



MUNICIPAL DEVELOPMENT FUND OF GEORGIA

Integrated revitalization of CH sites in Dzveli Shuamta,
Akhali Shuamta, Ikalto and preservation works of Ikalto
Church - Phase 2

Environmental Review

**WORLD BANK FINANCED
REGIONAL DEVELOPMENT PROJECT**

**Tbilisi, Georgia
June, 2015**

ABBREVIATIONS

WB	World Bank
EIA	environmental impact assessment
EMP	environmental management plan
ER	Environmental Review
MDF	Municipal Development Fund
MoENRP	Ministry of Environment and Natural Resources Protection
RDP	Regional Development Project
SECHSA	Strategic Environmental, Cultural Heritage, and Social Assessment
CH	Cultural Heritage

Environmental Screening and Classification

The subproject sites are located in Eastern Georgia, in Telavi Municipality of Kakheti Region. The SPs aims Integrated Revitalization of CH Sites in Dzveli Shuamta, Akhali Shuamta and Ikalto through arrangement light tourist infrastructure adjacent to the monuments of CH including auto parking sites, souvenir shops, toilets, access road, inner and outer water supply and power supply systems.

SPs for the “Integrated Revitalization of CH Sites in Dzveli Shuamta, Akhali Shuamta and Ikalto” has been commenced under the Regional Development Project (RDP) in 2012.

SP for the “Integrated Revitalization of CH Sites in Dzveli Shuamta, Akhali Shuamta and Ikalto was suspended in october of 2012, since the ancient tombs were discovered in Dzveli Shuamta and Moreover, during excavation works in the adjacent to the Ikalto Monastery Complex, the remains of the old church were found, which were invisible theretofore. Due to the mentioned facts and based on the letter the Ministry of Culture and Monument Protection of Georgia (#01/08-129; 16/01/2013) the works under the SP was terminated and construction contract was canceled.

The designs for arrangement of the light tourism infrastructural elements neighboring to the Dzveli Shuamta, Akhali Shuamta and Ikalto Monasteries have been updated. The SP also includes construction of Shuamta recreational center, at the turn of New and old Shuamta complex. It should be metntioned that construction of buildings skeletons is mostly completed. The SP includes demolition of some interior walls and removal of outer walls’ facing, arrangement of souvenir shops, toilets, access road, inner and outer water supply (boreholes, pipelines, pumping and disinfection equipment, reservoirs etc.) and power supply systems and auto parking sites, facing and roofing of already constructed buildings.

(A) IMPACT IDENTIFICATION

Has sub-project a tangible impact on the environment?	The SP will have a modest short-term negative environmental impact and is expected to have tangible long-term positive impact on the natural and social environment.
What are the significant beneficial and adverse environmental effects of the subproject?	<p>SP is expected to have positive long-term environmental and social impact through arrangement of the light tourism infrastructure at the entrances to the monuments of cultural heritage. They will be provided with auto parking lots, souvenir shops, toilets, access road, inner and outer water supply and power supply systems.</p> <p>Restoration works will preserve the monument from further damage, natural disasters and severe weather.</p>

	<p>The expected negative environmental and social impacts are likely to be minimal, short term and typical for small to medium scale rehabilitation/reconstruction works: noise, dust, vibration, and emissions from the operation of construction machinery; generation of construction waste; disruption of traffic and pedestrian access.</p> <p>Increased tourist flows may have indirect negative environmental impacts: waste and wastewater generation, vandalism, etc.</p>
<p>May the sub-project have any significant impact on the local communities and other affected people?</p>	<p>No physical or economic resettlement is expected as a result of project implementation.</p> <p>In case of active construction, activities will interfere with the monastery life of monks. During construction works, visitation excess to the sites of CH will be restricted or suspended. The impact will limited and temporary.</p> <p>SP will improve touristic attraction and increased tourist flows will result to the positive social impact through improvement of employment opportunities. During construction works, temporary employment of local citizens will increase the income of local population. The project will increase sanitary hygienic situation and thus improve health conditions.</p> <p>Sub-project will promote development of small business and will provide benefits to women, as they are trading in the surrounding area. (Their trade does not interfere with constructed buildings).</p> <p>Due to construction of souvenir shops and other facilities, number of employed persons will increase and income of local population will increase proportionally. It will increase presence of private sector, and result in growing number of tourism related enterprises.</p> <p>Sub-project will partially improve economic conditions of the Monasteries and enhance their environment. It will become a more attractive place for tourists.</p>

(B) MITIGATION MEASURES

Were there any alternatives to the sub-project design considered?	Siting alternatives for parking and other facilities have been considered and the optimal option selected.
What types of mitigation measures are proposed?	<p>The expected negative impacts of the construction phase can be easily mitigated by:</p> <ul style="list-style-type: none"> • demarcation of the construction site, • traffic management, • good maintenance of the construction machinery, • observance of the established working hours, and • well organized disposal of waste to the formally agreed sites. <p>Impact on surface and/or underground water with high chlorine concentration (content) waste water that are expected to be formed in washing and disinfection process before launching operation of newly installed water pipes will be reduced by neutralization prior to release to the environment.</p> <p>Biological wastewater treatment unit will be installed and maintained properly to avoid water pollution by newly arranged sewage system.</p> <p>Permit for Works on Cultural Heritage Monument will be issued by the National Agency for Cultural Heritage Preservation of Georgia after signing contracts with contractor.</p>
What lessons from the previous similar projects have been incorporated into the sub-project design?	<p>Mistakes, which hindered successful implementation of the previous SP, were taken into consideration and properly improved.</p> <p>The new SP has been re-defined and brought into compliance with international standards.</p>
Have concerned communities been involved and have their interests and knowledge been adequately taken into consideration in subproject preparation?	<p>Telavi population was informed about the planned construction activities during first phase of SPs implementation and their reaction was positive.</p> <p>The updated EMP current SP will be available for local population and will be publicly discussed prior to the construction works, in a consultation meeting.</p>

(D) CATEGORIZATION AND CONCLUSION

Based on the screening outcomes,

subproject is classified as environmental Category A
 B
 C

Conclusion of the environmental screening:

- 1. Subproject is declined
- 2. Subproject is accepted

If accepted, and based on risk assessment, subproject preparation requires:

- 1. Completion of the Environmental Management Checklist for Small Construction and Rehabilitation Activities
- 2. Environmental Review, including development of Environmental Management Plan

Social and Cultural Resource Screening of Subprojects

Social safeguards screening information		Yes	No
1	Is the information related to the affiliation and ownership status of the subproject site available and verifiable? (The screening cannot be completed until this is available)	✓	
2	Will the project reduce other people's access to their economic resources, such as land, pasture, water, public services or other resources that they depend on?		✓
3	Will the project result in resettlement of individuals or families or require the acquisition of land (public or private, temporarily or permanently) for its development?		✓
4	Will the project result in the temporary or permanent loss of crops, fruit trees and Household infrastructure (such as granaries, outside toilets and kitchens, etc.)?		✓
If answer to any above question (except question 1) is "Yes", then OP/BP 4.12 Involuntary Resettlement is applicable and mitigation measures should follow this OP/BP 4.12 and the Resettlement Policy Framework			
Cultural resources safeguard screening information		Yes	No
5	Will the project require excavation near any historical, archaeological or cultural heritage site?	✓	
If answer to question 5 is "Yes", then OP/BP 4.11 Physical Cultural Resources is applicable and possible chance finds must be handled in accordance with OP/BP and relevant procedures provided in the Environmental Management Framework .			

ENVIRONMENTAL ASSESSMENT

1. Introduction

1.1. Background Information

The Government of Georgia approved in June 25, 2010 (Government resolution no. 172), the State Strategy on Regional Development of Georgia for 2010-2017, prepared by the Ministry of Regional Development and Infrastructure (MRDI). The main objective of the strategy is to create a favorable environment for regional socio-economic development and improve living standards. These objectives will be attained through a balanced socio-economic development, increased competitiveness and increased socio-economic equalization among the regions.

In order to better utilize the tourism and agriculture potentials that exist in Kakheti and reduce internal socio-economic disparities, the Government of Georgia approached the World Bank with the request to provide financial support to the regional development in Kakheti. A Regional Development Project (RDP) was prepared jointly by the Government of Georgia and the World Bank, and the latter is expected to provide a loan funding for the implementation of RDP.

The SP for the “Integrated Revitalization of CH Sites in Dzveli Shuamta, Akhali Shuamta and Ikalto” is a part of the RDP and shall be prepared, reviewed, approved, and implemented in agreement with the requirements of the Georgian legislation and the World Bank policies applicable to the RDP.

1.2. The Municipal Development Fund as Implementing Agency

The Municipal Development Fund of Georgia (hereinafter: the MDF) is a legal entity of public law, the objective of which is to support strengthening institutional and financial capacity of local government units, investing financial resources in local infrastructure and services and improving on sustainable basis the primary economic and social services for the local population (communities). MDF is designated as an implementing entity for the RDP and is responsible for its day-to-day management, including application of the environmental and social safeguard policies.

MDF prepares and submits to the World Bank for approval the Subproject Appraisal Reports (SARs), with safeguards documents attached. Depending on whether a subproject is carrying higher or lower risks, the due environmental diligence applicable to it may include conduct of

an environmental review (including development of an EMP) – for high risk Category B, or be limited to the use of Environmental Management Checklist for Small Construction and Rehabilitation Activities – for low risk Category B.

1.3. Brief Information on Proposed SP

The subproject sites are located in Eastern Georgia, Kakheti Region, in Telavi Municipality. SP envisages construction works for arrangement of the tourism infrastructure regarding monuments of cultural heritage, in particular arrangement of auto parking sites, souvenir shops, toilets, access road, inner and outer water supply and power supply for the following monuments of Cultural Heritage:

1. Dzveli Shuamta Monastery
2. Akhali Shuamta Monastery
3. Ikalto Monastery
- 4.

The SP also includes construction of Shuamta recreational center, at the turn of New and old Shuamta complex. The project aims at appropriate perception of old and new Shuamta monasteries by visitors. During monastery external works configuration of the church was revealed in Ikalto, called as saint Nino church. The restoration and conservation works of St. Nino church located outside of Ikalto monastery main fence, which was revealed during construction activities for arrangement of Ikalto light tourist infrastucure, has been included under the SP as well.

The SPs for the “Integrated Revitalization of CH Sites in Dzveli Shuamta, Akhali Shuamta and Ikalto” has been commenced under the Regional Development Project (RDP) in 2012. SP for was suspended in October of 2012, since the ancient tombs were discovered in Dzveli Shuamta and Moreover, during excavation works in the adjacent to the Ikalto Monastery Complex, the remains of the old church were found, which were invisible theretofore. due to the mentioned facts and based on the letter the Ministry of Culture and Monument Protection of Georgia (#01/08-129; 16/01/2013) the works under the SP was terminated and construction contract was canceled.

Key Stakeholders

Grant Recipient/ Borrower: Government of Georgia represented by the Ministry of Finance

Local Representation: Telavi Municipality

Sources of Funding/ Financing: Word Bank (WB) and Municipal Government (MG)/Government of Georgia (GOG)

Implementing Agency: Municipal Development Fund of Georgia (MDF)

Financial Arrangements

The estimated project costs for construction works for arrangement of the tourism infrastructure regarding monuments of cultural heritage; in particular: arrangement of auto parking sites, souvenir shops, toilets, access road, inner and outer water supply and power supply.

Implementation Structure

World Bank (WB) Loan Agreement with the Government of Georgia; Project Implementation Agreement between the Borrower (Georgia) and MDF for the project; Investment Financing Agreement (IFA) for the funding arrangement of the tourism infrastructure regarding monuments of cultural heritage, in particular arrangement of auto parking sites, souvenir shops, toilets, access road, inner and outer water supply and power supply between MDF and the Municipal Government (MG) of Telavi municipality.

2. Legislation and Regulations

According to the law of Georgia on Permit on Environmental Impact (2008) the SP does not require EIA and obtaining of Permit on Environmental Impact.

The SP triggers to the OP/BP 4.01 Environmental Assessment and OP/BP 4.11 Physical Cultural Resources of the World Bank.

According to the above mentioned safeguard policies and the Environmental Management Framework adopted for the RDP, the SP has been classified as B(+) category and requires preparation of Environmental Review (ER) and environmental Management Plan (EMP), in compliance with recommendations of SECHSA and EMF.

According to the Law on ``Cultural Heritage`` permit should be obtained for conduction of rehabilitation work of the cultural heritage monument.

3. The Subproject

The subproject sites are located in Eastern Georgia, Kakheti Region, in Telavi Municipality. Access to the construction sites from Tbilisi is possible through Tbilisi-Gombori-Telavi or Tbilisi-Gurjaani-Telavi motorways and distance from Tbilisi is approximately 110-150 km.

The subproject envisages construction works for arrangement of the light tourism infrastructure, in particular: arrangement of auto parking slots, souvenir shops, toilets, access road, inner and outer water supply and power supply on the territory of Cultural Heritage sites below:

- 1) Akhali Shuamta Monastery;
- 2) Dzveli Shuamta Monastery;
- 3) Ikalto Monastery

SP also envisages construction of Shuamta recreational center, at the turn of New and old Shuamta complex.

The following projects are included in the lot:

- Shuamtis Karibche - Infrastructural building, architectural design
- Akhali Shuamta - Infrastructural building, architectural design
- Dzveli Shuamta - Infrastructural building, architectural design
- Dzveli Shuamta Church Restoration Project - Yard improvement
- Ikalto - Infrastructural building, architectural design
- Restoration of Ikalto St. Nino Church
- Shuamta water supply-wastewater project
- Ikalto water supply-wastewater project

As it was mentioned above SP for the “Integrated Revitalization of CH Sites in Dzveli Shuamta, Akhali Shuamta and Ikalto” has been commenced under the Regional Development Project (RDP) in 2012 but in 2013, construction works under the SP were terminated and construction contract was canceled. The old designs were revised and certain changes were made to initial designs, though the mentioned changes barely apply to works executed under the previous sub-project.

During monastery external works configuration of the church was revealed in Ikalto, called as saint Nino church. The church is located outside of Ikalto monastery main fence. Existence of the monastery was known but accesses asphalt road to the monastery was covering it, thus the church was sunk into oblivion. As the church requires some restoration and conservation works, a relevant design has been prepared in agreement with National Agency for Cultural Heritage Preservation of Georgia included under the SP.

1.1. Shuamta

The SP envisages implementation of the following construction works in Dzveli and Akhali Shuamta:

2. Reorganization of paths arranged in the Dzveli Shuamta monastery complex yard, adjustment of the terraced landscape. Moreover, for provision of perspective development of the monastery, the project envisages construction of the small motor road in the monastery area.
3. “Sainformatsio Karibche” center - the project envisages finishing works for the incomplete infrastructural building and its functional equipment. The mentioned building is a small ‘belvedere’ and a public toilet.
4. “Akhali Shuamta” – the project envisages finishing works for the incomplete

infrastructural building and its functional equipment. The mentioned building is a souvenir shop and public toilet.

5. “Dzveli Shuamta” - the project envisages finishing works for the incomplete infrastructural building and its functional equipment. The mentioned building is a souvenir shop and public toilet.
6. The project envisages water supply to all of the three infrastructural buildings, and arrangement of the well, potable water reservoir and biological wastewater treatment plant.

All of the design buildings and toilets to be constructed or arranged in the design building are adapted for disabled.

6.1.1. Akhali Shuamta Monastery.

The present subproject envisages arrangement of light tourist infrastructure adjacent to the Akhali Shuamta Monastery.

The first design of subproject envisaged arrangement of parking, light structure pavilion and public WC, and it was subjected to certain changes, which has not interfered with the initial layout of the building and at the same time has refined architectural appearance that will in future improve services to the tourists.

According to the new design, the building underwent inner layout alteration. It was decided to dismantle the partition wall dividing men’s and women’s WCs, in order to install a ramp instead of stairs for the WC of disabled, for their convenience. The design also envisages dismantling of the existing roofing underlay, arrangement of the drainpipes on the roof, covering parapet with 4cm basalt slabs, facing façade with brick and partially oversplit Georgian brick, roofing the building with 0.8% slope underlay and arrangement of the steel painted railings on the roof, by using a taut metal cable roap.

The design also envisages arrangement of parking lot, natural stone footpaths, engineering communications, water-wastewater systems, and door-windows. Besides, defects and substandard facing dating back to the previous project will be remedied. Parking will be located at the road side and will accommodate 10-12 cars. In the vicinity of parking there is light structure pavilion (wooden) covered with tile roofing, finished with brick and natural stone. The appearance of the design building blends with the environment.

6.1.2. Dzveli Shuamta Monastery

The subproject envisages provision of light tourist infrastructure neighboring to the Dzveli Shuamta Monastery including of car-parking lots, souvenirs shop and public WC.

Minor changes introduced to the Dzveli Shuamta monastery infrastructure arrangement design have not overall interfered with the initial layout of the building and at the same time has refined architectural appearance that will in future improve services to the tourists.

According to the new design, the building underwent inner layout alteration. It was decided to install the WC for disabled and a ramp in its vicinity. Hereby, a decorative wall be arranged by using wooden bars. The design also envisages dismantling of the parapets and arrangement of the drainpipes on the roof, covering parapet with basalt slabs, the WC entrance places will be covered with square metal pipe structure, on top of which will be placed a tempered glass. Facades will be mostly faced with natural Cheremi stone. Partially, the façade will be covered with high quality dried pine panels with antiseptic varnish coating. The design also envisages arrangement of parking lot, natural stone footpaths and stairs and green grass cover, engineering communications, water-wastewater systems, door-windows and stained glass windows. Besides, defects and substandard facing dating back to the previous project will be remedied.

Facing façade with brick and partially over split Georgian brick, roofing the building with 0.8% slope underlay and arrangement of the steel painted railings on the roof, by using a taut metal cable roap.

Parking will be located at the road side and will accommodate 10-12 cars. In the vicinity of parking there is light structure pavilion (wooden) covered with tile roofing, finished with brick and natural stone. The appearance of the design building blends with the existing environment.

The SP envisages reorganization of paths arranged in the Dzveli Shuamta monastery complex yard, adjustment of the terraced landscape as well. Moreover, for provision of perspective development of the monastery, the project envisages construction of the small motor road in the monastery area.

6.1.3. Recreational space of Shuamta Monastery

Recreational space of Shuamta Monastery will be located beside the Tbilisi-Telavi (Gombori) highway, at turn to old and new Shuamta monasteries. Currently the designed building is already partially constructed including walls, monolithic staircase, monolithic roofing, ramps and platforms.

Recreational space will be three-level building with total area 642m², which will include café, hall, kitchen, WCs, open terrace with information center for tourists. The café will be separated in two parts by staircase – the hall and the kitchen. In the middle of the café there will be placed fire-place; stained-glass windows of the café and terrace will open picturesque view on whole natural landscape.

Changes introduced to the Shuamta monastery infrastructure arrangement design have not overall interfered with the initial layout of the building and at the same time will refine

architectural appearance that will in future improve services to the tourists and conditions for disabled.

According to the new design, the building underwent inner layout alteration. It was decided to install the WC for disabled and a ramp in its vicinity. Facades will be mostly faced with natural Cheremi stone and oversplit Georgian brick. Walling with Georgian brick will be plastered with lime mortar. A terrace will be arranged on the building roof, which will be enclosed with steel railings and painted with anticorrosive paint, metal cable rope will be stretched between posts. The design also envisages arrangement of parking lot, natural stone footpaths, engineering communications, water-wastewater systems, door-windows and stained glass windows. Besides, defects and substandard facing dating back to the previous project will be remedied.

Overall, changes to the design will further contribute to refinement of the appearance of the newly arranged infrastructure and blending the building with the existing natural environment.

6.2. Ikalto

The SP envisages implementation of the following construction works in Ikalto

1. Completion of construction works for the newly arranged incomplete infrastructural building by the Ikalto monastery complex. The mentioned building is a souvenir shop and public toilet.
2. Water supply to the infrastructural building of Ikalto, and arrangement of the well, potable water reservoir and biological wastewater treatment plant.
3. Restoration-rehabilitation of the small Basilica type church – part of the monastery complex, which is located outside the main enclosure and which according to the art historians, is dating back to VIII-IX centuries.

3.1.1. Arrangement of light tourist infrastructure

The subproject envisages arrangement of souvenirs shop and public WC on the Ikalto Monastery adjacent area.

Minor changes introduced to the Ikalto design have not overall interfered with the initial layout of the building and at the same time has refined architectural appearance that will in future improve services to the tourists and disabled.

According to the new design, the building underwent inner layout alteration. It was decided to install the WC for disabled and a ramp in its vicinity. A wall will be arranged to separate technical utility from the souvenir shop. Facades will be mostly faced with natural Cheremi stone. Partially, the façade will be covered with high quality dried pine panels with antiseptic varnish coating. On the main façade, metal decorative grating will be arranged, which will be similar to the wood panel, in color. Roof parapet will be covered with 4cm thick basalt slabs.

The design also envisages arrangement of parking lot, natural stone footpaths and stairs and green grass cover, engineering communications, water-wastewater systems, door-windows and stained glass windows. Besides, defects and substandard facing dating back to the previous project will be remedied.

3.1.2. Restoration Ikalto Saint Nino Church

Ikalto saint Nino church is located outside of Ikalto monastery main fence. Existence of the monastery was known but accesses asphalt road to the monastery was covering it. Configuration of the church was revealed during Ikalto monastery external works in 2012 and requires some restoration and conservation works.

Works to be carried out are as follows:

1. Soil excavation manually;
2. Rearrangement of damaged weathered masonry;
3. Arrangement r/c belt;
4. construction of wall with cobble stone on mortar;
5. Arch with coble stone on mortar;
6. Cornice arrangement with selected cobble stones;
7. Arrangement of roof with Georgian tile on mortar;
8. Arrangement of floor with Georgian brick on mortar;
9. Arrangement of wood doors;
10. Arrangement of blind area around the church;
11. false work.

Scope of works to be carried out:

- Soil excavation manually
- Weathered damaged masonry rearrangement (coble stone)-14 m²
- Construction of new walls with cobble stone (1:1)18 m² thickness 0.3, 0,4 cm
- Arch – 10 m²
- Cornice arrangement with selected cobble stone – 25 linear m
- Roof arrangement with Georgian tile on lime mortar -26 m²
- Floor arrangement with Georgian brick – 8 m²
- Wooden window doors -2.5 m²
- Blind area arrangement 18 m²
- Recovery of missing facing with cobble stone -10m²
- removal of vegetable cover and treatment – 15m²
- Base recovery -17 linear m
- Fissure injection -5 linear m

Water supply and sewage systems

Subproject envisages arrangement of Household water-supply and Sanitary sewage systems for the sites described above.

Water Supply systems

Akhali Shuamta and Dzveli Shuamta

There are 10-15 persons serving in Dzveli Shuamta monastery. 150 visitors are expected during a day. It is well known that Shuamta monastery is detached from the residential area and in this area there is no source of water within the range of 5km and drinking water resources are very scarce in general, which can't provide for meeting water demand of these tourist infrastructure sites. Due to the above-mentioned, design discharge of water was estimated at maximally limited rate and the total water discharge will be expected to amount to 15.25 m³/24hr.

Under the circumstances, Shuamta water supply design was elaborated, which envisages the following activities:

Arrangement of the well with control center on the edge of the forest, on the right side of the new motor road leading to Dzveli Shuamta, at 40-50 m distance from the road; arrangement of the pump in the well for water extraction, which will supply water through a 50mm polyethylene pipeline to the design water reservoir – a V=50 m³ capacity tank, sunk in the earth; from the mentioned reservoir, by means of polyethylene 63mm gravity pipeline, water is supplied to Dzveli Shuamta Monastery and infrastructural sites.

The project envisages construction of the small size building for chlorine storage and preparation of the weak chlorinated water solution in polyethylene containers, which will be discharged into the V=50 m³ capacity reservoir.

Relocation of the existing power sub-station for its approximation to the main consumers of power and provision of power supply by means of respective electric wiring.

For provision of water supply to the ***Akhali Shuamta Monastery*** infrastructural facilities, the project design envisages the following activities:

From the V=50 m³ design reservoir, water is supplied to the V=30 m³ reservoir by means of 50m gravity pipeline, from this place water is supplied to the new infrastructural site through the 50 mm pipeline.

Shuamta recreational center will be supplied with water from the same well, which provides water for Dzveli and Akhali Shuamta infrastructural elements. The design envisages installation of the independent gravity 40mm pipeline, which will supply water from the V=30 m³ reservoir to the new touristic infrastructure site located along the Gombori motor road.

Monastery Complex of Ikalto Academy water supply

Ikalto Monastery water supply is performed from the spring source located at the high reference mark in the monastery adjacent area in the vicinity of the monastery, the spring has a very low debit and often dries out. There was no water running in the spring during its preliminary survey.

Due to the fact that after project implementation number of visitors and tourists will considerably increase, it became necessary to explore a new source of water supply. The

new source was revealed as a result of technical inspection and preliminary survey. Since there are 20 clergymen serving in Ikalto monastery and the average number of visitors and tourists equals 100, according to the respective calculations the total estimated consumption rate was determined at 4 m³/24hr.

The project envisages arrangement of the design well in the vicinity of the infrastructural site, at the monument adjacent virgin land, arrangement of the control center, control panel, hermetic 150 m³ tank and ultraviolet ray device for water disinfection, for its operation in automatic mode.

Sanitation system

Sewage system will also be made with polypropylene thick-wall pipes. The project envisages arrangement of internal mains and water gauge well.

In Shuamta monastery complex, a small capacity biological wastewater treatment unit will be installed for treatment of waste water.

In Dzveli Shuamta, a complex wastewater treatment plant will be installed with capacity of 3 m³/24hr, where technological equipment will be installed to provide for wastewater treatment. Treated effluent will be discharged into the deep gorge;

In Akhali Shuamta, for arrangement of a wastewater system for the infrastructural facilities, a compact wastewater treatment unit of 5 m³/24hr capacity is envisaged;

In the Gombori motor road adjacent area a compact wastewater treatment unit will be arranged.

From all facilities consumed water is discharged into the compact wastewater treatment unit through gravity flow, outflow and effluent discharge are also performed by means of gravity flow. Treated water flows into the deep gorge.

For Shuamta monastery complex infrastructural facilities, the above-mentioned wastewater treatment plant is arranged separately, in three places and requires qualified services-operation.

For Ikalto new infrastructural facilities a 5 m³/24hr capacity wastewater treatment unit is arranged, treated effluent is discharged into the river through the gravity collector, at the end of which will be arranged a concrete discharge outlet.

For treating of sanitary sewage, a modern biological treatment unit will be used.

Construction ally, it represents a cylinder made of polypropylene, hermetically sealed from bottom. It is fenced with polypropylene from inside and divided into several areas of treatment. It is characterized:

1. High quality of waste water treatment.
2. Electric power saving technology.

3. The facility is fully automated. No necessity of permanent supervision. The process of treatment of waste waters is fully automated, which enables optimization of the process of treating. It means that in the process of treatment of waste waters it can switch according to the flow automatically to the first, second and third saving modes. And moreover, it can operate in forced mode. The facility is equipped with emergency warning system when:
 - Electric power is switched off.
 - Any unit fails.
 - Filling of the receiver cell with large, rough items.
4. The sewer can be operated remotely from the watch house.
5. No need for cesspool truck for removing of waste. Accumulation of excess active slime is made in the bag inside the treatment facility, which is removed manually and put into a closed container. A new bag is put in its place.
6. Water treatment technology is made so that methane and hydrogen are not liberated, which enables the treating facility to be close to the building. Moreover, the process of nitrification and denitrification is repeated there several times, which enables reducing of phosphorus and nitrogen in the treated water.
7. In case of power outages, it can push earlier treated water from its sewer and continue working as multistage sediment chamber, which enables purification of waste waters from grease and floating waste. Upon restoration of power supply the facility starts operating in the normal mode.
8. A sewer is made by means of controllable lifts, which is expected to receive maximum water expenditures, enabling avoidance of leakage of untreated water from the facility.
9. The facility is made of polypropylene, which is not chemically active. It does not corrode, it is hermetic, it is small and light-weight.
10. With new technical solutions, high reliability, long-term service, low power consumption and high quality treatment of waste water.

The treating facility envisages chlorination of waste water; it is located under the manhole. Supply of already prepared hypochlorite is performed automatically.

Technical characteristics of treating facility

Data	Characteristics of treating facility	
	Input	Output
J b ml, mg O ₂ /l	≈390	5÷7
J q. m, mg O ₂ /l	≈480	≤50
NH ₄ mg/l	20	≤1
Particles mg/l	220	≤5÷8
Coli index	>100 000	1 000

Main quantities of construction works:

1	Arrangement of XPS heat insulating slabs	635 m ²
2	Wall painting works	635 m ²
3	Arrangement of Geosystem slabs	1015 m ²
4	Arrangement of metal-plastic panoramic windows	75 m ²
5	Facing walls with Georgian brick	130 m ²
6	Facing facades with Cheremi stone	550 m ²
7	Arrangement of drainage canal	115 m ²
8	Paving motor road with selected flat stones	405 m ²
9	Arrangement of the well in Shuamta, capacity 5m ³ /hr	200 m
10	Arrangement of the well in Ikalto, capacity 4-5m ³ /hr	180 m
11	Arrangement of the potable water reservoir in Shuamta	V=50 m ³
12	Arrangement of the potable water reservoir in Shuamta	V=30 m ³
13	Arrangement of the potable water reservoir in Ikalto	V=6 m ³
14	Installation of the biological wastewater treatment plant 3; 5; 5; 5m ³ /24hr	4 units

Machinery and Vehicles required for Rehabilitation Works

#	Item	Model	Quantity	Remarks
1	2	3	4	5
1	Single-bucket excavator, with bucket capacity of 0,25 m ³	eo-2621	1	Earth works
2	Pneumatic equipment (air drill, pneumatic hammer)	du - 31 ie - 4501	1	Earth compaction
3	Dump truck		3.	Earth disposal, Inert material supply
4	Truck		2	Materials' supply
5	Surface vibrator	iv – 77 iv – 91	2	Concrete works
9	Welding apparatus	so – 48	2	Welding works
10	Concrete mixer	sb – 30 sb – 159	1.	Concrete transportation
12	Crane with lifting capacity of 10 .0 tn		1	Lifting materials to various floors
13	Various purpose electropneumatic equipment			Construction works

Estimated duration of the contract is 12 months.

4. Baseline Environmental Conditions

The SP sites are located in Eastern Georgia, in Telavi municipality of Kakheti Region. Access to the construction sites from Tbilisi is possible via Tbilisi-gombori-Telavi and Tbilisi-Gurjaani-Telavi motorways and distance from Tbilisi is approximately 110 -150 km. To determine potential risks of environmental and social impacts and develop relevant measures to mitigate expected impact, it is important to discuss existing baseline environmental and social conditions of the region and areas of SPs location. The presented ER also discusses baseline information regarding monuments of cultural heritage to avoid impacts on the monuments located adjacent to the SP sites

4.1. Physical-geographical Description, Geology, Geomorphology, Hazardous Geological Processes

Kakheti is a region formed in eastern Georgia from the historical province of Kakheti. Kakheti is situated in the eastern part of Georgia. It is bordered by Russian Federation from the north (Republics of Chechnya and Dagestan), Azerbaijan from the east and south and Georgian regions - Mtskheta-Mtianeti and Kvemo Kartli from the west. The area of Kakheti is 11040.6 km² constituting 16,6% of the whole territory of Georgia Capital city is Telavi. The region comprises eight administrative districts; among them is Telavi (area 1.094 km², population 68.000) Municipality.

General physical-geographical description

Telavi Municipality shares a border with Akhmeta Municipality to the north and west, with Dagestan Republic – to the north-east, with Kvareli – to the east, with Gurjaai – to the south-east, with Sagarejo Municipality - to the south-west; total area of Telavi Municipality is 1094,5 km². Agricultural lands occupy 33156 ha of this area. Major part of municipal lands are taken by broad-leaved forests.

In terms of geomorphology, the municipality area is a complex formation. Central part of Telavi municipality is spread in the accumulative plain of Alazani, which in geological terms is a tectonic unit. From south-west it is enclosed by Gombori mountain range, from north –east – by the Kakheti Caucasus Ridge. In this area, height of lowlands reaches 350-600 meters. Gombori Range cuts into the South-western part of the Municipality, it is a large young anticline developed on the substrate of Pliocene Molassa deposits. These deposits are situated in unconformity on the Cretaceous and Paleogene complex-folded flysch deposits. In the crest part of Tsvi-Gombori ridge and upper step of its northern slope, there are fragments of plain-wavy watersheds and denudation surfaces are surviving. They are dissected with gorges characterized with strong mudflow activity. The highest peak of Gombori range Tsvi (1991 meter height) is located in Telavi municipality area. Tsvi is formed by Myo-pliocene loose deposits – conglomerates, clays and sandstone.

An important orographic unit is Andarazani mountain range – (southern branching of Kakheti

Caucasus), which is a watershed of the rivers Didkhevi and Lopota. It is formed by Lower Jurassic (Lia) clay shales. In the northern part of the range, there is a peak Didi Andarazani (3039 m), and in the southern section – a peak Patara Andarazani (2448 m). Telavi Municipality occupies south western slopes of Kakheti Caucasus Ridge: between the Sajikhve-Girgali and Nakerali branch ridges. It is formed with Jurassic and Cretaceous clay shales, as well as with sandstone, marl and limestone.

Morphological, geological, tectonic and hydrogeological conditions

The north-eastern part of Telavi municipality covers south-west slopes of the Caucasus, between the branch ridges of Sajikhve-Girgali (East) and Nakerala (West). It is built up by clay shales, sandstones, clay, marl, schists and limestones of the Jurassic and Cretaceous age. There are fragments of Jurassic diabases, porphyries in the upstream valley of Stori River. Palaeozoic age crystalline shale and marble are represented in the upstream valley of Lopota River.

The relief is strongly inclined and deeply divided by V- shaped valleys with steep slopes. The branches of the Caucasus main watershed ridge are: Sajikhve-Girgali (Sajikhvistavi Mountain – 2870 m), Andanazari (Didi Andanazari Mountain – 3039 m), Nakerali (Didgverdi mountain – 3293 m). Watershed ridges are serrated, in some places it is exposed. Traces of the Quaternary glaciers are observed in sloping line of the Caucasus.

Southwest part of Telavi Municipality includes north-eastern slope of young, folded Gombori ridge to the watershed of Shromiskhevi and Mghvriekhevi Rivers. It is mainly built up by Sarmatian-Cimmerian molasse, so called Tsivi suite conglomerates, loose sandstones and clays. In the sloping line, Tsivi suite is washed out and upper and lower Cretaceous limestones and volcanic suites, tuff breccia, tuff-sandstones and porphyrites are exposed. The ridge is flattened. Gombori Ridge slope is inclined towards Alazani plain. The highest point is the section between Gombori (1839,5 m) and Manavistsivi (1681,6 m) mountains. Landslides are common in river valleys.

The central part of the municipality is occupied by accumulative plain (350-600 m) of Alazani River, which tectonically belongs to the depression of Mtkvari and represent the intense subsiding zone. It is built up by Quaternary alluvial, proalluvial and diluvial-proalluvial cobbles, sandstone and clay. The plain is divided into two parts and is slightly inclined to the southeast. It is surrounded by Kakheti Caucasus from north-east and by foothill of Gombori Ridge from south-west. Alluvial fans and solifluctions are widely developed in foothill zone fragmented by valleys.

Pliocene sediments are represented by a thick (several hundreds of meters in thickness) continental sediments, in the formation of which conglomerates play an important role. In geological literature these sediments are known as Alazani suite (Middle and Upper Pliocene).

General assessment of hazardous geological processes

The territory of Georgia, as part of seismoactive region of Caucasus falls within the

mediterranean sea seismic belt and is located in the moderate seismic activity zone.

Southern part of Kakheti region is located within earthquake intensity of 7 grade, the central part comprising Dedoplistskaro and Sagarejo falls within 8 grade, Signangi and Gurjaani are located at the boarder of 8 and 9 grade zones and the Northern part of Kakheti, including Telavi, Ikalto, Akhmeta, Kvareli, as well as Tusheti falls within the most high risk zone of 9 grade earthquake intensity.

There are no geo-hazard areas and hazardous geological processes at the SP area.

Climate

There is moderately humid climate in Gombori ridge, summer is long here. Iori Plateau is characterized by dry sub-tropical steppe climat, with moderately cold winter and rather hot summer.

At 420m altitude above the sea level, average annual temperature is 12.4°, temperature in January - 0.9°, in August - 23.6°. Volume of precipitations amounts to 800 mm, in general, in the major part of the territory annual volume of precipitations amounts to 800 mm. Annual volume of precipitations is less in the plateau area and amountst to 500-600 mm.

Climate here is characterized by strong torrential rains.

Maximum of the precipitations falls in May-June, which has a positive effect on the agricultural productivity. Total of the active temperatures comprise more than 4000 hours a year.

Hydrology

The main hyfrological artery of Telavi Municipality is the river Alazani and its basin. River Stori is also notable (length 38 km), which collects water on the southern slope of Kakheti Caucasus. It feeds on snow, rain and ground waters. River Kisiskhevi (length 37 km)heads on at several kilometers distance southward of the mountain Tsivi, there are badlands at the outlet of the river. River Lopota should also be mentioned (length 33 m) with its right tributary Didkhevi. Lopota flows from the southern slope of Kakheti Caucasus and is sometimes characterized by mudflows.

The river Turdo is worth mentioning (length 32 km) among periodic rivers. It heads on Gombori ridge and forms alluvial fan on Alazani valley. The river mostly feeds on rain, water and to negligible extent – on snow water.

River Telaviskhevi (length 21km) is a typical river distinguished in mudflows, which is the right tributary of Alazani. The following small rivers also flow across the Municipality area: Akuriskhevi and Vantiskhevi.

Soils

On the left side of the Alazani valley is developed meadow-forest noncarbonated alluvial soil and on the right side the alluvial carbonate soil. In the foothill zone is developed the brown soil. In the Caucasus range and in the lower of slopes under broad-leaved forest is developed gray forest soil.

Flora and Fauna

Telavi Municipality lands are taken by foothill and low mountain oak-hornbeam and other broad-leaved forests. Alazani valley has preserved some liana forests.

There are oak-hornbeam and beech forests found in Gombori average height mountain zone. An area at 2000 m altitude above the sea level is dominated by beech, which is mixed with hornbeam and birch. Kakheti Caucasus slope at an altitude of 800-1000 m is dominant with Oak and Hornbeam, which is mixed with beech, some lime and chestnut.

Fauna of Telavi Municipality is represented by: brown bear, chamois, roe, there is great number of hare, wolf, fox, jackal, vole, rat, dormouse, wild boar, etc. Ornithofauna is represented by: owl, eagle, woodpecker, crow, etc.

There are following fish species in the rivers: Diplodus, Varicorhinus, Carp, Nemachilus, Barbus capito, etc.

Terrain

There are the following types of terrain formed in Telavi Municipality area:

1. Alluvial fan plain forest with shrubbery and proluvial humus calcareous soils;
2. Alluvial fan foothill with oak forests and forest brown and humus calcareous soils;
3. Low mountains with oak forests and oak-hornbeam forests, and brown and black soils;
4. Average height mountains with beech, oak and chestnut forests, and forest brown soils;
5. Subalpine meadows with mountain meadow soils;
6. Alpine meadow landscape on mountain meadow soils.

Anthropogenic transformation of the territory

The territory is almost completely altered. The valley forests were spread on large areas in the past, with a habitat of many animals. Nowadays these forests are completely destroyed and remain only in the forms of individual groves. They are replaced by the secondary grasses and shrubs and agricultural plots – cereals, gardens and vineyards. Due to high fertility of soils the area is agriculturally productive.

4.2. Social Conditions

Dzveli Shuamta Monastery & Akhali Shuamta Monastery

There is no community around the Dzveli Shuamta and Akhali Shuamta Monasteries; Vardisubani community is located at approximately 6-7 kilometers distance from the sub-project. Population of Vardisubani: total number of community population is 3 288, out of which Man- 1542 Women- 1746, Minorities-0,1%, IDP-0, Rate of migration-18,8, Number of workforce 61%, number and percentage of population employed in the Industrial sector (agriculture, fish-farming, trade, timber processing, cattle-breeding, poultry farming, catering, etc.) 0,9%, population employed in the public sector (education, healthcare, post, communal service, local self-governance, water supply system etc.) 1.6% (2004 y data.)

Ikalto

Population of Ikalto: total number of community population is 2 365, out of which Man- 1 129, Women- 1 236, Minorities-0,1%, IDP-0, Rate of migration-0,8, Number of workforce 64,2%, number and percentage of population employed in the Industrial sector (agriculture, fish-farming, trade, timber processing, cattle-breeding, poultry farming, catering, etc.) 2,6%, population employed in the public sector (education, healthcare, post, communal service, local self-governance, water supply system etc.) 4.0% (2004 y data.)

4.3. Cultural Resources

There are many significant monuments of Cultural heritage on the the Telavi Municipality areas. Below is given short description of monuments nearby of the territory where implementation of subprojects are envisaged.

Dzveli (Old) Shuamta Monastery:

Dzveli (Old) Shuamta Monastery is the monument of 5th – 7th cc and includes three structures. The 5th century basilica is one of the oldest examples of Christian architecture. Mtskheta St. Cross Temple-type large domed church belongs to the 7th century. The small-domed temple belongs to the same period.

All three churches were built with mortar and cobble stones which are common for Kakheti architecture. The artistic appearance of the ensemble is determined by the clear planning of structures and simplicity of masonry.

The interiors are simple; arches separating the chapel from the altar, a few small icons and paintings of saints. At about shoulder-level there's a band of wax and soot on the plaster from the countless candles that are stuck onto the walls. Small archways lead into neighboring chapels. Here one can see the three distinct sections of the church: nave, and two chapels on either side, each separated by a solid wall, a small window above each altar. Over to the right one can see the narrow passage leading from the larger, principal church over to the second

one, a sliver of which is visible on the far right. Activities and life of historical persons of Georgia were related to Dzveli Shuamta monastery in 5th – 16th centuries.

Akxali (New) Shuamta Monastery:

Akhali Shuamta monastery is the monument of 16th century. It was established by the spouse of Levan, King of Kakhs (1520-1574) – Queen Tinatin who rests here, according to the will. The main structure of the monastery – Khakhuli The Virgin’s Temple was built in 1540. The large part of the contemporary painting is maintained in the interior. The royal family members are painted on the western wall. Initially, the temple had a three-side encirclement and the structure was thoroughly repaired in the second half of the 18th century. The three-storey bell-tower of the monastery is contemporary to the church. There was dwelling area of the Queen Tinatin who had become a nun on the first ground. In 1883 the bell-tower was damaged by a strong thunder.

Ikalto Monastery:

Ikalto Monastery monument of 6th – 16th cc was founded activities of one of the Thirteen Assyrian Fathers – St. Zenon Ikaltoeli (6th century).

The small church of St. Trinity belongs to this period (second half of the 6th century) which underwent significant changes in appearance later.

The main temple of the monastery, “Deity” (9th century), is built on the location of the old church. St. Father Zenon rests here. The temple is one of the earliest examples of “inscribed cross” type in Kakheti architecture. It has reached us in the initial form, only the church dome collar belongs to the 19th century.

The temple was decorated with the 11th century stone iconostasis with rich, figure reliefs and ornamental frame. The Virgin church “Kvelatsminda” belongs to the turn of the 12-13th centuries. In the Middle Ages Ikalto was a significant cultural-educational center. At the turn of the 11-12th centuries a well-known Georgian churchman and philosopher – Arsen Ikaltoeli established an Academy here. He was buried in the same monastery.

The Monastery was famous as one of the most significant cultural-scholastic centers of Kakheti as well as of the whole of Georgia. A high school, the academy, was founded there; Archaeological excavations revealed numerous workshops, wine-cellars, a smithy, store-rooms and other household rooms grouped around the Academy building.

Ikalto Saint Nino Church

Ikalto saint Nino church is located outside of Ikalto monastery main fence. Existence of the monastery was known but accesses asphalt road to the monastery was covering it, thus the church was sunk into oblivion. Configuration of the church was revealed during Ikalto

monastery external works. Small size church was constructed with irregular shape rocks. Hall is not partitioned only alter apse is separated with one stage. Alter apse has oval shape. Small size niche is arranged at South part of apse and window in the center. Vault of the church is collapsed only flat conch is remained. South wall where entrance door should be located is almost demolished. Top section of East wall is also collapsed. On top of North wall and conch old tile fragments faced on lime mortar are still remained. Despite the minuteness of church its proportion, mural masonry type and internal space indicates on church antiquity. Masonry of this church is very similar to Ikalto VIII-IX century church. Small size stones rectilinear laying and vertical routing of conch arch with flat stones. Based on findings of ceramic materials and remains of tiles according to significant opinion of archeological works church is dated as of VIII-IX century.

Thus presumably this small size saint Nino church was constructed in relation to big church construction and it may represented small chaplain or tomb.

Chance Findings

In course of civil works under SP Integrated Revitalization of CH Sites in Dzveli Shuamta, Akhali Shuamta and Ikalto, the ancient tombs were discovered on the territory of Dzveli Shuamta monastery. Moreover, during excavation works in the adjacent to the Ikalto Monastery Complex, the remains of the old church were found, which were invisible theretofore.

The construction works on the construction sites were suspended and Implementation of archaeological works has been planned and relevant permits issued according to the correspondence between Municipal Development Fund of Georgia and the Ministry of Culture and Monument Protection of Georgia. The archeological survey of the sites have been conducted and relevant conservation plan developed. The reports of Archaeological research survey are stored in MDF office. On the bases of the plan, conservation works carried out on the territories of Old Shuamta monastery and small chapel of Ikalto Monastery, from May 25 to June 20, 2013. According to the agreement with the Agency for Cultural Heritage Preservation the identified archaeological remains for storage was transferred to the Diocese of Alaverdi. The SP was stopped The SP will be implemented in coordination with National Agency for Cultural Heritage Preservation and prior of starting of construction works relevant permit should be obtained.

5. Analysis of Potential Impacts

The potential impacts under SP may be related to construction and operation of the light tourism infrastructure that will be arranged at the entrances to the monuments of cultural heritage. The SP may cause impacts on social and natural environment and on the monuments of cultural heritage as well and effects are expected to be positive or negative and will carry temporary or long-term character.

5.1. Construction Phase

Social Impacts

- **General set of social issues.** The long-term social impact will be beneficial (improvement of local population living conditions and growth of tourist flow), as the CH sites will be provided with a new comfortable building of museum, which will cause significant improvement of the conditions for local staff. Significant social impact of rehabilitation activities, like change of local demographic structure, influx of new settlers, secondary development and increase of AIDS risks is not envisaged.
- **Resettlement Issues.** SP does not imply private land acquisition and no permanent impacts are envisaged on private or leased agricultural lands and private assets or businesses.
- **Positive impact related to Job opportunities for construction workers.** Limited and temporary.
- **Impacts related to noise, emissions, vibration.** Limited and temporary.
- **Traffic Disruption.** Local traffic can be impacted limited and temporary by transport activities related to the SP.
- **Safety and Access.** There will be reduced access to areas adjacent to rehabilitation and potential hazards to vehicles and pedestrians during rehabilitation downtime. During construction works, minor negative impact on school pupils and staff safe access to school located on the territory of Batonis Tsikhe is expected.
- **Interference in monks lifestyle -** In case of active monastery - construction activities will interfere with the monastery life of monks. The impact will be limited and temporary.
- **Restriction or suspension of visitation -** During construction works visitation excess to the sites of CH will be restricted or suspended. The impact will be limited and temporary.

Impact on cultural heritage

Impact on monuments of cultural heritage. As it was described above, there are aboveground monuments and known archaeological sites presented in the vicinity of worksite. Moreover, the SP envisages restoration and conservation works of Saint Nino church in Ikalto, located outside of Ikalto monastery main fence. Existence of the monastery was known but access to asphalt road to the monastery was covering it. Configuration of the church was revealed

during Ikalto monastery external works in 2012. Conservation works will preserve the monument from further damage, natural disasters and severe weather.

The risks of impacting the physical cultural property during construction works are marginal and related to noise, dust, vibration, and emissions from the operation of construction machinery. Also archaeological sites could not be excluded. The risk of impact on the aesthetic values and style of the monuments is high. Permit for Works on Cultural Heritage Monument will be issued by the National Agency for Cultural Heritage Preservation of Georgia after signing contracts with contractor. Supervision during construction works is also required.

Environmental Impacts

Pollution Related Impacts

Improper handling, storage, use and disposal of construction materials and wastes could pose a risk of water/ soil contamination at the construction site and storage site. Improper maintenance and fueling of equipment could also lead to the potential contamination of soil and to some extent – water (near the crossings of the unnamed seasonal stream). The later impact is less probable.

Soil Pollution

Potential pollutants from a SP of this nature include the following (this list is not exhaustive):

- Diesel fuel, lubrication oils and hydraulic fluids, antifreeze, etc. from construction vehicles and machinery;
- Miscellaneous pollutants (e.g. cement and concrete);
- Construction wastes (packaging, stones and gravel, cement and concrete residue, wood, etc.)
- Extremely small amount of hazardous wastes (e.g. waste oils, oily rags, spent filters, contaminated soil, etc.) constituting about 0.1% of total amount of the wastes.

Water Pollution

Water pollution may result from a variety of sources, including the following:

- Spillages of fuel, oil or other hazardous substance, especially during refuelling
- Disturbance of watercourse banks and bed during watercourse crossings by heavy machinery
- Silt suspended in runoff waters (“construction water”)
- Washing of vehicles or equipment

Spillages may travel quickly downhill to a watercourse or water body. Once in a watercourse, it can be difficult to contain the pollution which can then impact over a wide area downstream. It is therefore vital that prompt action is taken in the event of any potential water pollution incident.

Air Pollution and Noise

Potential impact of air pollution is minimal and related to operation of vehicles and heavy machinery at the construction site and during transportation of materials.

- Noise and vibration arising from heavy machinery and vehicles
- Air emissions (from vehicles, etc.)
- Dust (from vehicles).
- Fumes may be a concern linked to supply and transportation of materials

Construction Related Wastes

Inert and Non Hazardous Construction Wastes

The following types of inert and non-hazardous construction waste are anticipated to be produced from these activities:

- Inert (mineral) construction waste;
- Removed old wood materials;
- Removed bricks, gypsum plastering, glass;
- Removed the "Robermast" layer, tin, lime and cement plastering, bitumen residues from the roofs.

Hazardous Construction Wastes

Small quantities of the hazardous wastes will arise mainly from the vehicle maintenance activities. A number of hazardous wastes, which could be generated, include:

- liquid fuels;
- lubricants, hydraulic oils;
- chemicals, such as anti-freeze;
- contaminated soil;
- spillage control materials used to absorb oil and chemical spillages;
- machine/engine filter cartridges;
- oily rags, spent filters, contaminated soil, etc.)

Transport related impacts

- Noise & Vibration Impacts
- Traffic congestion (nuisance)
- Air pollution
- Mud on roads
- Refuelling, maintenance and vehicle cleaning and related risks of soil and water contamination

Impacts on the physical cultural property

The SP will be implemented in the territory of a cultural heritage site, including historical buildings. Risks related to restoration and upgrading of the site are: damage to old constructions due to vibration on site; impact on the historical and aesthetic values of the site.

Operational phase risks are related to management of visitation, securing rehabilitated palace from unfavorable storage conditions and preventing vandalism on site, and household waste management.

Topsoil losses due to topsoil stripping

- Topsoil washout due to improper storage and reinstatement
- Silt runoff to watercourses and water bodies
- Exposure of contaminated land

Flora and Fauna. As major volumes of construction works has been carried out on the SP sites and construction of building skeletons are completed, the implementation of activities envisaged under the presented part of the SP will not cause serious negative impacts on the existing environment. The project does not envisage woodcutting.

The projects for arrangement of water supply and wastewater systems for touristic infrastructure envisages provision of potable water to the Dzveli and Akhali Shuamta touristic and recreational areas, through arrangement of the water borehole on the forest meadow located in 40-50 meter distance right side of the motor road leading to Dzveli Shuamta. No woodcutting is included under the project but there is a risk of trees and vegetation damage, in case if the adequate mitigation measures will not be implemented.

Landscape. The project design does not envisage any substantial changes of landscape. The preexisting relief will be reinstated. The only irreversible impact is limited to cutting of small amount of bushes during the headwork and pipeline construction

5.2. Operation Phase

The light tourist infrastructure to be provided at the subproject sites transferred to the entity that owns the land under it. This entity will have overall responsibility for adequate operation and maintenance of the infrastructure.

The further impacts expected from operation and maintenance of the provided infrastructure (parking lots, cafes, souvenir shops and WCs) would be the following:

- enlarged number of tourists will result in the Increased volume of waste, wastewater and noise;
- The traffic will increase in adjacent area of CH sites, which will result in the increased level of local emissions and noise as well as traffic safety issues;
- Tours of sites of worshipping may conflict with local traditions and/or religious beliefs;
- Shooting photos of wall paintings may result in damage due to photochemical reactions induced by flashing.

The potential risks of chlorination of the supplied water are related to disruption of chlorination process when:

- The leakages of liquid chlorine may occur and chlorine content in potable water exceeds the established threshold;
- The leakages of liquid chlorine on the territory of chlorination unit may endanger the personnel; and
- Interruption of chlorination process.

Positive social impact will be related to the increasing of the touristic infrastructure that will have positive effect on the local population, in terms of employment.

6. Mitigation Measures

6.1. Construction Phase

General requirements:

A number of restrictions and mitigation measures are to be taken into account in course of construction activities:

1. The machinery should move only along the preliminarily agreed route;
2. The maximum allowed speed will be restricted on the castle adjacent territory;
3. The frequency of movement of the machinery will be restricted;
4. Parking place of the machinery/vehicles should be arranged outside of the cultural heritage site and no vehicles should not left on the site after working hours.
5. Construction materials must be obtained from licensed providers. Contractor will be required to submit to the MDF copies of the licenses, permits, written agreements, certificates, etc. to prove that all materials are obtained from licensed providers, including wood materials from oak. Contractor will not allow to use wood material from oak species listed in the Red List of Georgia.
6. On the CH territories the marginally allowable rates of vibration, noise and emissions will be by 20% decreased of maximum admissible levels of atmospheric air pollution, vibration and noise;
7. Storage of hazardous wastes on the cultural heritage rehabilitation area will be prohibited
8. Any construction or municipal wastes should be removed from the cultural heritage areas every day at the end of working hours.
9. Every worker at mobilization stage will undergo the respective training on working on the high sensitivity site. The institute provide such training and module of the training should be agreed with National Agency for Cultural Heritage Preservation. In course of rehabilitation activities, in case of observing any suspicious object, the rehabilitation works will be suspended and will restart only upon issuance of the permit by the National Agency for Cultural Heritage.

Noise Related Impact

Noise is one of typical impacts related to the construction activities. The compliance with the environmental requirements is even more significant for the SP area due to the considerations regarding the construction activities list to be implemented within the territory of historical monument area, because it will involve the transportation of heavy cargo with heavy vehicles in the direct proximity of the historical monuments.

In case of absence of special measures and disregard to the restrictions the transport and devices could inflict serious damage.

Contractor construction organization should adopt special measures to receive the appropriate construction permit and achieve agreement with all stakeholder organizations both on cargo transportation.

The following measures will be implemented to avoid or reduce noise related noises:

- The selected movement route of the heavy vehicles should be maximally distance from historical monument;
- Allowed intensity of the vehicle traffic and speed should be determined;
- The import of the inert material shall be conducted from the licensed quarries nearby project area. The rout of the transport movement during the transportation of inert material and any other construction material should be agreed upon with the appropriate regional services and overload with the trucks and violation of the allowed traffic intensity should not take place;
- The maximum speed should be restricted to the safety level during the pass of the trucks in the proximity of the David Gareja Monastery;
- Proper technical control and maintenance practices of the machinery should be applied;
- Activities should be limited to daylight working hours;
- No-load operations of the vehicles and heavy machinery are not allowed. Proper mufflers will be used on machinery.

Pollution Prevention Measures:

Water/Soil Pollution. Specific mitigation measures should be implemented at the construction site for prevention of water and soil pollution:

- Prevent operation of vehicles in the watercourses (e.g. unnamed stream near crossing sites);
- Revision of vehicles will be required to ensure that there is no leakage of fuel and lubricating materials. All machinery will be maintained and operated such that all leaks and spills of materials will be minimised. Daily plant checks (Vehicle Maintenance Procedure) will be undertaken to ensure no leaks or other problems are apparent. Vehicle

- maintenance, cleaning, and degreasing will be undertaken in designated areas, arranged outside of the cultural heritage site, of hard-standing, not over made ground. Maintenance points will not be located within 50m of any watercourse, well or dry gorge..
- Lubricants, fuel and solvents should be stored and used for servicing machinery exclusively in the designated sites, arranged outside of the cultural heritage site, with adequate lining of the ground and confinement of possible operation and emergency spills. Spill containment materials (sorbents, sand, sawing, chips etc.) should be available on construction site.
 - No fuel, lubricants and solvents storage or refuelling of vehicles or equipment will be allowed on the cultural heritage site.
 - Contractor should be required to organize and cover material storage areas. The material storage sites should be protected from washing out during heavy rain falls and flooding through covering by impermeable materials.
 - Wet cement and/or concrete will not be allowed to enter any watercourse, pond or ditch. Washing and disinfection of the newly laid pipelines and reservoirs - Upon completion of washing and disinfection of pipes and reservoirs the disinfection solution will be neutralized by the contractor prior to release to the environment – to avoid damage to terrestrial or aquatic organisms. In the case of disinfection via chlorination, this is achieved by application of a reducing agent, such as sodium bisulfate to achieve de-chlorination. The reducing agent, in turn, must be applied by the contractor at the precise dosage to neutralize the disinfectant – but no more, since reducing agent residuals are also detrimental to aquatic ecosystems. Releasing of neutralized water to the environment by the contractor will be agreed with the local municipality.

Waste Handling

All waste from the construction sites will be disposed of in accordance with environmental regulations and at legal landfills. Burning of waste on any construction site is forbidden with the exception of stub and small branches from felled trees and bushes, which is better to be burned in order to avoid pest dissemination.

Inert and Non-Hazardous Construction Wastes

- The disposal of excess soil and rock
 - Allow local communities to utilize any excess rock, which may be left following reuse. Suitable access to the materials will be agreed with the local authorities in consultation with the community.
 - Transport any remaining material, if required, for the permanent disposal to the location authorized in writing by local authorities. Disposal sites must meet the requirements for Inert Landfills by the MoE.
- Written agreement with the "Solid Waste Management Company of Georgia" Ltd should be obtained by contractor on the disposal of construction waste on the nearest approved landfill prior to the works commencement.

- The personnel involved in the handling of hazardous and non-hazardous waste will undergo specific training in:
 - Waste handling
 - Waste treatment; and
 - Waste temporary storage
- Burning of waste on the SP site is forbidden.
- The records of waste disposal will be maintained as proof for proper management as designed.

Municipal Waste

Municipal waste, like rubbish, plastic or glass bottles, glasses, waste food, etc. and a stationary waste may be generated on the construction sites. The specially assigned personnel on the area should collect waste, which will be placed into plastic containers and disposed on the nearest landfill based on written agreement with the "Solid Waste Management Company of Georgia" Ltd.

Hazardous Wastes

- Written agreement with the licensed company should be obtained by contractor on the transportation, handling, disposal of hazardous waste prior to the works commencement;
- Temporarily storage of all hazardous or toxic substances will be in safe containers labelled with details of composition, properties and handling information;
- The containers of hazardous substances shall be placed in an leak-proof container to prevent spillage and leaching
- Paints with toxic ingredients or solvents or lead-based paints will not be used.
- Some types of hazardous waste will finally be disposed on the nearest official landfill in accordance with written agreement with MoENRP and "Solid Waste Management Company of Georgia" Ltd.

Waste management general requirements

- The personnel involved in the handling of hazardous and non-hazardous waste will undergo specific training **in waste handling and storage.**
- Burning of waste on construction site is forbidden.
- The records of waste disposal will be maintained as proof for proper management as designed.

Dust and emissions

- All vehicles shall be maintained so that their emissions do not cause nuisance to workers or local people. Activities will be limited to daylight working hours to reduce impacts. All

vehicles will be checked and repaired in case of need to eliminate increased level of noise due to damaged parts.

- Regular maintenance of diesel engines will be undertaken to ensure that emissions are minimised, for example by cleaning fuel injectors. Routine maintenance will be to a high standard to ensure that vehicles are safe and that emissions and noise are minimised. All plant used on site will be regularly maintained so as to be in good working order at all times to minimise potentially polluting exhaust emissions.
- Vehicle refuelling will be undertaken so as to avoid fugitive emissions of volatile organic compounds through the use of fuel nozzles and pumps and enclosed tanks (no open containers will be used to stored fuel).

If deemed necessary in dry conditions or where significant quantities of dust are being or are likely to be produced mitigation measures will be arranged with the Construction Manager.

Mitigation measures will include:

- Sheeting of construction materials and storage piles;
- Use of defined haulage routes and reductions in vehicle speed where required. Materials will be transported to site in off peak hours;
- Materials transported to site will be covered/ wetted down to reduce dust. The construction site will be watered as appropriate. Protective equipment will be provided to workers as necessary. All vehicles will be checked and repaired in case of need to eliminate increased emission due to damaged parts.
- During removing of the bricks, gypsum plastering, etc. destruction dust shall be suppressed by ongoing water spraying and/or installing dust screen enclosures at site;
- The surrounding environment (sidewalks, roads) shall be kept free of debris to minimize dust
- There will be no open burning of construction / waste material at the site
- There will be no excessive idling of construction vehicles at sites

Subsoil Storage

The storage of subsoil in stockpiles, no more than 3 m high with side slopes at a maximum angle of 60⁰, will take into consideration the following:

- Dedicated storage locations where the stockpiles will not be compacted by vehicle movements or contaminated by other materials; and
- Segregation from topsoil stockpiles.

Topsoil storage and reinstatement

Topsoil should be stripped before starting of earthworks.

The topsoil shall not be handled by construction contractor when the following conditions are observed:

- The topsoil is frozen;

- The site is experiencing persistent rainfall;
- The topsoil is saturated; or Handling will damage the structure of the topsoil.

Topsoil will be stored in stockpiles, no more than 2m high with side slopes at a maximum angle of 45°. The following shall also be taken into consideration:

- Dedicated storage locations will be used that prevents the stockpiles being compacted by vehicle movements or contaminated by other materials;
- Topsoil will be segregated from subsoil stockpiles;
- No material will be stored where there is a potential for flooding;
- No storage at less than 25m from river/streams, subject to the site specific topography.

In the event that the stockpiles experience significant erosion the Contractor will be required to implement corrective action, such as installing erosion matting over the stockpiles if further surface compaction and/or topsoil seeding fails. The Contractor shall protect the stockpiles from flooding and run-off by placing berms or equivalent around the outside where necessary.

Stored topsoil should be used for reinstatement and landscaping. Topsoil from the sites, which will not be reinstated to the initial conditions will be distributed carefully on the surrounding area.

Temporary Erosion Control Measures

The measures, by which Contractor will address the protection of “slopes” of the dam against erosion before permanent reinstatement, are outlined in this section. Temporary erosion control measures will be introduced as necessary, paying special attention to:

- Construction activities that increase the potential for erosion from the check dam sides and/or sediment mobilization in watercourses;

Temporary erosion control measures will be left in place. The purpose of temporary erosion control measures is to:

- Interrupt surface water run-off;
- Slow the velocity of water runoff to the extent practical;
- Divert water off exposed check dam areas;
- Prevent and minimize sediment transportation off the construction sites; and
- Straw bale barriers in locations requiring small volumes of sediment interception;

Protection of CH Monuments

The Law of Georgia on Cultural heritage determines individual protection zones for monuments, their area of influence and a special mode of operation within this area.

The individual protection zone of the monument is a territory around it, which includes physical and visual protection areas, which are established for the purpose of physical and visual protection of the monument.

The physical protection zone of the monument is the area around the monument, where any action may cause physical damage to the monument or its adjacent territory. The physical protection zone area is calculated as follows – monument height multiplied by 2, but no less than 50 meter radius.

The law prohibits any activities in the area of physical protection, which may harm, damage, or diminish the perception or use of the monuments, including:

- such actions, which will lead to significant vibration or deformation of the land;
- chemical, flammable and explosive materials storage;
- erection of such structures, which do not serve to protect the monument or its environment;
- Plant species or planting in a way that could damage the monument.

The movement route of the heavy machinery should be selected prior starting of construction activities and will be in maximally distances from historical and CH monuments. In exceptional cases, the allowed intensity of the vehicle traffic and speed should be determined.

In case chance find is encountered in the course of earth works, the contractor must immediately stop any physical activity on site and informs the MDF. The MDF promptly notifies the Ministry of Culture and Monument Protection, which takes over responsibility for the following course of action. Works may resume only upon receipt of written permission from the Ministry of Culture and Monument Protection.

Protection of adjacent landscapes and vegetation

Movement of vehicles will strictly limited within traffic lane; Pockets for turning of vehicles should be arranged; Trees and shrubs will be strictly protected from damage while installation of the water supply system. All workers will be strictly prohibited from, foraging, waste dump or other damaging activities to adjusted landscapes. Large trees in the vicinity of the construction activities shall be marked and cordoned off with fencing, their root system protected and any damage to trees avoided.

Mitigation measures for Site safety access.

In compliance with national regulations, the contractor will insure that the construction site is properly secured and construction related traffic regulated. This includes but is not limited to:

- Signposting, warning signs, barriers and traffic diversions: site will be clearly visible and the public warned of all potential hazards;
- Alternate safe pavement will be provided for visitors;

- Construction site and all trenches should be fenced and properly secured to prevent unauthorized access (especially of children);
- Appropriate lighting and well defined safety signs should be provided;
- Adjustment of working hours to local traffic patterns, e.g. avoiding major transport activities during rush hours or times of livestock movement.

6.2. Operation Phase

For proper management of the **increased volume of waste** generated due to the increased number of visitors the following measures have to implement:

- **Containers should be placed.** The number and volume of containers to be placed in the tourists gathering centers depends on the following factors: the expected number of tourists; the area of the territory, existence of access roads. Based on the calculations, for the expected 300 tourists one 1.1 m³ capacity metal container should be placed. It should be taken into consideration that the distance between containers should not exceed 50m and at the same time the 1.1 m³ containers should be easily accessible by the respective vehicles and there should be space for maneuvering. If the abovementioned requirements cannot be met, a smaller size easily portable 0.24 m³ plastic containers should be used.
- **Imposing of penalty sanctions against littering of the site.** Placement of the containers will have no tangible result, if the penalty sanctions are not imposed and exercised. The more effectively the penalty mechanism is introduced, the more accelerated will be the pace of fulfillment of the set target.

Water-supply and sewage

Increased number of tourists will increase using of water supply and sewage systems. To exclude any accident that will cause water losses or disruption of sewage systems proper management and monitoring of the systems is required during operation period.

Traffic and pedestrian access

The traffic will increase in adjacent area of CH sites, which will result in the increased level of local emissions and noise as well as traffic safety issues. The Mitigation measures for this will be:

- Parking lots in Dzveli and Akhali Shuamta will be located nearby the gates and fences. These parking lots could receive the low amount of vehicles: cars and minibuses. To solve this problem recreational space of Shuamta Monasteries subproject envisages arrangement of auto and bus parking lots. The site will be located 2.4 km from Dzveli

Shuamta and 500 m from Akhali Shuamta where buses will stop from where tourists can move to destination on foot or by cars. Cars will be available on the place.

- Parking lots in Ikalto located in 40 m from monastery territory will not have any tangible negative impact on CH monument,
- The car parking area and lots are located so that cars and buses will be able to stop and maneuver uninterruptedly;
- The implementation of above mentioned issues and proper management services will reduce negative impacts, imposed by traffic jams causing increased volumes of emissions and noise, on CH sites

Noise and shouting is forbidden at the monastery territory. Shooting photos should be limited to in monasteries and especially near the wall paintings. A dress code is applied at the monastery site. Restrictions come from the patriarchate of Georgian Orthodox Church and monastery authorities. Women requested not to wear shorts or open t-shirts and to put on skirts cover head with scarf will be available for skirts and scarves provided at all entrances for free; and men are required not to cover heads with sport caps and not to wear shorts.

At the monastery to take photos monks without their permission is not allowed. There are some exceptions with prior agreement to monastery authorities.

7. Environmental Management Plan

Based on the expected impacts on social and natural environment and on cultural heritage proposed mitigation measures described above which are related to the construction activities under the SP, Environmental Management Plan (EMP) have been developed, which is attached (page 42) and is an integral part of this ER. ER including EMP is part of the construction contractor contract and implementation EMP requirements is obligatory for contractor.

7.1. Institutional Framework for EMP Implementation

Construction contractor is obligated to follow EMP and good construction practice. In order to meet this obligation, a contractor shall have at least one environmental specialist on the team, who is able to fully understand recommendations of EMP and professionally apply prescribed mitigation measures to the contractor's daily operations.

Construction Contractor requirements

The contractor is required:

1. To obtain construction materials only from licensed providers;
2. If contractor wishes to open quarries or extract material from river bed (rather than purchasing these materials from other providers), then the contractor must obtain licenses for inert material extraction;

3. If contractor wishes to operate own asphalt (rather than purchasing these materials from other providers), then the contractor must obtain an environmental permit with an established ceiling of pollutant concentrations in emissions;
4. If contractor wishes to operate own concrete plant (rather than purchasing these materials from other providers), then the contractor must prepare technical report on inventory of atmospheric air pollution stationary source and agree with the Ministry of Environment and Natural Resources Protection (MoENRP);
5. Construction waste must be disposed on the Telavi municipal landfill in accordance with written agreement with the Solid Waste Management Company of Georgia Ltd. under the Ministry of Regional Development and Infrastructure. The records of waste disposal will be maintained as proof for proper management as designed.

Copies of extraction licenses (if applicable), agreed technical report on inventory of atmospheric air pollution for operating concrete plants (if applicable), and waste disposal agreement must be submitted to the MDF prior to the commencement of works.

GOST and SNIP norms must be adhered

Supervisory company commissioned by MDF is responsible to establish strong field presence in the SP area and keep a close eye on the course of works. Along with ensuring consistency with the design and ensuring quality of works, the supervisor is mandated to track implementation of EMP by the construction contractor, reveal any deviations from the prescribed actions, as well as identify any unexpected environmental issues should they emerge at any stage of works. The company will be responsible for ensuring that the following requirements are met: (i) Georgian environmental regulations; (ii) environmental permits are obtained; (iii) waste is disposed to a licensed disposal site; (iv) any other requirements identified by the MoENRP and agreed with the MDF; and (v) the Environmental Management and Monitoring Plans are implemented.

MDF is responsible for liaising with local municipality authorities, local community and the contractors engaged for construction on environmental issues associated with the implementation of this EMP and the Environmental Guidelines for Contractors.

MDF provides a general oversight on the environmental compliance of works through ensuring quality performance of the technical supervisor and of the construction contractor.

7.2. Costs of Implementation

Costs of implementing the proposed individual mitigation measures are small and difficult to single out from the costs of construction operations. Nonetheless, it is recommended that Bill of Quantities presented in the tender documentation carries a line item for the disposal of waste and excess materials. Other costs of adherence to good environmental practice and

compliance with this EMP are expected to be integrated into the pricing of various construction activities.

7.3. Environmental Monitoring

The Environmental and Social specialists of MDF and responsible representatives of construction Supervisor Company hired by MDF are responsible for monitoring of social, environmental and cultural Heritage issues related to the SP.

Based on risk assessment and EMP a relevant monitoring program has been developed. Monitoring of sensitive receptors should be implemented before, during, and after construction and during operation of the camp site. Types and Frequency of monitoring may vary from simple visual inspection to complex analyses, depending on the risks. Monitoring measures include site supervision, verification of permits, monitoring of compliance of the contractor performance and environmental impacts like: noise, dust, soil and water pollution and air emissions etc. The recognized best-practice of monitoring and analytical methods will be used during environmental monitoring of construction site related activities. The results of environmental monitoring and occurred noncompliance / incident and ways for their resolution will be summarized in the relevant monthly and Quarterly reports.

The environmental monitoring plan for the SP is summarized in the Table below (page 47).

7.4. Reporting on EMP Implementation

Technical supervisor prepares monthly and quarterly progress reports, which include information related to the EMP implementation and environmental performance of the contractor. The reports provide information on the main types of activities carried out within the reporting period, status of any clearances/permits/licenses which are required for carrying out such activities, mitigation measures applied, and any environmental issues emerged in relations with suppliers, local authorities, affected communities, etc. Technical supervisor must highlight any cases of incompliance with EMPs, inform on any acute issues brought up by contractor or revealed by supervisor himself, and propose corrective actions.

MDF must ensure that monthly reports from the contractor and from the technical supervisor are made available for the environmental specialists of the MDF promptly upon their arrival in MDF administration. The MDF, through its environmental specialists, shall report each quarter (1 report per 3 months) to the WB on the status of environmental compliance of construction works. Such reporting shall contain information on all violations identified and the actions taken for fixing of such cases. MDF shall inform the WB on any major environmental issues at any time, independently from the schedule of regular reporting.

7.5. Remedies for EMP Violation

MDF, as a client of construction works, will be responsible for enforcing compliance of contractor with the terms of the contract, including adherence to the EMP. For minor infringements, an incident which causes temporary but reversible damage, the contractor will be given 48 hours to remedy the problem and to restore the environment. If restoration is done satisfactorily during this period, no further actions will be taken. If it is not done during this period, MDF will arrange for another contractor to do the restoration, and deduct the cost from the offending contractor's next payment. For major infringements, causing a long-term or irreversible damage, there will be a financial penalty up to 1% of the contract value in addition to the cost for restoration activities.

8. Public Awareness

ER including EMP will be discussed with beneficiary community prior to the commencement of works. The information regarding SP activities should be open and available for all stakeholders.

9. Grievance redress mechanism

Appropriate grievance redress mechanisms will be established to solve APs grievance if occurs. A responsible person will be assigned to receive, review and react on the APs grievance if occurs.

ENVIRONMENTAL MANAGEMENT PLAN

Activity	Expected Negative Impact	Mitigation Measure	Responsible for implementation
Pre-Construction Phase			
Obtaining of required permits/licenses and making of contracts	Incompliance to Georgian Law and World Bank requirements	<p>Obtaining of permits required by Georgian legislation. These include:</p> <ul style="list-style-type: none"> – Permit for disposal (stockpiling) of excessive soil – licenses for inert material extraction – environmental Impact Permit for asphalt production – Permits for production of such construction materials that belongs to the activity subject to ecological examination. – Other permits required by the national law <p>Agreements should be made with solid waste management companies for waste disposal on household waste and construction waste landfills.</p>	Construction contractor
Consultations with local community and other stakeholders	<p>Incompliance to the World Bank requirements</p> <p>Failure to consider opinion and interests of stakeholders in decision-making</p>	<ul style="list-style-type: none"> – Meeting with local community and other interested parties to provide information about planned activities and obtain their feedback – Public consultation meeting with local population and discussion of SP ER including EMP 	MDF, Construction supervisor
Arrangements for implementation of environmental measures	<p>Incompliance to Georgian Law and World Bank requirements</p> <p>Significant environmental and social impacts</p>	<ul style="list-style-type: none"> – Appointing a person responsible for protection of social and natural environment and EMP implementation – Training of workers regarding social and environmental protection measures to be implemented – Delivery of supplies required for implementation of planned mitigation measures 	Construction contractor

Activity	Expected Negative Impact	Mitigation Measure	Responsible for implementation
Construction Phase			
Construction works, including: - Preparation of construction sites - Earth works - Installation of facilities - Machinery operations - Transportation operations	Deterioration of ambient air	<ul style="list-style-type: none"> - Watering of construction sites and road during dry weather (when required) - Suspension of earth works during strong winds - Vegetation clearing immediately before construction works - Proper stockpiling of stripped soil/ excavated ground - Reinstatement of the sub-project territory immediately after finalizing of construction works - Covering of bulk building materials during transportation - Imposing of a speed limit for transportation operations - Minimizing of idle running time for project machinery - Ensuing that project machinery is in good technical condition 	Construction contractor
	Propagation of noise and vibration	<ul style="list-style-type: none"> - Implementation of transportation operations only during day-time - Limitation of machinery speed for residential areas - Minimization of idle running period for machinery - Ensure that machinery is in good technical condition 	Construction contractor
	Soil disturbance	<ul style="list-style-type: none"> - Demarcation of construction sites' boundaries and access roads before construction works are launched - Adherence to demarcated work site boundaries during operations - Stripping of topsoil from work sites (whenever possible) and stockpiling for subsequent reinstatement, in compliance with the Technical Regulations on Stripping, Stockpiling, Use and Reinstatement of Topsoil (2014) - Topsoil stripping during heavy rains should not be allowed - Reinstatement of the sub-project area immediately after completion of construction works. As appropriate, this may 	Construction contractor

Activity	Expected Negative Impact	Mitigation Measure	Responsible for implementation
	Soil pollution	<p>include leveling of ground surface, reinstatement of topsoil and measures to facilitate natural recovery of vegetation</p> <ul style="list-style-type: none"> – Provision of staff with toilets and bathrooms, and centralized discharge of generated wastewater in the sewer systems if possible or install temporary structures. – Ensuring that machinery are well maintained – Refueling of machinery using respectively equipped refueling trucks, and using of drip trays during refueling operations – Refueling and maintenance of machinery only at a specially devoted site, where topsoil is tripped and gravel layer is arranged – Ensuring that construction materials are appropriately stockpiled – Ensure that all spills are cleaned up immediately, and contaminated soil is respectively disposed off – Cleaning up of the entire sub-project territory from construction waste as soon as the construction works are finalized – Implementation of the proposed waste management measures 	Construction contractor
	Water pollution	<ul style="list-style-type: none"> – Implementation of the measures proposed for prevention of soil pollution – Arrangement of silt barriers at topsoil / subsoil stockpiles – Implementation of the proposed waste management measures – Ensure that wastewaters are not discharged in nature without treatment 	Construction contractor

Activity	Expected Negative Impact	Mitigation Measure	Responsible for implementation
	Environmental pollution with solid and liquid wastes	<ul style="list-style-type: none"> – Burning of waste should be prohibited – Separated collection of wastes – Designation of special sites for waste accumulation, and implementation of pollution prevention measures there – Disposal of solid waste (except of waste soil and hazardous waste) on landfills, based on the contract made with a solid waste management company. Household waste should be disposed at the official municipal landfill of Telavi municipality and construction waste should be delivered to the construction waste landfill. – Hazardous waste should be handed over to a permitted waste management company, on a contractual basis – Waste soil should be delivered to a pre-selected site. Permit on the disposal of waste soil should be obtained prior disposal is undertaken. – Maintenance a waste management logbook to record wastes generated on site and waste flow 	Construction contractor
	Impact on traffic flow	<ul style="list-style-type: none"> – Impose speed limitation to the sub-project machinery – Ensure that sub-project machinery move using only pre-determined routes 	Construction contractor
	Health and safety risks for local community and school pupils and personnel	<ul style="list-style-type: none"> – Protection of construction site from random access to the site. – Implementation of measures recommended for air protection and noise abatement – Imposing of speed limitation to the sub-project machinery – Ensuring that sub-project machinery move using only pre-determined routes – Demarcation of work sites and installation of warning signs 	Construction contractor

Activity	Expected Negative Impact	Mitigation Measure	Responsible for implementation
	Damage to private property	<ul style="list-style-type: none"> – Ensuring that sub-project machinery move using only pre-determined routes – Imposing of speed limitation to the sub-project machinery – Full compensation of all losses incurred 	Construction contractor
	Conflicts with local population or other affects people	<ul style="list-style-type: none"> – Meeting with local population (if required) – Reception and addressing of complaints/grievances 	Construction contractor
	Occupational health and safety risks	<ul style="list-style-type: none"> – Informing of the sub-project labor about potential health and safety risks, and instructing them regarding safety measures to be adhered (before launching construction works and during civil works) – Ensuring that required personal protection equipment (e.g. helmets, gloves, etc.) is supplied and used by workers as appropriate – Ensure safety of machinery operations – Provision of safety signs for high risk zones – Implementation of measures recommended for air protection and noise abatement 	Construction contractor
	Impact on cultural heritage	<ul style="list-style-type: none"> – Prohibition of machinery entry on the territories of CH monuments – implementation of restoration and conservation activities in compliance with design approved by NACHP – Cleaning up and reinstatement of the sub-project area immediately after the construction works are completed – Suspension of construction operations if archeological objects or artefacts are discovered during earth works, informing of the Ministry of Culture and Monument Protection about the chance finding and resume works only after respective permission is issued. 	MDF, Construction contractor

Activity	Expected Negative Impact	Mitigation Measure	Responsible for implementation
Operation Phase			
Operation of the New constructed tourism related Infrastructure	Environmental pollution with solid and liquid wastes	<ul style="list-style-type: none"> – Installation of waste bins around the sub-project facilities – clean up the CH momumens adjacent territories on daily basis – Regularly deliver solid waste from the site to the municipal landfill of Telavi Municipality, on the basis of a contract made with the municipal waste management company – Burning of waste should not be practiced – Sewage collector systems and biological wastewater treatment facility should be maintained in good technical condition 	Infrastructure Operator company

ENVIRONMENTAL MONITORING PLAN

Activity	What (Is the parameter to be monitored?)	Where (Is the parameter to be monitored?)	How (Is the parameter to be monitored?)	When (Define the frequency / or continuous?)	Why (Is the parameter being monitored?)	Who (Is responsible for monitoring?)
CONSTRUCTION PHASE						
Supply with construction materials	Purchase of construction materials from the officially registered/licensed suppliers	In the supplier’s office or warehouse	Verification of documents	During conclusion of the supply contracts	To ensure technical reliability and safety of infrastructure	MDF, Construction supervisor
Transportation of construction materials and waste, Movement of construction machinerie	Technical condition of vehicles and machinery Confinement and protection of truck loads with lining Respect of the established hours and routes of transportation	Construction site	Inspection	Unannounced inspections during work hours and beyond	Limit pollution of soil and air from emissions; Limit nuisance to local communities from noise and vibration; Minimize traffic disruption.	MDF, Construction supervisor, Traffic Police
Earth works	Temporary storage of excavated material in the pre-defined and agreed upon locations; Backfilling of the excavated material and/or its disposal to the formally designated locations; In case of chance finds immediate suspension of works, notification of the Ministry of Culture and Monument Protection, and resumption of works exclusively upon formal consent of the Ministry.	Construction site	Inspection	In the course of earth works	Prevent pollution of the construction site and its surroundings with construction waste; Prevent damage and loss of physical cultural resources	MDF, Construction supervisor

Activity	What (Is the parameter to be monitored?)	Where (Is the parameter to be monitored?)	How (Is the parameter to be monitored?)	When (Define the frequency / or continuous?)	Why (Is the parameter being monitored?)	Who (Is responsible for monitoring?)
Sourcing of inert material	<p>Purchase of material from the existing suppliers if feasible;</p> <p>Obtaining of extraction license by the works contract and strict compliance with the license conditions;</p> <p>Terracing of the borrow area, backfilling to the exploited areas of the borrow site, and landscape harmonization;</p> <p>Excavation of river gravel and sand from outside of the water stream, arrangement of protective barriers of gravel between excavation area and the water stream, and no entry of machinery into the water stream.</p>	Borrowing areas	<p>Inspection of documents</p> <p>Inspection of works</p>	In the course of material extraction	<p>Limiting erosion of slopes and degradation of ecosystems and landscapes;</p> <p>Limiting erosion of river banks, water pollution with suspended particles and disruption of aquatic life.</p>	MDF, Construction supervisor
Generation of construction waste	<p>Temporary storage of construction waste in especially allocated areas;</p> <p>Timely disposal of waste to the formally designated locations</p>	Construction site; Waste disposal site	Inspection	Periodically during construction and upon complaints	Prevent pollution of the construction site and nearby area with solid waste	MDF, Construction supervisor
Traffic disruption and limitation of pedestrian access	<p>Installation of traffic limitation/diversion signage;</p> <p>Storage of construction materials and temporary placement of construction waste in a way preventing congestion of access roads</p>	At and around the construction site	Inspection	In the course of construction works	Prevent traffic accidents; Limit nuisance to local residents	MDF, Construction supervisor
All types of activities (transport operations, construction works) that leads to an increase in background noise levels	Discontent of monasteries' inhabitants due to the increased background noise levels	At and around the construction site	Check the technical condition of the machinery. If necessary noise level measurements.	During the training process, as well as during the implementation of activities causing intense noise	Limit nuisance of the monasteries lifestyle	MDF, Construction supervisor

Activity	What (Is the parameter to be monitored?)	Where (Is the parameter to be monitored?)	How (Is the parameter to be monitored?)	When (Define the frequency / or continuous?)	Why (Is the parameter being monitored?)	Who (Is responsible for monitoring?)
Workers' health and safety	Provision of uniforms and safety gear to workers; Informing of workers and personnel on the personal safety rules and instructions for operating machinery/equipment, and strict compliance with these rules/instructions	Construction site	Inspection	Unannounced inspections in the course of work	Limit occurrence of on-the-job accidents and emergencies	MDF, Construction supervisor
Restoration Works	Compliance with design approved by NACHP	Construction site	Inspection	In the course of restoration works	Prevention of damage of historical features of building and historical site in hole.	MDF, Construction supervisor NACHP
Protection of CH Monuments	Machinery do not entry on the territories of CH monuments The SP areas are Cleaned up and reinstated	Construction site	Inspection	Unannounced inspections in the course of work	To avoid damage of CH Monuments	MDF, NACHP Construction supervisor
OPERATION PHASE						
Management of cultural heritage monuments	Household waste management Maintenance of water supply and sanitation system Control installation of new physical constructions and infrastructure within the site	territories of provided light tourism infrastructure	Inspection	During operation of facilities	Prevent littering of the site Present malfunction of fountains, public WCs, and utilities in the administration buildings Preserve historical and aesthetic value of the site	Operators of tourism infrastructure Telavi municipality
Maintenance of light tourism infrastructure	All elements of provided light tourism infrastructure are in good working conditions	Construction site	Inspection	During operation of arranged infrastructure	To keep the provided infrastructure	Telavi municipality Operators of tourism infrastructure
Management of visitation to cultural heritage monuments	Development and implementation of a site management plan	BatonisTsikhe site	Inspection	Prior to the rehabilitated site re-entering into operation and throughout operation	Prevent over-crowding of the site and dissatisfaction of visitors	Operators of tourism infrastructure

Photos: Dzveli and Akhali Shuamta





Ikalto



