, with organic content is the building foundation.
- 214.** According to seismic standard requirements the seismic site parameters used are: intensity 8 MSK and coefficient $A=0.14$. Because of the works are in damp area according to technical specification requirements, steel structures shall be protected by 4 layers of anticorrosion paint.

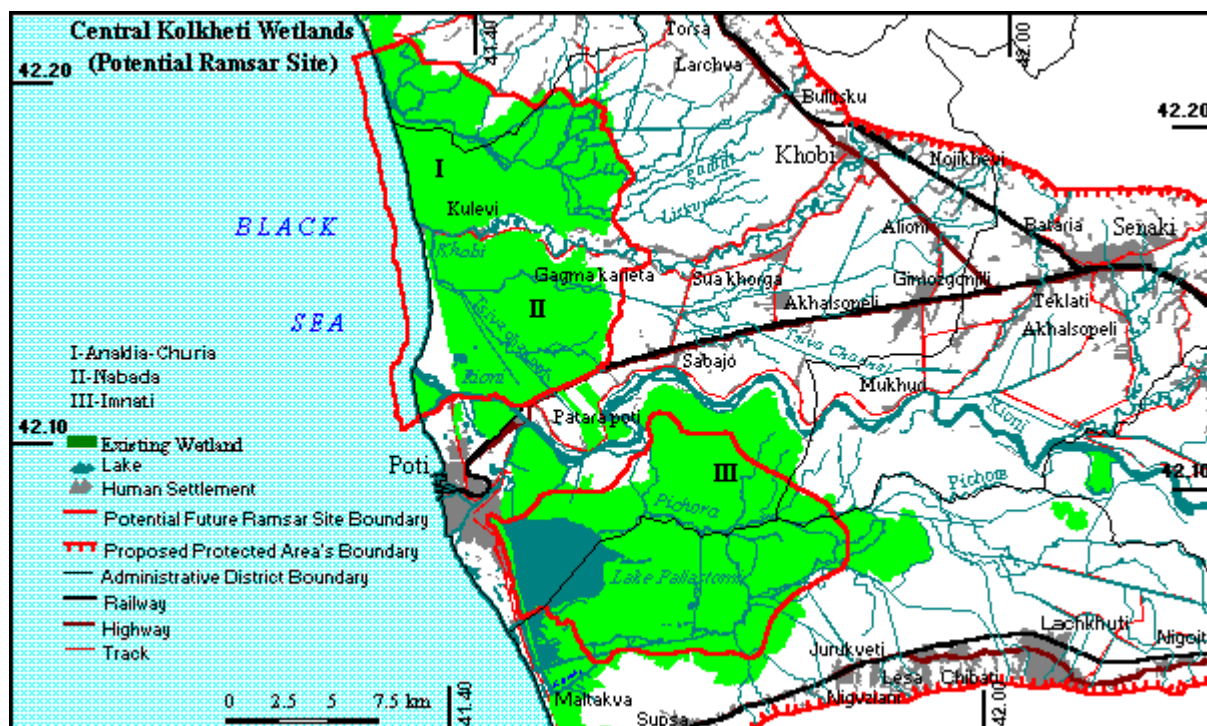
5.4. Protected areas

- 215.** There are 24 natural protected areas in Georgia under the administration of the Agency of Protected Areas, a Legal Entity of Public Law of the MEPA. These represent 4.1% of the country's territory. The Law on Protected Areas System of 1996 provides for categories administered by different bodies, such as the Ministry of Food and Agriculture, the State Department of Forestry, local governments, and others. As the system is currently under review, protection status of existing areas may change and new areas for designation are likely to be identified by on-going projects. The Law does however define protected are- as according to recognized IUCN categories.
- 216.** Several projects for protected areas are on-going. Examples are the UNDP/GEF project for the Conservation of the Arid and Semiarid Ecosystems in the Caucasus, the World Bank/GEF Georgia's Protected Areas Development Project and the EMERALD Network pilot project.
- 217.** The two national parks - Borjomi-Karagauli and Kolkhetti - have been established recently.
- 218.** Kolkhetti National Park is located in the historical region of Colchis in western Georgia. It lies on a coastal plain on the Black Sea, between the mouths of the Tikori and Supsa and spanning the districts of Zugdidi, Khobi, Lanchkhuti, Senaki and Abasha. The park was established during 1998 and 1999 as part of Georgia's Integrated Coastal Management Project, which was backed financially by the World Bank (WB) and the Global Environmental Facility (GEF), accomplished in 2007. Kolkhetti National Park covers an area of 44,313 hectares, incorporating the land of the former 500 hectare Kolkhetti State Nature Reserve, which had been established in 1947, and its surrounding wetlands, including the

Paleastomi Lake.

- 219.** The Kolkheti lowland became the subject of international interest firstly in 1996, when the Georgia joined the Ramsar Convention on "Wetlands of International Importance Especially as Waterfowl Habitat". Since 2000 the Kolkheti national park began full-scale functioning. The park is not a monolith formation and it is consisted of separate territories - the districts. The Park is divided into the following natural geographical districts: Anaklia-Churia (between the coastline sections of ravines of the Churia River and the Khobistskali River), Nabada (between the western sections of the ravines of the Khobistskali River and the Rioni River) and Imnati (between the western sections of the ravines of the Rioni River and the Supsa River). These are the places where the ecosystems of wetlands are best preserved. Besides, the national park includes the sea water area located between the estuaries of the rivers of Rioni and Churia. The area of Anaklia-Churia is 13,713 hectares; Nabada district covers a 10,697 hectare area, and the Imnati district area is 19,903 hectares. In total, the land area of the National Park is 28,571 hectares, and the sea water area – 15,742 hectares. The districts of the National Park are located in the territories of five administration districts - Zugdidi, Khobi, Senaki, Abasha and Lanchkhuti and are a part of two historical regions of Georgia - Samegrelo and Guria
- 220.** There are two Ramsar sites in Georgia including the wetlands of central Kolkheti (33,710 ha) located near Poti which were designated in 1997. These areas are indicated in the map from the 1995 State of the Environment Report (GRID).
- 221.** Flora, Fauna. In Georgia the history of Protected Areas dates back many centuries. The first Protected Area - Lagodekhi Strict Nature Reserve was established as early as 1912. At present the total area of Protected Areas is 520,273 hectares, which is about 7.46
- 222.** % of the country's territory. About 75 % of Protected Areas are covered by forests. Primary function of the Protected Areas is protection of natural heritage of the country, unique biodiversity and ecosystems. There are 5 different categories of Protected Areas according to the IUCN:
- 14 Strict Nature Reserves
 - 10 National Parks
 - 18 Managed Nature Reserves
 - 24 Natural Monuments
 - 2 Protected Landscapes.
- 223.** The territories of Kolkheti national park are interesting, first of all, by botanic point of view. The complexes of phytocoenosis are rich in quite diverse, relict and endemic species, and various compositions have remained there till present – they are different plant communities of the mires, swampy forests and sand dunes located along the coastline. The following plant species occur:
- spurge (*Euphorbia*)
 - eringo (*Eringium coeruleum*)
 - Colchis sedge (*Carex colchica*)
 - Imeretian cogongrass (*Imperata cylindrica*)
 - astragalus (*Astragalus caucasicus*)
 - Marsh woundwort (*Stachys palustris*)
 - catchfly (*Silene*)
 - Jerusalem Thorn (*Paliurus spina-christi*)
 - hawthorn (*Crataegus*)

- Sea-buckthorn (*Hippophae rhamnoides*)
- 224.** Along the lakes and marsh rivers in the wetlands the following plants can be found:
- Colchis water-lily (*Nymphaea colchica*)
 - Yellow water-lily (*Nuphar lutea*)
 - Colchis water chestnut (*Trapa colchica*)
 - Lesser duckweed (*Lemna minor*)
- 225.** and in the peaty mires together with the north tundra species
- Royal fern (*Osmunda regalis*)
 - Imeretian sedge (*Molionia litoralis*) *gvxvdeba*.
- 226.** In total 194 species of birds inhabit the Kolkheti National Park. The following species occur:
- Small water cock (*Gallinula chloropus*)
 - Heron (*Ardea cinerea*)
 - bright blue kingfisher (*Alcedo atthis*)
 - Common Buzzard (*Buteo buteo*)
 - Black Kites (*Milvus migrans*)
 - Common and Lesser Kestrel (*Falco tinnunculus*, *Falco naumanni*)
 - Eurasian Hobby (*Falco subbuteo*)
 - European Honey-Buzzards (*Pernis apivorus*)
 - White-tailed Eagle (*Haliaeetus albicilla*)
 - Steppe Eagle (*Aquila nipalensis*)
 - Imperial Eagle (*Aquila heliaca*)
- 227.** The following mammals exist:
- jackal (*Canis aureus*)
 - Wild boar (*Sus scrofa*)
 - Roe deer (*Capreolus capreolus*)
 - Otter (*Lutra lutra*).
- 228.** It is remarkable, that 6 species of the Red List of Georgia can be found here. The marine mammals are presented by 3 species of dolphins:
- the Bottle-nose Dolphin (*Aphalina*)
 - White-sided Dolphin (*Lagenorhynchus acutus*)
 - Herring hog (*Phocoena phocoena*).
- 229.** The following amphibians inhabit the Kolkheti protected area:
- common Tree frog (*Hyla arborea*)
 - Marsh frog (*Pelophylax ridibundus*)
- 230.** The Ichthyofauna of the National Park is presented by 88 species, out of which 23 species are transiting, 21 species live in fresh water and 44 species live in the Black Sea.



Map 12 Central Kolkheti Wetlands (State of the Environment 1995)

5.5. Economic Resources

- 231. Land use.** Ureki and Shekvetili are surrounded by agriculturally used land. Animal husbandry for meat and milk products, as well as farming exists within the project area and its vicinity. Potato and corn are the important crops in the area.
- 232.** Industries, commercial activities and tourism. Industrial activities in Ureki and Shekvetili are of only minor importance. Ureki and Shekvetili shall be further developed as tourism resorts. Number of tourists in the Borough Ureki during one year on average equals up to 50,000 persons. Ureki is equipped with 80 hotel-recreation and retreat centres for the tourists and family hotels of the private sector.
- 233.** Number of tourists in Shekvetili accounts for approximately 2,000 persons. Currently Shekvetili has the hotel-recreation and retreat centre and family hotels as well. Further investments are planned for the future.
- 234.** Roads & transport. Ureki and Shekvetili are connected to the city of Poti via the road E 70. The City of Poti is the most important port, providing its only secure access to the sea in Georgia and is also an important port in the context of the Caucasus region. As such, the City has, and continues to be, a regionally important trading centre and transport corridor with road and rail links to Armenia, Azerbaijan and onwards to countries including Turkmenistan, Uzbekistan and Kazakhstan.
- 235.** Urban Services. Ureki does not have centralized water supply system. Population mainly takes water from private wells. The water does not have drinking water quality.
- 236.** Power Supply. After the independence, the Government of Georgia has made efforts to improve the power supply through new generating sources. Hydropower is the predominant source (88 %), while the rest is from gas based thermal power stations.

5.6. Socio-Cultural Resources

237. Demography. The present population of Ureki is 1,700. Shekvetili has a population of 400. Ureki and Shekvetili have a small permanent population that mainly lives from tourism and some agriculture. The number of hotels, guest houses, restaurants and small shops is constantly growing.

238. The following table presents the officially registered population and the number of tourists in the project area for the year 2012.

Table 26 Population and Tourists, 2012

Project Area	Population	Tourists
Ureki	1,700	5,000
Shekvetili	400	2,000

5.7. Air, Noise & Vibration

Information about the background pollution

239. Air pollution and noise is not subject to monitoring in Georgia, so there is no data on ambient noise/vibration available. The main noise generating sources in the town are transport vehicles and local construction activities; there are no major noise generating activities like industries.

Aqueduct and gabion Construction

240. No baseline Environmental Quality Measurements of air pollution, noise and vibration was conducted since both Aqueduct and Gabion are located in the non-settled area. Alignment of the gabion wall is located more than 150 m away from the houses (please see photo map below).



- 241.** The distance between the aqueduct and the closest house is more than 270 m (Please see the map below).



6. ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

6.1. Pre-Construction activities

- 242.** The potential environmental effects of the pre-construction activities, such as contractor office set ups, necessary equipment stacks, sites preparation, and the adequacy of the accesses will be considered and all these activities will not deteriorate the existing conditions of the environment.
- 243.** Number of pre-construction surveys, including Natanebi River Water Quality Measurement, Aquatic ecology survey of water bodies will be carried out by contractor prior to the commencement of construction works.
- 244.** During the construction existing roads will be used, including transportation of material to the site from quarries and from the site for dumping. To minimize damage from existing roads, a preliminary road survey will be carried out by the contractor prior to commencement of work. The road will be periodically graded to maintain the working condition. In case of any damage during the movement of machinery and trucks the general road repair will be carried out at the final stage of the construction.

6.2 Topography, Geology & Soils

Impacts during Construction

- 245.** During the construction, impacts on topography, geology and soils are mainly due to earthworks and the operation of the contractor's yard.

- 246.** 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 laying. Therefore impacts associated with earthworks for trench laying are of temporary nature. Excavated soil will be placed alongside the trench, and the pipes will be placed in the trench manually. A sand layer of 30 cm thickness will be laid on top of the pipe, after which the trench will be refilled with excavated material and compacted manually. The excavation is expected to generate surplus material. Surplus material will be used as embankment fill as far as possible.
- 247.** The excavation and refilling works will disturb the soil characters at the sites. The excavation will lead to disturbance and loss of fertile top soil. 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.
- 248.** Since the project is located in high seismic intensity zone, appropriate precautions have to be included in the structural design of facilities:
- Apply design and construction norms of Zone-7 (MSK-64 scale) according to Government of Georgia “Construction in Seismological Regions”
- 249.** Source of construction material. Sand is sourced from licensed extraction sites and aggregate is sourced from licensed crushers only. In case that material demand exceeds supply it needs to be transported.
- 250.** Contractor’s yard: 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.
- 251.** 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 ground- water;
 - 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 Natanebi River. Storage facilities for fuels and chemicals will be located at save distance to the river. 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.
- 252.** 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.

253. Excavation works for reservoirs and pumping stations will also involve major earthworks and generate surplus material. These however will be confined to the project site, and therefore no significant impacts are anticipated beyond the area of influence of the project (project site and material extraction sites) on topography, soil and geology. When pipe laying material will be stored temporary alongside the trench and refilled after pipe laying.

254. The excavation work will also tend to loosen the top soil, which may lead to soil erosion due to winds and rains. As project area is partly situated in a flat region, the risk of erosion is comparatively low. However, removal of vegetation and tree cover will lead to erosion. Therefore the contractor shall ensure:

- that no trees shall be removed; clearing of shrub, bushes and grass shall be limited to actual construction area only; no clearance is allowed for activities such as material/waste storage, concrete mixing, etc.
- 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.

Impacts during Operation

255. Regular operation of water supply will be within the constructed facilities and therefore no impacts are envisaged.

256. The main requirement for maintenance of the water supply infrastructure will be for the detection and repair of leaks. Repairs will be conducted in essentially the same way as the pipes were laid. Trenches will be dug to reveal the leaking area and the faulty connection will be re-fitted, or the pipe will be removed and replaced if necessary. This activity however is not expected to generate any waste soil nor will have any impacts.

6.3. Surface Water and Groundwater

Impacts and Mitigation Measures during Construction

257. Potential impact arises from the operation of the contractor's yard, transport, maintenance of vehicles and handling and storage of lubricants and fuel. The required provisions for the contractor's yard are described in the chapter on impacts and mitigation measures concerning topography, geology and soils.

258. If not properly compacted the backfilled trench may affect the surface water drainage during rains. To avoid this qualified site supervision is required.

259. The ground water table will be above the trench bottoms. Ground water will be pumped from open trenches during construction if required. Leaking of construction machines and refueling close to ground water should be avoided as a mitigation measure to prevent water contamination.

260. Basically, the construction of the water network has no impact on the ground water.

6.4. Construction of Gabion Wall as River Bank Protection

Impact during Construction

261. There is also risk of temporary impacts to the River during the construction of Gabion Wall. The following mitigation measures will be implemented to minimize the impact on aquatic ecosystems in the project area:

- Prohibition of dumping any waste/material in the riverbed
- All works scheduled to be performed in or near watercourse will follow statement/ plan

for the execution of particular works;

- Control of the status of technical maintenance of machinery/vehicles and prohibition of damaged/leaking machinery/vehicles on the site;
- Arranging material storage area away from the riverbed (not closer than 50m from the active riverbed);
- Prohibition of fuelling and/or maintenance of machinery near (in less than 50m) the river;
- Prohibition of untreated discharge of wastewater/ potentially contaminated run off into the riverbed;
- Regular clean-up of the work area and timely removal of waste;
- Removal of surplus material, waste, temporary structures and machinery from the area after completion of works;
- In case planned to have some amount of fuel on the site – adequate protection of environment from spreading of accidentally spilled liquid. (Precaution measures include – secondary containment capable to retain 110% of container volume, location of the stock at not less than 50 m distance from the riverbed. Provision of adsorbents and training/briefing the staff in good operation practice and environmental safety issues.);
- Prior to diverting the stream flow into the diversion system, or discharging
- pumped water, the outlet area shall be stabilized to prevent erosion.
- Prior to any work commencing at the watercourse crossing, the work areas shall be made dry by diverting all water, using cofferdams constructed of sand bags and sheet plastic, portable Aqua Dam, or other acceptable method using non-erodible materials, and unwatering the area in addition to other measures which may be necessary;
- Construct cofferdams with sufficient free board and have sufficient pumping equipment on site to protect the work area and to accommodate peak flows during unwatering operations. Diversion of the watercourse may include such methods as the construction of a plastic lined diversion channel or pumping;
- Work should be carried out from the downstream section of the work area and progress to the upstream section;
- Any excavated material shall be removed from the site and shall be stockpiled away from the watercourse;
- All excavations shall be carried out using a tracked excavator which will operate between the limits of the work area or as directed by the Resident Engineer;
- All sections of newly constructed channel shall be adequately stabilized so as to prevent destabilization, erosion, or scouring of the channel;
- All construction related waste materials shall be removed from the work site(s). Sedimentation basins shall be pumped dry and backfilled with the original Department of Transportation and Works Environmental Protection Plan 30 excavated material and compacted.

262. Proper best management practices to reduce or eliminate runoff of contaminants would be used, including the proper use of silt fencing, to protect River from contamination and sedimentation.

263. Contractor will prevent illegal access and fishing in the River nearby the construction site by rising awareness of workers. Impact on wildlife at the construction stage can be minimized with the effective implementation of appropriate mitigation measures mentioned above and permanent monitoring of

Ichtyofauna.

Impacts and Mitigation Measures during Operation

- 264.** During the operation stage no effects on groundwater is envisaged. However as this is a ground water based water supply system, the effects due to water abstraction from the source and source water contamination risk needs to be assessed.
- 265.** Generally the main risk to the physical environment of operating a new/improved water supply system is that of increased abstraction, which may deplete the water resource. Unsustainable reduction may affect downstream uses and may have ecological impacts (such as on flora, fauna and inadequate groundwater recharge). On the other hand, unsustainable source may also lead to closure of the system and wastage of investment.
- 266.** However, in the present project, water is being abstracted from Natanebi river aquifer and water resources are constantly replenished. There are no major water pollution sources in the catchment, so there is no risk of source water contamination.
- 267.** An important aspect of increased water supply is that of increased sewage generation, which needs to be treated and disposed properly without causing any impacts. In case of inadequate facilities, disposal of untreated sewage into rivers/streams is common and therefore it offers a potential impact to surface and groundwater. The project will include the construction of a new wastewater system that will collect and treat the wastewater. These measures are examined in a parallel IEE.

6.5. Construction of Aqueduct

Impact during Construction

- 268.** The Contractor shall be aware that the work required in and around water crossings shall be performed with due care and caution so as to prevent pollution, sedimentation or any damage to the watercourses and downstream areas. All work associated with the Aqueduct construction project shall be undertaken to prevent any change(s) to the existing water quality.

Mitigation during construction

- 269.** The mitigation measure for the aqueduct's construction is that the aqueduct's pile construction process coincides with the period of the Natanebi River's shallowness, minimum yield period (winter), when all the fish species found within the design section spend winter in deep sections of the river. No piles will be located on the river bed, all 4 piles are located on the river bank.
- 270.** The following mitigation measures will be implemented to minimize the impact on aquatic ecosystems in the project area:
- Works should be carried out in low water period (in winter) when fish is not active;
 - Prohibition of dumping any waste/material in the riverbed to avoid blockage of the stream after reinstatement of the flow;
 - All works scheduled to be performed in or near watercourse will follow statement/ plan for the execution of particular works;
 - Control of the status of technical maintenance of machinery/vehicles and prohibition of damaged/leaking machinery/vehicles on the site;
 - Arranging material storage area away from the riverbed (not closer than 50m from the active riverbed);
 - Prohibition of fuelling and/or maintenance of machinery near (in less than 50m) the river;

- Prohibition of untreated discharge of wastewater/ potentially contaminated run off into the riverbed;
- Regular clean up of the work area and timely removal of waste;
- Removal of surplus material, waste, temporary structures and machinery from the area after completion of works;
- In case planned to have some amount of fuel on the site – adequate protection of environment from spreading of accidentally spilled liquid. (Precaution measures include – secondary containment capable to retain 110% of container volume, location of the stock at not less than 50 m distance from the riverbed. Provision of adsorbents and training/briefing the staff in good operation practice and environmental safety issues.)

Impacts during Operation

271. No impact is envisaged during the operation of Natanebi River Aqueduct crossing.

Mitigation measures:

272. No mitigation is required. However monitoring of fish and macro invertebrates is advisable to register any less likely, but adverse effect.

6.6. Climate & Air Quality

Impacts and Mitigation Measures during Construction

273. The activities that could cause impact on ambient air quality are (i) dust generation from construction activity and (ii) air emission from construction equipment (like excavators, crane) and material and waste transport vehicles.

274. There is a high potential for the creation of dust, from the excavation of dry soil and its storage, and leveling the ground. Works will be conducted close to the town. As per World Health Organization (WHO) Guidelines, particulate matter in the air with the size of 10 microns (PM10) should be maintained at 50µg/m³ for 24 hours and with an annual mean of 20 µg/m³ for normal ambient air quality. Accordingly, the Contractor should therefore be required to:

- Cover or damp down by water spray on the excavated mounds of soil to control dust generation;
- Apply water prior to leveling 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 unsurfaced/bad condition roads to avoid dust generation while using for material transport
- 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
- Don't allow access in the work area except workers to limit soil disturbance and prevent access by fencing

275. Various types of equipment and vehicles will be required for the construction activities. The exhaust emissions from these may degrade the ambient air quality. Considering the scale of work and use of

equipment, impact will be insignificant. Georgian emission standards are established for a number of air contaminants as shown in the Table below.

Table 27 Maximum admissible concentration of pollutants (MAC) in ambient air

N	Contaminant substance	N according to CAS	Formula	MAC (mg/m3)		Class of harmfulness
				Maximum fugitive	Average daily	
6	Nitrogen (IV) Dioxide	10102-44-0	NO ₂ SO ₂	0.2	0.04	2
11	Sulphur dioxide	9/5/7446	CO	0.5	0.05	3
1	Carbon monoxide	630-08-0	C	5	3	4
35	Soot (Carbon black)	1333-86-4		0.15	0.05	3
9						
36						
0						

276. In compliance to these standards, to enhance the subproject benefits, the Contractor should implement the following:

- Ensure that all equipment & vehicles used for construction activity are in good condition and are well maintained
- Ensure that all equipment & vehicles confirm to emission and noise norms

Impacts during Operation

277. Impacts on air quality during operation only refer to the WWTP.

6.7. Biological Environment

Impacts during Construction

278. The impacts on flora and fauna during implementation of contractor's yard are minor since site clearance activities will be mostly concentrated on the area adjacent to the already existing structures (existing reservoirs, pumping stations, existing transmission main).

279. 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

280. Operation of the water supply components of the subproject will not have any significant negative impact on the biological environment.

6.8.Economic Resources

Impacts during Construction

281. The construction of the water supply system will be conducted along existing roads in the town. The work may 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:

- 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
- Dust suppression by spraying water
- Initial situation of private properties has to be re-established after construction

282. Another aspect of construction work that has economic implications is the transportation of material to the site and of surplus soil from the site to locations where it can be put to beneficial use as recommended. As most of the excavated material is expected to be re- used, the volume of surplus material generated from the construction work is expected to be minor. Even as the transport of material is not significant, considering the large roads, it could disrupt traffic in the Town. The transportation of material/waste shall be implemented by the Civil Contractor in liaison with the town authorities, and the following additional pre- cautions 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

283. As the operation and maintenance activities will be conducted within the existing facilities there is no impact envisaged on economic resources. In fact, the improvements and new construction of 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.

6.9 Socio-Cultural Resources

Impacts during Construction

284. There are various social-cultural resources and tourism spots in Ureki. Depending on the prevailing wind situation, 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 tourism spots 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 and waste 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

285. There is invariably a safety risk when substantial construction such as this is conducted in inhabited 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), and suits
- Maintaining accidents records and report regularly

286. Guria Region, including Ureki and Shekvetili, is an important centre of Georgian history and culture. So there is a risk that any work involving ground disturbance could uncover and damage archaeological and historical remains. Therefore steps should be taken to minimize the risk.

287. 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 that they are protected and conserved. This should involve:

- 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 to ensure its removal or protection in situ.

288. 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 labor 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 labor camps. If temporary labor 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 labor 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
- 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

289. Archaeological heritage. Since prehistoric times, Georgia, as a part of the Caucasian geopolitical region, has been an area of interest for such great states and empires as Achaemenids and later Iran, classical Greece and Rome Byzantium, Arab caliphates, Tatar Mongolian hordes, and the Ottoman Empire. Due to this, local Georgian and other peoples material and spiritual culture have left significant archaeological traces.

290. 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..

291. In the unlikely event of an archaeological chance find the mitigation measure stipulated in “Table 6 Environmental Impacts and Mitigation Measures” of the Chapter “Environmental Management Plan” will have to be carried out.

Impacts during Operation

292. As the operation and maintenance activities will be conducted within the facilities no negative impacts on socio-cultural resources are envisaged.

293. Regular water quality surveillance program shall be implemented to avoid any public health risk as detailed below:

- Conduct regular water quality monitoring at well fields; results of monitoring conducted at this feasibility stage can be used as base values to study the change in the water quality in future
- Develop & implement a water quality monitoring program for distribution system according to the Georgian Law

294. The improved water supply system will bring numerous benefits when it is operated. The main beneficiaries will be the citizens of Ureki and Shekviteli, who will be provided with a constant supply of better quality water, which serves a greater proportion of the population, including urban poor and tourists as well. This will improve the quality of life of people as well as raise standards of both individual and public health. 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. Improvement in infrastructure will bring more economic opportunities.

295. The improved and expanded water supply system would require additional workforce

296. Both skilled and unskilled, for operation and maintenance, and therefore creates new employment opportunities for local people.

6.10. Noise & Vibration

Impacts during Construction

297. Construction activities are likely to generate noise and vibration from usage of equipment and haulage of construction materials/waste. This project however does not involve high noise/vibration generating activities like pile-driving or rock cutting. Appropriate personal protection equipment however needs to be provided for workers at the site. Haulage of materials/waste and operation of backhoe will also generate noise, but will be limited in duration and require no special measures. During the construction period, the Georgian noise quality standards should be adhered to by the Contractor. This specifies that noise level should not exceed 70 dBA (with indicative level of 55 dBA) from 7 am to 11 pm and 60 dBA (with indicative level of 55 dBA) from 11 pm to 7 am. Sensitivity to noise increases during the night hours. Following measures shall therefore be implemented:

- Provide prior information to the local people about the work

- No construction activities shall be conducted in the night
- Provide personal protection equipment like ear plugs to the workers at the noisy working site
- Sound barriers should be erected at schools and hospitals if the distance to the construction site is less than 50 m.

298. Another important activity is the haulage of construction material and waste to and from site. Roads are narrow and not in good condition. Following measures shall be included to avoid nuisance due to haulage of material and waste.

- Schedule material and waste haulage activities in consultation with local authorities
- No night time haulage activity; limit to day time off peak hours
- Educate drivers: limit speed between 20-25 km/h and avoid use of horn in the town
- Earmark parking place for construction equipment and vehicles when idling; no parking shall be allowed on the roads, that may disturb the traffic movement

299. As the construction vibration is considered, none of the activities in the subproject has a potential to generate significant vibration, and there are no sensitive structures in the proximity of the site. Therefore there are no likely impacts.

Impacts during Operation

300. There are no sources of noise or vibration from the operation activity of the new water supply system.

Hazardous Construction Wastes

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

Mitigation Measures

302. 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 MENRP 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.

Cumulative Impacts

303. The project is designed to improve environmental quality and living conditions in Ureki and Shekvetili through the construction of a new water supply system. The potential negative impacts identified on various environmental parameters, during both construction and operation, in the previous sections of this report, are local and temporary.

304. By nature, impacts such as on air quality and on people (due to disturbance, nuisance and safety risk of construction activity) can have cumulative impacts, as all the construction activities are conducted simultaneously. These are common impacts associated with any construction activity, and as discussed in the earlier sections, there exists proven and easy-to-implement measures to mitigate these impacts.

305. However, at present, various development and construction activities are under implementation in Ureki and Shekvetili. The Works shall be scheduled in consultation with the Municipality so that roads and inhabitants are not subject to repeated disturbance.

306. No cumulative impacts are envisaged during the operation stage

8. INFORMATION DISCLOSURE, CONSULTATION, AND PARTICIPATION

- 307.** Most of 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 Ureki, Shekvetili and Laituri well field
 - UWSCG as implementing agency
 - Other government regulatory institutions
 - Municipality of Ozurgeti
 - NGOs and CBOs working in the affected communities;
 - Other community representatives (prominent citizens, religious leaders, elders, women's groups);
 - The beneficiary community in Ureki and Shekvetili in general; and
 - The ADB, as funding agency
- 308.** A public meeting was held in Ureki on 16 July 2013 to which stakeholders were invited. The project measures and their locations were explained. The time schedule of construction activities and construction supervision were explained. Environmental impacts were discussed. Benefits of the project for local people were presented. Findings, list of participants, key concerns, and data are provided in Annex 1 of this report.
- 309.** This IEE Report in Georgian language will be distributed to the interested public. Re- port will be available for review in Tbilisi (at UWSCG Head Office), and Ozurgeti (at UWSCG Service Centre and the Town Hall). It will also be disclosed to public by making it available on websites of UWSCG, MoRDI and ADB, together with the IEEs prepared for the other subprojects.

9. GRIEVANCE REDRESS MECHANISM

- 310.** The contractor is obliged to implement the environmental management plan during the whole construction period and the supervising consultant will monitor these activities.
- 311.** The consultant will point out any deviations from the EMP and make sure that the contractor addresses all issues of the EMP in a timely and professional manner.
- 312.** A grievance resolution mechanism will be set up to allow an AP appealing any dis- agreeable decision, practice or activity arising from project implementation. APs will be fully informed of their rights and of the procedures for addressing complaints whether verbally or in writing during planning and implementation of the project. Care will always be taken to prevent grievances rather than going through a redress process. This is achieved by ensuring full AP participation and consultation, and by establishing extensive communication and coordination between AP, UWSCG, and the local government. The affected population and stakeholders may send their grievances, related to the project induced environmental impacts and nuisance to UWSCG or directly to the administrative bodies responsible for the environmental protection. The MoENRP and concerned municipalities are obliged to respond on the grievances, which have been received from population or other interested parties in accordance with the Administrative Code of Georgia.
- 313.** UWSCG on its part, in order to provide a direct channel to the affected and concerned citizens for approaching project authorities and have their grievance recorded and redressed in an appropriate time frame, will establish a Grievance Redress Mechanism. A Complaint Cell and a Grievance Redress

Committee will be established for each Investment Program town at the local UWSCG service centre, which will function throughout the construction period. The procedures adopted and the responsibilities of various project agencies in grievance redress are discussed in the following paragraph. During the public consultation process, UWSCG (the IA) will inform the stakeholders about the Grievance Redress Mechanism and provide contact details of persons responsible for grievance collection and response. These details will also be made available on UWSCG website. The DREP at the head office of UWSCG will be available for the local complaint cells for establishing direct links to relevant environmental authorities.

- 314.** The Complaint Cell at the UWSCG Service Centre in the Investment Program town will accept complaints regarding the environment safeguard issues in implementation of subprojects under the respective town. A three stage grievance redress mechanism is indicated in Fig. 2 below. The grievances received and actions taken will be included into the environmental monitoring reports submitted to ADB.

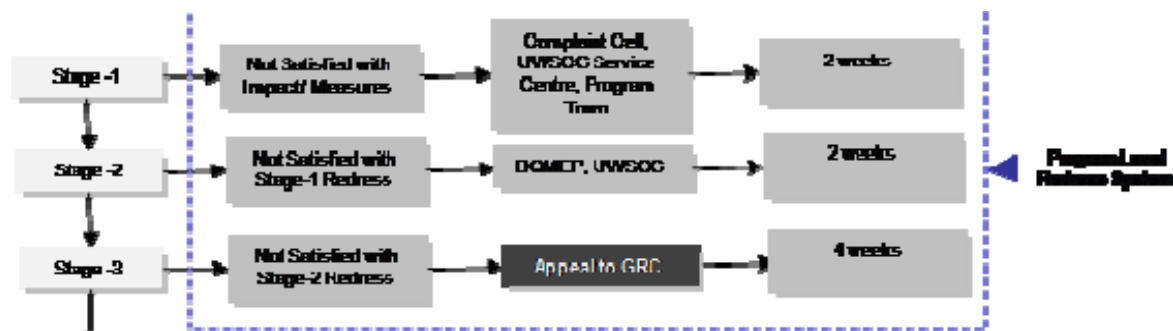


Figure 8 Grievance Redress Mechanism

- 315.** Complaints received (written or oral communication) by the Complaint Cell (CC) will be registered in database system, assigning complaint number with date; Complaint Cell will inform the complainant the time frame in which the corrective action will be taken.
- 316.** Complaint resolution will be attempted at Ureki level with the involvement of Community leaders and informal mediators.
- 317.** The Complaint Cell and UWSCG Investment Program Management Office (IPMO) will investigate the complaint to determine its validity, and assess whether the source of the problem is indeed due to subproject activities; if invalid, the Complaint Cell will intimate the complainant and may also provide advice on the appropriate agency to be approached.
- 318.** If the complaint is valid, the Complaint Cell will check the environmental management plan (EMP) of the subproject whether this issue was identified and mitigation was suggested; if yes, the Complaint Cell and UWSCG IPMO will direct the civil works Contractor to take immediate actions as per the EMP.
- 319.** If this is an unanticipated issue, the UWSCG IPMO will identify mitigation measures and advise the civil works Contractor accordingly and a corrective action should be taken and a Corrective Action Plan (CAP) prepared.

- 320.** The Complaint Cell will review the civil works Contractor's response on corrective action and update the complainant within two weeks.
- 321.** If the complainant is not satisfied with the action taken by the Contractor within two weeks from the start of corrective action as directed the Complain Cell, the grievance will be directed to the Division of Resettlement and Environment Protection of UWSCG.
- 322.** The DREP will review the issue with the IPMO and relevant Service Centre and may ask for additional information or conduct site visit, and will advise the IP- MO and relevant Service Centre on actions to resolve the issue.
- 323.** The Service Centre will submit the interim report in a week to DREP on the status of the complaint investigation and follow-up actions, and final action taken report within two weeks of completing the action. The DREP will intimate the complainant of the same.
- 324.** If the complainant is still dissatisfied with the action taken or decision, he/she may approach the Grievance Redress Committee (GRC, see below) established in the town
- 325.** Grievance Redress committee (GRC). A GRC will be established to resolve the unresolved issues at Stage 2 and this will function throughout the construction period, and will have hearings on need-basis. GRC will have following members:
- Chairman of the GRC – Head of Department of Social issues at Ureki Municipality
 - UWSCG Service Centre Head
 - Designated informal leader of sub-project affected community
 - Female AP
 - Member of IPMO
 - Local NGO representative
- 326.** Considering the anticipated impacts, it is not expected that there is any likely issue which will remain unresolved in the Stage 3 of the process. In the unlikely event of dissatisfaction after Stage 3, the complainant can approach Georgian Resident Mission in Tbilisi or go to the court.

10. ENVIRONMENTAL MANAGEMENT PLAN

Table 28 Environmental Impacts and Mitigation Measures

Potential Negative Impacts	Mitigation measures	Responsibility	Location	Cost	Monitoring of Mitigation
Pre-construction					
Conduct Survey for Otters	Prior to start construction activities, the Contractor will carry out the visual checkup in regards of animals like Otters. and report to the Engineer and Employer.	Contractor	Natanebi River bank	Included in project price	Check the identified mitigation measures, review & approval of report
Aquatic ecology survey of water bodies	Prior to start construction activities, contractor should carry out aquatic ecology survey of any water bodies likely to be directly or indirectly affected during the construction	Contractor	Project area, Natanebi River		Check the identified mitigation measures, review & approval of report
Survey of all new infrastructure locations including quarry, camp, construction yard etc.	<p>Prioritize areas within or nearest possible vacant space in the project location;</p> <p>If it is deemed necessary to locate elsewhere, consider sites that will not promote instability and result in destruction of property, vegetation, and drinking water supply systems;</p> <p>Do not consider residential areas;</p> <p>Take extreme care in selecting sites to avoid direct disposal to water body (river near intake) which will inconvenience the community.</p> <p>For excess spoil disposal, ensure: (a) site shall be selected preferably from barren, infertile lands. In case agricultural</p>	Contractor	Ureki	Included in Project price	Review of Survey report

Potential Negative Impacts	Mitigation measures	Responsibility	Location	Cost	Monitoring of Mitigation
	land needs to be selected, written consent from landowners will be obtained; (b) debris disposal site shall be at least 200 m away from surface water bodies; (c) no residential areas shall be located within 50 m downwind side of the site; and (d) site is minimum 250 m away from sensitive locations like settlements, ponds/lakes/ river or other water bodies				
Sources of Materials	To obtain a written approval from the MEPA of Georgia.	Contractor		Included in Project price	(i) List of approved quarry sites and sources of materials
Utilities	(i) Identify and include locations and operators of these utilities in the detailed design documents to prevent unnecessary disruption of services during construction phase; and (ii) contractor to prepare a contingency plan to include actions to be done in case of unintentional interruption of services. (iii) Contractor to prepare spoils management plan and traffic management plan	Contractor		Included in Project price	(i) List of affected utilities and operators; (ii) spoil management plan; (iii) and traffic management plan
Preparation of “Inert Waste Management Plan”	Prior to start construction activities, contractor should choose the areas for disposal inert waste and prepare “Inert waste management plan”. Prepared plan should be submitted to SC for endorsement and to UWSCG for approval.	Environmental Specialist of Contractor Environmental Specialist of SC	Ureki WS sites	Included in Project price	review & approval of Inert waste management plan
		Approved by UWSCG			

Potential Negative Impacts	Mitigation measures	Responsibility	Location	Cost	Monitoring of Mitigation
SEMP	<p>Contractor, prior to the onset of the construction, should conduct a number of studies and develop environmental plans, including “Site Environment Management Plan” (SEMP). Such plans can be further subdivided into Topic Specific or Site Specific EMP’s. The number of such plans will depend upon the type of project, complexity and sensitivity of the receiving environment.</p> <p>Topic Specific EMPs are developed on a topic by topic basis. For example: Waste Management Plans; Traffic Management Plans; Protected Species Management Plans; Water Management Plans.</p>	Environmental Specialist Of Contractor ES of SC	Project Area	Included in Project price	Review & approval of SEMP
Construction					
Risk due to high risk seismic intensity zone	<p>Apply design and construction norms of Zone-8 (MSK- 64 scale) according to Government of Georgia “Construction in Seismological Regions”</p> <p>Select appropriate pipe material and design for trans- mission lines according to seismic intensity of project area</p>	DC	-	Design Cost	
Impacts due to exca-vation and generation of waste soil	Utilize surplus/waste soil for beneficial purposes such as in construction or to raise the ground-level of low lying sites	Civil Con- tractor	All construction sites	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.	Civil Con- tractor	Pumping station, reservoirs	Part of construction cost	

Potential Negative Impacts	Mitigation measures	Responsibility	Location	Cost	Monitoring of Mitigation
Erosion due to excavation/refilling	<p>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</p> <p>In the steep slopes, local grass species shall be planted on the refilled trenches</p>	Civil Contractor	All construction sites	Part of construction cost	
<p>A negative impact on soil, water and air may be caused because of an incorrect management of the generated inertial waste. Also the generated noise, dust and vibration during demolition may cause a negative impact on the surrounding buildings and population.</p>	<p>Prohibited use of blasting equipment during the demolition process of reservoirs;</p> <p>No use of heavy duty equipment is allowed; Prior to the commencement of any activity, the Contractor shall identify whether any machinery or planned action will cause significant vibration. If the answer is yes, the Contractor is to undertake a condition survey of all structures within the zone of influence;</p> <p>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;</p> <p>Restrict demolition activities during period of the high winds or under more stable conditions when winds could nevertheless direct dust towards adjacent communities;</p> <p>Using a water truck for dust suppression on all exposed areas as required;</p> <p>Active areas adjacent to residents should be kept damp at all times;</p> <p>Establish and enforcing vehicle speed limits to minimize dust</p>	Contractor	Ureki project sites	Included in Project price	Monitoring of noise, dust and vibration, details are provided in table 31 below.

Potential Negative Impacts	Mitigation measures	Responsibility	Location	Cost	Monitoring of Mitigation
	<p>generation;</p> <p>Using tarpaulins to cover fugitive loads (for demolition concrete materials) on haul trucks moving off-site;</p> <p>Select plant and equipment, design work practices, and limit hours of operation to minimize potential impacts as far as practicable;</p> <p>Operators of noisy equipments or any other workers in the vicinity of excessive noisy equipment are to be provided with ear protection equipment;</p> <p>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 equipment near sensitive receivers;</p> <p>Ensure that all equipment is in good repair and operated in the correct manner;</p> <p>Consult with local residents and building owners the address community concerns;</p>				
Impact on surface water bodies , including construction during heavy rains	<p>(i) Prepare and implement a spoils management plan as the part of the Construction Management Plan. (ii) Avoid stockpiling of earth fill especially during the monsoon season unless covered by tarpaulins or plastic sheets; (iii) Install temporary silt traps or sedimentation basins along the drainage leading to the water bodies; (iv) Laying of pipelines during dry season and closing of all trenches before rainy season and avoid any chances of collecting the water in the trenches or pumping. (v) Place storage areas for fuels and lubricants away from any drainage leading to water bodies; (vi) Dispose any wastes generated by installation of pipeline</p>	Civil Contractor	Construction sites on slopes.	Part of construction cost	<p>(i) Areas for stockpiles, storage of fuels and lubricants and waste materials; (ii) Number of silt traps installed along trenches leading to water bodies; (iii)</p>

Potential Negative Impacts	Mitigation measures	Responsibility	Location	Cost	Monitoring of Mitigation
	<p>in designated sites; and (vii) Conduct surface quality inspection according to the Environmental Management Plan (EMP).</p> <p>In case of heavy rain, protect open trenches from entry of rain water by raising earthen bunds with excavated soil</p> <p>Confine construction area including the material storage (sand and aggregate) so that runoff from upland areas will not enter the site</p> <p>Ensure that drains are not blocked with excavated soil</p>				<p>Records of surface water quality inspection; (iv) Effectiveness of water management measures;</p> <p>(v) No visible degradation to nearby drainages, nallahs or water bodies due to civil works</p>
<p>Work Camps and worksites</p> <p>Temporary air and noise pollution from machine operation, water pollution from storage and use of fuels, oils, solvents, and lubricants</p> <p>Unsanitary and poor living conditions for workers</p>	<p>(i) Consult with UWSCG/IPMO before locating project offices, sheds, and construction plants; (ii) Minimize removal of vegetation and disallow cutting of trees; (iii) Provide drinking water, water for other uses, and sanitation facilities for employees; (iv) Ensure conditions of liveability at work camps are maintained at the highest standards possible at all times; (v) Prohibit employees from poaching wildlife and cutting of trees for firewood; (vi) Train employees in the storage and handling of materials which can potentially cause soil contamination; (vii) Recover used oil and lubricants and reuse or remove from the site; (viii) Manage solid waste according to the preference hierarchy: reuse, recycling and disposal to designated areas; (ix) Ensure unauthorized persons especially children are not allowed in any worksite at any given time.</p>	Contractor	Project area	Part of construction cost	Site observation

Potential Negative Impacts	Mitigation measures	Responsibility	Location	Cost	Monitoring of Mitigation
Impact on ambient air quality due to dust generation	Cover or damp down by water spray on the excavated mounds of soil to control dust generation;	Civil Contractor	All construction sites	Part of construction cost	Site observation Measurement Data
	<p>Apply water prior to leveling or any other earth moving activity to keep the soil moist throughout the process;</p> <p>Bring the material (aggregate and sand) as and when required;</p> <p>Ensure speedy completion of work and proper site clearance after completion;</p> <p>Damp down unsurfaced/bad condition roads to avoid dust generation while using for transport of waste/material</p> <p>Use tarpaulins to cover loose material that is transported to and from the site by truck</p> <p>Control dust generation while unloading the loose material (particularly aggregate and sand) at the site by sprinkling water/unloading inside barricaded area</p> <p>Clean wheels and undercarriage of haul trucks prior to leaving construction site</p> <p>Don't allow access in the work area except workers to limit soil disturbance and prevent access by fencing</p>				
Impact on air quality due to emissions from construction equipment/vehicles	<p>Ensure that all equipment & vehicles used for construction activity are in good condition and are well maintained</p> <p>Ensure that all equipment & vehicles confirms to emission and noise norms</p>	Civil Contractor	Ureki, Shekvetili	Part of construction cost	

Potential Negative Impacts	Mitigation measures	Responsibility	Location	Cost	Monitoring of Mitigation
Removal of vegetation/trees for construction and impacts due to presence of open trenches	<p>Avoid tree cutting by local and small change of layout plan/alignment</p> <p>In unavoidable cases, plant two trees of same species for each tree that is cut for construction</p> <p>Bushes and grasses shall be cleared only in actual construction area all other preparatory works (material storage) shall be conducted on barren lands where there is no vegetation</p> <p>Use excavated soil for refilling the pipeline trench; avoid sand layer on the top of the pipe in inaccessible areas to avoid importing material and related disturbances</p> <p>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. This will avoid any safety risk to people, domesticated, wild or astray animals.</p>	Civil Contractor	Reservoirs, pumping stations	Part of construction cost	
Disturbance to business, people, activities and socio-cultural resources due to construction work	<p>Inform all residents and businesses about the nature and duration of any work well in advance so that they can make necessary preparations if necessary;</p> <p>Limit dust by removing waste soil quickly; by covering and watering stockpiles, and covering soil with tarpaulins when carried on trucks</p> <p>Provide wooden walkways/planks across trenches for pedestrians and metal sheets where vehicle access is required</p> <p>Increase workforce to complete the work in minimum time in the town</p>	Contractor	All construction sites	Part of construction cost	Site observation

Potential Negative Impacts	Mitigation measures	Responsibility	Location	Cost	Monitoring of Mitigation
Disturbance/nuisance/noise due to construction activity including haulage of material/waste	<p>Plan transportation routes in consultation with Municipality and Police</p> <p>Schedule transportation activities by avoiding peak traffic periods</p> <p>Use tarpaulins to cover loose material that is transported to and from the site by truck</p> <p>Control dust generation while unloading the loose material at the site by sprinkling water</p> <p>Clean wheels and undercarriage of haul trucks prior to leaving construction site</p> <p>Educate drivers: limit speed between 20-25 KMPH and avoid use of horn in the town</p>	Civil Contractor	All construction sites	Part of construction cost	
	<p>Earmark parking place for construction equipment and vehicles when idling; no parking shall be allowed on the roads, that may disturb the traffic movement</p> <p>Provide prior information to local people about work;</p> <p>No night-time construction activities including material/waste haulage</p>				
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	Site observation

Potential Negative Impacts	Mitigation measures	Responsibility	Location	Cost	Monitoring of Mitigation
Impacts due to import of labour and establishment of temporary labour camps	<p>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:</p> <p>Establish temporary labour camps in consultation with the local authority</p> <p>Construction camp shall be located away from water bodies</p> <p>No clearance of trees vegetation shall be allowed for establishment of camp</p> <p>Provide all basic amenities (water supply and sanitation, waste collection & disposal, first aid facilities, etc)</p> <p>Camp shall be established after removal of existing landfill</p> <p>Contractor shall provide fire wood and no worker shall be allowed to cut any tree</p> <p>Ensure regular and clean maintenance of the camp</p>	Civil Contractor	Temporary labour camps	Part of construction cost	Site observation
Safety risk – public and worker	<p>Follow standard and safe procedures for all activities – such as provision of shoring in deep trenches (>2 m)</p> <p>Exclude public from the site – enclose construction area, provide warning and sign boards, security personnel</p> <p>Provide adequate lighting to avoid accidents</p> <p>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), suits;</p> <p>Maintain accidents records and report regularly</p>	Civil Contractor	All construction sites	Part of construction cost	
Historical, archaeo- logical 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				Historical, archaeological chance finds

Potential Negative Impacts	Mitigation measures	Responsibility	Location	Cost	Monitoring of Mitigation
	<p>protected and conserved. This should involve:</p> <p>Having excavation observed by a person with archaeological field training;</p> <p>Stopping work immediately to allow further investigation if any finds are suspected;</p> <p>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;</p>	UWSCG/Design Consultant	All construction sites	Part of construction cost	during excavation
Cumulative impacts – repeated disturbance to roads and people	Schedule the construction activities in harmony with the other on-going works	UWSCG	All construction sites		
Soil contamination due to leakages with mineral oil	<p>Provide double walled fuel tanks or store single walled fuel tanks in collecting basin for refueling construction engines</p> <p>Provide modern non-leaking equipment</p>	Civil Contractor	Contractor's camps	Part of construction cost	
Contamination of surface water	<p>Store fuel tanks away from surface water on a safe location minimum 50 m distance to surface water</p> <p>Provide modern non-leaking equipment</p>	Civil Contractor	Contractor's camps	Part of construction cost	
Soil Contamination	<p>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.</p> <p>Solid waste generated during construction and at campsites will be properly treated and safely disposed of only in demarcated waste disposal sites.</p> <p>Construction chemicals will be managed properly</p> <p>Clearly labelling all dangerous products,</p> <p>Fuel tanks (diesel or oil) should be placed in a concrete pool</p>	Environmental Specialist of Construction Company	Construction sites	Part of construction cost	

Potential Negative Impacts	Mitigation measures	Responsibility	Location	Cost	Monitoring of Mitigation
	<p>which its perimeter walls will be at least 1.0 m high with the concrete or plastered masonry wall,</p> <p>A proper floor drain should be installed on the slab of the concrete pool for safely discharging the leakages.</p>				
Impact on air quality due to emissions from construction equipment/vehicles	<p>Ensure that all equipment & vehicles used for construction activity are in good condition and are well maintained</p> <p>Ensure that all equipment & vehicles confirms to emission and noise norms</p>	Construction Contractor	Kutaisi	Part of construction cost	Measurement data
Damaging of protected trees	<p>The old trees to be protected shall be marked.</p> <p>A vegetation protection fence will be installed during construction stage in order to protect the valuable trees and</p> <p>Access road to construction site shall be shifted as far away from the old trees to be protected, as it is technically feasible</p>	Construction Contractor	New East Reservoir	Part of Construction Cost	Site observation
During and after construction pollution of water/riverbed with waste and/or material (in case of improper management), fuel/oil; this can impact fish and macro-invertebrates after restoration of water stream within the project section.	<p>Works should be implemented in the riverbed or near it according to preliminary developed methods/plan;</p> <p>Control over technical functionality of machinery/equipment; damaged machinery/equipment are not allowed to enter the site;</p> <p>Material should be stored in not less than 50 m from active riverbed;</p> <p>Prohibit fueling and/or maintenance in the distance not less than 50 m from active riverbed;</p> <p>Prohibit discharge of processed wastewater/ potentially polluted surface runoff into the river;</p> <p>Regular cleaning of the site and timely waste removal;</p> <p>Removal of excess material, waste and temporary structures</p>	Contractor	Work area	Part of construction costs	

Potential Negative Impacts	Mitigation measures	Responsibility	Location	Cost	Monitoring of Mitigation
	and equipment from the site after completion of works; If there is fuel storage on the site – in case of accidental spillage avoid spreading in the environment (measures include – 110% of tank capacity) presence of spill trapping secondary storage device; Tank should be located in not less than 50 m from active riverbed. Provide absorbents; Train/inform personnel on best practice of work implementation and environmental issues.				
Impact on fish food base due to riverine vegetation cleanup.	Maximum preservation of riverine vegetation cover; Strict adherence to construction site borders in order to avoid impact on vegetation cover outside the borders of the work site; Instruct personnel on the need of protection of riverine vegetation cover.	Contractor	Riverbanks in the project impact zone (work areas)	Part of construction costs	
Illegal fishing in the River	Contractor will prevent illegal access and fishing in the River nearby the construction site by rising awareness of workers. Impact on wildlife at the construction stage can be minimized with the effective implementation of appropriate mitigation measures mentioned above and permanent monitoring of Ichtyofauna.	Contractor	Riverbanks in the project impact zone (work areas)		
Construction of Aqueduct River Crossing	Works should be carried out in low water period (in winter) when fish is not active; Prohibition of dumping any waste/material in the riverbed to avoid blockage of the stream after reinstatement of the flow; All works scheduled to be performed in or near watercourse will follow statement/ plan for the execution of particular works;	Contractor	Riverbanks in the project impact zone (work areas)	Part of construction costs	Site observation

Potential Negative Impacts	Mitigation measures	Responsibility	Location	Cost	Monitoring of Mitigation
	<p>Control of the status of technical maintenance of machinery/vehicles and prohibition of damaged/leaking machinery/vehicles on the site;</p> <p>Arranging material storage area away from the riverbed (not closer than 50m from the active riverbed);</p> <p>Prohibition of fuelling and/or maintenance of machinery near (in less than 50m) the river;</p> <p>Prohibition of untreated discharge of wastewater/ potentially contaminated run off into the riverbed;</p> <p>Regular clean up of the work area and timely removal of waste;</p> <p>Removal of surplus material, waste, temporary structures and machinery from the area after completion of works;</p> <p>In case planned to have some amount of fuel on the site – adequate protection of environment from spreading of accidentally spilled liquid. (Precaution measures include – secondary containment capable to retain 110% of container volume, location of the stock at not less than 50 m distance from the riverbed. Provision of adsorbents and training/briefing the staff in good operation practice and environmental safety issues.)</p>				
Construction of Gabion River protection wall	<p>Prohibition of dumping any waste/material in the riverbed</p> <p>All works scheduled to be performed in or near watercourse will follow statement/ plan for the execution of particular works;</p> <p>Control of the status of technical maintenance of machinery/vehicles and prohibition of damaged/leaking machinery/vehicles on the site;</p>	Contractor	Contractor	Riverbanks in the project impact zone (work areas)	Site observation

Potential Negative Impacts	Mitigation measures	Responsibility	Location	Cost	Monitoring of Mitigation
	<p>Arranging material storage area away from the riverbed (not closer than 50m from the active riverbed);</p> <p>Prohibition of fuelling and/or maintenance of machinery near (in less than 50m) the river;</p> <p>Prohibition of untreated discharge of wastewater/ potentially contaminated run off into the riverbed;</p> <p>Regular clean-up of the work area and timely removal of waste;</p> <p>Removal of surplus material, waste, temporary structures and machinery from the area after completion of works;</p> <p>In case planned to have some amount of fuel on the site – adequate protection of environment from spreading of accidentally spilled liquid. (Precaution measures include – secondary containment capable to retain 110% of container volume, location of the stock at not less than 50 m distance from the riverbed. Provision of adsorbents and training/briefing the staff in good operation practice and environmental safety issues.);</p> <p>Prior to diverting the stream flow into the diversion system, or discharging pumped water, the outlet area shall be stabilized to prevent erosion.</p> <p>Prior to any work commencing at the watercourse crossing, the work areas shall be made dry by diverting all water, using cofferdams constructed of sand bags and sheet plastic, portable Aqua Dam, or other acceptable method using non-erodible materials, and unwatering the area in addition to other measures which may be necessary;</p>				

Potential Negative Impacts	Mitigation measures	Responsibility	Location	Cost	Monitoring of Mitigation
	<p>Construct cofferdams with sufficient free board and have sufficient pumping equipment on site to protect the work area and to accommodate peak flows during unwatering operations. Diversion of the watercourse may include such methods as the construction of a plastic lined diversion channel or pumping;</p> <p>Work should be carried out from the downstream section of the work area and progress to the upstream section;</p> <p>Any excavated material shall be removed from the site and shall be stockpiled away from the watercourse;</p> <p>All excavations shall be carried out using a tracked excavator which will operate between the limits of the work area or as directed by the Resident Engineer;</p> <p>All sections of newly constructed channel shall be adequately stabilized so as to prevent destabilization, erosion, or scouring of the channel;</p> <p>All construction related waste materials shall be removed from the work site(s). Sedimentation basins shall be pumped dry and backfilled with the original Department of Transportation and Works Environmental Protection Plan 30 excavated material and compacted.</p> <p>Proper best management practices to reduce or eliminate runoff of contaminants would be used, including the proper use of silt fencing, to protect River from contamination and sedimentation.</p>				

Potential Negative Impacts	Mitigation measures	Responsibility	Location	Cost	Monitoring of Mitigation
Occupational Health and Safety Occupational hazards which can arise during work	(i) Comply with all national, state and local labor laws (ii) Develop and implement site-specific occupational health and safety (OH&S) Plan, and include in the Construction Management plan. The OH & S plan will include measures such as: (a) excluding public from the site; (b) ensuring all workers are provided with and use personal protective equipment like helmet, gumboot, safety belt, gloves, nose mask and ear plugs; (c) OH&S Training for all site personnel; (d) documented procedures to be followed for all site activities; and (e) documentation of work-related accidents; (iii) Ensure that qualified first-aid can be provided at all times. Equipped first-aid stations shall be easily accessible throughout the site; (iv) Provide medical insurance coverage for workers; (v) Secure all installations from unauthorized intrusion and accident risks; (vi) Provide supplies of potable drinking water; (vii) Provide clean eating areas where workers are not exposed to hazardous or noxious substances; (viii) Provide H&S orientation training to all new workers to ensure that they are apprised of the basic site rules of work at the site, personal protective protection, and preventing injuring to fellow workers; (ix) Provide visitor orientation if visitors to the site can gain access to areas where hazardous conditions or substances may be present. Ensure also that visitor/s do not enter hazard areas unescorted; (x) Ensure the visibility of workers through their use of high visibility vests when working in or walking through heavy equipment operating areas; (xi) Ensure moving equipment is outfitted with audible back-up alarms; (xii) Mark and provide sign boards for hazardous areas such as energized electrical devices and lines, service rooms housing high voltage equipment, and areas for storage and disposal.	Contractor			Site observation

Potential Negative Impacts	Mitigation measures	Responsibility	Location	Cost	Monitoring of Mitigation
	Signage shall be in accordance with international standards and be well known to, and easily understood by workers, visitors, and the general public as appropriate; and (xiii) Disallow worker exposure to noise level greater than 85 dBA for a duration of more than 8 hours per day without hearing protection. The use of hearing protection shall be enforced actively.				
Community Health and Safety. Traffic accidents and vehicle collision with pedestrians during material and waste transportation	(i) Plan routes to avoid times of peak-pedestrian activities. (ii) Liaise with UWSCG/IPMO in identifying high-risk areas on route cards/maps. (iii) Maintain regularly the vehicles and use of manufacturer-approved parts to minimize potentially serious accidents caused by equipment malfunction or premature failure. (iv) Provide road signs and flag persons	Contractor	Project Sites	(i) Traffic Management Plan; (ii) Complaints from sensitive receptors	
Operation					
Risk of delivery of unsafe water to consumers	Conduct regular water quality monitoring; results of monitoring conducted at this feasibility stage can be used as base values to study the change in the water quality in future Develop & implement water quality monitoring program for distribution system	UWSCG	Well fields, water network	Part of operating costs	
Disturbance/ nuisance/ noise due to operation activity	Plan transportation routes in consultation with Municipality and Police Schedule transportation activities by avoiding peak traffic periods		Reservoirs, pumping stations, pipe alignments,		

Potential Negative Impacts	Mitigation measures	Responsibility	Location	Cost	Monitoring of Mitigation
	<p>Use tarpaulins to cover loose material that is transported to and from the site by truck</p> <p>Educate drivers: limit speed between 20-25 KMPH and avoid use of horn in the town</p> <p>Provide prior information to local people about work;</p> <p>No night time operation activities</p>	UWSCG	transport routes	Part of operation costs	

11. MONITORING

- 327.** 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.
- 328.** 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, and overseen by MC, on behalf of Implementing Agency. Monitoring during operation stage will be conducted by the UWSCG.
- 329.** 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 Ureki is needed.

Table 29 Environmental Monitoring Plan for general construction activities in Ureki

Mitigation measures	Parameters to be Monitored	Location	Measurements	Frequency	Responsibility	Costs
Pre-Construction Phase						
	Environmental audit of bidding documents to ensure relevant sections of the EMP have been included			Once	DC, UWSCG	Included in design contract
	Environmental audit of designs to ensure project design compliance with IEE Guidelines.			Once	DC, UWSCG	Included in design contract
Construction Phase						
All construction related mitigation measures	Implementation on site	All construction sites	Observations on/off site; CC records; interviews with people and workers	Weekly	SC	Included in SC contract
All design related mitigation measures	Inclusion in the project design		Design review	As needed	DREP	
Site conditions	Noise, emission levels (water quality when needed)	To be established by the CS environmental specialist	Dust (PM10), vehicular emissions (Nitrogen (IV), dioxide, sulphur dioxide, Carbon monoxide, Soot (Carbon black)	Baseline stage and monthly	Civil Contractor	Included in Works Contract

Mitigation measures	Parameters to be Monitored	Location	Measurements	Frequency	Responsibility	Costs
Operation						
Leak detection	Losses in m/s	Pipe alignment	Leak detection along the new network	Continuously	UWSCG	3,000 USD/m
Develop & implement water quality monitoring program for distribution system ¹	Parameters as per footnote	Monitoring locations as per footnote	GoG drinking water regulation	See footnote	UWSCG	500 USD/m

- 330.** Most of the mitigation measures require the contractors to adopt good site practice, which should be part of their normal construction contract, so there are no additional costs to be included in the EMP. Costs of design-related mitigation measures (such as construction of laboratory) are included in the budgets for the civil works.
- 331.** Monitoring of implementation of mitigation measures by contractor during construction will be conducted by Environmental Management Specialist of SC. The review of design and contract to check the inclusion of all design-related mitigation measures will be conducted by Environmental Specialist of UWSCG.
- 332.** Long-term water quality surveys are proposed in operation phase. Periodic source water quality, raw and treated water quality is to be conducted through UWSCG laboratory.

12. INSTITUTIONAL ARRANGEMENTS

- 333.** Following agencies will be involved in implementing this Water Supply Subproject in Ureki and Shekviteli under this ADB funded Investment Program:
- (i) Ministry of Regional Development and Infrastructure (MoRDI) is the Executing Agency (EA) responsible for management, coordination and execution of all activities funded under the loan. MoRDI will have overall responsibility for compliance with loan covenants.
 - (ii) United Water Supply Company of Georgia (UWSCG) is the implementing agency (IA), which will be responsible for administration, implementation (design, construction and operation) and all day-to-day activities under the loan. An, Investment Program Management Office (IPMO) will be established within the UWSCG for all Investment Program related functions. The IPMO will coordinate construction of subprojects across all towns, and ensure consistency of approach and performance.
 - (iii) The IPMO will be assisted by (a) Management Contractor (MC) who will provide Investment Program management support, assure the technical quality of design and construction, and provide advice on policy reforms, (b) Detailed Engineering Design Consultants (DC), who will design the infrastructure and manage tendering process and (c) Supervision Consultant (SC) who will supervise the implementation of the EMP by the contractors. Civil works contractors build the infrastructure.

¹ Schedule N7 of Technical Regulation on Drinking Water, 2007, Ministry of Labor, Health and Social Welfare, GoG (Appendix 4)

(iv) ADB is the donor financing the Investment Program.

334. UWSCG, specifically its Department of Environmental Protection and Permits(DEPP), will bear the responsibility of implementing the subproject in compliance with the Georgian Law and ADB Policy throughout design and implementation phase. Specific tasks would include:

- Updating the IEE report to reflect any changes in final project design,
- Submission of revised IEE to ADB, for review and approval; incorporating ADB comments, if any
- Implementation of the EMP including grievance redress

335. Currently DREP is staffed with the Division Head, the Head of the Resettlement Unit and an Environmental Advisor consultants for the handling of environmental tasks and issues in compliance the ADB safeguard Policy requirements and Georgian environmental regulations. With the existing staff, the DREP can update the IEE internally and can also coordinate with government agencies for necessary approvals. The DREP, however, re- quires support for implementation of EMP.

336. The implementation of EMP of this subproject requires an experienced Environmental Management Specialist (EMS) to spend a total of around 15 months over the average 6 month design and 36 months construction period, conducting routine observations and surveys, and preparing monitoring reports. The EMS will also be responsible for: incorporation of mitigation measures in design and construction; and, baseline and construction-stage environmental quality monitoring. Support of an additional EMS is also required to oversee the EMP implementation, and collating and submitting bi-annual Environmental Monitoring Reports (EMR) to ADB. Since the specialist support is not required continuously, it will be feasible and convenient to engage consultants to implement these tasks, which can be part of SC.

337. DC will be responsible for: incorporation of mitigation measures in design and construction; SC will be responsible for baseline and construction-stage environmental quality monitoring. The SC will review and approve IEE and/or EIA reports and oversee implementation of EMP. The SC will regularly report to UWSCG about EMP activities. At the discretion of ADB, an international environmental auditor shall visit the construction site, assess the general compliance of the project, undertake spot inspection and write-up the Environmental Bi-annual Report to be submitted to ADB. The civil works Contractor will implement mitigation measures during construction. Implementation of mitigation and monitoring measures during operation will be the responsibility of DREP. Government regulatory agencies such as MoEPNR will also monitor the environmental performance. In addition the Contractor should employ an environmental specialist who will ensure that the site specific EMP (SSEMP) is prepared and implemented. The EMS at the IA will review and approve the SSEMP.

338. The Costs for Environmental Management of the project shall mainly consist of the (i) monitoring works of the CSC environmental who will be employed by the CS Consultant, the cost of which is shown in the preceding Table; (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); (iii) periodic visits, ascertaining conformance to performance indicators and drafting the Bi-annual Environmental Monitoring Report by an international environmental specialist. All of the implementation of mitigation measures shall be part of the contractual works and obligation of the Contractor.

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

Table 30 Environmental management cost table

Item	Quantity ²	Unit Cost* USD	Total Cost USD	Remarks
Baseline Parametric Measurements	6	200	1,200	To be conducted by the Contractor for noise, air emissions, dust (and water, if necessary) measurements
Monthly Parametric Measurements (at least 6 sites)	216	200	43,200	Tests to be conducted by the Contractor at 6 sites x 36 months monthly monitoring For Construction Supervision
Bi-Annual Audit of International Environmental Specialist with Bi-annual appraisal visit	8	15,000	120,000	Consultant: 1 Initial Reporting; 6 Bi-annual Visits; 1 Final Project Completion Reporting (including trips and per diem); 1 visit is 1 month duration
Environmental Management Specialist (SC)	9 months	2,500	22,500	10% for above Items Total for above 12% of Subtotal
Miscellaneous Subtotal Contingency			18,690 205,590 24,671	
GRAND TOTAL			230,261	
				For the entire construction period of 36 Months

Performance Indicators

- 340.** Based on the identified impacts of the project the performance indicators can be established. The objective of the EMP is to eliminate, avoid, minimize and if not possible, compensate the affected entities or individuals by the project. During the initial stage of the project, the Contractor, under the supervision of the CS Consultant, should establish the baseline parameters of the work sites and make appropriate parametric measurements which shall be the basis for comparison in the entire project. This shall include physical parameters on noise, dust, air emissions (water quality if necessary) and related local community concerns. Mitigation measures shall be implemented or improved based on the level of nonconformance to the identified performance indicators. The environmental monitoring and management shall focus on the Contractor's conformance to these performance indicators throughout the entire duration of the project.
- 341.** In establishing the performance indicators local as well as international standards and guidelines are used as reference. In addition, local social and community concerns should also be utilized as performance indicators of the project. These performance indicators are Tabulated below:

²To be established by CS Consultant and international environmental specialist.

Table 31 Environmental performance indicators

Environmental Aspect	Parameter	Performance Indicator	
Air Emission ³	Nitrogen (IV) Dioxide	0.2 (mg/m ³) max	0.04 (mg/m ³) Daily Average
	Sulphur Dioxide	0.5 (mg/m ³) max	0.05 (mg/m ³) Daily Average
	Carbone Monoxide	5 (mg/m ³) max	3 (mg/m ³) Daily Average
	Soot (Carbone black)	0.15 (mg/m ³) max	0.05 (mg/m ³) Daily Average
Dust	PM10 (WHO Guidelines ⁴)	20 µg/m ³ annual mean	50 µg/m ³ 24-hour mean
Noise ⁵	Noise Levels for residential areas at 7am – 11 pm	55 Indicative Level La dBA	70 Maximum Admissible Level La max dBA
	Noise Levels for for residential areas at 11pm – 7am	45 Indicative Level La dBA	60 Maximum Admissible Level La max dBA
Social and Community Concerns ⁶	Traffic	Number or Complaints	
	Impairment of Access	Number or Complaints	
	Public Safety	Number or Complaints	
	Disruption to Utilities	Number or Complaints	
	Curtailment of Social and Business Activities	Number or Complaints	

13. CONCLUSION AND RECOMMENDATION

Recommendation

- 342.** The environmental impacts of infrastructure elements proposed in the water supply system improvement subproject in Ureki and Shekviteli 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.
- 343.** Mitigation measures were discussed with engineering specialists, and some measures have already been included in the designs.
- 344.** 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.

³ 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

⁴ <http://www.who.int/mediacentre/factsheets/fs313/en/>

⁵ 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

⁶ From the EMP Table 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.

- 345.** When operating, the water supply components will have overall beneficial impacts to human health

and the environment as it will provide the inhabitants of Ureki and Shekviteli with a new water supply system.

- 346.** The main beneficiaries of the improved system will be the citizens of Ureki and Shekviteli, 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.
- 347.** 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.
- 348.** 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.

Conclusion

- 349.** The environmental impacts of the proposed water supply components have been assessed by the Initial Environmental Examination reported in this document.
- 350.** 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
- 351.** 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. The citizens of Ureki will benefit from continuous supply of good quality water. Project will stimulate economic growth. Continuous water supply and drinking water of 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

APPENDICES

Appendix 1

Minutes of Meeting of Public Hearing on 16th of July 2013

LCC "United Water Supply Company of Georgia"

Public Hearing Meeting
Improving the Water Supply and Sanitation System in Ureki Initial Environmental Examination Report
17:00pm

Minutes

Ureki

16.07.2013

The meeting was attended by the local Governor of Ozurgeti municipality Mr. Konstantine Sharashenidze. The following persons attended the meeting:

1. Beso Nibladze - "United Water Supply Company of Georgia, LLC" (UWSCG), Head of Environmental Protection and Resettlement Division;
2. Bidzina Inaishvili - "United Water Supply Company of Georgia, LLC" (UWSCG), Head of Ureki Service Centre;
3. David Tsertsvadze - "United Water Supply Company of Georgia, LLC" (UWSCG), Local Service Centre;
4. Ketevan Chomakhodze - "United Water Supply Company of Georgia, LLC", Environment Specialist;

The following residents of Ureki attended:

1. Zviad Iominashvili - local resident
2. Tamar Gadakhabadze - local resident
3. Merab Makharadze - local resident
4. Guri Makharadze - local resident
5. Diner Makharadze - local resident
6. Lasha Archvadze - local resident
7. Ivane Shovnadze - local resident
8. Midodashvili Eka - local resident
9. Irine Gorgoshia - local resident
10. David robakidze - local resident

Public Consultation

The public consultation meeting was held on July 16, 2013 at 17:00pm in Ureki, at the Cultural Centre of Ueki. The consultative meeting was organized with representatives from the local population of Ureki, Shekvetili and Natanebi. Local population from Shekvetili and Natanebi villages have been delivered by minibuses organized by the Ozurgeti service centre of UWSCG. The meeting covered the water supply system as well as the wastewater system and WWTP, the latter being subject of a separate IEE.

By giving advertisements in advance, attendance of a wide range of related people to the meetings was encouraged. During the Public Consultation Meetings, citizens were informed about the activities to be carried out within the scope of the project, environmental effects of the project and measures to be taken against these effects. Opinions, ideas and suggestions of the local residents and related people were received during the meeting.

Public Opinion

Consultation with affected population was undertaken

- to ensure their informed participation in the design, implementation and monitoring of the project measures and their impacts on the environment, as well as the efforts to minimize and the mitigate impact when avoidance is not possible;
- to introduce the project benefits to the local population that accrue to them as a result of project implementation;
- to incorporate all relevant views of affected people and other stakeholders into decision making, such as project design, mitigation measures, the sharing of development benefits and opportunities, and implementation issues.

The following topics were discussed during the meeting:

- project context and rationale
- expected start and end of the project
- benefits of the project to local population and to the country as a whole
- the environmental issues and mitigated measures related to the project

The public consultation showed a support for the Ureki subproject by the local population. During public consultation importance of a good cooperation between the local population, the contractor and UWSCG has been discussed.

Local population were aware of the need to improve the water and sanitation system services. Residents also were of the view that the proposed project will improve the public health, the environment, and the socio-economic development of Ureki.

The Following questions have been asked from the local population:

#	Questions from local residents	Answers from the United Water Supply Company of Georgia
1	When will the project start?	In 2014, project will start after the 3 Tranche is signed by the Government of Georgia and ADB and a Construction Company is selected based on the 2 stage selection process.
2	What is the duration of the project?	36 months.
3	Name of the employer of a Ureki Water Supply System	United Water Supply Company of Georgia, LLC
4	What are objectives of Environmental Assessment?	To examine the project's potential negative and positive environmental impacts and to recommend any measures needed to prevent, minimize, mitigate or compensate for adverse impacts and improve environmental performance

#	Questions from local residents	Answers from the United Water Supply Company of Georgia
		To formulate Environmental Management Plan: mitigation measures and monitoring program
5	What are objectives of Social Assessment	Identify affected persons and assess the Project's socioeconomic impacts on them Formulate and recommend measures to minimize or eliminate negative impacts
6	What mitigation measures will be undertaken to minimize the impact of WWTP construction and operation?	Impacts on air quality during operation of WWTP due to odor emissions. Mitigation Measure The odor emission components of the WWTP are the inflow, the screens and the aerated grit chambers. As a mitigation measure these components will be covered. Environmental Impact Impacts on air quality during operation of WWTP due to noise emissions. Mitigation Measure The noise emission components of the WWTP are the blower, the pumps and the overflow weirs. As a mitigation measure the blower and the pumps will be covered. Overflow weirs are constructed in a manner that covering is also possible if required.
7	What type of impact on environment is associated with the project?	Environmental impacts that are associated with the project are only site specific. Impacts are mostly confined to the construction stage of the project and are therefore temporary. For permanent environmental impacts during operation stage, suitable mitigation measures will be implemented.
8	What will be benefit for local population from the rehabilitation of the water supply system in Ureki?	The Project will have overall beneficial impacts on quality of life for the citizens of Ureki. It will stimulate economic growth by constant supply and good quality of drinking water and sanitation system which is a prerequisite for tourism development
9	Will local population employed by contractor?	Yes. Contractor will ensure involvement of local population in construction works.

There were no other comments or/and opinions from local population.

It should be mentioned also that public consultations with local population were carried out during the first week of June, when the representatives of the Resettlement and Environment Protection Division, UWSCG has series of meetings and consultations with local population of Natanebi, Shekviteli and Ureki, including resettlement issues of WWTP construction.

Photos of the public consultation:



Appendix 2

Chance Finds report form



Initial Detail

Location of Find: _____

Chance Finds Report Form

Please contact: _____

To discuss find, on: _____

Date of Find: _____

Person who identified find: _____

Description of Initial Find: _____

Was work stopped in the immediate vicinity of the find?

☐ Yes

☐ No

Was an archaeologist contacted?

☐ Yes

☐ No

Archaeological Detail:

Date of inspection: _____

GPS coordinates:

Zone: _____ N: _____

E: _____

Reporting Archaeologist: _____

Photo Record:

☐ Yes

☐ No

Does Chance Find Correspond to a known PNG National Museum site?

☐ Yes

☐ No

If Yes, which site code: _____

If No, temporary site code is: _____

If No, new Museum site code is: _____

Description of Find (fill in applicable information) (use additional pages if required):

Artefact type: _____

Max artefact length (in mm): _____

Max artefact width (in mm): _____

Max artefact thickness (in mm): _____

Max artefact platform width (in mm): _____

Approximate number of artefacts at site:

☐ 1

☐ 2 to 10

☐ > 10

☐ >50

Other: _____

Approximate size of site:

Site area: _____ m²

Site length: _____ m

Site height (max) (for rockshelters/caves): _____ m

Brief description of site and vegetation (e.g., surface sediment type, ground surface visibility, distance to nearest freshwater source, attach site sketch if necessary):

Brief description of find(s):

Statement of Significance (scientific, spiritual, historic, aesthetic and emotive and any evidence of stratification):

Appendix 3



United Water Supply Company of Georgia LLC

Tbilisi, Georgia

Tbilisi, Georgia

Georgian Urban Services Improvement
Investment Program

UREKI
Water Supply System (2040) - Overview

Scale: 1:4,000

Drawing No. :
URE-WS-3

Date :
Sept. 2012

