



Integrated Revitalization of Cultural Heritage Site of Katskhi Monastery

Environmental Review

Tbilisi, Georgia

October 2015

Environmental Screening and Classification

The subproject (SP) envisages:

- Provision of the tourist infrastructure at the opposite site of the Katskhi Cathedral along the Chiatura-Zestaphoni road, including sanitary arrangements;
- Arrangement of a parking area;
- Arrangement of a panoramic (sight) terrace;
- Arrangement of the water supply system for Katskhi Cathedral and visitor center;
- Arrangement of internal sewerage system in Katskhi Cathedral visitors' center and biological waste water treatment unit;
- Rehabilitation of the adjacent road to the Katskhi Cathedral.

Katskhi Savior Cathedral is located in West Georgia, Imereti Region, Chiatura municipality, near the town of Chiatura. It is located 190 km west from Tbilisi. The site is accessible from Tbilisi-Chiatura or Tbilisi-Zestaponi Highways.

Construction of a new light tourist infrastructure at the Katskhi Cathedral includes:

- Provision of the tourist infrastructure at the opposite site of the Katskhi Cathedral along the Chiatura-Zestaphoni road, including sanitary arrangements;
- Arrangement of a parking area;
- Arrangement of a panoramic (sight) terrace.

Tourist infrastructure will be arranged on the territory with total area 2240 m², which is registered as municipal property.

The tourist center (133.35 m²) represents a single-storey frame construction finished by natural dressed stone, using hard wood, and roofed with ceramic tiles. The following premises are arranged in the facility: tourist and information bureau, open terrace (53, 30 m²), roofed terrace (35.01m²), spring, and sanitary conveniences (22.04m²). A heating and conditioning hybrid system has been designed for the building using a split system conditioning unit. The cooling process is provided by means of the split system conditioning, while that of the heating - by means of conditioning and additional electrical heaters.

Parking area nearby the infrastructure facility includes parking of passenger cars and buses, and availability of movement and turning. The parking area will be paved with concrete tiles, with subsequent possibility of an increase of the parking area's capacity by means of a rearrangement of configuration of the lawn adjacent to the bus parking area. A footpath ranges along the territory up to the road. The territory of the infrastructure facility is ended with a well-organized panoramic terrace with rail guard on the west side.

The tourist infrastructure at the Katskhi Cathedral is designed by request of the National Agency for Cultural Heritage Preservation of Georgia on the basis of the designing and planning assignment and officially submitted to the MDF by the letter #10/12/912 dated 09.07.14.

The SP envisages rehabilitation of the Katskhi Church access motor road with the total length of 140 meters (road width is 7 m). The road to be rehabilitated is a right connection, at 77-th kilometer, of the internal Gomi-Sachkhere-Chiatura-Zestaponi motor road. The road

section passes through a mountainous landscape. At present, the asphalt-concrete pavement of the road is considerably deformed. The SP envisages rehabilitation of the road paving with an asphalt-concrete layer, arrangement of the curb fitting ditches for diversion of water from the road pavement, arrangement of the gabion protection wall (45 m), arrangement of sidewalks, placing road signs. Apart from the above-mentioned works, the SP also envisages arrangement of sidewalks with guardrails in the church adjacent area on the Gomi-Sachkhere-Chiatura-Zestaponi motor road.

Speed bumps (breakers), pedestrians crossing and limiting signs will be arranged to increase pedestrian safety.

Water supply to the Monastery will be provided from natural springs through pumping.

Rehabilitation of Katskhi church water supply system includes:

- Rehabilitation of the spring intake existing on the river Katskhura bank. The simple intake of the spring water is completely damaged as a result of the spring floods of 2013. The SP envisages construction of the capital intake structure, from where the water will be supplied to the design reservoir and pump station through the existing metal pipe (440 m);
- Arrangement of the reservoir (25 m³) and pump station with chlorination unit (in the building with the area 9 m²);
- Laying a potable water polyethylene pressure pipe (973,8 m) from the pump station to the water reservoir;
- Arrangement of potable water reservoir (V=25m³), and fencing reservoir area with wire fence;
- Laying a potable water polyethylene gravity pipe (258 m) from the reservoir to the visitors' center.

Wastewater system works include arrangement of the wastewater biological treatment plant (capacity 4 m³/24hr) and sewage collectors. From the visitors' center, wastewater is supplied through collector to the treatment plant, from where treated water flows to the river Katskhura.

Tourist infrastructure and waste water treatment unit will be arranged on the land plot which is registered as municipal property. Water reservoir near the monastery will be arranged on the land plot registered as municipal property. Access road with nearby areas along the road is registered as municipal property as well.

Land plot along the river bank on which reservoir and pump station with chlorination unit will be arranged is registered as state property. Two buildings (20 m² and 12.96 m²) are located on the land plot. One of them is used by community administration as pump station from which water is supplied to village by pressure pipe. Another one is small sized pool used by local villager for trout breeding. Reservoir (25 m³) will be located between small sized pool and existing pump station. The use of the private fish pond will not be affected by the SP. New pump station with chlorination unit will be constructed near the existing one. Territory of the existing spring intake is not registered. The territory is crossed by water supply pipe used by a local villager. The SP will not affect water supply to the local villager.

Some sectors of land area required for laying of water supply and sewage pipes are located within State Forest Fund. However, the installation of the water supply and sewage pipes will

not cause cut of trees. The respective land plots of the State forest area (230 m²) are temporary transferred for special use to the Municipal Development Fund of Georgia.

(A) IMPACT IDENTIFICATION

<p>Has the subproject a tangible impact on the environment?</p>	<p>The SP has a modest negative environmental impact and is expected to have tangible long term positive impact on the social environment.</p>
<p>What are the significant beneficial and adverse environmental effects of the subproject?</p>	<p>SP is expected to have positive long term social impact through provision of the tourist infrastructure at the Katskhi Cathedral Cultural Heritage site.</p> <p>Arrangements of the light touristic infrastructure will improve touristic attraction. The increased tourist flows will have positive social impact through improvement of employment opportunities. SP implementation will create opportunity for new jobs for local population and increase their incomes. The design of the touristic infrastructure is simple. The proposed morphology and use of materials appear to be seamlessly integrated into the natural environment.</p> <p>Construction of the visitor’s center of Katskhi monastery will improve infrastructure for service delivery to support the development of tourism-based economy and cultural heritage circuits in the Imereti region.</p> <p>Although SP will be implemented around the territory of a cultural heritage site, no interventions are planned on the structural elements of the Monastery buildings. Therefore, the risk of negative impacts on the structural integrity and historical value of the Monastery complex is minimal. As the SP is to be implemented on a CH site, there is higher than average likelihood of encountering chance-finds during excavation works.</p> <p>The expected negative environmental and social impacts are likely to be short term and typical to medium scale rehabilitation works in modified landscape: noise, dust, vibration, and emissions from the operation of construction machinery; generation of construction waste; disruption of traffic and pedestrian access.</p> <p>Some sectors of land area required for laying of water supply and sewage pipes are located within State Forest</p>

	<p>Fund. However, the installation of the water supply and sewage pipes will not cause cut of trees.</p> <p>Increased tourist flows may have indirect negative environmental impacts: waste generation, vandalism, etc.</p> <p>In operation phase proper management of generated solid waste and waste water should be ensured to reduce impact on the environment.</p>
<p>May the subproject have any significant impact on the local communities and other affected people?</p>	<p>No new land take and resettlement are expected.</p> <p>The tourist infrastructure will be arranged on the land plot which is registered as municipal property. Access road with nearby areas along the road is registered as municipal property as well.</p> <p>Land plots on which reservoir and pump station with chlorination unit will be arranged are registered as state property.</p> <p>Land plot nearby of the Cathedral on which water reservoirs will be arranged is registered as municipal property.</p> <p>Some sectors of land area required for laying of water supply and sewage pipes are located within State Forest Fund. However, the installation of the water supply and sewage pipes will not cause cut of trees. The respective land plots of the State forest area (230 m²) are temporary transferred for special use to the Municipal Development Fund of Georgia.</p> <p>The long term social impact will be beneficial (growth of tourist flow, attraction of private sector investment in tourism infrastructure (hotels, restaurants, shopping, entertainment, etc.).</p> <p>Negative impacts are short term and limited to the construction site. They are related to the possible disturbance described above.</p>

(B) MITIGATION MEASURES

<p>Were there any alternatives to the sub-project design considered?</p>	<p>Alternative locations for the parking lots and for the panoramic observation deck have been considered and the optimal option selected.</p>
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<p>What types of mitigation measures are proposed?</p>	<p>The expected negative impacts of the construction phase can be mitigated by 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> <p>In case of chance finds, works will be taken on hold and notification be sent to the Ministry of Culture and Monument Protection of Georgia. Works will resume only upon written consent of the Ministry.</p> <p>Water extracted for the supply to the Monastery complex will be chlorinated for disinfection. Biological waste water treatment unit will be installed and maintained properly to avoid water pollution by newly arranged sewage system in the visitor center.</p> <p>Large trees on and in the vicinity of the construction activities shall be marked and cordoned off with fencing, their root system protected, and any damage to the trees avoided. The Contractor shall, prior to works commencement, to mark the route for installation water supply and sewage pipes with participation of qualified experts (botanists) so as to prevent the cutting of trees.</p>
<p>What lessons from the previous similar subprojects have been incorporated into the project design?</p>	<p>The initial design of the tourist infrastructure has been amended and specific changes were made such as engineering details securing sustainability of construction and details securing the rights of using the building by disabled people.</p>
<p>Have concerned communities been involved and have their interests and knowledge been adequately taken into consideration in subproject preparation?</p>	<p>Chiatura population was informed about the upcoming projects in a meeting held in Chiatura Governor's office in (06.06.2012) and generated positive reaction of the beneficiary community.</p> <p>SP specific EMP will be made available for Chiatura population and will be discussed in a consultation meeting prior to the commencement of works.</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 Screening

Social safeguards screening information		Yes	No
1	Is the information related to the affiliation, ownership and land use status of the sub-project site available and verifiable? (The screening cannot be completed until this is available)	✓	
2	Will the sub-project reduce people's access to their economic resources, such as land, pasture, water, public services, sites of common public use or other resources that they depend on?		✓
3	Will the sub-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 infra-structure (such as ancillary facilities, fence, canal, 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 Review and Environmental Management Plan

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 Imereti 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 Imereti. A Regional Development Project II (RDP II) 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 II.

SP for Integrated Revitalization of Cultural Heritage Site in Katskhi Monastery and Preservation measures for Katskhi and Ubisa Monasteries is a part of the RDP II 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 II.

MDF has an extensive experience in implementation infrastructure projects. Up to date it has implemented numerous projects for the rehabilitation and construction of the buildings, water supply and sewage systems, power supply and roads in the country. It should be noted that the similar Regional Development project (US\$75.0 million) is being implemented in Kakheti Region and MDF staff has already gained additional experience in similar projects.

1.2. Institutional Framework

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. These may include, as case may be, an Environmental Review (ER) along with an Environmental Management Plan (EMP), an EMP prepared using the Environmental Management Checklist for Small Construction and Rehabilitation Activities, and a Resettlement Action Plan (RAP).

1.3 Legislation and Regulations

According to the law of Georgia on Permit on Environmental Impact (2008) the SP does not require preparation of 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 safeguard policies of the World Bank.

According to the above mentioned safeguard policies and the Environmental Management Framework adopted for the current program, the SP has been classified as B(+) category and requires preparation of Environmental Review (ER) and environmental Management Plan (EMP).

2. Subproject description

The subproject (SP) envisages:

- Provision of the tourist infrastructure at the opposite site of the Katskhi Cathedral along the Chiatura-Zestaphoni road, including sanitary arrangements;
- Arrangement of a parking area;
- Arrangement of a panoramic (sight) terrace;
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Katskhi Savior Cathedral is located in West Georgia, Imereti Region, Chiatura municipality, near the town of Chiatura. It is located 190 km west from Tbilisi. The site is accessible from Tbilisi-Chiatura or Tbilisi-Zestaponi Highways.

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the road pavement, arrangement of the gabion protection wall (45 m), arrangement of sidewalks, placing road signs. Apart from the above-mentioned works, the SP also envisages arrangement of sidewalks with guardrails in the church adjacent area on the Gomi-Sachkhere-Chiatura-Zestaponi motor road.

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Rehabilitation of Katskhi church water supply system includes:

- Rehabilitation of the spring intake existing on the river Katskhura bank. The simple intake of the spring water is completely damaged as a result of the spring floods of 2013. The SP envisages construction of the capital intake structure, from where the water will be supplied to the design reservoir and pump station through the existing metal pipe (440 m);
- Arrangement of the reservoir (25 m³) and pump station with chlorination unit (in the building with the area 9 m²);
- Laying a potable water polyethylene pressure pipe (973,8 m) from the pump station to the water reservoir;
- Arrangement of two potable water reservoirs (V=25m³), and fencing reservoir areas (64 m² each) with wire fence;
- Laying a potable water polyethylene gravity pipe (258 m) from the reservoir to the visitors' center.

Wastewater system works include arrangement of the wastewater biological treatment plant (capacity 4 m³/24hr) and sewage collectors. From the visitors' center, wastewater is supplied through collector (194,8 m) to the treatment plant, from where treated water flows to the river Katskhura through the 326,8m pipe.

3. Baseline Environmental Conditions

Katskhi Savior Cathedral is located in West Georgia, Imereti Region, Chiatura municipality, near the town of Chiatura in the village Didi Katskhi. It is located 190 km west from Tbilisi. The site is accessible from Tbilisi-Chiatura or Tbilisi-Zestaponi Highways.

Village Didi Katskhi is located on the banks of the river Katskhuri, on the Chiatura-Zestaponi motor road, at 11 km distance from town Chiatura. The village is center of the Katskhi community combining villages: Didi Katskhi, Etseri, Mordzgveti, Navardzeti, Saliati, Jokoeti. The village is first referred to in the XI century. The late feudal period sources refer to the „Katskhi Fort“. There are 886 inhabitants living in the village. Main means of livelihood comes from maize and bean crops.

Tourist infrastructure will be arranged at the opposite site of the Katskhi Cathedral along the Chiatura-Zestaphoni road. From the back the area is bounded by the village cemetery. Debris of the former bus station and shop and damaged latrine are located on the area. The area around latrine is scattered by trash.

Katskhi Monastery is located in the eastern part of the southern slope of Racha Mountain Range, in the gorge of river Katskhura (right tributary of the river Kvirila), at 650 m altitude above sea level.

Geological Conditions

In terms of geomorphology, the area constitutes part of submountain slope, which is inclined south-westward. The slope is formed by limestone stratum, which is covered with the limestone crushed rock soil, in certain places – with light color terraces.

Climate and Meteorological Conditions

The SP area is characterized by rather humid climate, winter there is moderately cold, summer – hot and relatively dry. Average annual temperature is 11.5° C, temperature in January - 0.4°C, in July – 22°C. The observed absolute minimum temperature is -31°C, absolute maximum +41°C. The total annual average volume of precipitations is within the range of 910 mm (the maximum is observed in autumn and winter).

Hydrology

The Municipality is rich with inland waters. The main river is Kvirila with the length of 16 km, it halves the territory of Chiatura District. Its right tributaries are: Buja, Katskhura, Rganisghele, Nekrisa, Jruchula, etc. Left tributaries are: Shavletisghele, Itkhivitskali, Shukrutistskali, Sadzaliskhevi, etc. The rivers are fed by rain, snow and ground waters. High water periods are observed in spring, shallow water periods – in winter. There are many springs and underground rivers.

The river Katskhura, on the left bank of which is located the Katskhi Monastery, has its head located at 1160 m altitude above sea level, on the southern slope of Racha mountain range and is the right affluent of the river Kvirila. The river length is 13 km, river basin area - 31 km². It feeds with the snow, rain and ground waters. Flood period is spring, shallow water is observed in winter. Summer-fall is characterized with torrents. Average annual discharge rate by the outfall – 0.9 m³/sec.

Headwork (water intake structure)

The headwork of Katskhi Church will be located on the bank of river Katskhura, almost on the same level with the river. The designer has developed structural solution of headwork, which will prevent the water intake from scouring and inundation. The water intake is protected against scouring by a spur (toe), while inundation is prevented by means of the 2.16 m high water intake wall. Overflow pipe is located in the water intake at 1.5 m height above the river reference mark.

Water main from the intake to the pump station

The design envisages utilization of the existing pipeline at the river bed crossings (addition of 30 m long section of the pipeline), with its arrangement in the trench below the scouring depth.

Pump station with the chlorination plant and storage reservoir

Chlorination plant and storage reservoir of the pump station are located within the range of 482.70 – 483.70 m altitude above the sea level and 1.5-2 m higher than water edge, on the left bank of the river. On the right bank of the river – a local motor road is running along the river bed, which is 0.5 m below the pump station area. The photos and on-site exploration reveal that the motor road is not subjected to inundation. Due to the above-mentioned inundation of the pump station during ordinary (approximately 20 year return period) floods is not expected.

Soils

Calcareous soils prevail, which are formed on the weathered products of limestone and calcareous sandstone. On the low terraces of the river Kvirila and its tributaries there are alluvial soils, on the old terraces – heavy clay and clay brown soils.

Vegetation

Within the Chiatura structural plateau, the area is deforested and the vegetation is of secondary origin. The major part of this territory is occupied by crops and mowing. The species prevailing in the forested areas are as follows: hornbeam, alder, hawthorn, nut tree, plums, lime, oak is rare. There are two large lime trees on the territory on which tourist infrastructure will be arranged. The territory of the spring intake is located nearby the river Katskhura in forested area. However cut of trees is not planned due to the construction of intake structure. Pump station and chlorination unit will be constructed on the area covered by shrubs (mainly alder, nut trees, elderflowers). The area of the reservoirs nearby the Cathedral is covered by secondary grass vegetation.

Description of Katskhi Monastery

The Katskhi Nativity of the Savior Monastery is a medieval monastery in Georgia. It was built at the behest of the Baguashi family in the period of 1010–1014. 30 years later from three sides it was surrounded by the entrance. The church is surrounded by a pentagonal wall (restored in 1937), which contains a free-standing bell tower in its eastern corner, which also serves as gates. This monastery is one of the most original and outstanding monuments of Georgian architecture. The similar architectural forms cannot be found in any other place in Georgia. The Cathedral is a domed premise, built with the square limestone blocks. Today it has almost original shape. The north-west round part and the church tower are damaged and the part of the gate wall is ruined. In 1980-ies, while repair works, the interior walls were covered with facing, the Cathedral coverage was changed.

4. Analysis of Potential Impacts

4.1. Construction Phase

4.1.1. Social Impacts

- **General set of social issues.** No significant social issues are associated with implementation and operation of this SP.
- **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 during construction and limited during operation.
- **Health issues related to noise, emissions, and 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.

4.1.2. Impacts on the physical Cultural Property

The SP will be implemented around the territory of a cultural heritage site. No interventions are planned on the structural elements of the Monastery buildings. Therefore, the risk of negative impacts on the structural integrity and historical value of the Monastery complex is minimal.

In course of rehabilitation and construction activities, especially during soil excavation works, chance finds may be encountered. In such cases works will be immediately taken on hold and the Ministry of Culture and Monument Protection will be informed. Works may resume only upon formal permission from the National Agency for Cultural Heritage Preservation.

Operational phase risks are related to management of visitation, preventing vandalism on site, maintenance of water supply and sanitation systems, and household waste management.

4.1.3. Environmental 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.).

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;
- Releasing silt water from excavations;
- Silt suspended in runoff waters (“construction water”);
- Washing of vehicles or equipment;
- Exposure of contaminated land and groundwater;
- Impact on surface and/or underground water with chlorine-containing waste water that are expected to be formed in washing and disinfection process before launching operation of newly installed water pipes.

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.

Once the working width has been stripped of topsoil, the subsoil becomes exposed. During earthworks in a wet weather this may result in uncontrolled release of suspended solids from the work area.

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, bulldozers, excavators etc.);
- Dust (from vehicles);
- Fumes may be a concern linked to supply and transportation of materials.

Construction Related Wastes

Construction Wastes

The following types of inert waste are anticipated to be produced from these activities:

- Natural materials (soil and rock);
- Contaminated soil with non-hazardous substance or objects;
- Packaging materials;
- Metals (including scrap metal and wire) – negligible amount of metal waste is expected;
- Debris and domestic waste located on the area for tourist infrastructure arrangement.

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.

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.

Landscape and vegetation

Several components of the water supply and sewage systems will be arranged on the forested areas. There are some large trees on the area where tourist infrastructure will be arranged, as well as along the road to be rehabilitated within the SP. Spring intake, pump station with reservoir and chlorination unit will be arranged on the area covered by shrubs. So cut of shrub vegetation will be needed. Measures must be implemented to avoid any damage of the trees (especially roots). Cut of tree branches (if needed) and removal of the shrub vegetation must be approved by local (municipal) governing bodies in written.

The SP design does not envisage any substantial changes of landscape. The preexisting relief will be reinstated.

4.2. Potential Impacts - Operation Phase

Potential impact related to the operation of the provided light infrastructure would be the following:

- Increase of the number of tourists will result in the increased volume of waste 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.

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

- Inappropriate transportation, storage and application of chlorination lime, it may cause damage to personnel health and chlorine content overdose in potable water;

- 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.

5. Environmental Management Plan

This Environmental Management Plan (EMP) has been prepared to ensure that negative environmental impacts associated with this SP are minimized.

5.1 Construction Phase

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 nearest municipal landfill in accordance with written agreement with the local authorities and works supervisor company. 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.

A number of restrictions and mitigation measures are to be taken into account during the construction process:

1. The machinery should move only along the preliminarily agreed route;
2. The maximum allowed speed will be restricted;
3. The frequency of movement of the machinery will be restricted;
4. Uncontrolled storage of hazardous wastes on the construction area is prohibited;
5. Any construction or municipal wastes produced during construction stage should remove from the site area frequently, site shall be kept clean and tidy;
6. Large trees in the vicinity of the construction activity shall be marked and cordoned off with fencing, their root system protected, and any damage to the trees avoided;

7. 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.
8. Any damage of the water supply pipelines near the spring intake and small sized pool near the pump station should be avoided.

Waste Handling

Construction waste should be removed frequently from the SP site and site shall be kept clean and tidy. Temporary storage area of the construction waste should be enclosed and protect from the washing out.

Construction waste must be disposed on the nearest municipal landfill in accordance with written agreement with local authorities and supervisor company. The records of waste disposal will be maintained as proof for proper management as designed.

Municipal waste (rubbish, plastic or glass bottles, glasses, waste food, etc.) should be placed into plastic containers and removed from the site every day.

Burning of waste on construction site is forbidden.

The records of waste disposal will be maintained as proof for proper management as designed.

Noise

The following measures will be implemented for noise reducing:

- The import of the inert material shall be conducted from the licensed quarries nearby SP 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;
- Proper technical control and maintenance practices of the machinery should be applied;
- Activities should be limited to daylight working hours.

Pollution

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;
- 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, of hard-standing, not over made ground. Maintenance points will not be located within 50m of any watercourse.
- Lubricants, fuel and solvents should be stored and used for servicing machinery exclusively in the designated sites, 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 near 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.

The disposal of excess soil and rock

- Allow local communities to utilise 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 authorised in writing by local authorities.

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:

- Dumping down using water bowser with spray bars or other technical means;
- Sheeting of construction materials and storage piles; and
- Use of defined haulage routes and reductions in vehicle speed where required. Materials will be transported to site in off peak hours.
- Materials and waste will be covered/ wetted down while transportation 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 demolition works 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 3m 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 berm 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.

Protection of adjacent landscapes and vegetation

The Contractor shall, prior to works commencement, to mark the route for installation water supply and sewage pipes with participation of qualified experts (botanists) so as to prevent the cutting of trees.

Large trees in the vicinity of the construction activity, shall be marked and cordoned off with fencing, their root system protected, and any damage to the trees avoided.

Adverse effects on all trees within or in the vicinity of the SP site shall be minimized by the adoption of suitable mitigation measures, including, but not limited to the following (where appropriate):

- the use of matting around the root zone to prevent excess soil compaction;
- the use of paling around the trunk to prevent damage; and

- notwithstanding (ii) above, construction activities shall be controlled in the vicinity of all trees so as to minimize excessive compaction of the ground beneath the entire canopy of the tree. No heavy materials or plant shall be stored, and construction traffic movements shall be controlled, within the areas.

Any tree that is damaged or cut down without approval or dies as a consequence of the construction shall be treated or be replaced by a suitably sized transplant to the approval of the MDF.

Movement of vehicles will strictly limit within traffic lane; Pockets for turning of vehicles should be arranged. All workers will be strictly prohibited from, foraging, waste dump or other damaging activities to adjusted landscapes.

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.

Clearance of Site on Completion

The Contractor shall clear up all working areas both within and outside the SP site and accesses as work proceeds and when no longer required for the carrying out of the Rehabilitation works.

All surplus soil and materials, temporary roads, plant, sheds, offices and temporary fencing shall be removed, post holes filled and the surface of the ground restored as near as practicable to its original condition.

5.2 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.

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 will be located at 60 meter distance from the monastery entry, along the access road.
- The car parking area and lots are located so that cars and buses will be able to stop and maneuver uninterruptedly;
- The proper management services will reduce negative impacts, imposed by traffic jams causing increased volumes of emissions and noise.

To ensure **safe functioning of the water supply disinfection system via chlorination** following mitigation measures will be implemented:

- Health & Safety Plan for protection of operations staff & environment will be prepared, regarding transport, storage, use, application, disposal, emergency first-aid facilities/ procedures for chlorine disinfection system;
- Operations & Maintenance Training (upon facility start-up and 4 x seasonally during guarantee period) will be executed by works contractor, including supply of Operations Manuals and preparation of Training Program Summary Report.

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.

6. Monitoring

MDF carries overall responsibility for monitoring of the implementation of the environmental mitigation measures. A consulting firm hired for supervision of works will supplement MDF's in-house capacity for tracking environmental and social compliance of works undertaken under this SP. Field monitoring checklist will be filled out and photo material attached on monthly basis. Narrative reporting on the implementation of EMP will be provided on quarterly basis as part of the general progress reporting of MDF. MDF will also be expected to obtain from contractors and keep on file all permits, licenses, and agreement letters which contractors are required have according to the Georgian law for extracting material, operating asphalt/concrete plants, disposing various types of waste, etc.

7. 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.

8. MONITORING MANAGEMENT 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 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 machinery	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
Earthworks	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;	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 NACHP

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?)
	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.					
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</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

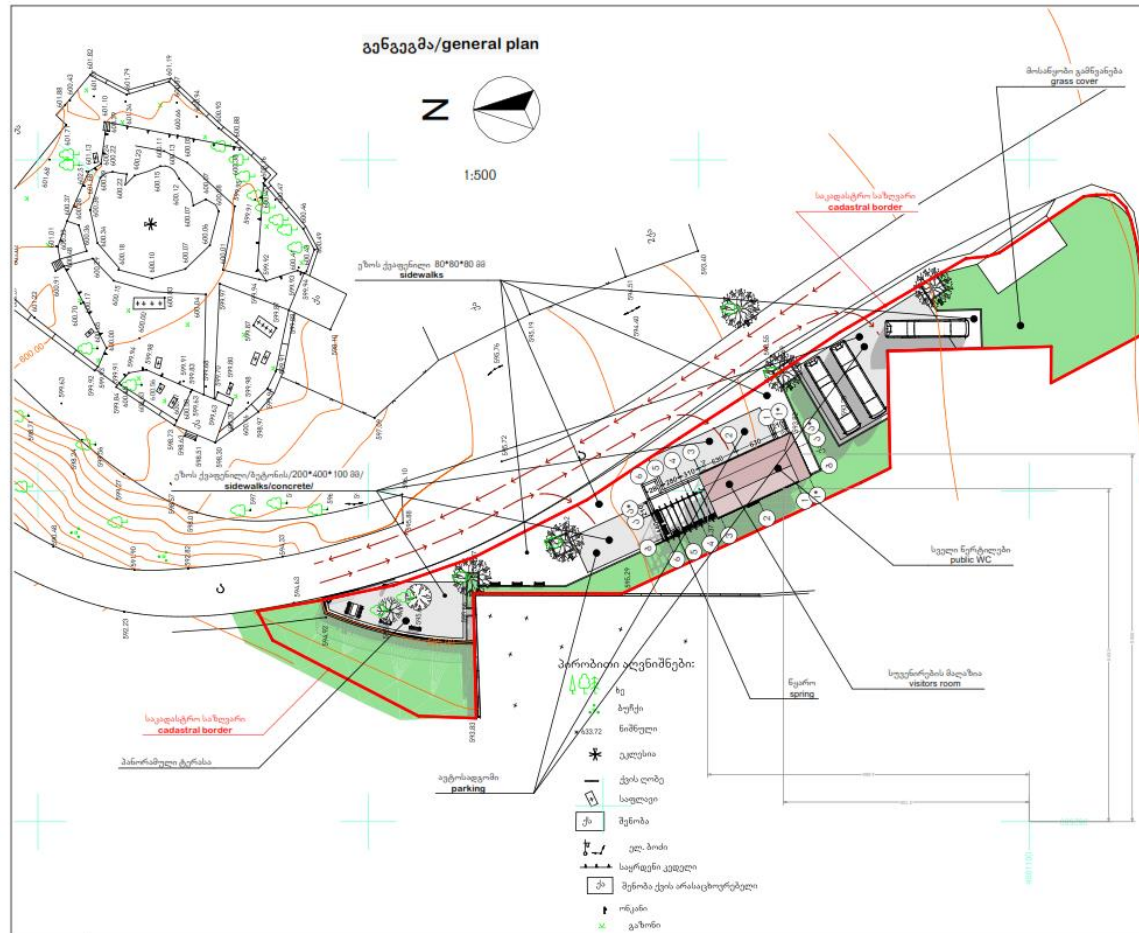
Activity	What (Is the parameter to be monitored?)	Where (Is the parameter to be monitored?)	How (Is the parameter to be monitored?)	When (Define the frequency / or continuous?)	Why (Is the parameter being monitored?)	Who (Is responsible for monitoring?)
	water stream, and no entry of machinery into the water stream.					
Generation of construction waste	Temporary storage of construction waste in especially allocated areas; Timely disposal of waste to the formally designated locations	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
Landscape and vegetation protection	Marking and cordoning of the large trees in and around the construction sites, Protecting of the roots of the plants,	Along the route of water supply and sewage pipes	Inspection	Periodically during construction and upon complaints	Protection of adjacent landscapes and vegetation	MDF, Construction supervisor
Washing and disinfection of the newly laid pipelines	Neutralization of disinfecting solvent prior to release to the natural environment	End points of pipelines	Inspection	In course of pipeline washing by the time of completion of their installation	Prevent environmental damage due to release of concentrated disinfectant solvents	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?)
Traffic disruption and limitation of pedestrian access	Installation of traffic limitation/diversion signage; Storage of construction materials and temporary placement of construction waste in a way preventing congestion of access roads	At and around the construction site	Inspection	In the course of construction works	Prevent traffic accidents; Limit nuisance to local residents	MDF, Construction supervisor
Clearance of Site on completion	Clear up all working areas both within and outside the SP site and accesses, removal of all surplus soil and materials temporary sheds, fencing, filling of all holes and restoration of the surface of the ground as near as practicable to its original condition	At and around the construction site	Inspection	After works completion	Landscape protection	MDF, Construction supervisor
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,	Construction site	Inspection	Unannounced inspections in the course of work	Limit occurrence of on-the-job accidents and emergencies	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?)
	and strict compliance with these rules/instructions					
OPERATION PHASE						
Management of the solid waste from the visitors' center	Trash bins provided on site and arrangement in place for timely regular out-transporting of waste	Rehabilitated facilities	Inspection	During operation of facilities	Prevent littering of the site and area around it	Chiatura municipality
Servicing of water supply scheme and sewage treatment unit	Water supply scheme does not leak and water supply uninterrupted Sewage treatment block operate smoothly	Rehabilitated facilities	Inspection	During operation of facilities	Prevent water loss and water logging of the site Prevent pollution of surface and ground water with untreated sewage	Chiatura municipality
Safe functioning of the water supply disinfection system via chlorination	Health & Safety Plan for protection of operations staff & environment is prepared, regarding transport, storage, use, application, disposal, emergency first-aid facilities/ procedures for chlorine disinfection system;	Potable water treatment facility	Inspection	Upon start-up of water supply system operation	Prevent environmental damage due to operational and emergency release of chlorine	Chiatura municipality

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?)
	Operations & Maintenance Training (upon facility start-up and 4x seasonally during guarantee period) is executed by works contractor, including supply of Operations Manuals and preparation of Training Program -Summary Report.					
Maintenance and operation of the monastery complex and the visitors' center	No unauthorized construction and no informal land use in the vicinity of the historical site	Rehabilitated facilities	Inspection	During operation of facilities	Prevent loss of the historical and aesthetic values of the monument and surrounding area	Chiatara municipality

Attachment 1. General Plan of the tourist infrastructure and photo illustrations of the existing situation

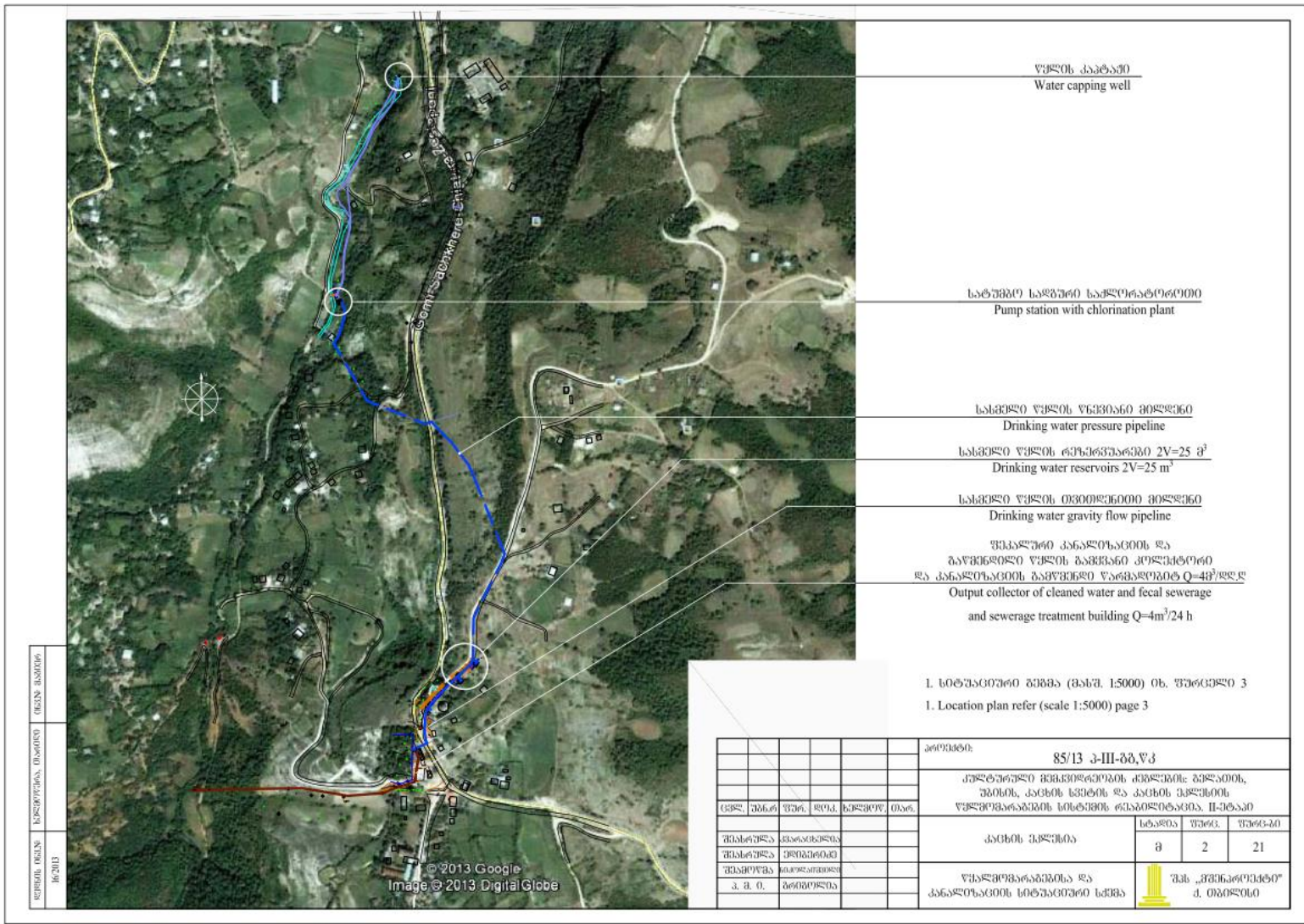




Render of tourist infrastructure



Attachment 2. Scheme of the water supply and sewage systems and photo illustrations



Existing spring intake



Area of the reservoir and pump station with chlorination unit



Area of the reservoir (nearby the cathedral)



Road to be rehabilitated within the SP



