

# Updated Draft Initial Environmental Examination

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July 2016

GEO: Urban Services Improvement Investment  
Program – Project 1  
(Improvement of Poti and Abasha Water Supply  
Sub-projects)

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

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## CURRENCY EQUIVALENTS

(as of 15 July 2016)

Currency unit	–	Georgian Lari (GEL)
GEL1.00	=	\$ .43
\$1.00	=	GEL2.3

## ABBREVIATIONS

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

## NOTE

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

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## EXECUTIVE SUMMARY

1. It is proposed to improve the water supply system in Poti and Abasha under the Asian Development Bank (ADB) funded Urban Services Improvement Investment Program – Project 1. This Investment Program, implemented in eleven towns, including Poti and Abasha, will develop the water supply and sanitation (WSS) services, which will improve quality of life and optimize the social and economic development. Ministry of Regional Development and Infrastructure (MoRDI) is the Executing Agency (EA) and United Water Supply Company of Georgia (UWSCG) is the Implementing Agency (IA) of this Program. This subproject is being implemented from 2013 and likely to be completed by 2016. Since the subproject is unlikely to have significant adverse impacts, it is classified as environment Category B, and accordingly an Initial Environmental Examination has been conducted. This is a summary of the IEE Report.

2. The City of Poti is located at the Black Sea and lies some 310 km to the west from the capital city of Tbilisi. The service levels of water supply are low with partial coverage, high system losses, and poor water quality at consumer end. Rehabilitation of the water supply network is currently in progress under another project. A wastewater treatment plant out of operation is located north of the city. Basically, domestic wastewater drains untreated in the Rioni River. The water demand is likely to grow significantly as population will grow. This subproject will expand the system and improve the service standards, with a daily supply of potable water in adequate quantity (214 lpcd - total specific water demand in 2020). The subproject is designed to meet the projected demand of 2040. This will be achieved by: (i) rehabilitation of infrastructure to tap water from Nosiri well field; water abstraction from Rioni River is discussed as well (ii) rehabilitation / construction of transmission pipes (iii) construction of a water treatment plant for treating water from Grouli springs, and (iv) rehabilitation of Nabada water reservoir. These improvements will benefit Poti Town and villages in the urban periphery. As for Abasha, it is a town in western Georgia with a population of approximately 6,000 people. It is located between the rivers of Abasha and Noghela, at 23m above sea level (Latitude 42.1941667°, Longitude 42.2241667°) and is located 283 km to the west of Tbilisi, capital of Georgia. The settlement of Abasha acquired the status of a town in 1964 and currently functions as an administrative center of the Abasha District within the Samegrelo-Zemo Svaneti region. The headquarters of the Georgian Orthodox Eparchy of Chkondidi is also located in Abasha.

3. The City of Poti is the most developed part of the Samegrelo - Zemo Svaneti region of Georgia. To the west it borders the Black Sea; to the north the tributary of the rivers Rioni and Khobi and to the southeast the river Kapartchina and Paliastomi Lake. The City of Poti is the most important port, providing its only secure access to the sea in Georgia and is also in an important port in the context of the Caucasus region. As such, the city has, and continues to be, a regionally important trading centre and transport corridor with road and rail links to Armenia, Azerbaijan and onwards to countries including Turkmenistan, Uzbekistan and Kazakhstan. Its favourable location provides a strong basis for the future development of the city. The interaction of the port with future development of the oil industry further favours the city's development prospects.

4. The City itself is located at sea level on the sea end of an alluvial plain of the Kolkhevi lowland. It has a highest altitude of less than 5 m. It covers an area of approximately 59 km<sup>2</sup> and is administratively divided into four municipalities: Centre, Nabada, Island, and Maltakva. It has a population of about 48,000 inhabitants and is one of the main

populated centres in Georgia. The present rate of population increase is estimated at 1.15 %. The increase is caused by the growing importance of the Poti seaport as a trans-shipment centre.

5. The subproject activities are partly located in the town and surrounding suburbs. The drinking water intake is located at Nosiri about 42 km northeast of Poti. It is proposed to convey water from existing Nosiri well field. The water is pumped at a level of 29 masl and conveyed to Nabada reservoirs and to villages by gravity or by pumping via two transmission mains. Three options are discussed to cover the water demand of 55,200 m<sup>3</sup>/d. Abstraction and treatment of water from Rioni River is discussed as another option. As for Abasha, subproject activities are mainly located on the road from headworks and crosses several villages. Execution of works will be less in the town itself.

6. Both transmission mains supplies water to the villages situated along the road from Nosiri to Poti. There is loss of water not only due to leaks, but also due to unmetered or illegal water connections and mainly due to irrigation purposes.

7. The existing sewer network was designed as a separate system and covers the centre of Poti. It is orientated towards the location of the existing wastewater treatment plant at the northern edge of Poti. As the terrain is very flat with ground levels between 0.50 m and 2 m, a number of pumping stations are required that allow to sewer depths of > 3.50 m. The construction of a sewer system will improve essentially the environmental situation in Poti. Currently only 25 % of the population is connected to the sewer system. Improvements to the sewerage system do not form part of this sub-project.

8. The Poti water supply system improvement subproject is relatively small in scale and involves straightforward construction. Although there are forest areas within the nearby Kolkheti nature reserve, none of the components will encroach into these area and most of the activities are planned along the existing access 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 Poti with an improved water supply.

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

10. There are a number of development activities (for instance, road works) currently under implementation in Poti. 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.

11. There are no health and safety risks associated with the subproject.

12. The subprojects are 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.

13. To ensure that all the mitigation measures as suggested are implemented, a program of environmental monitoring is prepared. Division of Resettlement and Environmental Protection (DREP) 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

14. The proposed Urban Services Improvement Investment Program is intended to optimize social and economic development in select urban areas (provincial capitals and secondary towns) through improved urban water and sanitation (WSS) services. This ADB funded Multitranche 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

15. *WSS Services in Georgia.* The service levels of urban water supply and sanitation systems in Georgia at present are not satisfactory. Piped water supply service is available to less than 75 % of urban population. Most of the serviced population suffers with inefficient service levels – inadequate and intermittent supply with low terminal pressure. Due to old systems, most of the pipelines are profusely leaking, and water losses in the system are as high as 50-70 %. Similarly, less than 50 % of the urban population is connected with underground sewerage system, and the rest depend on individual disposal systems like pit latrines, septic tanks etc. Sewage treatment facilities are almost non-existent and collected waste is disposed untreated into rivers/streams raising environment and public health concerns.

16. 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 6 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. The proposed investments under Tranche-1 include improvement of water supply systems in urban areas of Mestia, Anaklia, Kutaisi, Poti, Ureki and Abasha. Investments in the city of Poti are also part of tranche IV.

17. The Poti and Abasha water supply improvement subproject 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).

18. According to ADB provisions, the water supply components subject to this IEE study are: construction of reservoirs and pumping station at Nabada site in Poti; construction of Grouli WTP; rehabilitation / reconstruction of transmission lines; disconnection / connection of villages from / to transmission lines; replacement of a transmission line DN 600 under a bridge; and rehabilitation of Nosiri well field with installation of 29 new pumps and associated electrical installations; also, installation of new transmission pipeline for Abasha water supply system

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

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

20. 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 progressed.

21. This IEE report was prepared based on the Environmental Assessment Report according to Georgian Law, the draft final report on Poti Municipal Investment Programme for Water and Wastewater Services (Jacobs Gibb 2005), the Feasibility Study and the detailed design. It was also based on secondary information and data from various sources and field observations.

22. The IEE was prepared for improvement of the WSS system in Poti, construction of Grouli WTP, transmission lines, rehabilitation of Nosiri well field, Nabada reservoir, and 29 well pump installations. Improvement of the wastewater network and WWTP are not part of this subproject; also, for installation of transmission pipeline for Abasha water supply project.

23. 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**

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

Section II establishes the project need, rationale and alternatives

Section III describes project components and construction & operation details

Section IV discusses impacts on physical and biological environment

Section V discusses impacts on socio-economic environment

Section VI provides Environmental Management Plan and Monitoring Plan, and

Section VII emphasizes on IEE recommendations and concludes the report

# **II PROJECT RATIONALE AND NEED**

## **A Type of the Project**

25. This is an urban water supply improvement sub-project. It involves construction of WTP, rehabilitation and future use of existing well field, construction of new or rehabilitation of damaged transmission mains, and rehabilitation / construction of storage reservoirs and pumping stations.

## **B Need of the Project**

26. 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 entire population and the serviced areas suffer from inefficient service levels. Systems are old and inefficient.

The situation is not different in the program towns of Poti and Abasha. Untreated sewage infiltrates into the underground and pollutes the rivers. This sub-project is needed because the present water supply infrastructure in Poti and Abasha 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 a wastewater subproject is also needed and will follow this subproject in the near future.

27. The United Water Supply Company of Georgia<sup>1</sup> (UWSCG) provides water supply in Poti and Abasha. Presently, the City of Poti is supplied from two sources: Nosiri Well Field and Grouli Springs. Nosiri well field is located about 42 km east of Poti. Grouli springs with a productivity of about 300 l/s (1,080 m<sup>3</sup>/h) is a carstic spring located at a distance of about 47 km from Nosiri. The spring water is often turbid. It cannot be used for drinking water purposes. Therefore it is only used during the dry season in summer when the water is clear. As for Abasha, it is supplied with water by two pipelines: One is 400mm – old and amortized pipe which supplies nearby villages with water and new 315mm Polyethylene pipe which is already built and is ready for exploitation. Change the old pipe is essential as one pipe (315mm Polyethylene) cannot provide city with sufficient Water. Distribution manhole near headwork is damaged and needs rehabilitation. The pipeline network of the city is very old, but there are no damages in the water pipeline system as the pressure of the water is very low. During the years there have been special works accomplished on town pipeline system and changes of the damaged pipes has been performed.

28. Currently, the total amount of the boreholes at Nosiri well field is 29, out of which 19 wells are in operation while ten boreholes lack pumps. The 19 bore holes are equipped with old 165 kW well pumps that are used to pump water to the nearby old collecting reservoir with a storage volume of 500 m<sup>3</sup>. The total well field productivity is about 1,250 m<sup>3</sup>/h at the moment. The wells are typically drilled to depths of 25 m and some to 50 m. The diameter of the pipe casing is estimated at 325 mm.

29. The wells have not been cleaned for the past 30-35 years. The well productivity is limited because of the existence of sand. Except sand, the boreholes are filled with gravel and cobbles. All machinery equipment, fixtures, mechanical installations and the fence are damaged. The steel collector pipes from the boreholes to the reservoir are damaged. They are installed underground, but some sections are above-ground, vulnerable to further damages. No water protection zones are existing.

30. From the Nosiri reservoir, the water is transferred to the Nabada reservoirs via a set of two pumps, each with a design capacity of 1,250 m<sup>3</sup>/h, 125 m geodetical height and a capacity of the electromotor of 630 kW. These pumps are in bad condition and have a low efficiency. One of them is working as stand-by pump.

31. A chlorination station working with liquid chlorine is located at the well field. The chlorination is carried out at the collecting reservoir.

32. Water borne diseases are reported due to insufficient drinking water quality. Basically ground water quality from Nosiri well field is good. Bacterial contaminations result from leakages within the water net when the system is not under pressure. Waste water infiltrates into the water network.

33. The present water supply system covers about 70% of the population. Due to old system water losses are very high (80%), net water supply is about 200 LPCD. Existing water supply coverage and future water demand is shown in **Table 1**.

34. Besides the existing inadequacies, the water supply system requires augmentation to meet the growing population.

35. The present sub-project is designed to improve the service standards of water supply in Poti. It is designed to meet the maximum desired water demand by the year 2040 at an

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A government company under Ministry of Regional Development and Infrastructure

amount of 47.232 m<sup>3</sup> per day. The project is also designed to improve the service standards of waste water treatment and discharge.

## **C Location**

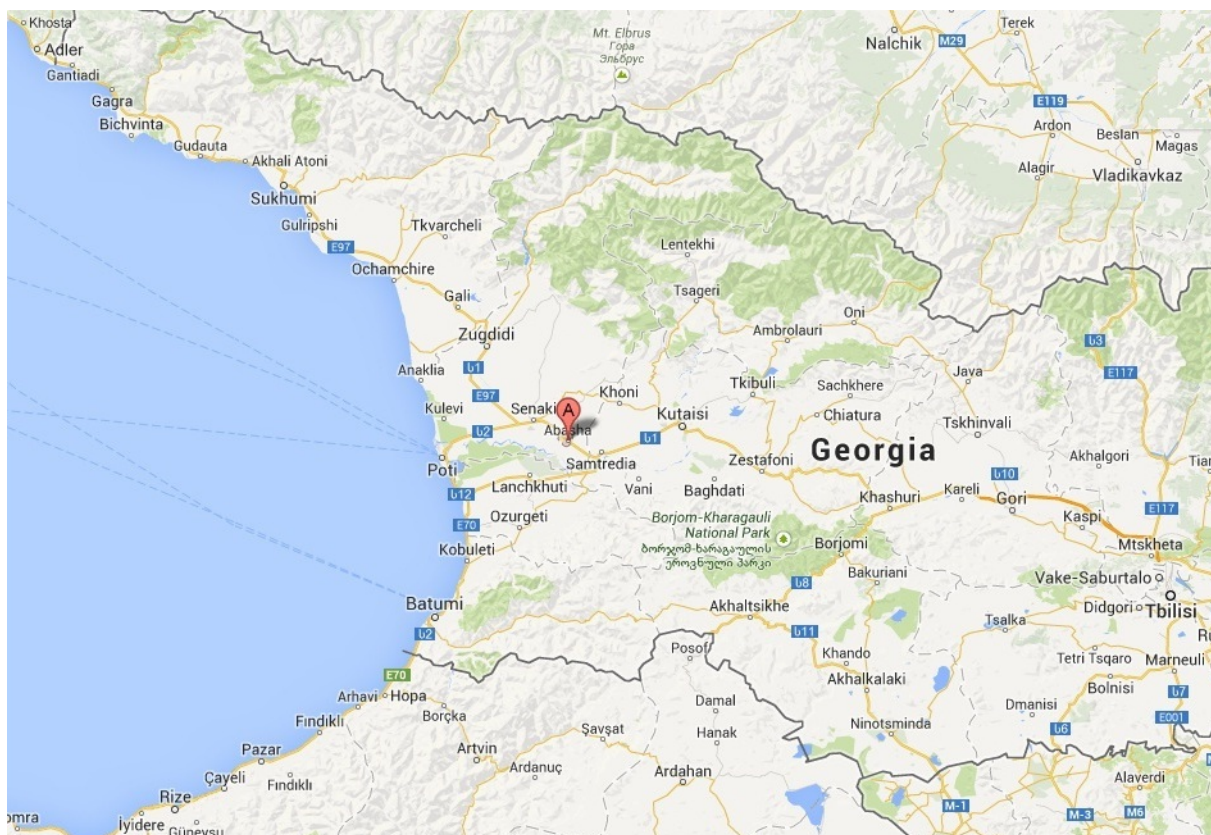
36. This sub-project is located in Poti. The City of Poti is the most developed part of the Samegrelo - Zemo Svaneti region of Georgia. It is located on the Black Sea and lies some 360 km to the west from the capital City of Tbilisi. To the west it borders the Black Sea; to the north the right tributary of the rivers Rioni and Khobi and to the southeast the river Kapartchina and Paliastomi Lake. Regional location of Poti is shown in **Map 1**.

As for Abasha water supply sub-project, it is located between the rivers of Abasha and Noghela, at 23m above sea level (Latitude 42.1941667°, Longitude 42.2241667°) and is located 283 km to the west of Tbilisi, capital of Georgia. The settlement of Abasha acquired the status of a town in 1964 and currently functions as an administrative center of the Abasha District within the Samegrelo-Zemo Svaneti region. The headquarters of the Georgian Orthodox Eparchy of Chkondidi is also located in Abasha. Location of Abasha is shown in Map 2.



Map 1: Location of Project Town - Poti





Map 2. Location of Project town - Abasha

37. Headwork project measures consist of construction of a new WTP at Grouli springs, replacement of electrical installations and connection of wells at Nosiri well field to transmission mains, disconnection of villages from transmission mains and connection to transmission main DN 350. In addition Nabada reservoir will be reconstructed and a DN 600 pipe section under a bridge over Rioni river will be replaced.

38. Location of above described headwork measures is to the north and east of the city of Poti. Nabada reservoir is at the northern outskirts of Poti, replacement of DN 600 pipe section is located under a bridge crossing Rioni river, northeast of Poti. New transmission main DN 300 runs north of river Rioni and connects various villages to Nosiri well field, located few km to the west of the city of Senaki. New WTP Grouli is located few km to the northeast of the Nosiri well field.

#### **D. Implementation Schedule**

39. In the first phase the civil works will only include rehabilitation / reconstruction of the Water Supply System in Poti. Construction work is scheduled to start in 2013 and should be completed by 2016. As for Abasha, construction work will be implemented during 2016,

#### **E. Analysis of Alternatives**

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

40. Infrastructure proposed within the framework of this subproject focuses on the head-

works and comprises the construction of a new water treatment plant for Grouli spring that can only be used partly currently, rehabilitation works at Nosiri well field, the disconnection of some villages along the transmission line into Poti and their connection to the transmission line DN 350, as well as the construction of new reservoirs and a pumping station at Nabada territory. The new water treatment plant will have a capacity of 240 l/s. A total of about 20 km pipes will be laid in order to distribute to and connect the villages along the transmission lines. The storage volume of the reservoirs in Poti will amount to 15,000 m<sup>3</sup> and the capacity of the pumping station will be 37,000 m<sup>3</sup>/d.

41. Except for the new water treatment plant, all measures are either rehabilitation or replacement. Options for different locations or transmission lines were not given and investigated. The alternative to completely exchange the existing transmission mains was dismissed for its high investment costs. The environmental impact of the new measures is positive. The measures will result in fewer losses, and consequently fewer production, as well as in the installations of electro-mechanical equipment with higher efficiencies. The options for the location of the new water treatment plant were limited. The location was to be along the existing transmission line and at an elevation that would allow the gravity operation without extra pumps and the gravity flow into Poti from the location. One plot of public land was available and was chosen for the project.

Regarding Abasha water supply system, subproject will comprise with installation of transmission pipeline from headworks to the town of Abasha approximately 15km, with maximum 500mm diameter pipe.



**Table 1: Location and Design Alternatives within the Selected Option 2**

Components	Location Justification
Rehabilitation at Nosiri well field	Existing head works <ul style="list-style-type: none"> <li>• No land acquisition required</li> <li>• Involves no clearing of trees</li> <li>• Location accessible for cars and trucks</li> </ul>
Transmission mains from Nosiri head works to Nabada reservoir	<i>Transmission mains from headworks to Nabada reservoir.</i> Alignment follows existing roads. Mitigation of impact by rehabilitation / reconstruction existing pipelines.
Nabada reservoir	<i>Nabada Reservoir Site.</i> UWSCG owned site, no additional land acquisition required
WTP Grouli	Located close to Grouli springs. Ensuring of permanent good water quality
Transmission Pipeline installation	Alignment follows existing road, which is not very crowded and less impact occur during implementation and future operation and maintenance. There is no much alternative, unless crossing private lands, which is not preferable. As headworks and network are already existing and sub-project is just connection between headworks and network, this is the only reasonable solution.

## 2. Water Supply System (IEE)

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

The following components are designed:

43. Headworks:
- WTP Grouli
  - Disconnection / connection of villages from / to transmission lines
  - Rehabilitation of Nosiri well field, connection of 8 wells, electrical installations (29 pumps)
  - Replacement of section of DN 600 transmission main under bridge over Rioni River
  - Replacement of Nabada reservoirs and pumping station
  - Installation of transmission pipeline and disconnection of old pipeline.

## F. Licenses & Approvals Required

44. 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.

45. None of the components of the proposed water supply improvement subproject in Poti and Abasha are notified in the Law on EIP and therefore environmental impact permit is not required. According to current legislations in force, water abstraction from a surface water source does not require any permission/approval from Government of Georgia.

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

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

47. 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. Due to changes in headwork design an additional public meeting was held in Poti on 11th of May 2012. More are attached as Appendix 1.

### **1. ADB Policy**

48. 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.

49. 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.

50. 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.

51. 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.

52. The Poti Water Supply subproject 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 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.

## 1.1. International Standards

### 1.1.1 Ambient Air Quality

Projects with significant<sup>1</sup> sources of air emissions, and potential for significant impacts to ambient air quality, should prevent or minimize impacts by ensuring that:

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

Table 1 : WHO Ambient Air Quality Guidelines		
	Averaging Period	Guideline value in mg/m3
Sulfur dioxide (SO <sub>2</sub> )	24-hour	125 (Interim target)
	10 minute	500 (guideline)
Nitrogen dioxide (NO <sub>2</sub> )	1-year	40 (guideline)

<sup>1</sup> Significant sources of point and fugitive emissions are considered to be general sources which, for example, can contribute a net emissions increase of one or more of the following pollutants within a given airshed: PM10: 50 tons per year (tpy); NOx: 500 tpy; SO<sub>2</sub>: 500 tpy; or as established through national legislation; and combustion sources with an equivalent heat input of 50 MWth or greater. The significance of emissions of inorganic and organic pollutants should be established on a project-specific basis taking into account toxic and other properties of the pollutant;

	1-hou	200 (guideline)
Particulate Matter PM10	1-year	70 (Interim target)
	24-hou	150 (Interim target)
Particulate Matter PM2.5	1-year	35 (Interim target)
	24-hour	75 (Interim target)
Ozone	8-hour daily maximum	160 (Interim target)
		100 (guideline)

### 1.1.2 Noise

25. Noise prevention and mitigation measures should be applied where predicted or measured noise impacts from a project facility or operations exceed the applicable noise level guideline at the most sensitive point of reception. The preferred method for controlling noise from stationary sources is to implement noise control measures at source.

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

Table 2 Noise Level Guidelines

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

### 1.1.3 Water Quality Standards

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

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

Table 3 water quality standards

parametr	World heals Organization	European Union	EPA

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

## 2. Georgian Law

53. The **Law of Georgia on Environmental Permit** (2008) establishes legal bases 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. These are not the subject of this IEE.

54. 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.

55. 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.

56. 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

57. A feasibility study was conducted to improve the water supply system in Poti to meet the design year demand (2040) and the project is formulated for implementation under the proposed ADB funded Investment Program. Works are proposed to be implemented through multi tranche funding. **Table 2** shows the subproject and components selected for implementation under tranche-1, for which, according to ADB requirement, this IEE is conducted. Photographs of project sites are shown in Appendix 1.

#### A Sub Project Components

58. This subproject focuses on a new transmission main from existing source and water storage including pumping stations. The descriptions shown in **Table 2** are based on the present stage of the final design.

**Table 2: Proposed Subproject & Components Water Supply System**

Infrastructure	Function	Description	Location
<b>Water Supply components of the subproject</b>			
WTP Grouli	Water treatment	Treatment and disinfection of water by chlorine	Near Grouli springs, located to the north-east of Senaki village
Reconstruction of Nosiri well field	To provide constant supply of potable water	Rehabilitation and connection of 8 wells to transmission lines. Electrical installations (new pumps)	Nosiri well field, located to the East of Senaki village
Transmission mains from Nosiri well field (head works) to Nabada PS / reservoir by gravity or by pumping	Convey water from the well fields to Nabada PS / reservoir. Connection of villages to transmission lines	Rehabilitation of existing transmission lines DN 350, DN 600 and DN 700	Area between well field and Nabada reservoir
Reconstruction of Nabada reservoirs and pumping station	Storage of water	Construction of 5 squared reservoirs, 3,150 m <sup>3</sup> each	Existing Nabada water supply area
Reconstruction of Nabada pumping station	Distribution of water within the water supply system	From the Nabada reservoir water is supplied to the city system via a pumping station located on the	Existing Nabada water supply area

Infrastructure	Function	Description	Location
<b>Water Supply components of the subproject</b>			
WTP Grouli	Water treatment	Treatment and disinfection of water by chlorine	Near Grouli springs, located to the north-east of Senaki village
		same site. Operating pumps are in bad condition and need to be reconstructed.	
Water Supply Transmission Pipeline	Transmission of water from headworks to the town	Installation of new 15km transmission pipeline with maximum 500mm diameter PE pipe.	Public road between Headworks and town Abasha

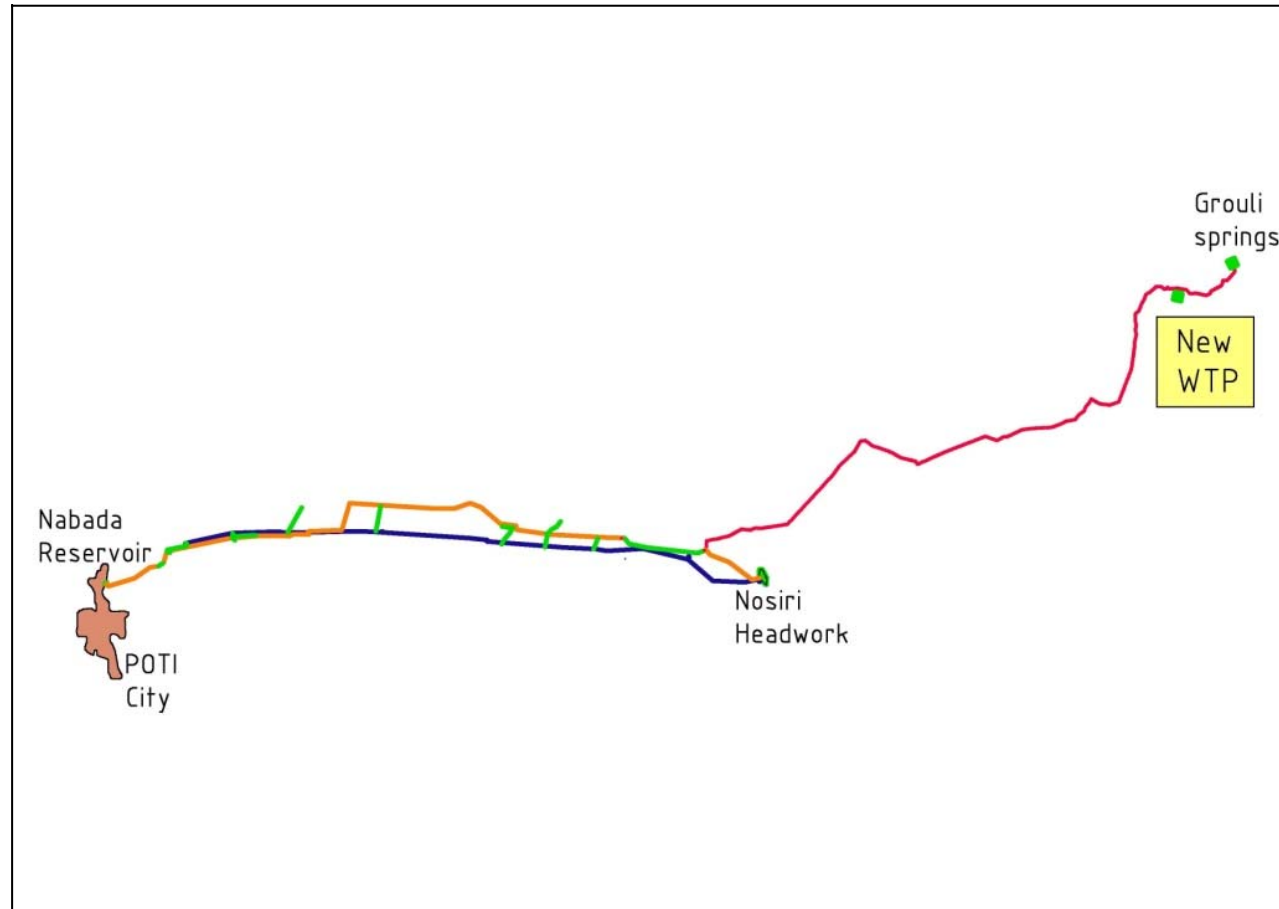
59. The proposed water supply infrastructure improvement works have been elaborated based on the development goals identified in the Feasibility Study.

60. A new WTP will be constructed for treatment of water from Grouli springs.

61. Grouli is a spring that has been tapped and connected to the water supply system with a new GRP DN 500 pipe only a few years ago. The source cannot be used up to 50% of the year due to high turbidity in the raw water. A new treatment plant will increase the number of days Grouli can be connected to the water supply of Poti.

62. In order to reduce operation and maintenance it is proposed to install simple filter units without flocculation. This unit may not be able to treat the raw water sufficiently on days with very high turbidity but it will considerably increase the number of days filtered Grouli spring water can be used as drinking water. During days of high turbidity, Nosiri well field will increase the production. The yield of the well field is large enough to cover the demand of Poti alone. The high costs for operation and maintenance do not justify the construction of a water treatment plant with the full conventional treatment, when Nosiri well field can easily increase its production during days when the WTP Grouli is put out of operation.

63. The WTP will be located south of the village of Meore Balda. Here, the incoming pressure is high enough to pass through the filter units and the elevation at the outflow is sufficient to supply Poti with gravity.

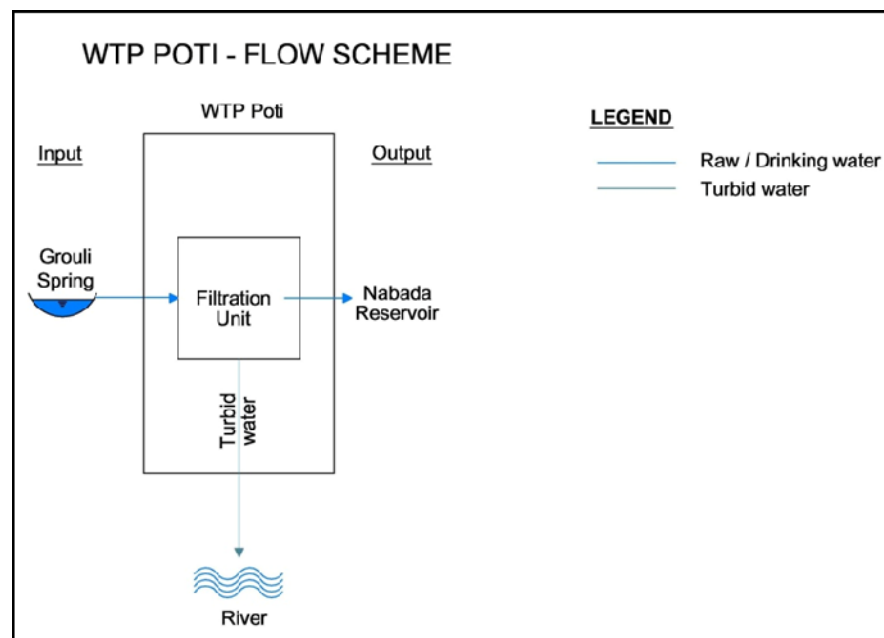


**Figure 1** Location of WTP



**Figure 2 Site of WTP**

64. The following figure sketches the flow schemes for the proposed water treatment technology for the WTP Poti.



**Figure 3 Flow scheme WTP**

The capacity of the plant will be 240 l/s.

## B. Construction Activities

66. *Construction of Water Treatment Plant Grouli.* Water treatment plant will involve construction of filter unit and chlorination facility, both of which will be located in a building. Filter unit consists of large rectangular tanks of adequate size filled with filter media (graded sand), pipes (inlet, outlet and backwash pipes) and fixtures. The chlorination facility will be a small unit to administer the chlorine into filtered water. Construction of the water treatment plant will be similar to building construction – excavation for foundation fixing of reinforcement and pouring of concrete mixed into voids to form foundation and columns, over which RCC roof will be laid in the similar manner. Walls will be constructed with locally available building stones/cement blocks. Rectangular RCC tanks for filter beds will be constructed similar to any tank/reservoir. Concrete will be mixed in mixer and needle (pen) vibrator will be used for compaction of concrete around the reinforcement. The quantity of earthwork or surplus soil generated from this work will be available only after design of the units; however, this quantity will be insignificant and can be used within the site to level the ground surface.

67. *Reconstruction / Rehabilitation of Nosiri well field* consists of drilling activities and electrical installations. No major earthwork activities are involved.

68. *Laying of Transmission Mains.* Existing transmission mains will be amended to connect villages in between Poti and Senaki village to 350 DN pipe and disconnect from DN 700 and DN 600 pipes. Part of DN 600 transmission line will be replaced under bridge crossing Rioni river in order to reduce hydraulic losses. Trenches for new pipe sections will be dug using a backhoe digger, supplemented by manual digging. For Abasha subproject, new transmission main will be installed with maximum DN500mm and length will be approximately 15km.

**Asbestos:** If any 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 5** EMP matrix. Also, Asbestos management plan shall be taken into consideration.

69. 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.

70. *Construction of water network.* This subproject has already been included in a project financed by EIB (European Investment Bank). This project is currently under progress, therefore, not covered under this IEE.

71. *Construction of Reservoir.* Reservoirs will be constructed within the premises of the Nabada water supply. 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.

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

73. Water needed for civil works comprises potable water and construction water. Potable water will be taken from the water supply network in Poti. Construction water and water to be used for dust suppression measures will be taken either from the Rioni River or from ground water. Quantity of these resources is not a critical issue. Prior to use as construction water a quality test shall be conducted.

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

74. Treatment will consist of sand filtration, in which water will be passed through a sand bed, and, application of chlorine into the water supplies. Average dose of chlorine will be about 5 mg/l; maximum daily usage of chlorine will be 32 kg. A solid powder solution containing chlorine will be used as disinfectant (most commonly used is Sodium Hypochlorite, NaClO, in white powder form), which contains about 25% of chlorine.

75. 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**

76. Poti is located in the western part of the country on the eastern coast of the Black Sea, approximately 310 km west of Tbilisi, the capital of Georgia, and about 40 km southwest of Zugdidi. Geographically located at 42°08'32" North latitude and 41°40'31" East longitude. Altitude ranges from 2 m to 4 m above the mean sea level (MSL).

77. 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.

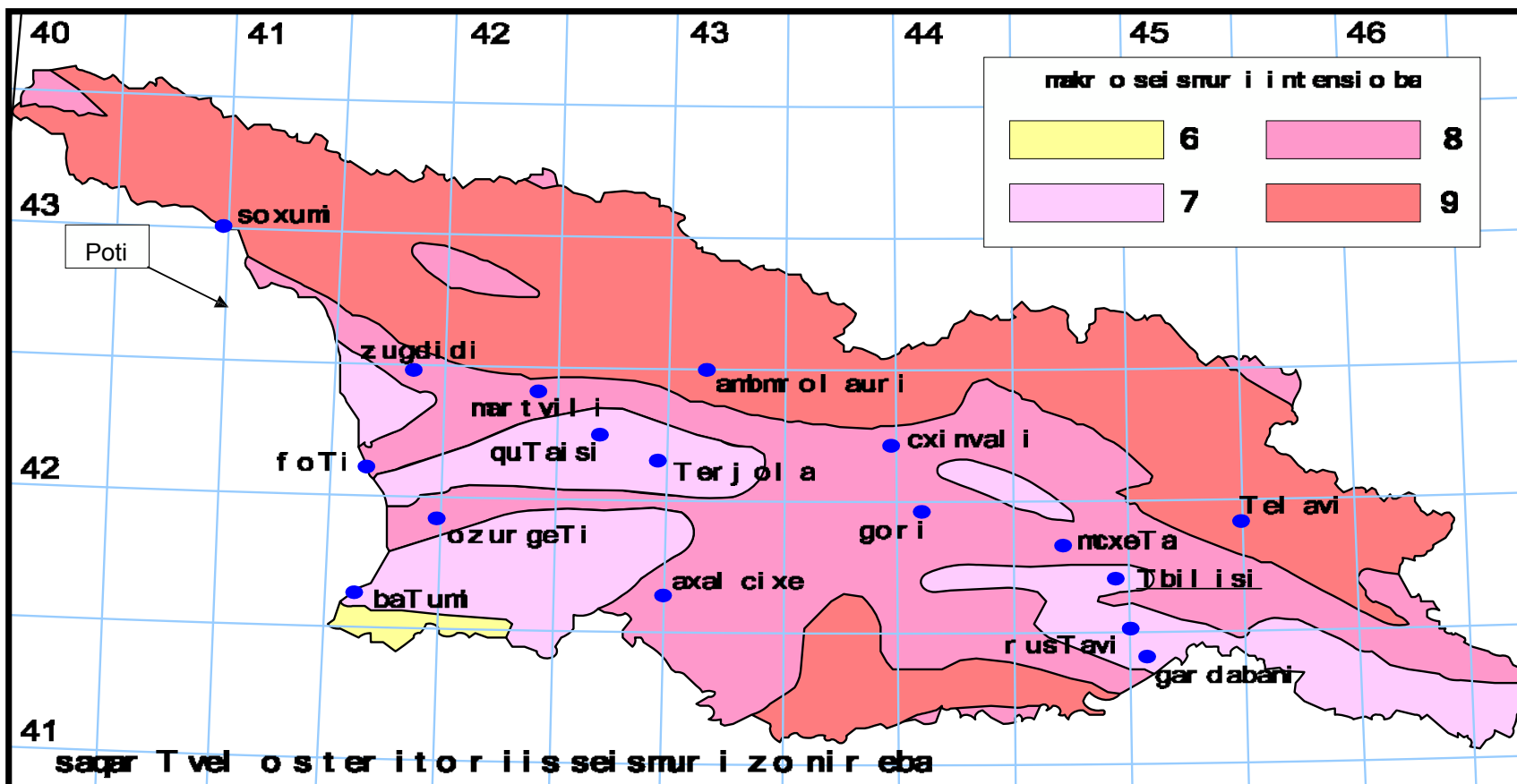
### **B. Topography, Geology & Soils**

#### **1. Baseline Conditions**

78. *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. Poti borders to the Black Sea to the west; to the north the left tributary of the rivers Rioni and Khobi and to the southeast the river Kapartchina and Paliastomi Lake. The City itself is located at sea level on the sea end of an alluvial plain of the Kolkhevi lowland. The city is divided into two parts by the original mouth of the Rioni River. It covers an

area of approximately 59 km<sup>2</sup> and is administratively divided into four municipalities: Centre, Nabada, Island, and Maltakva. It is one of the main population centres in the country.

79. *Geology*, Poti belongs to the western dipping region of the Georgian block. The territory is basically structured by recent (Q4) – new black marine, old black marine (Holocene) and upper quaternary Q3 – new Euxine, beach and deltaic loose quaternary deposits. In the region, gathering deposits were connected to transgressions and regressions. Gathering deposits from about 30 m to 100 m are connected to new Euxine regression, but gathering younger deposits (from 15 m to 30 m) are connected to Pontic and Kolkhian regressions; as for the uppermost layer gathering deposits to 15.0 m depth are connected to Lazian transgression. By geomorphological viewpoint, Poti is located on west ending of Kolkheti Plain, on accumulative seaside plains and partly on the river Rioni terraces. The surface is straight, almost flat, bending a little to the seaside, partly marshy (both banks of the river Kaparcha, riverbed and etc). Peat and moisture loving plants are spread on the surface. The soils are structured by Quaternary deposits; their thickness is more than 100 m. Holocene deposits genetically represent marine deposits, but lithologically – sands and silty sands. Groundwater levels range from 0.3 to 2.0 m depths. Poti belongs to 8 scale seismic region according to the scheme of seismic regionalization of Georgia (Construction Norms and Rules “Seismic Resistance Construction” – pn 01.01-09).



Map 2: Seismic Zones of Georgia



80. *Soil.* The soils are structured by quaternary deposits; their thickness is more than 100 m. Holocene deposits genetically represent marine deposits, but lithologically – sands and silty sands. The natural soils (especially within the city boundaries) are covered with 0.15 - 1.3 m thick technogenic soils (tQIV) – GE 1 (cobbles, gravel, sand, construction residuals and others). In the upper part of lithological section, firm clays are rarely observed. Their thickness changes within 0.6 - 2.5 m. Clays are characterized by local distribution. Besides the soils mentioned above, several types of sand of various density and grains are observed.

## **2. Impacts during Construction**

81. During the construction, impacts on topography and geology are mainly due to excavation activities.

82. Excavation works for reservoirs, pumping station and WTP will generate significant quantities of surplus material. These however will be confined to the project sites, 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. When pipe laying material will be stored temporary alongside the trench and build in again after pipe laying. Because existing transmission mains are used only small amounts of excavated soil will result.

83. Works do not involve deep excavations. Loose quaternary deposits are available due to geological conditions. Rock cutting is not required.

84. 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

85. The excavation for the transmission lines comprises material excavation, pipe laying and backfill of material including compaction. Material will be stored temporary alongside the trench and build in again after pipe laying. Therefore impacts associated with earthworks for trench laying are of temporary nature. Excavated soil will be placed alongside the trench, and the pipes will be placed in the trench manually. A sand layer of 30 cm thickness will be laid on top of the pipe, after which the trench will be refilled with excavated material and compacted manually. The size of trench will be 2.2 m deep and 1.15 m wide. The excavation is expected to generate surplus material. After construction, part of the trench will be filled with pipe and the sand layer and the trench is then refilled with the excavated material. Surplus material will be used as embankment fill as far as possible.

86. Surplus soil needs to be disposed properly without causing further physical impacts on topography or soil at the point of disposal. This will require:

87. Utilizing surplus soil for beneficial purposes such as in construction or to raise the ground-level of low lying sites

88. The excavation and refilling works will disturb the soil characters at the sites. The excavation will lead to disturbance and loss of fertile top soil. Therefore the Contractor should implement the following measures:

89. Top soil of about 1 ft depth (about 0.2-0.3 m) shall be removed and stored separately during excavation work, and after pipeline construction the same soil shall be replaced on the top. Depth for foundations for water treatment plant component needs to be determined with the detailed design being further developed.

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

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

91. *Source of construction materials.* Sand should be sourced from River Rioni and aggregate is sourced from licensed crushers. In case that material demand exceeds supply it needs to be transported from River Enguri about 30 km north of Poti. In case that it is required to open new excavation sites, these sites need to be legally approved according to Georgian legislation and rehabilitation measures shall be foreseen.

92. *Contractor's yard:* The establishment of contractor's work camp may cause adverse impacts if various aspects such as liquid and solid waste management, equipment maintenance, materials' storage, and provision of safe drinking water are not addressed properly. The site for the work yard will be selected by the contractor.

93. 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 and wet lands. Storage facilities for fuels and chemicals will be located at a distance to Rioni River and wet lands. 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.

94. 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 during Operation**

95. Regular operation of water supply system will be within the constructed facilities and therefore no impacts are envisaged. Construction of new WTP at Grouli results in permanent loss of soil due to surface sealing. Regular operation and maintenance of WTP Grouli will not result in any significant impacts on soils and Geology.

96. 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**

97. *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 and the rivers in the west join the Black Sea. These two basins are separated by Likhi Ridge. The project area, Poti, is situated at the estuary of the Rioni River. The river flows about 1 km north of the city. The Black Sea borders the western district.

98. Originating in the Caucasus Range, Rioni River is the main river in western Georgia draining around 20 % of the country (Map 3). The length of the river is 327 km. The catchment area is around 13,400 km<sup>2</sup>. The spring is located at 2,960 masl. Poti is developed in the mouth of River Rioni.

99. The river experiences floods after snow melting in spring and low flow in warmer periods. In July-September flow normally is low. Water quality is bad due to the discharge of domestic and industrial waste water. Prior to use as construction water a quality test shall be conducted.

Map 3: River Network in Western Georgia

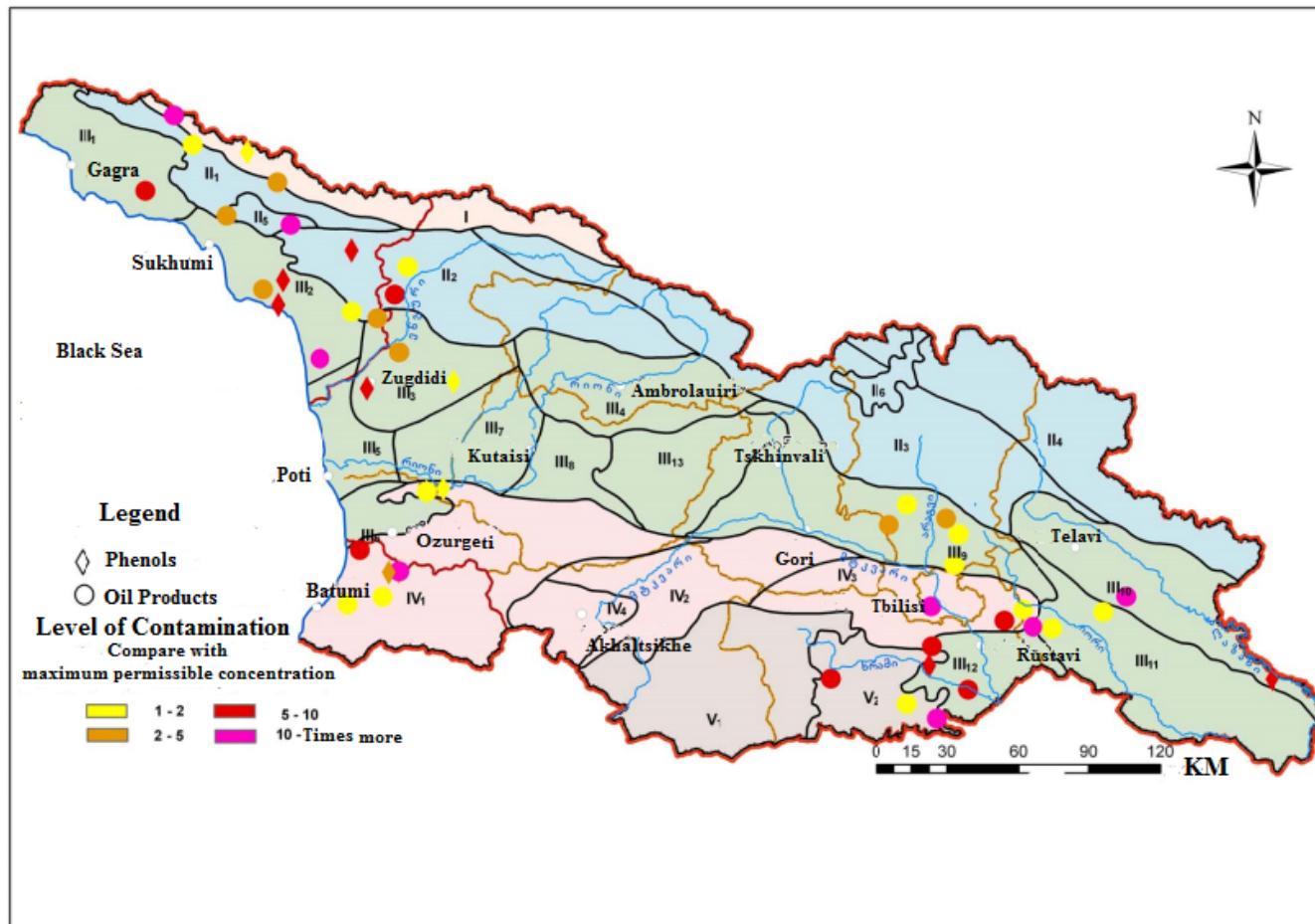


100. Data on quality of the country's surface waters is extremely limited. Tentative observations that have been made are that:

101. Surface water quality probably exceeds Georgian (and comparable international) norms many times over throughout the main flows of both the Rioni and Kura rivers. Organic pollution and bacteriological contamination due to the discharge of waste water is expected.

102. *Groundwater.* Based on the groundwater characteristics, Georgia is divided into five hydro-geological zones, which are further defined into sub-zones/districts. Project area, Poti, is in Zone – III<sub>5</sub> (alluvial deposits along rivers, **Map 4:**). Water bearing strata of contemporary alluvial deposits characterized by free groundwater table decline along the general flow of the river. The water table depths vary from 2.0 m to 5.0 m. The aquifer is characterized by rich water resources. It is mainly fed from rivers and precipitation. Despite the aquifer is rich with water, its practical water use is limited.

Map 4: Hydro-geological Zones of Georgia



103. Chemical analyses of ground water samples were carried out during geotechnical investigation in June and in August 2011. High concentrations for anions and cations were assessed (Table 4).

No.	BH / TP no.	Cli- mate	Sam- pling Depth, m	Unit	Content per 1 liter							PH
					Anions				Cations			
					Dry residual	HCO <sub>3</sub> <sup>-</sup>	CL <sup>-</sup>	SO <sub>4</sub> <sup>-</sup>	Ca <sup>++</sup>	Mg <sup>++</sup>	Na <sup>+</sup> +K <sup>+</sup>	
1	2	3	4	5	6	7	8	9	10	11	12	13
1	1	Nor- mal and Wet Cli- mate zone	1,00	mg-l	3654,00	620,00	1752,00	6,20	50,50	154,00	1032,00	7,20
				mg-equiv.		10,16	49,41	0,13	2,52	12,66	44,51	
				% mg-equiv.		17,02	82,76	0,22	4,22	21,22	74,56	
2	20		1,00	mg-l	3021,00	635,00	1562,00	15,60	61,10	137,00	957,00	7,30
				mg-equiv.		10,41	44,05	0,32	3,05	11,27	40,47	
				% mg-equiv.		19,00	80,41	0,59	5,57	20,57	73,87	
3	21		0,50	mg-l	2254,00	589,00	652,00	10,50	90,60	54,10	452,00	7,30
				mg-equiv.		9,65	18,39	0,22	4,52	4,45	19,29	
				% mg-equiv.		34,16	65,06	0,77	16,00	15,74	68,26	
4	32		1,10	mg-l	2731,00	65,20	1112,30	7,60	105,00	83,20	467,00	7,20
				mg-equiv.		1,07	31,37	0,16	5,24	6,84	20,51	
				% mg-equiv.		3,28	96,24	0,49	16,08	20,99	62,93	
5	38		1,50	mg-l	1356,00	680,00	225,00	17,40	77,90	44,30	226,00	7,10
				mg-equiv.		11,15	6,35	0,36	3,89	3,64	10,32	
				% mg-equiv.		62,43	35,54	2,03	21,77	20,41	57,82	

**Table 3: Chemical Analyses of five Groundwater Samples during Geotechnical Investigations (June 2011)**

## 2. Impacts and Mitigation Measures during Construction

104. Impacts and Mitigation Measures during Construction Construction of reservoirs and pumping station will cause only little decrease in surface water infiltration.

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

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

107. The ground water table is expected to be higher than the excavation depths and therefore it is expected that construction will interfere. Ground water will be pumped from open trenches during construction if required. Leaking of construction machines and refueling close to ground water should be avoided as a mitigation measure to prevent water contamination.

108. Basically construction of water network has no impact on ground water when considered over the long term. Short term it will be necessary to pump groundwater from all pipelines and structures which will temporarily draw down the water table. Care will have to be taken not to effect nearby structures, though this is less of a problem with water supply than sewerage projects.

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

109. During the operation stage no effects on groundwater is envisaged. However as this is a ground water based water supply system, the effects due to water abstraction from the source and source water contamination risk needs to be assessed.

110. Generally the main risk to the physical environment of operating a new/improved water supply system is that of increased abstraction, which may deplete the water resource. Unsustainable reduction may affect downstream uses and may have ecological impacts (such as on flora, fauna and inadequate groundwater recharge). On the other hand, unsustainable source may also lead to closure of the system and wastage of investment.

111. However, in the present project, water is being abstracted from existing wells. Present water quality is suitable for drinking after conventional treatment for turbidity and pathogens and the necessary treatment facilities are part of the project. There are no major water pollution sources in the catchment, so there is no risk of source water contamination. At Nosiri wells treatment will consist of chlorination only. At Grouli WTP there need to be turbidity removal and chlorination.

112. An important aspect of increased water supply is that of increased sewage generation, which needs to be treated and disposed properly without causing any impacts. In case of inadequate facilities, disposal of untreated sewage into rivers/streams is common and therefore it offers a potential impact to surface and groundwater.

113. The existing sewer network was designed as a separate system and covers the centre of Poti. The existing treatment facility is out of operation and untreated sewage is disposed into Rioni River. Households not serviced by sewerage network either depend on septic tanks/pit latrines or dispose directly into Rioni River.

114. With the current project, water supply will be increased further. The increase in water supply may increase the sewage generation until the effects of water metering reduce the water consumption.

115. Without any proper sewage collection, treatment and disposal system, the increased sewage will have negative impacts on receiving water bodies. It is therefore necessary that:

- Existing sewerage system is to be replaced by a new system to cover 100% of the population
- Sewage system must be connected to a WWTP, which can treat the sewage to European standards and dispose safely
- The above measures will be implemented in a separate sub-project which will follow the water supply system improvement sub-project.

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

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

116. *Air Quality.*

106. According to the visual audit results, no stationary sources contributing to ambient air contamination are located within the study area. The quality of the ambient air in the study area may be affected by exhaust gases produced by machinery and transportation means operating in the sites of the nearby container terminals and production facilities, as well as by the vehicles moving along the city bypass road. It is obvious that no air quality gauging stations exist in Abasha for years, and therefore practically no air quality data are



available for the project impacted area. Due to such situation, it was found reasonable to apply the methodology approved by the Ministry of Environment and Natural Resources of Georgia (PD 52.04,186-89). This methodology recommends application of the population-based approach for evaluating the baseline ambient air condition for the areas lacking any observation data (**Table 26**).

**Table 26: Recommended baseline pollution levels by population quantities**

Population (‘000 persons)	Baseline pollution level, mg/m <sup>3</sup>			
	NO <sub>2</sub>	SO <sub>2</sub>	CO	Dust
250-125	0.03	0.05	1.5	0.2
125-50	0.015	0.05	0.8	0.15
50-10	0.008	0.02	0.4	0.1
<10	0	0	0	0

117. *Climate*. The City is reported as having a subtropical climate. Winter is mild and warm with the average temperature in January being around 5 degrees centigrade, and temperatures in summer months increasing to between 20 and 25 degrees centigrade. The

city is located in high rainfall in the humid western part of the country and has abundant rainfall that average about 2,000 mm pa. The climate condition estimation for the investigated site is based on meteorological station data of Poti. Data are obtained from the construction climatological standard (pn 01.05-08). According to climate regionalization map of Georgia the region belongs to III climatic and III-b sub region.

## **2. Impacts during Construction**

118. 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.

119. 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 involves significant quantities of earth work. Action will therefore be needed to reduce 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

120. 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

121. Impacts during Operation

## **E. Biological Environment**

### **1. Baseline Profile**

122. About 40 percent of the total geographical area of the country accounts for forests. The average density of forests is 163 m<sup>2</sup> per ha. 97 percent of forests is located on moun-

tains, the remaining 3 % are low-lying and flood plain forests in Kolhida Region and in Western Georgia.

123. The construction will not pose any hazard to the possible existence of the species included in the Red List since the water supply subproject has no significant impacts.

124. *Biodiversity* Georgia is located in the southern Caucasus. The Caucasus is recognized as one of the world's 25 biodiversity hot spots and Georgia is recognised to have a rich biodiversity. Georgia's flora and fauna are also characterized by a high degree of endemic, subendemic and relict species. According to the actual biodiversity index (ABI) and the average biodiversity index (BDI), Georgia ranks first in Europe and 36th in the world in terms of biodiversity (Fig. 8). The study areas for the options range from Poti, located on the Black sea coast within the Kolkheti lowland, a very humid, Mediterranean-type refugial zone, to Grouli in the humid mountain forest in the foothills of the mountains western Georgia.

Figure 4 Bio-geographic regions of Georgia



## 1.1 Protected areas

125. There are 24 natural protected areas in Georgia under the administration of the State Department for the Management of Protected Areas. These represent 4.1% of the country's territory. The Law on Protected Areas System of 1996 provides for categories administered by different bodies, such as the Ministry of Food and Agriculture, the State Department of Forestry, local governments, and others. As the system is currently under review, protection status of existing areas may change and new areas for designation are likely to be identified by ongoing projects. The Law does however define protected areas according to recognized IUCN categories.

126. Several projects for protected areas are ongoing. Examples are the World Bank project for Integrated Coastal Zone Management (ICZM) in the Black Sea Region (ICZM Project Implementation Unit), the UNDP/GEF project for the Conservation of the Arid and Semiarid Ecosystems in the Caucasus, the World Bank/GEF Georgia's Protected Areas Development Project and the EMERALD Network pilot project.

127. The two national parks - Borjomi-Karagauli and Kolkheti - have been established recently. Kolkheti National Park comprises diverse ecosystems such as the continental shelf and coastal zone of the Black Sea, meadows, wetlands and plain forest over an area of 44,313 ha around Poti. State nature reserves are generally long established and were mostly set up on forest land, for example the Kolkheti nature reserve near Poti (Figure 5).

128. There are two Ramsar sites in Georgia including the wetlands of central Kolkheti (33,710 ha) located near Poti which were designated in 1997. These areas are indicated in the map from the 1995 State of the Environment Report (GRID).

129. *Flora, Fauna.* 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 the Protected Areas are covered by forests. The primary function of the Protected Areas is the protection of the natural heritage of the country. Kolkheti National Park is located in western Georgia. It covers the eastern zone of the Black Sea coast and the basin of the Paliastomi Lake. The Park is established with the purpose of protection and surviving of wetland ecosystems.

130. The territories of Kolkheti national park are interesting, first of all, by botanic point of view. The complexes of phytocoenosis are rich in quite diverse, relict and endemic species, and various compositions have remained there till present – they are different plant communities of the mires, swampy forests and sand dunes located along the coastline. The following plant species occur:

- spurge (*Euphorbia*)
- eringo (*Eringium coeruleum*)
- Colchis sedge (*Carex colchica*)
- Imeretian cogongrass (*Imperata cylindrica*)
- astragalus (*Astragalus caucasicus*)
- Marsh woundwort (*Stachys palustris*)
- catchfly (*Silene*)
- Jerusalem Thorn (*Paliurus spina-christi*)
- hawthorn (*Crataegus*)
- Sea-buckthorn (*Hippophae rhamnoides*)

131. Along the lakes and marsh rivers in the wetlands the following plants can be found:

- Colchis water-lily (*Nymphaea colchica*)
- Yellow water-lily (*Nuphar lutea*)
- Colchis water chestnut (*Trapa colchica*)
- Lesser duckweed (*Lemna minor*)

and in the peaty mires together with the north tundra species

- Royal fern (*Osmunda regalis*)
- Imeretian sedge (*Molionia litoralis*) gvxvdeba.

132. In total 194 species of birds inhabit the Kolkheti National Park. The following species occur:

- Small water cock (*Gallinula chloropus*)
- Heron (*Ardea cinerea*)
- bright blue kingfisher (*Alcedo atthis*)
- Common Buzzard (*Buteo buteo*)
- Black Kites (*Milvus migrans*)
- Common and Lesser Kestrel (*Falco tinnunculus*, *Falco naumanni*)
- Eurasian Hobby (*Falco subbuteo*)
- European Honey-Buzzards (*Pernis apivorus*)
- White-tailed Eagle (*Haliaeetus albicilla*)
- Steppe Eagle (*Aquila nipalensis*)
- Imperial Eagle (*Aquila heliaca*)

133. The following mammals exist:

- jackal (*Canis aureus*)
- Wild boar (*Sus scrofa*)
- Roe deer (*Capreolus capreolus*)
- otter (*Lutra lutra*).

134. It is remarkable, that 6 species of the Red List of Georgia can be found here. The marine mammals are presented by 3 species of dolphins:

- the Bottle-nose Dolphin (*Aphalina*)
- White-sided Dolphin (*Lagenorhynchus acutus*)
- Herring hog (*Phocoena phocoena*).

135. The following amphibians inhabit the Kolkheti protected area:

- common Tree frog (*Hyla arborea*)
- Marsh frog (*Pelophylax ridibundus* )

136. The Ichthyofauna of the National Park is presented by 88 species, out of which 23 species are transiting, 21 species live in fresh water and 44 species live in the Black Sea.

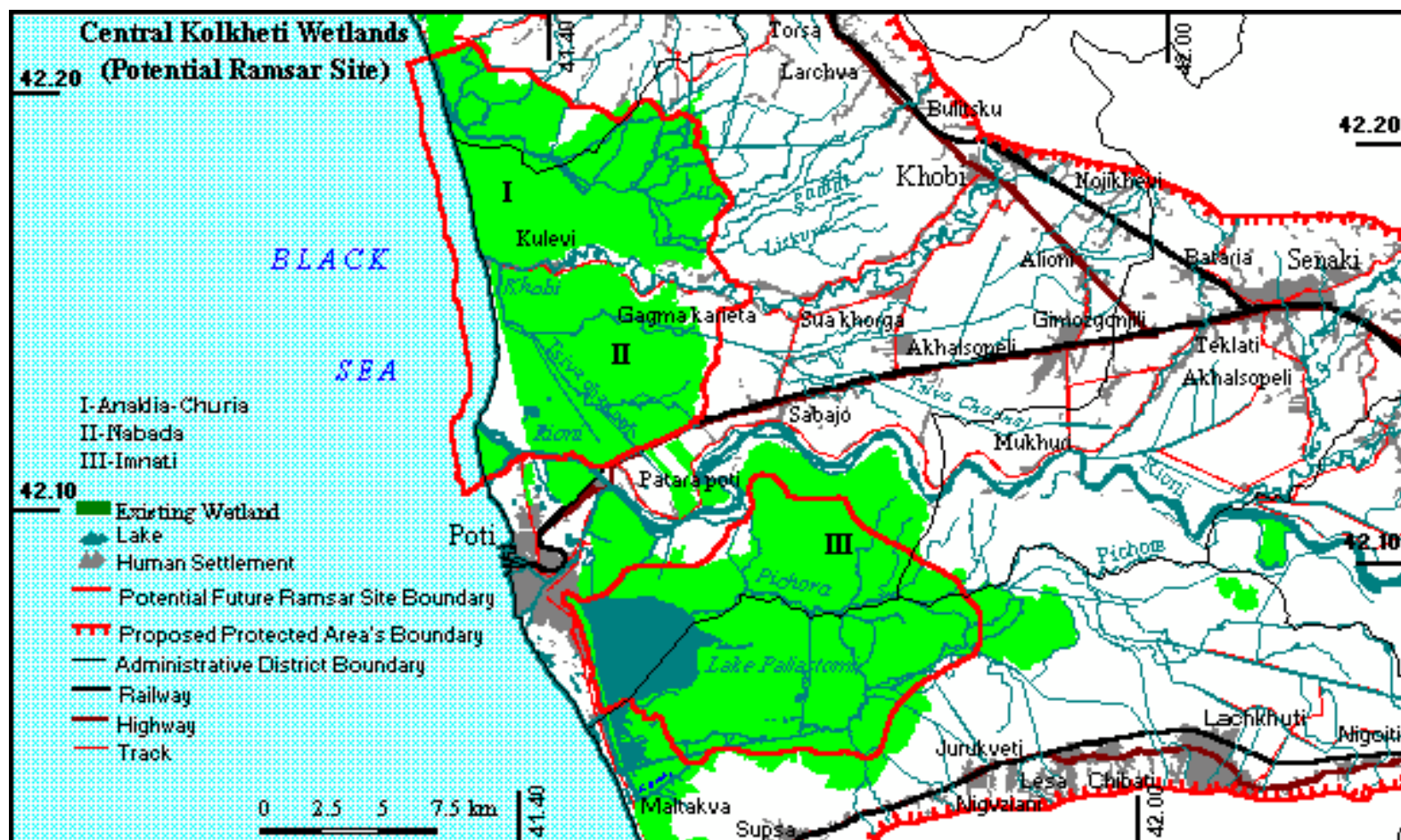


Figure 5 Central Kolkheti Wetlands (State of the Environment 1995)

## **2. Impacts during Construction**

137. The protected area of Kolkheti National Park will not be affected during the construction of the transmission mains for the water supply, which will follow the existing transmission corridors.

138. 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 existing structures (existing reservoir, pumping station and existing transmission main).

139. 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.

## **3. Impacts during Operation**

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

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

### **A. Economic Resources**

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

141. *Land use.* Poti is surrounded by marsh land. Animal husbandry for meat and milk products, as well as farming exist in the suburban areas. Potato and corn are the important crops in the area.

142. *Industries and commercial activities.* The city accounts for 21 % of the total industrial production in the region. It is also the main economic and commercial centre in the country with activities heavily focused around its port. The Port is the central economic activity in the City directly accounting for around 20% of private sector employment in the City. As a result of the port and trading activity, the City has a comparatively well developed banking sector. These provide an important source of employment.

143. *Roads & transport.* The City of Poti is the most important port, providing its only secure access to the sea in Georgia and is also an important port in the context of the Caucasus region. As such, the City has, and continues to be, a regionally important trading centre and transport corridor with road and rail links to Armenia, Azerbaijan and onwards to countries including Turkmenistan, Uzbekistan and Kazakhstan. Internal roads in Poti are developed.

144. *Urban Services.* UWSCG provides water supply and sewerage services in the town. Nosiri well field is the main source of water supply. A sewerage system is in operation. The existing wastewater treatment facility is out of operation. The collected wastewater is dis-



posed into River Rioni without any treatment. Storm water drainage is available in part of the town. The solid waste management system is not well developed; waste is collected and disposed of in a dump site south of the city close to Rioni River.

145. *Power Supply.* After the independence, the Government of Georgia has made efforts to improve the power supply through new generating sources. Hydropower is the predominant source (88%), while the rest is from gas based thermal power stations. Poti gets uninterrupted good quality electricity supply from Enguri Hydropower Station.

## **2. Impacts during Construction**

146. For the location of the Nabada Reservoirs and pumping station, the government has selected the site of the existing reservoirs. The construction will take place on public land (land fill and access road).

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

147. Another aspect of construction work that has economic implications is the transportation of material to the site. As most of the excavated material is expected to be re-used, the volume of surplus material generated from the construction work is expected to be minor. Even as the transport of material is not significant, considering the large roads, it could disrupt traffic in the Town. Dust generated during the transport may also impede the commercial and trade activities, which are predominantly located along the main roads in Poti. 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**

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

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

### **1. Baseline Profile**

149. *Demography.* The present population of Poti is 47,700. The City has an estimated refugee population of around 4,250. Contrary to overall growth rate of Georgia, which had declined during the last two decades, the population of Poti has increased marginally.

150. *Population Composition.* Almost the entire population in Poti is ethnic Georgians. Georgian is the main language, while most can speak Russian, a few can also speak English. There is no population which can be categorized as indigenous in the project area.

**Table 4: Population of Project Area**

<b>Year</b>	<b>Population</b>
2010	47,700
2020	91,352
2030	96,024
2040	98,452

151. *Education & health facilities.* The City of Poti with a population of 47,700 inhabitants is the main administration centre in the region and is the centre for the most social services. The City has basic educational, including a university, and medical facilities:

- 4 kindergartens
- 12 nursery
- 12 schools
- 1 university
- 2 hospitals

152. *History & Culture.* Historically and ethnographically, Poti has always been regarded a chief community of Samegrelo - Zemo region. The town known as former Greek colony has been an important centre of Georgian culture for centuries.

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

153. There are various social-cultural resources (such as schools, hospitals, churches and tourism spots) in the town. Depending on the prevailing wind situation, the construction impacts 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 and waste quickly; by covering and watering stockpiles, and covering soil with tarpaulins when carried on trucks
- Providing wooden walkways planks across trenches for pedestrians and metal sheets where vehicle access is required
- Increasing the workforce to complete the work quickly
- Dust suppression by spraying water

154. There is invariably a safety risk 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), and suits especially when moving the existing landfill
- 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

155. Samegrelo - Zemo Region, including Poti, is an important centre of Georgian history and culture. So there is a risk that any work involving ground disturbance could uncover and damage archaeological and historical remains. Therefore steps should be taken to minimize the risk. 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 that they are protected and conserved. 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.

156. *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

157. *Archeaological 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.

158. 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. One meeting was conducted in Poti 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.

159. 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. Furthermore **Appendix 3** provides a Chance Find Checklist to be followed.

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

160. No negative impacts resulting from the water supply system are envisaged.

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

162. The main beneficiaries will be the citizens of Poti, who will be provided with a reliable water supply 24 hours/day. 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. Availability of good infrastructure will boost the tourism economy.

## **C. Noise & Vibration**

### **1. Baseline Profile**

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

For Abasha project, the noise level was measured on three different points where transmission pipeline will be installed. The noise level was measured with South Korean equipment „Digital Sound Level Meter“(Figure 13 and 14).

136. This equipment measures noise with 1-second intervals and plots the relevant diagram. Neither of the two points where the noise level was measured is not densely populated and is not located near the road mains. The measurements at all three points were done in a 5-minutes interval. The results of the measurements are given in following table.

<b>Sites</b>	<b>5 Min</b>	<b>10 Min</b>	<b>15 Min</b>	<b>20 Min</b>	<b>25Min</b>	<b>30 Min</b>	<b>medium</b>
<b>Site 1 – Village “Meore Ontofo”</b>	<b>40.2</b>	<b>40.0</b>	<b>40.2</b>	<b>40.0</b>	<b>40.5</b>	<b>40.5</b>	<b>40.23</b>
<b>Site 2 – Village “Gulukheti”</b>	<b>41.2</b>	<b>41.0</b>	<b>41.8</b>	<b>41.1</b>	<b>41.3</b>	<b>41.1</b>	<b>41.25</b>
<b>Site 3 – Between two above mentioned villaged</b>	<b>40.2</b>	<b>40.0</b>	<b>40.3</b>	<b>40.1</b>	<b>40.2</b>	<b>40.0</b>	<b>40.13</b>

## **2. Impacts during Construction**

164. 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 for the construction of the reservoirs and pumping station and the Grouli WTP. Appropriate personal protection equipment however needs to be provided for workers at the site. Haulage of materials/waste and operation of backhoe will also generate noise, but will be limited in duration and require no special

measures. Sensitivity to noise increases during the night hours. Following measures shall therefore be implemented:

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

165. Another important activity is the 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

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

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

167. There will be no significant noise impacts from the operation of the reservoirs, pumping station and Grouli WTP.

### **D. Cumulative Impacts**

168. The project is designed to improve environmental quality and living conditions in Poti through the construction of a new/improved 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.

169. 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 the major construction activities that are subject to this Environmental Assessment ( water supply system) are either confined to a single site located to the north east of the town (Grouli WTP or adjacent to already existing structures (transmission mains and Nabada reservoir / PS). 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.

170. However, at present, various development and construction activities are under implementation in Poti. The proposed construction of the WTP and main water supply system components shall therefore be scheduled in consultation with the other implementing agencies so that roads and inhabitants are not subject to repeated disturbance.

171. No cumulative impacts are envisaged during the operation stage.

## **E. Public Consultation**

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

- A Public meeting was held in Poti Town on 11.05.2012, to which stakeholders were invited. The meeting took place in a government building. The exact location of the building is not known and no map indicating the location where the meeting took place could be prepared therefore. Participants were 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 were invited to discuss their views and concerns, to be incorporated into the IEE. The duration of the construction was asked. Construction activities should be performed within 36 months. The contractor should employ local residents as far as possible. Environmental impacts are associated to be only site specific. Most impacts occur only during construction phase. They are temporary therefore. Mitigation measures will be implemented. More detailed information concerning findings, participants, and dates is available in Appendix 1 of this report.
- Ad hoc discussions were held on site with people and communities who could be affected by the subprojects, so that views could be expressed in a less formal setting. These were also considered in preparing the IEE.

## **VI. ENVIRONMENTAL MANAGEMENT PLAN**

### **A. Institutional Arrangements**

173. Following agencies will be involved in implementing this Water Supply Subproject in Poti under this ADB funded Investment Program:

- (i) Ministry of Regional Development and Infrastructure (MoRDI) is the Executing Agency (EA) responsible for management, coordination and execution of all activities funded under the loan. MoRDI will have overall responsibility for compliance with loan covenants.
- (ii) United Water Supply Company of Georgia (UWSCG) is the implementing agency (IA), which will be responsible for administration, implementation (design, construction and operation) and all day-to-day activities under the loan. An, Investment Program Management Office (IPMO) will be established within the UWSCG for all Investment Program related functions. The IPMO will coordinate construction of subprojects across all towns, and ensure consistency of approach and performance.
- (iii) The IPMO will be assisted by (a) Management Contractor (MC) who will provide Investment Program management support, assure the technical quality of design and construction, and provide advice on policy reforms, 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.

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

175. Currently, the 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.

176. The implementation of EMP of this subproject require an experienced Environmental Management Specialist (EMS) to supervise design works and the 24 month construction period, conducting routine observations and surveys, and preparing monitoring reports. The EMS should be on site one month before construction and 24 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.

177. The 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. 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.

## **H. Grievance Redress Mechanism**

290. For the effective implementation of a GRM system under the USIIP, UWSCG issued special order (#122) on 30 April 2014. The "Establishment of GRM within the Framework of the Asian Development Bank Funded Projects" signed by the head of UWSCG gives clear instructions to every involved stakeholder how to act when affected people are impacted by the project.

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

292. Any affected person can apply at a UWSCG **local service centre** through different ways, either by going to the service centre, sending a letter to the service centre, or calling a hotline. The operators of the service centre can respond by going directly to the



affected person if they are disabled to get the written grievance from them..

293. GRM in Marneuli will operate in three stages:

294. During the **first stage**, complaints are discussed within two weeks of being received by the local service centre of UWSCG (e.g. Marneuli office), based on the verbal or written complaint. In the first stage of grievance review and resolution, an authorized representative of the local service centre is responsible for ensuring the registration of the claim and its further processing. He/she engages in the grievance review and resolution process representatives (managers and environmental specialists) of Construction and Supervision Companies, and the representatives of UWSCG central office as required. At the local service centre, the affected person is provided with a queue number and then registers the grievance at the service desk.

295. The service centre operators, who are trained<sup>2</sup> in USIIP/Reg-01 project, register all relevant grievances with support of an **online task management system**, which tracks information on the grievance review process and the responsible person. Moreover, the operators fill the ADB complaints log with the registered grievance that coincides with local internal forms. This **electronic intranet system**<sup>3</sup> allows the UWSCG Tbilisi Office to immediately see claims. Therefore, claims submitted to any regional service centre can be monitored by the Head of the Investment Projects Management Office (IPMO), as well as the Head of the Environmental and Resettlement Division, Maka Goderdzishvili.

296. When a grievance is solved positively in the first stage, the grievance is closed through an Agreement Protocol, which is reflected in the eDocument – Task Management System.

297. The grievance enters a **second stage** if it is not solved. In that case, the authorized representative of the local service centre will help the claimant prepare a package of grievance application documents for official submission to the Grievance Redress Committee (GRC). The package contains the following information:

- Name, ID, address and contact details of the claimant
- Description of the essence of the complaint

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

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

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

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

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

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

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

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

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

184. The following **Table 5** 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 5: Environmental Impacts and Mitigation Measures**

Potential Negative Impacts	Mitigation measures	Responsi- bility	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-8 (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 Con- tractor	WTP, reservoirs, pumping station,, construction road, Transmission Line	Part of construc- tion 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.</li> </ul>	Civil Con- tractor	WTP, reservoirs, pumping station, access road, Transmission Line	Part of construc- tion cost
Erosion due to excava- tion/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> <li>• In the steep slopes, local grass species shall be planted on the refilled trenches</li> </ul>	Civil Con- tractor		Part of construc- tion cost
Impact on ground water and surface water	<ul style="list-style-type: none"> <li>• Fuel, chemicals and hazardous material, and waste should be stored at a distance of at least 50 m to open water bodies</li> </ul>	Civil Con- tractor	Chlorine at Grouli, Nosiri and Na- bada	Part of construc- tion 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 re-quired;</li> <li>• Ensure speedy completion of work and proper site clearance after completion;</li> <li>• Damp down unsurfaced/bad condition roads to avoid dust</li> </ul>	Civil Con- tractor	All sites	Part of construc- tion cost

Potential Negative Impacts	Mitigation measures	Responsi- bility	Location	Cost
	generation while using for transport of waste/material <ul style="list-style-type: none"> <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 barricaded area</li> <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	All sites.	Part of construction cost
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.</li> </ul>	DSC / EA	All sites.	Part of construction cost

Potential Negative Impacts	Mitigation measures	Responsibility	Location	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>• Increase workforce to complete the work in minimum time in the town</li> </ul>	Contractor	All sites.	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> <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 prior information to local people about work;</li> <li>• No night time construction activities including material/waste haulage, construction activities are not allowed between 7 pm and 7 am</li> </ul>	Civil Contractor	All sites.	Part of construction cost
Safety risk – public and worker - asbestos	- Follow standard and safe procedures for all activities – such as	Contractor	All construction sites	130\$ per sample

Potential Negative Impacts	Mitigation measures	Responsibility	Location	Cost
	<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>			<p>Costs for disposal of asbestos cement depends on local conditions Part of construction cost</p> <p>300\$/m removal asbestos pipe</p> <p>Disposal 350\$/t</p>
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 sites	Part of construction cost

Potential Negative Impacts	Mitigation measures	Responsi- bility	Location	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>○ Construction camp 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>○ Camp shall be established after removal of existing land-fill</li> <li>○ Contractor shall provide fire wood and no worker shall be allowed to cut any tree</li> <li>○ Ensure regular and clean maintenance of the camp</li> </ul> </li> </ul>	Civil Contractor	Temporary labour camps	Part of construction cost
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), suits;</li> <li>• Maintain accidents records and report regularly</li> </ul>	Civil Contractor	All sites	Part of construction cost
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. . <b>Appendix 4</b> presents a Chance Find Checklist that the contractor and the EA's Environment Specialist will follow once the find has been made.</li> <li>• This should involve: <ul style="list-style-type: none"> <li>○ Having excavation observed by a person with archaeo-</li> </ul> </li> </ul>	UWSCG/D esign Consultant	All sites.	Part of construction cost

Potential Negative Impacts	Mitigation measures	Responsi- bility	Location	Cost
	logical field training; ○ Stopping work immediately to allow further investigation if any finds are suspected; ○ Calling in the state archaeological authority if a find is suspected, and taking any action they require to ensure its removal or protection in situ;			
Cumulative impacts – repeated disturbance to roads and people	<ul style="list-style-type: none"> <li>• Schedule the construction activities in harmony with the other ongoing works</li> </ul>	UWSCG	All sites.	
<b>Operation</b>				
Disturbance/nuisance/noise due to operation activity including haulage of waste, dewatered sludge	<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	All sites.	Part of operation costs
Influx of insects, rodents	<ul style="list-style-type: none"> <li>• Regular waste and disposal on landfill, regular cleaning of the facility</li> </ul>	UWSCG	All sites	Part of operation costs



## D. Environmental Monitoring Plan

185. The regular control and inspection of the future Grouli WTP, Nabada reservoir site and Nosiri well field in Poti, as well as transmission line for Abasha, is needed to guarantee their long term and sustainable operation. The following table includes physical and chemical analyses to be carried out. Trained personnel and a laboratory are required.

**Table 6:** Environmental Monitoring Plan for Poti and Abasha

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	SC
<b>Operation</b>					

Environmental Monitoring Plan for Abasha

**Table 27: Environmental Management Cost**

Item	Quantity <sup>4</sup>	Unit Cost	Total Cost	Remarks
Baseline Parametric Measurements	6	200 USD	1,200	To be conducted by the Contractor for air emissions, dust, vibration measurements
Monthly Parametric Measurements (at least 3 sites) Noise, vibration and dust	45	200 USD	9 000	Tests to be conducted by the Contractor at 3 sites x 5 months monthly monitoring.  Noise, dust and vibration should be monitored on the regular bases as well as during the peak operation of Construction Equipment and Machinery.
Environmental Management	5 months	2,500 USD	12 500	The costs are included in the contract signed between

<sup>4</sup>To be established by CS Consultant and environmental specialist.

Item	Quantity <sup>4</sup>	Unit Cost	Total Cost	Remarks
Specialist (SC)				UWSCG and SC and no additional costs will occur.
Environmental specialist (Contractor)	5 month	1500 USD	7500	The costs will be included in the contract signed between UWSCG and Contractor.
E&HS Trainings	2	2500 USD	5000 USD	Training should be conducted for all persons involved in construction process
Traffic Specialist	5 month	2.500	12.500	Specialist will be hired in scope of three projects took place in Marneuli at the same time
Miscellaneous			4770	10% for above Items
Subtotal			52 470	Total for above

## **VII. RECOMMENDATIONS & CONCLUSION**

### **A. Recommendation**

186. The environmental impacts of infrastructure elements proposed in the water supply improvement subproject in Poti 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.

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

188. Regardless of these and various other actions taken during the IEE process and in developing the project, there will still be impacts on the environment when the infrastructure is built and when it is operating. Appropriate monitoring measures to guarantee the long term and sustainable operation of the WTP are presented in a monitoring plan.

189. When operating, the improved water supply system will have overall beneficial impacts to human health and the environment as it will provide the inhabitants of Poti with a new water supply system and also will contribute to better water quality of Poti due to long-term and sustainable water treatment at Grouli.

190. The main beneficiaries of the improved system will be the citizens of Poti, who will be provided with a new/improved water supply system. This will improve the quality of life of people as well as raising the 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.

191. 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.

192. The recommendation of this Environmental Assessment process is that all mitigation, enhancement and monitoring activities proposed here and through the parallel process of Resettlement Planning, if required, 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**

193. The environmental impacts of the proposed water supply subproject have been assessed by the IEE reported in this document. The impacts are found to be limited to the construction phase.

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 components. 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**

LCC “United Water Supply Company of Georgia”

## MEETING MINUTES

Improving the Water Supply System in Poti  
Initial Environmental Examination Report

**Poti**

11.05.2012

### Attendees Present:

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

### Attendees Present from the local residents of Poti:

1. Malkhaz Babilua - Local resident;
2. Eliza Shubitidze - Local resident;
3. Nana kavtaradze - Local resident;
4. TinaTin Khoshtaria - Local resident;
5. Nana Ejibia - Local resident;
6. Nadejda Gvazabia - Local resident;
7. Teimuraz Kiria - Local resident;
8. Archil Khulordava - Local resident.

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### AGENDA:

Meeting was called for public hearings of the Initial Environmental Examination of the Construction of Water Supply System in the city of Poti.

Ketevan Chomakhidze made the opening of meeting informing the participants with the aim of public hearings. She made PowerPoint presentation of IEE of the Poti Construction of Water Supply Systems.

Ketevan Chomakhidze 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 system, and the meaning of the 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	Duration and date of completion of the Poti water supply system	Duration of the Construction: 36 months
2	Name of the supervising and monitoring entity	LLC "United Water Supply Company of Georgia"/ Supervision Consultant
3	Employment of local residents in the process of construction and responsible entity	Constructor should employ local residents in the process of construction as possible
4	Type of impacts on environment that are 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
5	Objectives of the Environmental Assessment	To examine the project's potential negative and positive environmental impacts and to recommend any measures needed to prevent, minimize, mitigate or compensate for adverse impacts and improve environmental performance.

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

## Appendix 2

Land (real estate) cadastral code # 41.12.37.009

### Extract from Public Registry

#### Application registration

Date of preparation

# 882012365188-24/07/2012 10:33:46

24/07/2012 10:48:47

		Property section		
Zone	Sector	Block	Land plot	
Martvili	Gachedili			
41	12	37	009	

**Address: Region Martvili, village Gachedili**

Land plot ownership type: Property /ownership

Land plot function: agricultural land

Affirmed area/territory: 600.00 sq.m

Land plot previous number:

#### Owner's section

Application registration: # 882012213135, date 16/05/2012 17:40:42

Registration of ownership: date 16/05/2012

Confirming document of ownership:

- Reference # 38/o, confirmation date: 16/05/2012, MINISTRY Of Regional Development and Infrastructure Of Georgia

Owners:

LLC United Water Supply Company of Georgia, ID #412670097

Owner:

LLC United Water Supply Company of Georgia

#### Description:

#### Real Estate Mortgage

loan on mortgage:

Not registered

### **Obligation**

Sequestration/arrest of property:

Not registered

Registry of debtors:

Not registered.

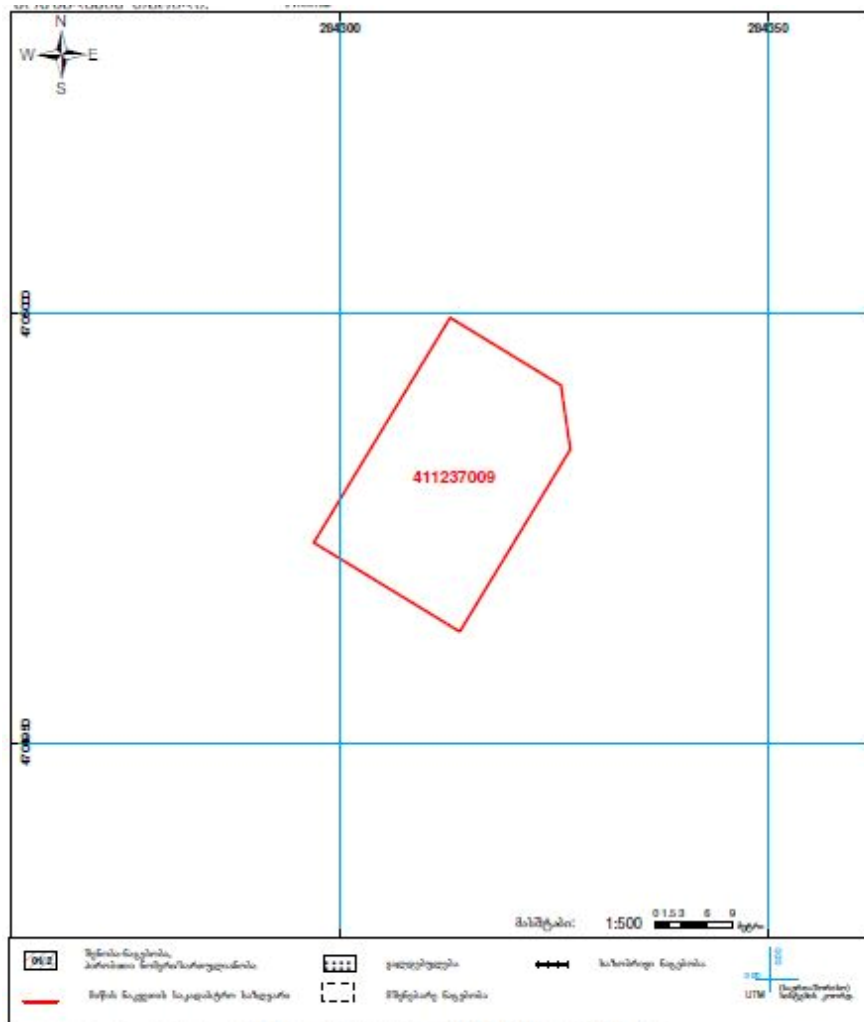
Income tax is paid till 1st of April of the next year of the accounting year in case of realization of material assets owned by private person with the time period up to 2 years, or in case when property with value of GEL 1000 or more is granted as a gift during the tax year. The physical person submits declaration to the tax authority in the same period of time. Non-fulfillment of abovementioned obligation is considered as the law violation, which results in responsibility according to the chapter # XVIII of the Tax Code of Georgia.

In case of detection of technical defects in the extract from public registry, it is possible to submit application without visiting the registration office on the following web-page: <http://public.reestri.gov.ge>; or/and through following phone numbers: 2 405 405 ; 595 33 71 81. You can receive the amended extract on the web-page in electronic version, or at the registration office or at any affiliate of the "Liberty Bank".



Ministry of Justice of Georgia  
National Agency of Public registry  
Cadastral Plan

Land plot cadastral code: 41 12 37 009  
Application registration number: 882012198874  
Land plot area/territory: 600 m<sup>2</sup>  
Function: Agricultural  
Category:  
Date of preparation: 14.05.12



## 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?  
Was an archaeologist contacted?

☐ Yes ☐ No  
☐ Yes ☐ No

## Archaeological Detail:

Date of inspection: \_\_\_\_\_

GPS coordinates:

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

Does Chance Find Correspond to a known PNG National Museum site? ☐ Yes ☐ No

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

Photo Record:

☐ 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 thickness (in mm): \_\_\_\_\_

Max artefact width (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:

\_\_\_\_\_