

# Initial Environmental Examination

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July 2012

GEO: Urban Services Improvement Investment  
Program - Project 1  
- Improvement of Kutaisi Water Supply Sub-project

Prepared by the United Water Supply Company of Georgia for the Asian Development Bank.

## CURRENCY EQUIVALENTS

(as of 31 July 2012)

Currency unit	–	Georgian Lari (GEL)
GEL1.00	=	\$ .604
\$1.00	=	GEL1.655

## 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	-	Kilometer
lpcd	-	Liters per Capita per Day
M	-	meter
MC	-	Management Contractor
MDF	-	Municipal Development Fund
MFF-IP	-	Multitranchise Financing Facility Investment Program
mg/l	-	milligram per liter
mm	-	millimeter
MoRDI	-	Ministry of Regional Development & Infrastructure
RCC	-	Reinforced Cement Concrete
uPVC	-	Un-plasticized Poly vinyl Chloride
UWSCG	-	United Water Supply Company of Georgia
WS	-	Water Sanitation
WSS	-	Water Supply & Sanitation
WWTP	-	Waste Water treatment Plant

## NOTE

In this report, "\$" refers to US dollars.

This initial environmental examination is a document of the borrower. The views expressed herein do not necessarily represent those of ADB's Board of Directors, Management, or staff, and may be preliminary in nature. Your attention is directed to the "terms of use" section of this website.

## Table of Contents

	EXECUTIVE SUMMARY .....	1
I.	Introduction.....	3
	A. Background .....	3
	B. Extent of the IEE Study .....	3
	C. Report Structure .....	4
II.	Project Rationale and Need .....	4
	A. Type of the Project.....	4
	B. Need of the Project.....	4
	C. Location.....	5
	D. Implementation Schedule.....	6
	E. Analysis of Alternatives .....	10
	F. Licenses & Approvals Required .....	12
	G. Policy, Legal, and Administrative Framework .....	12
III.	Project Description .....	15
	B. Construction Activities .....	15
	C. Operation of Improved Water Supply System .....	16
IV.	Impacts on the Physical & Biological Environment .....	16
	A. Introduction.....	16
	B. Topography, Geology & Soils.....	17
	C. Surface Water and Groundwater.....	20
	D. Climate & Air Quality .....	26
	E. Biological Environment.....	27
V.	Impacts on the Socioeconomic Environment .....	29
	A. Economic Resources .....	29
	B. Socio-Cultural Resources.....	30
	C. Noise & Vibration.....	33
	D. Cumulative Impacts .....	34
	E. Public Consultation.....	35
VI.	Environmental Management Plan .....	37
	A. Institutional Arrangements.....	37
	B. Grievance Redress Mechanism .....	38
	C. Environmental Impacts & Mitigation Measures .....	40
	D. Environmental Monitoring Plan .....	47
VII.	Recommendations & Conclusion .....	48
	A. Recommendation .....	48
	B. Conclusion.....	50

## **APPENDIX**

1. Minutes of Meeting of Public Hearing on 10th of May 2012
2. Chance Find Report Form

### **LIST OF TABLES**

Table 1: Effluent criteria for future WWTP in Kutaisi.....	26
Table 2: Ambient Noise & Vibration and Sensitive Receptors at Project Sites .....	33
Table 3: Environmental Impacts and Mitigation Measures .....	41
Table 4: Environmental Monitoring Plan for general construction activities at Kutaisi .....	47

### **LIST OF MAPS**

Map 1: Location of project town .....	7
Map 2: Water Supply Network and recently rehabilitated districts (green colour).....	9
Map 3: Water supply system.....	11
Map 4: Seismic Zones of Georgia.....	18
Map 5: River Network in Western Georgia .....	22
Map 6: Hydro-geological Zones .....	24
Map 7: Kutaisi - office of the UWSCG in Gugunava Street 12.....	36

### **List of Figures**

Fig. 1 Existing Water Supply at Kutaisi .....	8
Fig. 2 Grievance Redress Mechanism .....	39

## EXECUTIVE SUMMARY

1. It is proposed to improve the water supply and sanitation (WSS) system in Kutaisi under the Asian Development Bank (ADB) funded Urban Services Improvement Investment Program, which is under preparation stage. This Investment Program, implemented in six towns, including Kutaisi, 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. The WSS project will be implemented from midst of 2011 and likely to be completed by 2016. A first phase will focus in water supply measures and will be implemented in 2012/2013. Since the water supply subproject is unlikely to have significant adverse impacts, it is classified as environment Category B, and accordingly an Initial Environmental Examination has been conducted. This is a summary of the IEE Report.

2. Kutaisi, the capital of Imereti region, is the second largest Georgian city and the political, economic, and cultural centre of Imereti region. Imereti region, with a total area of 6,515.8 km<sup>2</sup>, is strategically located on the main East-West transit corridor between the Caspian and the Black Seas. It is the most populated region in Georgia, with more than 702,700 inhabitants (based on 2002 data). It consists of 12 administrative-territorial units – the city of Kutaisi and eleven districts (Baghdati, Vani, Zestaphoni, Terjola, Samtredia, Tkibuli, Kharagauli, Khoni, Tskaltubo, and Chiatura). Kutaisi, which is about 240 km to the west from the capital City of Tbilisi, lies at the River Rioni, the main river in western Georgia draining to the Black Sea.

3. The service levels of water supply are low with partial coverage, high system losses, and poor water quality at consumer end. With the government initiative to develop Kutaisi, the water demand is likely to grow slightly. This subproject will expand the system and improve the service standards, with a daily supply of potable water in adequate quantity (205 lpcd). The subproject is designed to meet the projected demand of 2040. This will be achieved by: (i) restructuring of water supply network if required (ii) exchange / reconstruction of old transmission pipes (iii) and construction of two new reservoirs.

4. The Kutaisi WSS system improvement project is relatively large in scale and maintenance as compared to other project towns. Sataplia Nature Reserve is located 9 km north-west from Kutaisi. None of the components will encroach into this reserve and most of the activities are planned along the existing roads. Further any disturbance will be limited to construction period. The identified impacts are mostly short-term, localized and can either be easily avoided or mitigated. After construction stage the project will have overall beneficial impacts on human health and life quality by providing the inhabitants of Kutaisi with an up to date sanitary system. Also the project has beneficial impacts on the environment as Rioni River will no longer be subject to untreated sewage pollution. Water quality and aquatic biota of Rioni River will benefit from the investment. Better water quality in Rioni River will also support the tourism development.

5. 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 fish breeding season; (v) restoring the top soil after construction, (vi) avoiding tree cutting through lo-

cation alignment changes, and (vii) to avoid safety hazards construction site will be secured at critical segments.

6. There are a number of development activities (for instance, road works) currently under implementation in Kutaisi. The following measures are suggested so that roads and inhabitants are not subject to repeated disturbance by work in the same area for different purposes: (i) scheduling construction in consultation with the other implementing agencies, and (ii) conducting the road work, where the transmission line is proposed, after the pipeline work.

7. The water supply subproject is likely to have several positive benefits during operation. The citizens will be provided with a constant supply of better quality water, which will improve the quality of life.

8. To ensure that all the mitigation measures as suggested are implemented, a program of environmental monitoring is prepared. Department of Quality Management and Environmental Protection (DQMEP) 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.

## **I. INTRODUCTION**

### **A. Background**

9. The proposed Urban Services Improvement Investment Program is intended to optimize social and economic development in selected urban areas (provincial capitals and secondary towns) through improved urban water and sanitation (WSS) services. This ADB funded Multitranchise Financing Facility Investment Program (MFF-IP) complements the government's emerging vision for the WSS sector, formulated in its sector development strategy and road map, policy framework and reform implementation plan, and a business climate that encourages increased donor investment. This support will also complement ongoing donor efforts to improve and expand Georgia's urban WSS services. ADB identifies support to developing the country's municipal infrastructure a key contributor to enhancing sustainable economic growth, with the cross cutting themes of governance, regional cooperation and environmental protection. ADB's support can contribute to: (i) sector reforms; (ii) strengthening the link between financing local infrastructure projects and decentralization reforms; (iii) stimulating local economic development; and (v) improving the quality of life of urban population

10. The Investment Program focuses on investments in improvement of basic urban infrastructure (i.e. water supply and sewerage). Besides, it will also provide policy reforms to strengthen urban governance, management, and support for urban infrastructure and services. This Program will be implemented in 3 tranches over a period of 8 years beginning in 2011. The Executing Agency (EA) is the Ministry of Regional Development and Infrastructure (MoRDI), Government of Georgia; and the Implementing Agency (IA) is the United Water Supply Company of Georgia, a wholly-owned company of Government of Georgia under MoRDI.

11. The Kutaisi WSS improvement project has been classified as environmental assessment category B (some negative impacts but less significant than category A). According to ADB procedures, the impacts of the subproject were assessed by the Initial Environmental Examination, conducted according to ADB Safeguard Policy Statement (2009). According to Georgian Legislation an Environmental Impact Assessment needs to be conducted for the following components of the Kutaisi subproject:

- Installation of the main sewage collector and
- Construction of the sewage treatment plant, because it is exceeding 1000 cm<sup>3</sup> per day.

12. This IEE relates to the water supply subproject only..

### **B. Extent of the IEE Study**

13. This is the Initial Environmental Examination (IEE) Report for the Kutaisi water supply subproject. It discusses the environmental impacts and mitigation measures relating to the location, design, construction and operation of all physical works proposed under this subproject.

14. This IEE study is conducted based on the feasibility study and updated design. Certain details changed in the detailed design stage as the development of the subproject pro-

gressed. This however is expected not to result in any alterations of the environmental assessment.

15. This IEE report was prepared based on the Environmental Assessment Report according to Georgian Law and on the final report - Joint Environmental Programme II City of Kutaisi (2006) the Feasibility Study and the detailed design. It was also based on secondary information and data from various sources and field observations. Field surveys were limited to essential baseline factors such as source water quality and hydrological calculations. The IEE was prepared for improvement of the water supply system in Kutaisi including head works, transmission lines, reservoirs, and water distribution network.).

16. Since there are no significant, irreversible, or complex issues involved, no specialized techniques were required to be employed. All impacts were simple, easy to identify and mitigation measures were readily available.

### **C. Report Structure**

17. This IEE Report is organized into seven sections including this introductory section:

Section 2 establishes the project need, rationale and alternatives

Section 3 describes project components and construction & operation details

Section 4 discusses impacts on physical and biological environment

Section 5 discusses impacts on socio-economic environment

Section 6 provides Environmental Management Plan and Monitoring Plan, and

Section 7 emphasizes on IEE recommendations and concludes the report

## **II. PROJECT RATIONALE AND NEED**

### **A Type of the Project**

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

### **B. Need of the Project**

19. As discussed earlier, the service level of urban water supply and waste water treatment at present is not satisfactory in Georgia. Services are not available to the entire population and the serviced areas suffer with inefficient service levels. Systems are old and inefficient. The situation is no different in the program town of Kutaisi. Untreated sewage infiltrates into the underground and pollutes into rivers. This WSS project is needed because the present water supply infrastructure in Kutaisi is inefficient and inadequate to the needs of the growing population and tourists. Untreated sewage contaminates soil and surface water. It endangers human health. Therefore the project is urgently needed. This water supply sub-project is the first phase of improvement.

20. The United Water Supply Company of Georgia<sup>1</sup> (UWSCG) provides water supply in Kutaisi. Owing to its location, there are numerous well fields. These well fields are main source of water supply to the town. These sources at present provide 36,489m<sup>3</sup>/day.

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<sup>1</sup> A government company under Ministry of Regional Development and Infrastructure



21. Partskhanakanebi Wellfield is the largest single source of supply for Kutaisi. It lies near the village of the same name, about 15 km south-south west of the outskirts of the city, among farmland and river floodplains. The pumps produce 1,250m<sup>3</sup>/h (347l/s). Mukhiani Wellfield is near to Partskhanakanebi, only 3km further to the east. Four pumps each of Russian manufacture, rated at 1000 m<sup>3</sup>/hour (278 l/s). Kopitnari well field was developed in 1970. The well field itself has a total of 22 wells, of which 16 are currently in operation. They are each rated at 120 m<sup>3</sup>/hour though it is doubtful whether they actually deliver anything like that flow. The village of Gumati is situated on the right (west) bank of the Rioni River some 4 km upstream (north) of Kutaisi. At present four of the original seven wells from Gumati well field remain operational. They are of various sizes (25, 25, 60 and 160 m<sup>3</sup>/hour), and yield in total an estimated 200m<sup>3</sup>/hour.

22. The present water supply system covers about 95% of the population in urban areas. Due to old systems water losses are very high. Existing water supply coverage and future water demand is shown in **Table 1**. Due to the fact, that the number of tourists in Kutaisi is insignificant, the annual fluctuations of the water demand are negligible.

23. The present sub-project is designed to improve the service standards of water supply in Kutaisi – daily supply of potable water in adequate quantity (205 lpcd) at requisite pressure. In addition water has to be provided for industrial purposes (2,300m<sup>3</sup>/d).

24. The chemical quality of the groundwater is good and the samples meet all of the standards applicable to Georgia except for the bacteriological tests, where the failure rate is relatively high.

### **C. Location**

25. Kutaisi, the capital of Imereti region, is the second largest Georgian city and the political, economic, and cultural centre of Imereti region. Imereti region, with a total area of 6,515.8 km, is strategically located on the main East-West transit corridor between the Caspian and the Black Seas. It is the most populated region in Georgia, with more than 702,700 inhabitants (based on 2002 data). It consists of 12 administrative-territorial units – the city of Kutaisi and eleven districts (Baghdati, Vani, Zestaphoni, Terjola, Samtredia, Tkibuli, Khargauli, Khoni, Tskaltubo, and Chiatura). Kutaisi, which is some 240 km to the west from the capital City of Tbilisi, lies on the river Rioni, the main river in western Georgia draining to the Black Sea. Regional location of Kutaisi is shown in **Map 1**.

26. The proposed complete WSS infrastructure improvement works will be located in and around the town. There are six main components of the project: (i) restructuring of water supply network if required (ii) exchange / reconstruction of old transmission pipes (iii) construction of new reservoirs and pumping stations (iv) sewer network including main sewage collector (vi) construction of WWTP.

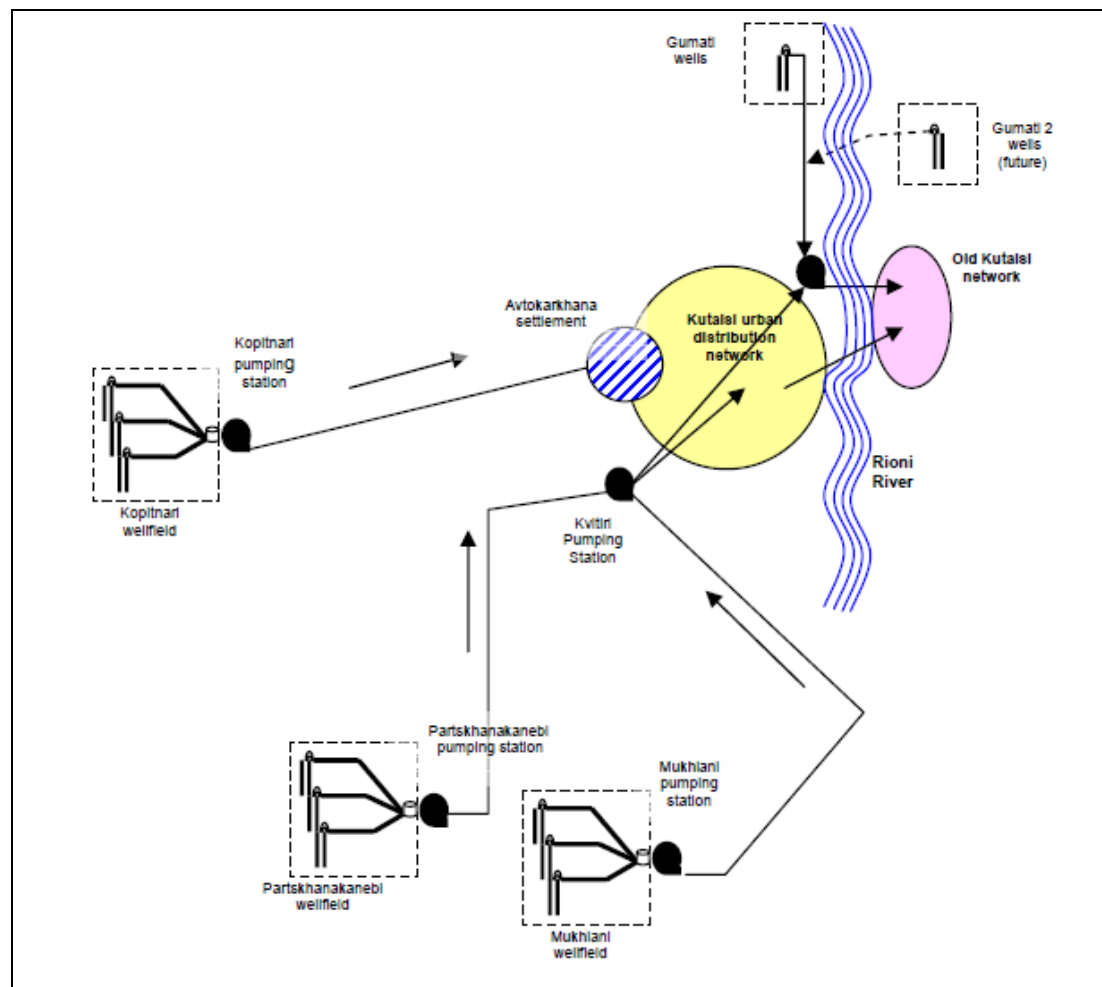
27. Location of the new WWTP was selected during feasibility study. It will be within the area of the existing WWTP. The existing main sewage collector will be used in future after rehabilitation. The treated sewage will be discharged into Rioni River. The WWTP will cover about 206,171 PE by 2040. The new WWTP and the main sewage collector are located in the southern suburbs of the town adjacent to Rioni River. The WWTP is not subject to this IEE.

**D. Implementation Schedule**

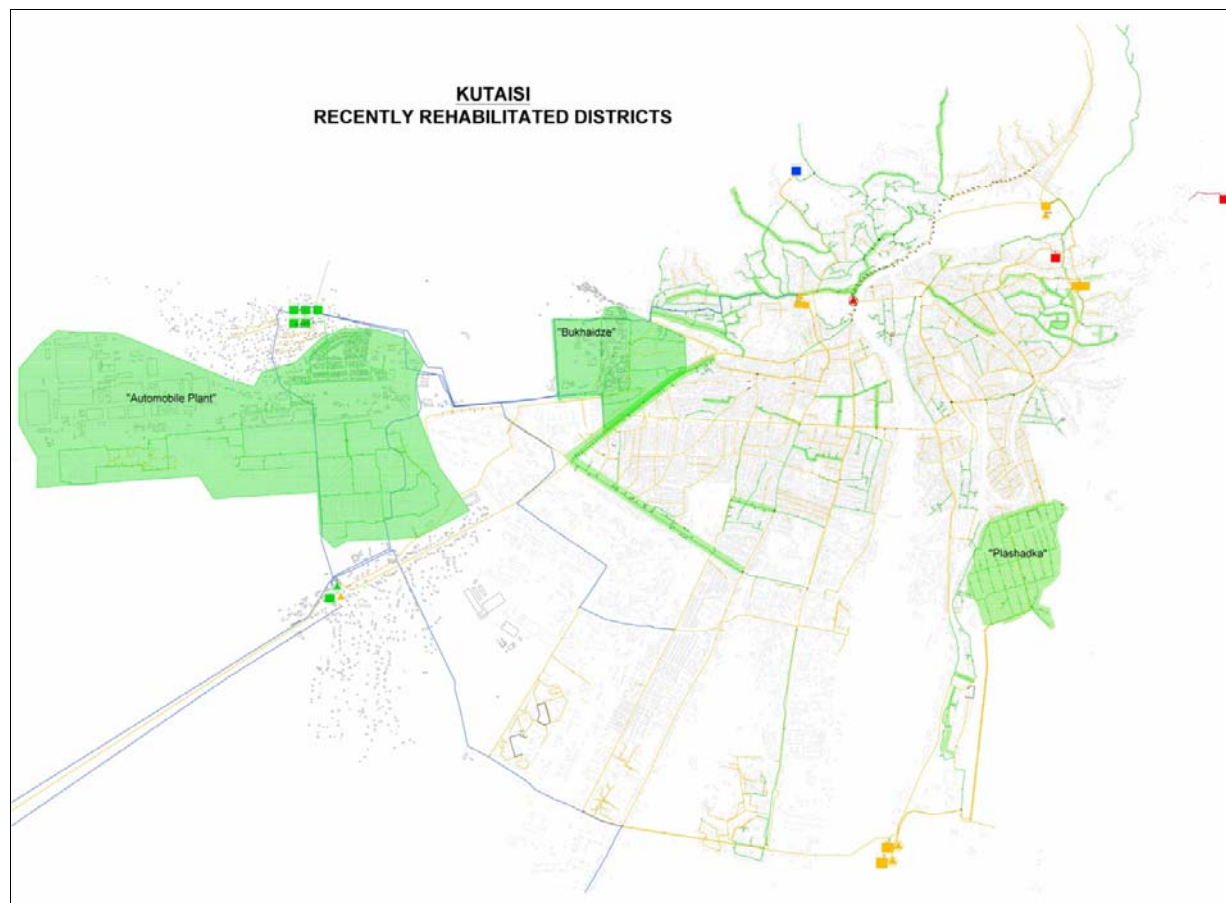
28. Construction is scheduled to start in spring 2012 with Phase I. All work should be completed by 2016.



Map 1: Location of project town



**Fig. 1 Existing Water Supply at Kutaisi**



**Map 2: Water Supply Network and recently rehabilitated districts (green colour)**

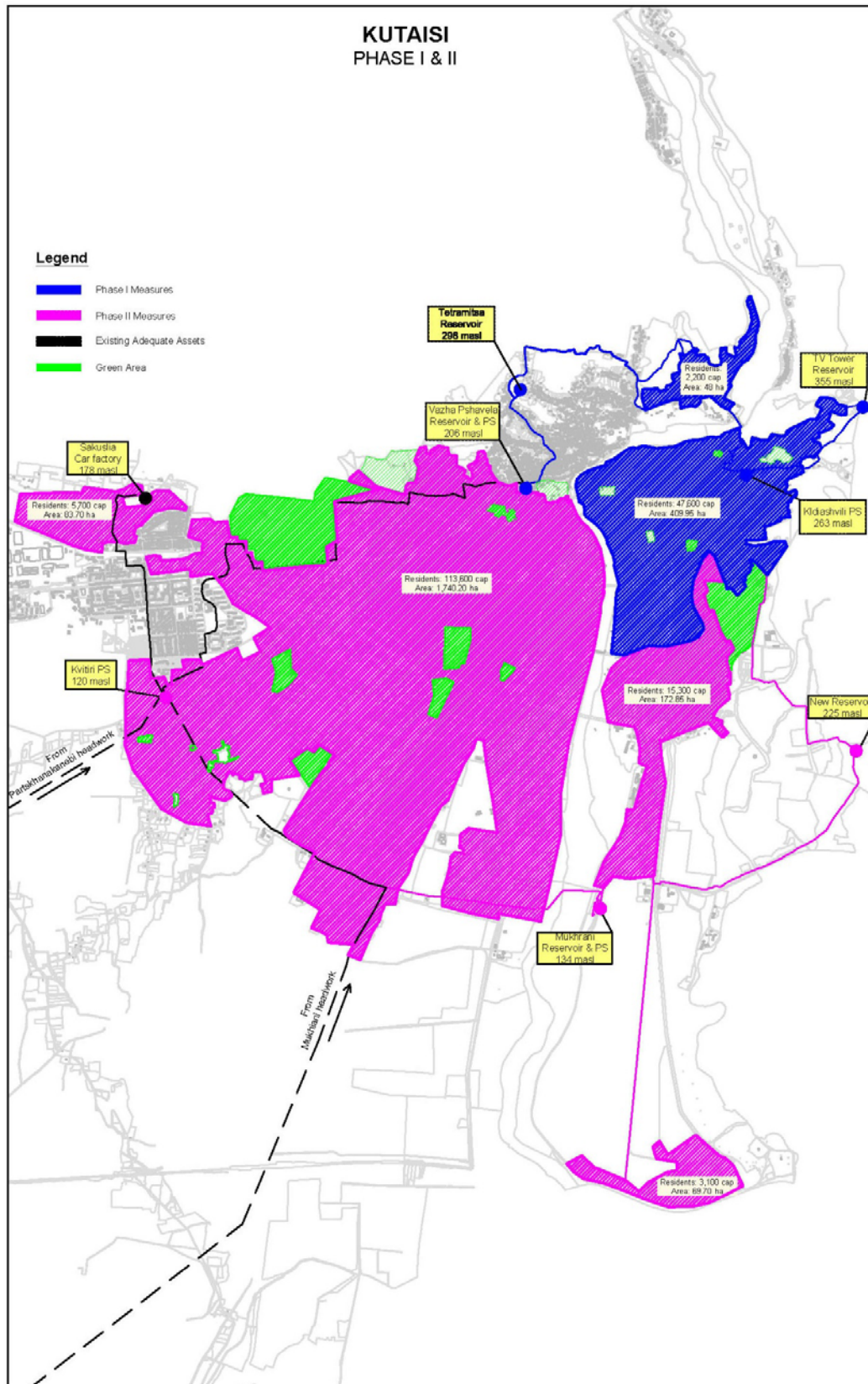
29. Above map shows water supply network within Kutaisi. Old pipes that need replacement will be exchanged by new ones. To overcome deficiencies in supply, net will be restructured where necessary.

## **E. Analysis of Alternatives**

### **1. Water Supply System**

30. The Kutaisi water supply subproject to be financed by tranche 1 loan will comprise a first phase of the rehabilitation of the water supply system and will focus on the northern and eastern areas of Kutaisi. Here, the settlement reaches up into surrounding hills and the supply and pressure situation is worse than in the southern and western parts of Kutaisi that are basically flat and where the supply of water is generally better. The subproject will (i) reduce nonrevenue water losses through the replacement of old pipelines; and (ii) improve the pressure in the supply area through the construction of additional reservoir capacity and the establishment of supply and pressure zones. The subproject comprises the laying of 70 km of distribution and transmission pipes, the rehabilitation of 2 pumping stations and the construction of 15,000 m<sup>3</sup> storage volume at three locations. In addition, about 40,000 water meters at apartment blocks will be installed. Phase 1 works as well as the locations of the reservoirs and pumping stations are shown in the map below.

31. As the works mainly comprise rehabilitation and replacement works within the existing water supply system, no major alternatives are to be investigated. Pipeline routes and reservoir locations are not changed with the exception of one new reservoir in the East of Kutaisi, which will only be constructed in the next phase though. The location was chosen for its elevation and the location near the Eastern parts of Kutaisi. Alternatives were limited to three hills with similar elevation; the location with available land was chosen. There are no environmental advantages and disadvantages compared with the alternative locations. Other options were limited to existing locations and concern reservoir sizes, capacities of pumping stations and diameters of transmission and distribution lines that have no environmental impact.



**Map 3: Water supply system**

## **F. Licenses & Approvals Required**

32. Environmental assessment of various activities and development projects in Georgia is governed by the Law on Environmental Impact Permits (EIP), which has entered into force in January 2008. This Law notifies the list of the activities and projects, which will be subjected to ecological expertise and require Environmental Impact Permit. The Law also makes the public participation mandatory in the process of environmental assessment, ecological expertise and decision making on issuance of an environmental impact permit. Under this Law, various projects/activities have been divided into four categories based on their size, importance and potential environmental impact, and sets out permitting process for each category.

33. None of the components of the proposed water supply improvement subproject in Kutaisi are notified in the Law on EIP and therefore environmental impact permit is not required. Water abstraction from existing water source does not require any permission/approval from Government of Georgia.

34. *ADB Review and Approval.* For Category B projects the Draft IEE report are 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.

## **G. Policy, Legal, and Administrative Framework**

35. 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. ADB Policy**

36. 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.

37. 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:

(i) avoid adverse impacts of projects on the environment and affected people, where possible;

(ii) minimize, mitigate, and/or compensate for adverse project impacts on the environment and affected people when avoidance is not possible; and

(iii) help borrowers/clients to strengthen their safeguard systems and develop the capacity to manage environmental and social risks.



38. ADB's SPS sets out the policy objectives, scope and triggers, and principles for three key safeguard areas:

- (i) environmental safeguards,
- (ii) involuntary resettlement safeguards, and
- (iii) Indigenous Peoples safeguards.

Concerning the present IEE environmental safeguards are considered. The Policy Principles of environmental safeguards are as follows:

(i) A screening process for each proposed project should be applied. The appropriate extent and type of environmental assessment should be identified so that appropriate studies are undertaken.

(ii) An environmental assessment should be carried out for each proposed project. Data concerning physical and cultural resources of the project's area of influence should be collected and evaluated. Potential direct, indirect, cumulative, and induced impacts of the project should be identified: Risks to environmental media (physical and biological environment) should be determined. Socioeconomic impacts should be highlighted (livelihood, health and safety, vulnerable groups, and gender issues), The potential of transboundary and global impacts, including climate change has to be assessed as well. A strategic environmental assessment should be applied where appropriate.

(iii) Discuss alternatives to the project's location, design, technology, and components and their potential environmental and social impacts. Propose the rationale for selecting the particular alternative. Consider the no project alternative.

(iv) Avoid, and minimize, mitigate, or offset adverse impacts and describe positive impacts by environmental planning and management. An environmental management plan (EMP) must be prepared. The EMP includes the proposed mitigation measures, environmental monitoring and reporting requirements Related institutional or organizational arrangements, capacity development and training measures, implementation schedule, cost estimates, and performance indicators have to be added to the EMP.

(v) Carry out public consultation with affected people. Ensure women's participation in consultation. Involve stakeholders, including affected people and concerned nongovernment organizations. Continue consultations with stakeholders throughout project implementation as necessary to address issues related to environmental assessment. Establish a grievance redress mechanism to receive and facilitate resolution of the affected people's concerns and grievances regarding the project's environmental performance.

(vi) Disclose a draft environmental assessment (including the EMP) in a timely manner, before project appraisal to affected people and other stakeholders.

(vii) Do not implement project activities in areas of critical habitats, unless (i) there are no measurable adverse impacts on the critical habitat that could impair its ability to function, (ii) there is no reduction in the population of any recognized endangered or critically endangered species, and (iii) any lesser impacts are mitigated.

(ix) Apply pollution prevention and control technologies and practices consistent with international good practices as reflected in internationally recognized standards such as the World Bank Group's Environmental, Health and Safety Guidelines. Avoid the use of hazardous materials subject to international bans.

(x). Work has to be carried out under safe and healthy conditions. Prevent accidents, injuries, and diseases.

(xi). Conserve physical cultural resources and avoid destroying or damaging. Chance findings have to be taken into account. A pre-approved management and conservation approach for materials has to be provided.

39. 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 and the most sensitive feature. 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.

40. The Kutaisi WSS project has been classified as environmental assessment category B (some negative impacts but less significant than category A) according to the criteria laid down in the checklists for sewerage projects and the checklist for water supply projects of the ADB's Environmental Assessment and Review Framework (November 2010) that was especially prepared for the environmental assessment of the Georgia Urban Services Improvement Investment Program.

## 2. Georgian Law

41. The **Law of Georgia on Environmental Permit** (2008) establishes legal basis for participation of the public. The purpose of the Law is to protect persons' health, natural surroundings, material assets and cultural heritage in the course of the activity. The installation of a WWTP and main sewage collector requires an Environmental Permit including Environmental Impact Assessment. Discharge of WWTP must follow limiting values.

42. **The Law of Georgia on Environmental Protection** regulates the legal relationship between the bodies of the state authority and the persons or legal entities (without distinction-legal form) in the scope of environmental protection and in the use of nature. Rights and obligations of citizens in the scope of environmental protection are described. Citizens may take part in the decision-making process in the scope of environmental protection. Basically the use of water is subject to licensing. Endangered wild animals and plants are listed in "The Red Book" and in "The Red List" of Georgia. Any activity relating to the endangered species of wild animals and plants, as well as to deterioration of their habitats are prohibited.

43. The state ensures protection of the environment and, correspondingly, protection of water as its main component in The **Water Act of Georgia** (16 October 1996). 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 object 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 waste water from the sources of pollution located on the land. The use of a surface water body for discharging industrial, communal-household, drainage and other waste waters 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.

44. The Regulation on Environmental Impact Assessment (4 April 2010) describes the main principles of an EIA (project description, solutions, local and regional factors, public consultation). Impacts on the environment and on human health and safety due to planned activities are identified during the EIA process. Mitigation measures have to be found out. An environmental management plan should be worked out. Stages of an EIA procedure are described. The EIA should be basic information for the application of an environmental permit. Essential topics and supplements of the EIA report are listed in this regulation. The EIA report is basic information for authorities to be involved to check environmental concerns of the project and to verify compliance of the project with the relevant environmental legislation.

### **III. PROJECT DESCRIPTION**

45. A feasibility study was conducted to improve the water supply system in Kutaisi 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.

#### **A. Water Supply Components of the Subproject**

46. The proposed water supply infrastructure improvement works have been elaborated based on the development goals identified in the Feasibility Study. The following measures are foreseen.

1. To overcome deficiencies in supply, network will be restructured where necessary.
2. Old pipes that need replacement will be exchanged by new ones.
3. Three new reservoirs: "Tetra Mitsa", "TV Tower" and new "Vazha Pshavela" will be constructed

47. Phase I that will be implemented from 2012 on will include

4. Replacement of pipes in the city area East of the river and in Choma settlement
5. Rehabilitation of pumping stations in Vazha Pzavela and Kldiashvili
6. Construction of new reservoirs in Vazha Pzavela, Tetra Mitsa and TV Tower.

#### **B. Construction Activities**

48. Main components the subproject are the restructuring of water supply network, the exchange / reconstruction of old transmission pipes, the construction of three new reservoirs and two pumping stations.

49. Construction practices of these works are described below:

50. Pipe Laying Existing old, malfunctioning or leaking pipes will be replaced. Pipelines will follow existing roads and existing alignments. Trenches will be dug using a backhoe digger, supplemented by manual digging.

51. **Asbestos:** If the old pipes that require replacement are Asbestos they will be left in-situ and new pipes will be laid above them. If any asbestos pieces are broken or accidentally excavated these will be disposed off as explained in the Table 3 EMP matrix.

52. 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.

53. Construction of Reservoir. Three new reservoirs will be constructed. 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.

54. *Source of construction materials.* In Kutaisi, sand is sourced from River Rioni and aggregate is sourced from licensed crushers. Construction waste/debris is normally used for leveling low lying areas in the town. No additional IEE will be required as material extraction will be limited to licensed sites and facilities only.

### **C. Operation of Improved Water Supply System**

55. 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.

## **IV. IMPACTS ON THE PHYSICAL & BIOLOGICAL ENVIRONMENT**

### **A. Introduction**

56. The city of Kutaisi developed historically on the banks of the River Rioni, at the point where the river emerges from the mountains and flattens out into a braided channel meandering across agricultural, alluvial floodplains. The older part of the town is on the banks of the river and extends up the sides of the adjacent hills.

57. The following sections evaluate the impacts on physical and biological environment due to the proposed project. Each subsection first describes the baseline profile followed by impact identification and assessment during construction and operation. Mitigation measures are also discussed in conjunction with the impacts.

## **B. Topography, Geology & Soils**

### **1. Baseline Conditions**

58. *Topography.* Despite its small area, Georgia presents one of the most varied topographies within its geographical boundaries. Georgia lies mostly in the Caucasus Mountains, and its northern boundary is partly defined by the Greater Caucasus range. The Lesser Caucasus range runs parallel to the Turkish and Armenian borders and the Surami and Imereti ranges connect the Greater Caucasus and the Lesser Caucasus, create natural barriers in the region. The city lies at an elevation of 125–300 meters (410–984 feet) above sea level. To the east and north-east, Kutaisi is bounded by the Northern Imereti Foothills, to the north by the Samguruli Range and to the west and the south by the Colchis Plain.

59. *Geology.* The project area belongs to western part of Transcaucasus. The city of Kutaisi is located at the junction of two different geomorphologic and tectonic units. Its southern part lies at Kolkhida alluvial plain, the northern one at the southern wing of the Okriba anticline, with hilly relief. The southern part is composed of alluvial deposits, the northern one with Jurassic clay shale, sandstone, cretaceous limestone and marls. Karstic features are widespread in the surface of cretaceous carbonate rocks. The available information regarding geological condition of Kutaisi was very limited. According to the Kuttskalkanali report on engineering and geological reconstruction of Kutaisi water supply, there is a clay layer between 0-1.8m from the surface which is underlain by middle and coarse fraction of fine pebbles inter bedded with sand and boulder clay. The boreholes were drilled only to 5m depth, deeper geological layers seem as not have been be studied. The southern part of the project area structurally belongs to quaternary alluvial deposits of the flood plain (Rioni River). Gravel layers with thickness >5m and sand layers of different grit size exist. Alluvial clay consisting most of silty and sandy components also occurs. According to seismic zoning map, Georgia is classified into Zone 6 to Zone 9 (in increasing order of seismic intensity, Map 4) and Kutaisi falls under Zone 7 (seismic intensity zone). There has been no history of major earthquakes in Kutaisi.



60. *Soil.* Most of the underlying sediments are covered by top soil. Top soil means the upper part of the earth cover (depth 0.3 – 0.5m). It is aerated and contains roots. The top soil is underlain by alluvial clay and sand deposits.

## **2. Impacts and Mitigation Measures during Construction**

61. During the construction, impacts on topography and geology are mainly to due to invasive nature of excavation activities.

62. Excavation works for reservoirs and pumping stations will generate significant quantities of surplus material. These however will be confined as far as technically possible 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. The surplus soil from foundation work will be utilized at the same site for raising the ground level and embankment building.

63. Works do not involve deep excavations. Due to hilly region, hard rock is available for the reservoirs and foundations will be laid directly on the hard rock, thus this work do not involve cutting of rocks. The existing alignment of the water network will be used. This area has been modified already by construction works in the past. No impact on geology and soil is envisaged therefore.

64. 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”
- Select appropriate pipe material and design for transmission lines according to seismic intensity of project area

65. Excavation for main collector comprises material excavation only at locations where pipe rehabilitation is needed. Backfill of material including compaction will be implemented only at these locations. Material will be stored temporary alongside the trench and build in again after rehabilitation works. Therefore impacts associated with earthworks for trench laying are of temporary nature.

66. Top soil of about 1 ft depth (0.3 m) shall be removed and stored separately during excavation work, and after pipeline construction the same soil shall be replaced on the top.

67. The excavation work will also tend to loosen the top soil, which may lead to soil erosion due to winds and rains. Therefore the contractor should consider the following:

- No trees shall be removed on the slopes; 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.
- 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

68. *Source of construction materials.* Sand is sourced from River Rioni and aggregate is sourced from licensed crushers. In case that material demand exceeds supply it needs to be transported.

69. *Contractors 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.

70. To ensure that potentially resulting impacts are kept at a minimum the contractor will be required to prepare the following plans or method statements:

- Layout plan of the work camp including a description of all precautionary measures proposed to avoid potential adverse impacts on the receiving environment (surface and ground water, soils, ambient air, human settlement);
- Sewage management plan for provision of sanitary latrines and proper sewage collection and disposal system to prevent pollution of watercourses or groundwater;
- Waste management plan covering the provision of garbage bins, regular collection and disposal in a hygienic manner, as well as proposed disposal sites for various types of wastes (e.g., domestic waste, used tires, etc.) consistent with applicable national regulations; and
- Description and layout of equipment maintenance areas and lubricant and fuel storage facilities including distance from Rioni River. Storage facilities for fuels and chemicals will be located at a distance to Rioni 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.

71. 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 may be taken from Rioni River.

### **3. Impacts and Mitigation Measures during Operation**

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

73. The main requirement for maintenance of the water supply infrastructure will be for the detection and repair of leaks and for cleaning and inspection. 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.

## **C. Surface Water and Groundwater**

### **1. Baseline Conditions**

74. *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 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.



75. The Rioni River is the largest river in the Western Caucasus and the largest tributary to the Black Sea. Rioni River is draining approximately 20% of the country. It starts from the main summit of Caucasus Mountains, at the bottom of the Mountain Fasi (2620asl). The mouth of the river is situated at Poti, where it flows into the Black Sea. The length of River Rioni is 327km, the average slope – 7.2%. The catchment covers 13400km<sup>2</sup> and the average height of the watershed is 1084m. Main tributaries of the river Rioni are as follows:

- Jojora – length - Kvirila – length 140km
- Khanistkali – length 57km
- Tskhenistskali – length 176km
- Nogela – length 59km
- Tekhuri – length 101km
- Tsivi – length 60km.

76. The River Rioni is fed with water from icy mountains, snow and rain water. Snow and rain water contribute the most to its flow. The river floods mainly in spring to summer (March – end of August), with the maximal peak in May/early June as the result of snow melt and rains. The second period of flooding is the end of September to October – this is a result of heavy rains. The average flow of the Rioni in Kutaisi is 132.7m<sup>3</sup>/sec. The project area, Kutaisi, is situated in the flood plains of Rioni River Basin. The River flows through Kutaisi town.

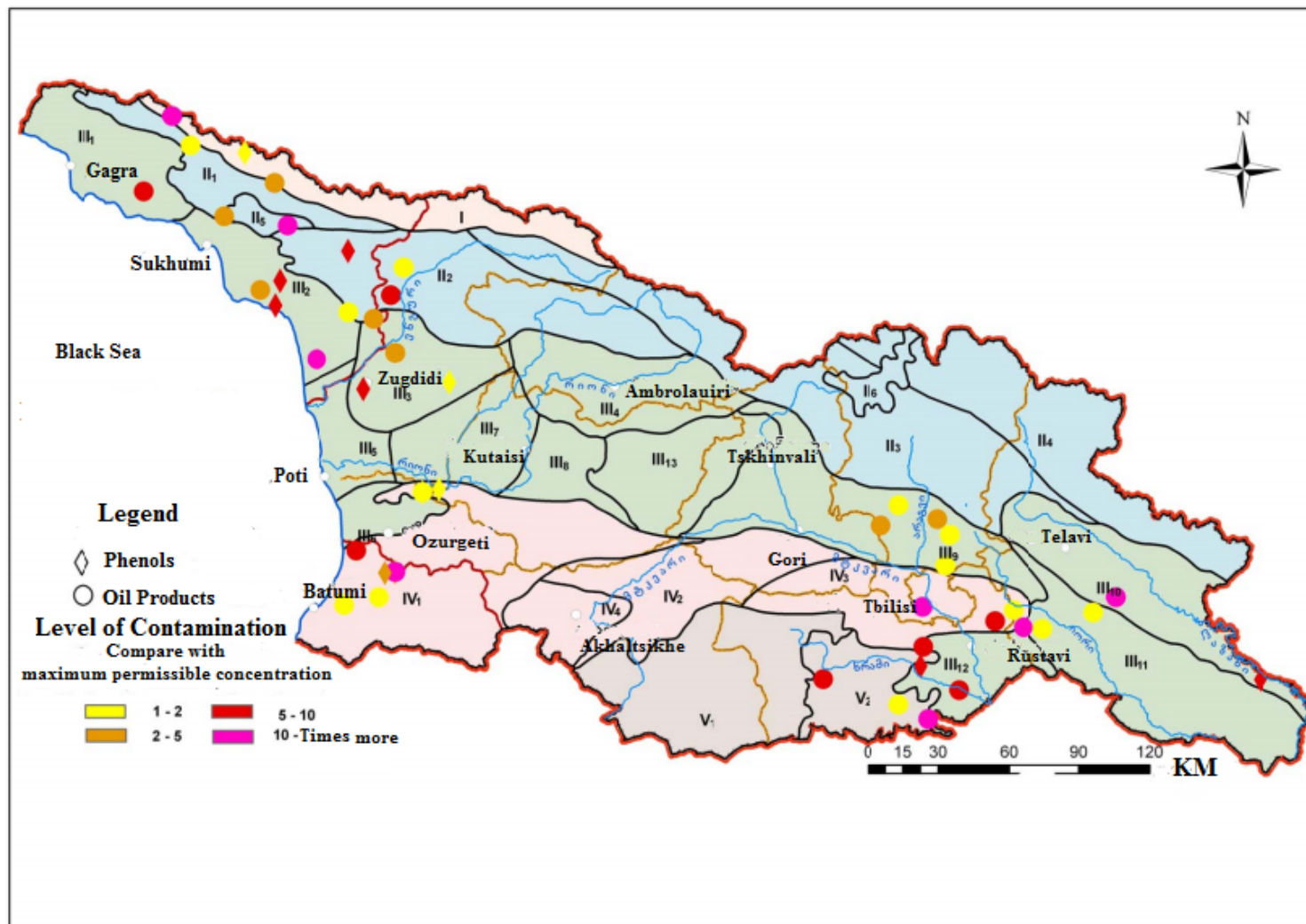
77. The Rioni River is mostly polluted with industrial and municipal wastewaters. As the waste water treatment plant, Patriketi, is not operating, all the wastewaters are discharged straight to this river. Fecal masses from Choma district are also polluting river Rioni as this district is not connected to the sewage network. The Rioni is polluted with industrial and municipal waste. The majority of the industrial sources of pollution are not operating at present, however they were polluting the river for years with industrial waste and oils. Industrial plants were not equipped in any pre-treatment facilities and they used to discharge industrial waste directly into the river. There are no recycling facilities for used oils, they are still discharged to the river. Water quality data of Rioni River are not available. Basically the water quality of Rioni River is supposed to be bad and its quality should be tested prior to use as construction water to make sure that it meets the required quality.

Map 5: River Network in Western Georgia



**Groundwater. Based on the groundwater characteristics, Georgia is divided into five hydro-geological zones, which are further defined into sub-zones/districts. Project area, Kutaisi, is in Zone –III7 Map 6:).**

78. Water bearing strata is of contemporary alluvial deposits characterized by free groundwater table declined along the general flow of the rivers. The shallow ground water level is 1.5m – 1.8m below ground and anticipated amplitude of groundwater level fluctuation is below 1m. At some locations near the riverbeds and groves, groundwater is very shallow depths (0.3 m). The aquifer is mainly fed from rivers and precipitation. Despite the aquifer is rich with water, its practical water use is limited. No information on groundwater quality is available. Groundwater does not need any treatment before entering the pipe, however it loses its quality, as the old broken down system allows contamination.



Map 6: Hydro-geological Zones

## **2. Impacts and Mitigation Measures during Construction**

79. Excavation works for water supply pipes can affect local drainage patterns if ground-water is affected as trenches are being dug. Water collected in the trench should not be discharged to the river during the fish breeding season.

80. Impacts on ground water and surface water from excavation works at the reservoirs are not envisaged.

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

82. If not properly compacted the backfilled trench may affect the surface water drainage during rains. To avoid this there is need for qualified site supervision.

## **3. Impacts and Mitigation Measures during Operation**

83. During the operation stage no effects on groundwater is envisaged.

84. Abstraction of ground water at Rioni River is not supposed to affect downstream users. Basically water abstraction was conducted in the past without causing any big fluctuations of the ground water level.

85. An improved water supply system will cause an increased waste water flow. Waste water will be collected in the existing sewerage system which will be improved under a subsequent subproject together with and treated in a modern WWTP, which will also be under another subproject. During operation stage no effects on surface water and ground water is envisaged. Basically water quality of Rioni River will be improved eventually after construction of the proposed WWTP.

**Table 1: Effluent criteria for future WWTP in Kutaisi**

	Parameters	EU effluent standard	effluent standard according to Georgian law	proposed effluent criteria consultant
Discharge Standard	BOD <sub>5</sub>	25 mg/l O <sub>2</sub> (without nitrification)	25 mg/l O <sub>2</sub> (without nitrification)	25 mg/l
	COD	90 mg/l	125 mg/l	90 mg/l
	Suspended Solids	35 mg/l	30 mg/l	30 mg/l
Additional Discharge Standards for Discharge into sensitive Water Bodies	Total - N	15 mg/l N (10,000 to 100,000 PE)	15 mg/l N (10,000 to 100,000 PE)	15 mg/l N (10,000 to 100,000 PE)
		10 mg/l N (> 100,000 PE)	10 mg/l N (> 100,000 PE)	10 mg/l N (> 100,000 PE)
	Total - P	2 mg/l P (10,000 to 100,000 PE)	2 mg/l P (10,000 to 100,000 PE)	2 mg/l P (10,000 to 100,000 PE)
		1 mg/l P (> 100,000 PE)	1 mg/l P (> 100,000 PE)	1 mg/l P (> 100,000 PE)

## **D. Climate & Air Quality**

### **1. Baseline Profile**

86. *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 Kutaisi. Although traffic is less, roads in town are in very bad condition, and vehicle movement tends to produce a lot of dust.

87. *Climate.* The climate in Kutaisi is humid subtropical with a well-defined on-shore/monsoonal flow (characteristic of the Colchis Plain) during the Autumn and Winter months. The summers are generally hot and relatively dry while the winters are wet and cool. Average annual temperature in the city is 14.5°C. January is the coldest month with an average temperature of 5.3°C while July is the hottest month with an average temperature of 23.2°C. The absolute minimum recorded temperature is -17°C and the absolute maximum is 44°C. Average annual precipitation is around 1,530 mm. Rain may fall in every season of the year. The city often experiences heavy, wet snowfall (snowfall of 30 cm/12 inches or more per single snowstorm is not uncommon) in the winter, but the snow cover usually does not last for more than a week. Kutaisi experiences powerful easterly winds in the summer which descend from the nearby mountains.

### **2. Impacts during Construction**

88. 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.

89. There is a lot of potential for the creation of dust, from the excavation of dry soil and its storage, and levelling on the ground. As stated earlier, the construction activity does not involve significant quantities of earth work. However, some of the works will be conducted in the town (repair of sewage system, water network). Action will therefore be needed to re-

duce impacts on air quality at both the construction and disposal sites, by controlling dust and reducing the amount of material to be dumped. 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 levelling or any other earth moving activity to keep the soil moist throughout the process;
- Bring the material (aggregate and sand) as and when required;
- Ensure speedy completion of work and proper site clearance after completion
- Damp down unsurfaced/bad condition roads to avoid dust generation while using for transport of waste/material
- Use tarpaulins to cover loose material that is transported to and from the site by truck
- Control dust generation while unloading the loose material (particularly aggregate and sand) at the site by sprinkling water/unloading inside 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

90. Various types of equipment and vehicles would be required for the construction activity. The exhaust emissions from these may degrade the ambient air quality. Considering the scale of work and use of equipment, impact will be insignificant, and will be beyond the scope of this project. However, 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

### **3. Impacts and Mitigation Measures during Operation**

91. Impacts on air quality are not envisaged during operation.

## **E. Biological Environment**

### **1. Baseline Profile**

92. About 40 percent of total geographical area of the country accounts for forests. Average density of forests is 163 m<sup>2</sup> per ha. 97 percent of forests situated in the mountains, the rest 3% are low-lying and flood plain forests in Kolhida Region and in Western Georgia. No forest area lies within the future project area.

93. *Flora.* Kutaisi is the administration centre of the Imereti Region. The Imereti Region with a area of 6.5 thousand km<sup>2</sup> lies within the eastern part of Western Georgia, within Kolketi lowland, a very humid, Mediterranean-type refugial zone, bordering the humid mountain forest in the foothills of the mountains of western Georgia. The north-eastern part of Kutaisi supports Cork-Oak Forest (*Querkus suber. Pal.*), while in the south-eastern part Oak Forest with the prevailing Imeretian Oak (*Querkus imeretina Stev.*) (Western Georgia endemic species) is located. Within the city border a rare tree species can be found – Dzelkva (*Zelkova caprinifolia*).

94. *Fauna.* The project area lies within the city and agricultural land south of Kutaisi. No data concerning fauna were available. The species of sturgeon (*Acipenser sturio*, *A. stell-*

*tus*, *A. gueldenstaedti colchicus* and *Huso Huso*) are anadromous species with a life cycle between the Black Sea and the lower Rioni River. Rioni River is heavily polluted with domestic and industrial sewage. Only very common species adapted to pollution occur. Only very common species occur within the project area (agricultural land, pasture land).

95. **Protected Areas.** There are 14 Strict Nature Reserves, 8 National Parks, 12 Managed Nature Reserves, 14 Natural Monuments and 2 Protected Landscapes in Georgia. These protected areas cover about 7 % 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. State nature reserves are generally long established and were mostly set up on forest land, for example the Sataplia Nature Reserve located 9 km north-west from Kutaisi. Sataplia has been protected as a reserve from 1935 and it covers the area of 354 ha. It is a floristic natural complex with unique limestone caves and footprints of dinosaurs and 95% of its area is covered with Colchic forest, characterised by the presence of hornbeam, alder, box, chestnut, beech, ilex, medlar, ivy, rhododendron, bilberry and blackberry. 12 km south-east from Kutaisi another nature reserve is located. Ajameti Nature Reserve with Imeretian oak forestry and species as dzelkva (*Zelkova caprinifolia*) and gartvisi.

## **2. Impacts and Mitigation Measures during Construction**

96. 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).

97. In Kutaisi, the water supply pipes will be laid into city streets. The impact on the biological environment will therefore only be minor. The required width for the construction and the deposition of excavated material is approximately 5 m.

98. The following measures need to be implemented to avoid any impacts on flora and fauna:

- Avoid tree cutting
- In unavoidable cases, plant four trees of same species for each tree that is cut for construction
- The trench shall not be kept open in the night/after working hours. This will avoid any safety risk to wild animals.

99. No protected area will be impacted by the project.

## **3. Impacts during Operation**

100. The operation and maintenance activities will be conducted within the facilities, and therefore no impacts envisaged on biological environment.



## **V. IMPACTS ON THE SOCIOECONOMIC ENVIRONMENT**

### **A. Economic Resources**

#### **1. Baseline Profile**

101. *Land use.* Following the collapse of heavy industry in the early 1990s the main economic activities in Kutaisi are centred around the service and trade sectors. Industry, once the largest sector, now accounts for about 25% of the local domestic product. However, some recovery of industry is evident with an increase of 6% in the sector between 2003 and 2004. Most of the present industry can be characterised as light but it is expected that there will be some recovery of heavy industries as they re-privatised.

102. *Roads & transport.* Kutaisi is easily accessible and is one of the major traffic and transit points for the flow of goods between Europe, the CIS, and Asia. Its closeness to Georgia's main seaports, Kutaisi and Batumi, makes Kutaisi a potential target region for assembling imported components or exporting to the European Union and the Near East.

103. *Urban Services.* UWSCG provides water supply and sewerage services in the town. Well fields are the main source of water supply. It is estimated that some 70% of the inhabitants of Kutaisi are connected to the wastewater network. While this connection rate is higher than in many towns and cities in Georgia it still means that a significant number of people have to use sanitation methods. Some of the unconnected areas are the relatively sparsely populated steep areas in the higher parts of the city where the topography would make it difficult and expensive to provide sewerage. There is no wastewater treatment facility; the collected wastewater is disposed into River Rioni without any treatment. Storm water drainage is available in part of the town. Solid waste management system is not well developed; waste is collected and disposed in low-lying areas.

104. *Power Supply.* After the independence, Government of Georgia has made efforts to improve the power supply through new generating sources. Hydropower is the predominant source (88%), while rest is from gas based thermal power stations.

#### **2. Impacts during Construction**

105. The rehabilitation of the water network will be conducted along existing roads in the town. Although work will not require land acquisition it could still have economic impacts, if the presence of trenches, excavated material and workers discourage customers from visiting shops and other businesses, which lose income as a result. These losses however will be short in duration. Implementation of the following best construction measures will reduce the inconvenience and disturbance:

- 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

106. Another aspect of the work that has economic implications is the transportation of material to the site and surplus soil from the site to locations where it can be put to beneficial use as recommended. The volume of surplus soil generated from the construction work is limited, which will generate truck trips (assuming a smaller truck, 5 m<sup>3</sup> capacity per trip, due to narrow roads in some parts of the town during more than 4 years of construction phase. In addition there will be truck movements carrying material. Although this is not significant, considering the narrow roads, it could disrupt traffic in the Town. Dust generated during the transport may also impede the commercial and trade activities, which are predominantly located along the main roads. The transportation of material/waste shall be implemented by the Civil Contractor in liaison with the town authorities, and the following additional precautions should be adopted to avoid effects on traffic:

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

### **3. Impacts during Operation**

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

## **B. Socio-Cultural Resources**

### **1. Baseline Profile**

108. *Demography.* The present population of Kutaisi is about 192,500 inhabitants. Contrary to overall growth rate of Georgia, which had declined during the last two decades, population of Kutaisi has decreased. The decrease is caused by a combination of falling birth rate, increasing death rate, and more importantly a net migration of population to other areas in Georgia and abroad (*Source: Government Estimates*). A slight increase is projected for 2040 (194,600 inhabitants) due to expected economic development. The City has an estimated refugee population of more than 10,000 (UNHCR quote 14,180 at end 2003). The refugees are housed within the City and given the length of period that they have been resident in the City, they can be considered as part of the City's permanent population.

109. *Population Composition.* Almost entire population in Kutaisi is ethnic Georgians. Georgian is the main language, while most can speak Russian few can also speak English. About 10,000

110. *Education & health facilities.* The City of Kutaisi is the main administration centre in the region and is the centre for the most social services. The City has comprehensive educational, including a university, and medical facilities.

111. *History & Culture.* Historically and ethnographically, Kutaisi has always been regarded a chief community of Imereti region. The town has been an important centre of Georgian culture for centuries and contains a number of Kutaisi has an ancient cultural tradition. Here is a list of the cultural centers:

- State historical museum
- Museum of Sport
- Museum of Martial Art
- State Historical Archive
- Art Salon

## 2. Impacts during Construction

112. There are various social-cultural resources (such as schools, hospitals, churches, university) in the town. The construction impact will include noise and dust, and interrupted access due to movement of heavy vehicles transporting material and waste. Mitigation will therefore be needed to protect socio-cultural resources and to enable usage by local people and visitors to continue throughout the construction work. This will be achieved through several of the measures recommended above (under the impacts on air quality), including:

- Limiting dust by removing waste soil quickly; by covering and watering stockpiles, and covering soil with tarpaulins when carried on trucks
- Providing wooden walkways planks across trenches for pedestrians and metal sheets where vehicle access is required
- Increasing the workforce in to complete the work quickly

113. There is invariably of safety risks when substantial construction such as this is conducted in an urban area, and precautions will thus be needed to ensure the safety of both workers and citizens. The Contractor will be required to formulate and implement health and safety measures at construction sites, which should include such measures as:

- Following standard and safe procedures for all activities – such as provision of shoring in deeper trenches (> 2 m)
- Excluding public from the site – enclosing the construction area and provide warning and sign boards, and security personnel
- Providing adequate lighting to avoid accidents
- Ensuring that all workers are provided with and use appropriate Personal Protective Equipment - helmets, hand gloves, boots, masks, safety belts (while working at heights etc.)
- Maintaining accidents records and report regularly
- Traffic control Irregular control of trucks by local police (radar control, safety control). Speed limits to be introduced within construction areas and on access roads
- Yellow / orange warning tape to protect workers and pedestrians from falling into building pits, to prevent pedestrians from entering the construction site Warning signs to prevent accidents within the construction site and on access roads

114. Imereti Region, including Kutaisi, 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 minimize the risk. This should involve:

- Contractor should put in place a protocol for conducting any excavation work, to ensure that any chance finds are recognized and measures are taken to ensure they are protected and conserved, a Chance Find report is attached as **Appendix 2** as a sample. This should involve:
  - Having excavation observed by a person with archaeological field training;

- Stopping work immediately to allow further investigation if any finds are suspected;
- Calling in the state archaeological authority if a find is suspected, and taking any action they require to ensure its removal or protection in situ.

115. *Economic Benefits.* There could be some short-term socio-economic benefits from the construction work if local people gain employment in the workforce. To ensure that these benefits are directed to local people, the Contractor should be required to employ as much of his labour force as possible from the local communities in the vicinity of construction sites. Drawing of majority of workforce from local communities will avoid problems that can occur if workers are imported, including social conflicts and issues of health and sanitation due to labour camps. If temporary labour camps are to be provided, Contractor should ensure that they are maintained well with proper water supply and sanitation facilities.

- To the extent possible labour force should be drawn from the local community
- In unavoidable case of sourcing labour from other areas, provide adequate housing facilities so that there are no impacts and conflict with the local people. Following measures shall be followed:
  - Establish temporary labour camps in consultation with the local authority
  - 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

116. *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.

117. 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 no evidence for chance finds of archaeological objects. This also can be concluded due to the conduct of the public meeting. A meeting was conducted in Kutaisi in May 2012. Attendances to the meetings (NGO's, stakeholders, governmental regulatory institutions) were given the opportunity to raise concerns and to comment on the Project. No concerns with regard to any archaeological issue were raised.

118. 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.

### **3. Impacts during Operation**

119. As the operation and maintenance activities would be conducted within the facilities, no impacts on socio-cultural resources envisaged. Water will be disinfected through application of bleaching powder, and therefore no risk due to handling and application of chlorine gas.

120. 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<sup>2</sup>
- Establish a water quality laboratory as part of the project, with adequate building, equipment and trained personnel

121. Laboratory should be able to monitor the future WWTP influent and effluent quality as well as potable water quality.

122. The improved water supply system will bring numerous benefits when it is operated. The main beneficiaries will be the citizens of Kutaisi, 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.

123. The improved and expanded water supply system would require additional workforce – both skilled and unskilled, for operation and maintenance, and therefore creates new employment opportunities for local people.

## C. Noise & Vibration

### 1. Baseline Profile

124. Ambient noise is not subjected to monitoring in Georgia, so there is no data on ambient noise/vibration available. Main noise generating sources in the town are transport vehicles, local construction and industrial activities. Following table shows the subproject sites and their background noise levels (based on site observation) and sensitive receptors, if any.

**Table 2: Ambient Noise & Vibration and Sensitive Receptors at Project Sites**

Subproject Sites	Background Noise/Vibration	Sensitive Receptors
Well fields at Rioni River	Situated on the bank of River Rioni, the site is located in a rural setting amidst agricultural fields; there is no residential area; Except the noise from operation of pumps within the site, the background noise of from the surrounding area is negligible only “lull” prevails most of the time	There are no sensitive receptors

### 2. Impacts during Construction

125. 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. Concrete mixers (80 dB) and concrete vibrators (76 dB) will be used in construction of WWTP and reser-

<sup>2</sup> Schedule N7 of Technical Regulation on Drinking Water issued in 2007 by Ministry of Labor, Health and Social Welfare, Government of Georgia

voirs. As the site is located away from the town, no noise impacts envisaged. Appropriate personal protection equipment however needs to be provided for workers at the site. Haulage of materials/waste, and operation of backhoe (if used for transmission main trench excavation in the town), will also generate noise, but will be limited in duration and require no special measures. Sensitivity to noise increases during the night hours in residential neighbourhoods; this is applicable to the transmission line work in the town. Following measures therefore shall be implemented:

- Provide prior information to the local people about the work
- No construction of 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 50 m or less than 50 m

126. Another important activity is haulage of construction material and waste to and from site. Roads in the town 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 kmph 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

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

### **3. Impacts during Operation**

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

### **D. Cumulative Impacts**

129. Project is designed to improve environmental quality and living conditions in Kutaisi through the improvement of 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 localized and temporary.

130. 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. However, construction sites are not concentrated in a small area, and most of the construction activity (reservoirs and pumping stations) is confined to sites located outside the town. Further, 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.

131. However, at present various development and construction activities (for instance, road works) are under implementation in Kutaisi. The proposed water supply improvement works shall therefore be scheduled in consultation with the other implementing agencies so

that roads and inhabitants are not subject to repeated disturbance by trenching/construction work in the same area for different purposes.

132. No cumulative impacts envisaged during the operation stage.

## **E. Public Consultation**

### **1. Water Supply System (IEE)**

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

134. Two forms of public consultation will be used, to discuss the project and involve the community in planning the mitigation measures and develop the Environmental Monitoring Plan. These are:

- Public meeting in Kutaisi Town to which stakeholders will be invited. Participants will be informed about the aim of the subprojects and the benefits together with their likely impacts and the ways in which they would be mitigated. Participants will be invited to discuss their views and concerns, which will then be incorporated into the IEE as far as technically feasible.
- Ad hoc discussions will be held on site with people and communities who could be affected by the subprojects, so that views can be expressed in a less formal setting. These were also considered in preparing the IEE.

135. This IEE Report in Georgian language will be distributed to the interested public. Report will be available for review in Tbilisi (at UWSCG Head Office), and Kutaisi (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.

136. Public Hearing was held in Kutaisi on 10th of May 2012. The appendix contains a summary of the meeting. The employer of the Anaklia Headworks project was presented as the United Water Supply Company of Georgia. Rehabilitation measures to improve the water supply system were explained (replacement of pipes, rehabilitation of pumping stations in Vazha Pzavela and Kldiashvili). 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 **Appendix 1** of this report.



**Map 7: Kutaisi - office of the UWSCG in Gugunava Street 12**



## **VI. ENVIRONMENTAL MANAGEMENT PLAN**

### **A. Institutional Arrangements**

137. Following agencies will be involved in implementing this Water Supply Subproject in Kutaisi 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 sub-projects 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, and (b) Detailed Engineering Design Consultants (DC), who will design the infrastructure and manage tendering process. Civil works contractors build the infrastructure.
- (iv) ADB is the donor financing the Investment Program.

138. UWSCG, specifically its Department of Quality Management and Environment Protection (DQMEP), 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 this IEE 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

139. Currently DQMEP is staffed with an Ecologist/Environmental Specialist, who also heads the Department. The incumbent Ecologist/Environmental Specialist, with a master's degree in ecology and 7 years of professional experience (including 5 years in Licenses and Permits Department of the MoEPNR), is well versed with the Georgian environmental law, EIA and EIP processes, and other government regulations. With the existing staff, the DQMEP can update the IEE internally and can also coordinate with government agencies for necessary approvals. The DQMEP, however, requires support for implementation of EMP.

140. Implementation of EMP of this subproject require an experienced Environmental Management Specialist (EMS) to spend a total of around 16 months over the average 6 month design and 36 month construction period, conducting routine observations and surveys, and preparing monitoring reports. . The EMS should be on site one month before construction and 15 months during construction activities. 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 MC and DC.

141. DC will be responsible for: incorporation of mitigation measures in design and construction; and, baseline and construction-stage environmental quality monitoring. The MC will review and approve IEE and/or EIA reports and oversee implementation of EMP. The civil works Civil Contractor will implement mitigation measures during construction. Implementation of mitigation and monitoring measures during operation will be the responsibility of DQMEP. 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.

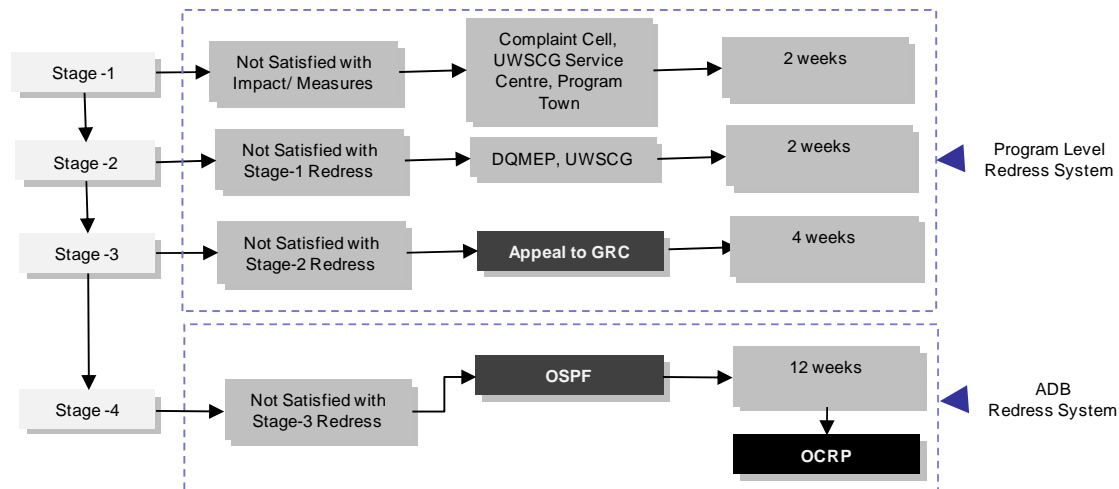
## **B. Grievance Redress Mechanism**

142. 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 MoEPNR 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.

143. 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 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.

144. 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 four 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

**Fig. 2 Grievance Redress Mechanism**



- (i) Complaints received (written or oral communication) by the Complaint Cell will be registered in database system, assigning complaint number with date of receipt; informs the complainant the time frame in which the corrective action will be undertaken.
- (ii) 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 subproject activities; if invalid, the Complaint Cell intimates the complainant and may also provide advice on the appropriate agency to be approached.
- (iii) 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.
- (iv) If this is an unanticipated issue, the UWSCG IPMO will to identify mitigation measures and advise the civil works Contractor accordingly and a corrective action should be taken and a Corrective Action Plan CAP prepared.
- (v) The Complaint Cell will review the civil works Contractor's response on corrective action and update the complainant within two weeks.
- (vi) 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 Department of Quality Management and Environmental Protection (DQMEP) of the UWSCG.
- (vii) The DQMEP 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 IPMO and relevant Service Centre on actions to resolve the issue.
- (viii) The Service Centre will submit the interim report in a week to DQMEP on the status of the complaint investigation and follow-up actions, and final action taken report within two weeks of completing the action. The DQMEP will intimate the complainant of the same.

- (ix) 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.

145. **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, respective municipality or an elected member nominated by the Chairman
- UWSCG Service Centre Head
- Member of IPMO

146. 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 ADB with the complaint. ADB has in place a system under the ADB Accountability Mechanism, where people adversely affected by ADB-assisted projects can voice and find satisfactory solutions to their problems. An affected person can file a complaint (mail, facsimile, electronic mail, or by hand delivery) with the:

Office of the Special Project Facilitator (OSPF), ADB, 6 ADB Avenue  
Mandaluyong City, 0401 Metro Manila, Philippines  
Tel: (63-2) 632-4825; Fax: (63-2) 636-2490; Email: [spf@adb.org](mailto:spf@adb.org)

or

Georgia Resident Mission, which will forward it to OSPF

147. In the event of unsatisfactory redress from OSPF, the complainant can further approach Office of the Compliance Review Panel (OCRP) at ADB headquarters.

### **C. Environmental Impacts & Mitigation Measures**

148. The Following Table 3 summarizes the environmental impacts and suggested mitigation measures as discussed in previous sections. It also delegates the responsibility of mitigation measures implementation to various project agencies.

**Table 3: Environmental Impacts and Mitigation Measures**

Potential Negative Impacts	Mitigation measures	Responsibility	Location	Cost
<b>Construction</b>				
Risk due to high risk seismic intensity zone	<ul style="list-style-type: none"> <li>• Apply design and construction norms of Zone-7 (MSK-64 scale) according to Government of Georgia “Construction in Seismological Regions”</li> <li>• Select appropriate pipe material and design for transmission lines according to seismic intensity of project area</li> </ul>	UWSCG	-	Design Cost
Impacts due to excavation and generation of waste soil	<ul style="list-style-type: none"> <li>• Utilize surplus/waste soil for beneficial purposes such as in construction or to raise the ground-level of low lying sites</li> </ul>	Civil Contractor	All construction sites	Part of construction cost
Loss of top soil	<ul style="list-style-type: none"> <li>• Top soil of about 1 ft depth (0.3 m) shall be removed and stored separately during excavation work, and after pipeline construction the same soil shall be replaced on the top.</li> </ul>	Civil Contractor	Pipeline work in pasture lands, agricultural land	Part of construction cost
Erosion due to excavation/refilling	<ul style="list-style-type: none"> <li>• 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</li> </ul>	Civil Contractor	All construction sites	Part of construction cost
Impact on surface water bodies due to construction during heavy rains	<ul style="list-style-type: none"> <li>• In case of heavy rain, protect open trenches from entry of rain water by raising earthen bunds with excavated soil</li> <li>• Confine construction area including the material storage (sand and aggregate) so that runoff from upland areas will not enter the site</li> <li>• Ensure that drains are not blocked with excavated soil</li> </ul>	Civil Contractor	construction sites on slopes	Part of construction cost
Impact on ambient air quality due to dust generation	<ul style="list-style-type: none"> <li>• Cover or damp down by water spray on the excavated mounds of soil to control dust generation;</li> <li>• Apply water prior to levelling or any other earth moving activity to keep the soil moist throughout the process;</li> <li>• Bring the material (aggregate and sand) as and when required;</li> <li>• Ensure speedy completion of work and proper site clearance after completion—;</li> <li>• Damp down unsurfaced/bad condition roads to avoid dust generation while using for transport of waste/material</li> <li>• Use tarpaulins to cover loose material that is transported to and from the site by truck</li> <li>• Control dust generation while unloading the loose material (particularly aggregate and sand) at the site by sprinkling water/unloading inside</li> </ul>	Civil Contractor	All construction sites	Part of construction cost

Potential Negative Impacts	Mitigation measures	Responsibility	Location	Cost
	barricaded area <ul style="list-style-type: none"> <li>Clean wheels and undercarriage of haul trucks prior to leaving construction site</li> <li>Don't allow access in the work area except workers to limit soil disturbance and prevent access by fencing</li> </ul>			
Impact on air quality due to emissions from construction equipment/vehicles	<ul style="list-style-type: none"> <li>Ensure that all equipment &amp; vehicles used for construction activity are in good condition and are well maintained</li> <li>Ensure that all equipment &amp; vehicles confirms to emission and noise norms</li> </ul>	Civil Contractor	-	Part of construction cost
Impact on aquatic biota				
Removal of vegetation/trees for construction and impacts due to presence of open trenches	<ul style="list-style-type: none"> <li>Avoid tree cutting by local and small change of layout plan/alignment</li> <li>In unavoidable cases, plant four trees of same species for each tree that is cut for construction</li> <li>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</li> <li>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</li> <li>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 wild animals.</li> </ul>	DSC /EA	river crossings of transmission mains, waste water network, water supply system	Part of construction cost
Disturbance to business, people, activities and socio-cultural resources due to construction work	<ul style="list-style-type: none"> <li>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;</li> <li>Limit dust by removing waste soil quickly; by covering and watering stockpiles, and covering soil with tarpaulins when carried on trucks</li> <li>Provide wooden walkways/planks across trenches for pedestrians and metal sheets where vehicle access is required</li> <li>Increasing workforce to complete the work in minimum time in the town</li> </ul>	Contractor	waste water network, water supply network	Part of construction cost
Disturbance/nuisance/noise due to construction activity including haulage of material/waste	<ul style="list-style-type: none"> <li>Plan transportation routes in consultation with Municipality and Police</li> <li>Sound barriers should be erected at schools and hospitals if the distance to the construction site is less than 50 m</li> </ul>	Civil Contractor	All construction sites	Part of construction cost

Potential Negative Impacts	Mitigation measures	Responsibility	Location	Cost
	<ul style="list-style-type: none"> <li>• Schedule transportation activities by avoiding peak traffic periods</li> <li>• Use tarpaulins to cover loose material that is transported to and from the site by truck</li> <li>• Control dust generation while unloading the loose material at the site by sprinkling water</li> <li>• Clean wheels and undercarriage of haul trucks prior to leaving construction site</li> <li>• Educate drivers: limit speed between 20-25 kmph and avoid use of horn in the town</li> <li>• Earmark parking place for construction equipment and vehicles when idling; no parking shall be allowed on the roads, that may disturb the traffic movement</li> <li>• Provide information to local people about work;</li> <li>• No night time construction activities including material/waste haulage between 7 pm and 7 am</li> <li>• Educate drivers: limit speed between 20-25 kmph and avoid use of horn in the town</li> <li>• Earmark parking place for construction equipment and vehicles when idling; no parking shall be allowed on the roads, that may disturb the traffic movement</li> </ul>			
Socio-economic benefits from employing local people in construction work	<ul style="list-style-type: none"> <li>• To the extent possible labour force should be drawn from the local community</li> </ul>	Civil Contractor	All construction sites	Part of construction cost
Impacts due to import of labour and establishment of temporary labour camps	<ul style="list-style-type: none"> <li>• In unavoidable case of sourcing labour from other areas, provide adequate housing facilities so that there are no impacts and conflict with the local people: <ul style="list-style-type: none"> <li>○ Establish temporary labour camps in consultation with the local authority</li> <li>○ Shall be located away from water bodies</li> <li>○ No clearance of trees vegetation shall be allowed for establishment of camp</li> <li>○ Provide all basic amenities (water supply and sanitation, waste collection &amp; disposal, first aid facilities, etc.)</li> <li>○ Contractor shall provide fire wood and no worker shall be allowed to cut any tree</li> </ul> </li> </ul>	Civil Contractor	Temporary labour camps	Part of construction cost

Potential Negative Impacts	Mitigation measures	Responsibility	Location	Cost
	<ul style="list-style-type: none"> <li>○ Ensure regular and clean maintenance of the camp</li> </ul>			
Safety risk – public and worker	<ul style="list-style-type: none"> <li>• Follow standard and safe procedures for all activities – such as provision of shoring in deep trenches (&gt;2 m)</li> <li>• Exclude public from the site – enclose construction area, provide warning and sign boards, security personnel</li> <li>• Provide adequate lighting to avoid accidents</li> <li>• 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.);</li> <li>• Maintain accidents records and report regularly</li> </ul>	Civil Contractor	All construction sites	Part of construction cost
Safety risk – public and worker - asbestos	<ul style="list-style-type: none"> <li>○ Follow standard and safe procedures for all activities – such as <ul style="list-style-type: none"> <li>○ Asbestos pipes if broken during removal should be dismantled by hand and disposed</li> <li>○ Detachable fasteners must be removed in such a way that the asbestos cement products are not broken</li> <li>○ Avoid disruption of asbestos cement. If the old pipes require replacement they are not to be removed. Leave all asbestos pipes in-situ and lay new pipes over them.</li> <li>○ Asbestos pipes must be kept wet when eroded</li> <li>○ Asbestos pipes must be sprayed prior to abrasion or dismantling with dust-binding agents</li> <li>○ The asbestos retrieved or accidentally excavated should be bagged in a double coating of HDPE liner and sealed using duct tape. The bagged asbestos should be buried at the location</li> <li>○ The site where the bagged recovered Asbestos material is buried should be marked with yellow tape as warning for future excavations.</li> </ul> </li> </ul>	Contractor	All construction sites	130\$ per sample  Costs for disposal of asbestos cement depends on local conditions Part of construction cost  300\$/m removal asbestos pipe  Disposal 350\$/t
Historical, archaeological chance finds during excavation	<ul style="list-style-type: none"> <li>• Contractor shall put in place a protocol for conducting any excavation work, to ensure that any chance finds are recognized and measures are taken to ensure they are protected and conserved. Appendix 2 includes a Chance Find report as a sample. This should involve: <ul style="list-style-type: none"> <li>○ Having excavation observed by a person with archaeological field training;</li> <li>○ Stopping work immediately to allow further investigation if any finds</li> </ul> </li> </ul>	UWSCG/Design Consultant	All construction sites	Part of construction cost



Potential Negative Impacts	Mitigation measures	Responsibility	Location	Cost
	are suspected; <ul style="list-style-type: none"> <li>o 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..</li> </ul>			
Cumulative impacts – repeated disturbance to roads and people	<ul style="list-style-type: none"> <li>• Schedule the construction activities in harmony with the other ongoing works</li> <li>• Schedule works before road work</li> </ul>	UWSCG	Transmission line works, works on waste water network, water supply network in the town	-
soil contamination due to leakages with mineral oil	<ul style="list-style-type: none"> <li>• Provide double walled fuel tanks or store single walled fuel tanks in collecting basin for refuelling construction engines</li> <li>• Provide modern non-leaking equipment</li> </ul>	Civil Contractor	WWTP and main collector	---
contamination of surface water	<ul style="list-style-type: none"> <li>• Store fuel tanks away from surface water on a safe location minimum 50 m distance to surface water</li> <li>• Provide modern non-leaking equipment</li> </ul>	Civil Contractor	WWTP and main collector	---
Risk of delivery of unsafe water to consumers	<ul style="list-style-type: none"> <li>• 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</li> <li>• Develop &amp; implement water quality monitoring program for distribution system</li> <li>• Establish a water quality laboratory as part of the project, with adequate building, equipment and trained personnel</li> </ul>	UWSCG	Well fields, water network	Part of project design – water quality testing laboratory is part of design
Noise emission to adjacent residential area	<ul style="list-style-type: none"> <li>•</li> </ul>	UWSCG		Part of construction costs

Potential Negative Impacts	Mitigation measures	Responsibility	Location	Cost
Disturbance/nuisance/noise due to operation activity including haulage of waste,	<ul style="list-style-type: none"> <li>• Plan transportation routes in consultation with Municipality and Police</li> <li>• Schedule transportation activities by avoiding peak traffic periods</li> <li>• Use tarpaulins to cover loose material that is transported to and from the site by truck</li> <li>• Educate drivers: limit speed between 20-25 kmph and avoid use of horn in the town</li> <li>• Provide prior information to local people about work;</li> <li>• No night time operation activities</li> </ul>	UWSCG		Part of operation costs
Influx of insects, rodents	<ul style="list-style-type: none"> <li>•</li> </ul>	UWSCG		Part of operation costs

H-high; M- Medium and L-Low

#### D. Environmental Monitoring Plan

149. The regular control and inspection during general construction activities in Kutaisi is needed. The following table includes physical and chemical analyses to be carried out. Trained personnel and a laboratory are required.

Table 4: Environmental Monitoring Plan for general construction activities at Kutaisi

Mitigation measures	Parameters to be Monitored	Location	Measurements	Frequency	Responsibility
<b>Construction Phase</b>					
• All construction related mitigation measures	Implementation on site	All construction sites	Observations on/off site; CC records; interviews with people and workers	Weekly	DC
• All design related mitigation measures	Inclusion in the project design		Design review	As needed	MC
<b>Operation</b>					

## **VII. RECOMMENDATIONS & CONCLUSION**

### **A. Recommendation**

150. The environmental impacts of the infrastructure elements proposed in the water supply improvement subproject in Kutaisi has 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 improved infrastructure. Mitigation measures have been developed to reduce all negative impacts to acceptable levels.

151. Mitigation measures were discussed with engineering specialists, and some measures have already been included in the design. This means that the number of impacts and their significance has already been reduced by the design.

152. Regardless of these and various other actions taken during the IEE process and in developing the project, there will still be impacts on the environment when the infrastructure is built and when it is operating. Appropriate avoidances/mitigation/enhancement measures have been suggested for the likely impacts that are identified.

153. During the construction phase, impacts mainly arise from generation of dust from soil excavation and refilling; and from the disturbance to residents, traffic and important buildings by the construction work. These are common impacts associated with the construction processes, and there are well developed methods for their mitigation. Various measures are suggested, including:

- Utilizing surplus/waste soil for beneficial purposes
- Measures to reduce/control dust generation (cover/damp down by water spray; consolidation of top soil, cover during transport etc.)
- Providing prior public information and planning the work in consultation
- Avoiding night time construction activities

154. The environmental assessment process also identified opportunities for environmental enhancement. Certain measures suggested in this regard include:

- Employing the local people in construction work as much as possible to provide them with a short-term economic gain
- Employing local people in operation and maintenance of the new systems

155. Most facilities will operate with routine maintenance, which should not affect the environment. Measures have been suggested to provide adequate drinking water quality (water quality surveillance program).

156. The main beneficiaries of the improved water supply system will be the citizens of Kutaisi, who will be provided with a constant supply of good quality water, which serves a greater proportion of the population, including urban poor. This will improve the quality of life of people as well as raising 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.

157. 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.

158. Stakeholders will be involved through both face-to-face discussions on site and a public meeting to hold in the town, after which views expressed will be incorporated into the IEE and the planning and development of the project.

159. The recommendation of this IEE 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.

## **B. Conclusion**

160. The environmental impacts of the proposed water supply subproject in Kutaisi have been assessed by the Initial Environmental Examination reported in this document. The impacts are found to be limited to the construction phase.

161. 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.

# **Appendices**

**Minutes of Meeting of Public Hearing on 10th of May 2012**

**LCC “United Water Supply Company of Georgia”**

Public Hearing Meeting  
Improving the Water Supply System in Kutaisi

Initial Environmental Examination Report

Minutes

Kutaisi

10.05.2012

The following persons attended the meeting:

1. Tinatin Zhizhiashvili – “United Water Supply Company of Georgia, LLC” (UWSCG), Head of Quality Management, Resettlement and Environmental Protection Division;
2. Ketevan Chomakhodze - “United Water Supply Company of Georgia, LLC”, Environment Specialist of Quality Management, Resettlement and Environmental Protection Division;

From the Kutaisi Local Population the meeting has been attended:

1. Ketevan Kiknadze – local resident
2. Giga gelkhvidze – local resident
3. Tamuna Jintsaradze – local resident
4. Mari Kharabadze – local resident
5. Monika Margania – local resident
6. Mariam Alavidze – local resident
7. Pikria Chanturidze – local resident
8. Asmat Chanturidze - local resident
9. Sergo Chakvetadze - local resident
10. Lasha Giorgadze – local resident

**Meeting Agenda**

The public hearing was held on May 10, 2012 in Kutaisi, at the service center of UWSCG, commencing at 17:00 p.m.

The PowerPoint presentation was submitted by Ketevan Chomakhidze. She presented full information for local residents and attendees present about projected activities and described the project nature and estimated impacts as a result of this project implementation.

Tinatin Zhizhiashvili presented full information for attendees present about the impact from the construction and operation of water supply systems, environmental management plan and projected mitigation measures.

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



The Following questions have been asked from the local population:

#	Questions from local residents	Answers from the United Water Supply Company of Georgia
1	Name of the employer of a Kutaisi water supply system	United Water Supply Company of Georgia
2	Who is responsible for repair and maintenance of pipes in case of damage?	United Water Supply Company of Georgia
3	What is duration and date of completion of the construction of the project?	Duration of the Construction: is 36 months
4	What rehabilitation measures will be undertaken to improve water supply system?	162. Water supply rehabilitation measures consist of: 163. replacement of pipes in the city area East of the river and in Choma settlement; rehabilitation of pumping stations in Vazha Pzavela and Kldiashvili; construction of new reservoirs in Vazha Pzavela, Tetra Mitsa and TV Tower.
5	Of what material are the pipes made?	164. Polyethylene
6	There is a loss of a large amount of water on Pshavela Street, whether this problem will be solved by the project?	165. Yes, the proposed project envisages Rehabilitation of pumping stations in Vazha Pshavela street and this will solve the problem 166.
7	When will the construction of Water Supply System start?	167. In October 2012
8		168.
9	Who will supervise and monitor construction and operation of the project?	UWSCG/ Supervision Consultant
10	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
11	What will be benefit for local population from the rehabilitation of the water supply system in Kutaisi?	The Project will have overall beneficial impacts on quality of life for the citizens of Kutaisi. It will stimulate economic growth by constant supply and good quality of drinking water which is a prerequisite for tourism development.
12	Who is implementing and sponsoring the Project?	Project is co-financed by the Asian Development Bank (ADB) and the Government of Georgia and implemented by the United Water Supply Company of Georgia (UWSCG)

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

## Chance Finds report form

## Chance Finds Report Form

Please contact: \_\_\_\_\_  
To discuss find, on: \_\_\_\_\_

Location of Find: \_\_\_\_\_ 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: \_\_\_\_\_

Reporting Archaeologist: \_\_\_\_\_

GPS coordinates:

Photo Record:

Zone: \_\_\_\_\_ N: \_\_\_\_\_ E: \_\_\_\_\_

☐ 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

Approximate size of site:

Site area: \_\_\_\_\_ m<sup>2</sup>

Site length: \_\_\_\_\_ m

Site height (max) (for rockshelters/caves): \_\_\_\_\_ m

Other: \_\_\_\_\_

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):

**Level of Significance as per the PNG LNG Chance Finds Protocol Flowchart**

Low ☐ Medium ☐ High ☐ Skeletal ☐

**Impact Assessment**

Is site destroyed?

☐ Yes

☐ No

Can further impacts to the chance find be avoided?

☐ Yes

☐ No

Avoidance and mitigation measures discussed:

**Impact to Find**

Avoidance and mitigation outcome:

Date completed form lodged:

Person who lodged form:

Signature:

\_\_\_\_\_