Environmental Compliance Audit

September 2013

GEO: Sustainable Urban Transport Investment Program – Tranche 1

Prepared by the Municipal Development Fund of Georgia for the Government of Georgia and the Asian Development Bank.

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Environmental Compliance Audit

Project Number: 2655-GEO (SF)
September 2013

GEORGIA: GEORGIAN SUSTAINABLE URBAN TRANSPORT INVESTMENT PROGRAM

Tranche 1

Project: Rehabilitation and Reconstruction of Secondary Road Zugdidi-Jvari-Mestia-Lasdili KM.74– KM.80, KM.89, KM.91 - 103 and KM.121-KM.125

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ABBREVIATIONS

ADB	Asian Development Bank
EA	Executing Agency
EARF	Environmental Assessment and Review Framework
EIA	Environmental Impact Assessment
EIP	Environmental Impact Permit
EMP	Environmental Management Plan
GoG	Government of Georgia
SUTIP	Georgian Sustainable Urban Transport Investment Program
IA	Implementing Agency
IEE	Initial Environmental Examination
MDF	Municipal Development Fund
MFF	Multi-tranche Financing Facility
MoENRP	Ministry of Environmental and Natural Resources Protection of Georgia
MoRDI	Ministry of Regional Development & Infrastructure

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A. INTRODUCTION

Upgrading and improvement of local transport and transport-related infrastructure plays a significant role in the development of Georgia infrastructure. To this effect a number of important activities have been implemented and financed from the budget of Georgia and from other sources. Development of transport and related infrastructure plays an important role in improvement of Georgia's urban infrastructure. Recently several significant programs, financed through state budget, loans and grants, have been implemented with this regard. Notwithstanding the efforts undertaken so far several problems need to be solved regarding development of transport infrastructure.

Sustainable Urban Transport Investment program tranche 1 include several projects in the different municipalities of Georgia. Program aims efficient, reliable and affordable urban infrastructure development and service improvement. In effect, urban transport service will be improved, and the level of different types of public and social services will be increased.

Sustainable Urban Transport Investment Program tranche 1 includes consultation services and construction activities for the following projects:

- Rehabilitation of Zugdidi-Jvari-Mestia-Lasdili motor road;
- Anaklia coastal improvement Phase 1;
- Tbilisi Metro extension.

And, Consultation services for the following projects:

- Anaklia coastal improvement Phase 2;
- Rustavi-Tbilisi urban link for section I and III;
- Rustavi-Tbilisi urban link for section II

The environment classification for tranche is Environmental Category B, as all subprojects under SUTIP 1 were classified as category B which will not have significant irreversible or permanent negative environmental impacts during or after construction and requires preparation of Initial Environmental Examination (IEE).

The environmental categorization of subprojects were conducted using ADB's Safeguard Policy Statement (2009), the required environmental assessment was conducted and the IEEs including environmental management plans (EMP) which are the integrated part of IEEs have been prepared accordance with environmental assessment and review framework (16.04.2010) approved for SUTIP 1:

Rehabilitation of Zugdidi-Jvari-Mestia-Lasdili motor road

Rehabilitation of Zugdidi-Jvari-Mestia-Lasdili motor road was initiated by the Department of Motor Roads of Georgia. The road is of national significance and connects upper Svaneti region with Tbilisi-Senaki-Leselidze main motor road. The road needed significant rehabilitation in order to restore its operational capacity and insurance of traffic safety. Certain sections and infrastructure facilities of the road needed significant reconstruction.

The secondary road Zugdidi-Jvari-Mestia-Lasdili links the villages located in Zeda Svaneti region, Daba Mestia and Mestia with the region Zugdidi as well as with the trunk road Tbilisi-Senaki-Leselidze, which is the main road in the region. It should be noted that the present project aims to significantly contribute to the socio-economic development of Zeda Svaneti region and facilitate development of tourism infrastructure.

Presented project is one of various projects backed by international donor organizations to be implemented by the Municipal Development fund (MDF).

The Municipal Development Fund of Georgia (MDF) is a legal entity under Public Law. Its objectives are to facilitate institutional and financial capacity building of the local municipalities, invest in the development of local infrastructure and services and improve economic and social services to the local communities.

The presented investment project has been implemented under SUTIP tranche 1 and envisaged reconstruction/rehabilitation of the following four sections of Zugdidi-Jvari-Mestia-Lasdili motorway:

1) Section 1 – motorway section from km 74 to 80;
2) Section 2 – demolition of the existing balcony (260 m long) at km 89 and construction of a new tunnel instead;
3) Section 3 - from km 91 to 203 of the motorway;
4) Section 4 – from km 121 to km 125 of the motorway.

B. CONSTRUCTION ACTIVITIES DURING PROJECT IMPLEMENTATION

As it was mentioned above Zugdidi-Jvari-Mestia-Lasdili motorway reconstruction/rehabilitation project included four subprojects. The works were substantial completed and handed over on 27.10.2011 for Lot 1 and 4 and on 12.12.2012 for Lot 2 and 3. The defects liability period was 365 days.

At the end of the defects liability period of Lot 3 and 4, surface distresses on the concrete pavement were observed. In order to investigate the distress and to allow a rectification of defects outside the winter period, the defects liability period was extended until June 1, 2013 for Lot 3 and 4 to complete remedial of defects.

During the defects liability period the services includes:

- Periodic inspection to reveal defects prior to the expiry of the contractor’s defects liability period
- Supervision services on part time basis during Defects Liability period.
- Carry out final inspection of works together with representatives of the Employer and the Contractor

Subproject 1 - contract # P42414-ICB-1.01-L1: Rehabilitation of section km 74 – km 80 of the Secondary Road Zugdidi-Jvari-Mestia-Lasdili

The rehabilitated section is located in Mestia, mainly on uninhabited area. The project section starts at PK 73+200 of Zugdidi-Jvari-Mestia- Lasdili road corresponding the PK 0+00. The end section is PK 80+200 corresponding with project PK 70+00.

The works covered preparatory works: repair and cleaning of culverts, construction of new culverts, repair of road pavements and bridge PK 68+00, repair and construction of retaining walls.

Subproject 2 - P42414-ICB-1.01-L2: Reconstruction of section km 89 (Tunnel and Gallery) of the Secondary Road Zugdidi-Jvari-Mestia-Lasdili

This section of a road was characterized with intensive rock falls (on the total length of balcony) and snow avalanches.

Reconstruction of this section included the construction of tunnel and gallery against snow slide with length 84 m.

For the transportation safety tunnel on this section of the road has been considered. The length of the project tunnel was 260 m.

Blasting works generally were done by specialized authorities and team.

Subproject 3 - P42414-ICB-1.01-L3: Reconstruction of section km 91- km 103 of the Secondary Road Zugdidi-Jvari-Mestia-Lasdili

Design considered restoration of the road bed on separate sections of the rehabilitated road with construction of retaining walls by gabion boxes. Repair of the existing retaining walls had done as well. Walls repair included rising in height, filling with stones and construction of reinforced concrete casing. In total design considered:

- Gabion lower retaining walls –589/2738 linear m/m3;
- Gabion upper retaining walls–62/275 linear m/m3;
- Gravity gabion walls – 101/1702.5 linear m/m3;
- Repair of the existing concrete retaining walls– 32/1005 u/linear m;

The following works were performed immediately upon the completion of preparatory works: repair and cleaning of culverts, construction of new culverts, repair of bridges, repair and construction of gabion retaining walls.

Blasting of 63905 m^3 rocky soil (31a, 31g, 28b) was required on the road Zugdidi-Jvari-Mestia-Lasdili km 91-km 103.

Subproject 4 - P42414-ICB-1.01-L4: Reconstruction of section km 121-km 125 of the Secondary Road Zugdidi-Jvari-Mestia-Lasdili

The rehabilitated section km 121-km 125 (section I) with the length of 5.14 km of the road is located in Mestia, mainly on uninhabited area. Along the project section the village Becho is

located, at 23 km the road junction is located directing the way to the villages Magarduli, Lezgara, Tskhumari and etc.

Construction of new road pavement instead of heavily damaged asphalt-concrete pavement was stipulated under the present project.

9 reinforced concrete pipe culvert and one box-culver 1.0x1.0 s from 16 had been repaired.

7 new box-culverts of 1x1.5 m had been constructed under the present design.

At 121 km of the rehabilitation road PK 203+40 crosses the river Dolra Bridge. Design considered bridge repair, in proper: total removal of bridge deck and construction of new one, replacement of steel railings, sidewalk blocks, movement joints and pavement.

Repair of 17 existing down retaining walls had been done under the project. The total length of walls is 659 L.m.

Blasting of 19770 m^3 rocky soil was required on the road Zugdidi-Jvari-Mestia-Lasdili km 121-km 125.

Remedial Works and Rectification of Defects

At the time of substantial completion of works for each lot, a detailed list of remedial and outstanding minor works was established and included in the handover documents.

The progress of completion of remedial and outstanding works has been monitored during periodic site visits during the defects liability period of the works.

Lot 1, Road Section from Km 74+000 to Km 80+000

On Lot 1 works were executed by construction company “SANI” LTD. The works were completed on 17.10.2011 and the road section was handed over on 27.10.2011.

No outstanding works and defects were noticed at handover. Therefore no remedial works were carried out during defects liability period.

No defects were observed during the defects liability period. The final inspection of the works was carried out with representatives of the employer, contractor and supervisor. No defects were revealed and the certificate on expiry of defects liability period was issued on 25 October 2012.

Lot 2, Road and Tunnel Section at Km 89

The works on the road and tunnel at km 89, on Lot 2, were executed by “ZIMO” LTD. The works were completed and handed over on 12.11.2011.

No outstanding works and defects were noticed at handover. Therefore no remedial works were carried out during defects liability period.

During the defects liability period no defects were observed. The final inspection of the works was carried out with representatives of the employer, contractor and supervisor. No defects were revealed and the certificate on the expiry of defects liability period was issued on 7 February 2013.

Lot 3, Road Section from Km 91+000 to Km 103+000

The works on the road section from km 91 to km 103, on Lot 3, were executed by JSC "ARQOPLISI'. The works were completed and handed over on 12.11.2011.

Due to rock fall side ditches and culverts were filled and collected water caused damages on road pavement and culvert headwall.

Following defects were noticed:

- Km 95 - Pavement has been settled (average 3-6 cm) at about 25 m^2;
- KM 98 - Gabion retaining wall partially deformed, the right lane of cement- concrete carriageway was depressed (5 cm) on 20m length;
- Km 98 - Head wall of box culvert was constructed on existing old wall and moved out of angle, resulting in a gap between wall and culvert section;
- Km 100 - The right lane of cement-concrete carriageway has been settled (5 cm) on 40m length, shoulder is slightly depressed also;
- Km 100 - The right lane of concrete carriageway has been settled (10 cm) on 30m length, shoulder is slightly depressed also;
- Km 102/103 - The right lane of cement-concrete carriageway has been settled (10 cm) on about 110m length, the second lane is cracked, and shoulder is depressed also.

Side ditches and culverts have been cleaned from rock fall debris.

Settled sections of the concrete pavement have been removed and a new concrete pavement has been constructed. Where shoulder or side ditches shows erosion damages, there have been reinstated.

The deformed parts of the gabion walls at km 98 have been replaced and the headwall of the culvert has been made good. The culvert was cleaned from debris and a new reinforced concrete headwall constructed.

During the defects liability period distresses of the concrete pavement surface were observed. Scaling/mortar flaking appeared over large areas. In order to investigate the surface distress and allow a rectification of defects outside the winter period, the defects liability period was extended until June 1, 2013 from the original defects liability period ending 12.11.2012.

Scaling or mortar flaking is the general loss of surface mortar and was exposed to large areas.

The distress was investigated and it found out that scaling/mortar flaking does not expose the coarse aggregate and appears as a very shallow loss of mortar in the surface. This is purely aesthetic in nature and is not a progressive distress that continuous to greater depths in the

concrete. The original mortar flaking disappears as the pavement ages and traffic abrades the surface. Therefore no remedial action were necessary and¸ in consent with the employer, no remedial work were carried out.

Final inspections with representatives of the employer and contractor were carried at the end of the extended defects liability period and so far no further defects were observed. However, the end of defects liability certificate has not been signed yet and is under revision of the responsible departments.

Lot 4, Road Section from Km 121+000 to Km 125+000

On Lot 4, works were executed by the Joint Venture (JV) of construction companies ENGURI 2006 and JSC "ARQEOPOLIS". The works were completed on 17.10.2011 and the road section was handed over on 27.10.2011.

Following defects were noticed and remedial measures were carried out:

- Installation of crash barrier (several locations);
- Filling of shoulders at depressed shoulders(several locations);
- Reinstate damaged carriageway sections (several locations).

The outstanding works have been completed and defects on the carriageway were rectified during the defects liability period.

As for Lot 3, also in Lot 4 was scaling/mortar flaking of the concrete pavement surface observed during the defects liability period. Therefore In order to investigate the surface distress and allow a rectification of defects outside the winter period, the defects liability period was extended until June 1, 2013.

The distress was investigated and it found out that scaling/mortar flaking does not expose the coarse aggregate and appears as a very shallow loss of mortar in the surface. This is purely aesthetic in nature and is not a progressive distress that continuous to greater depths in the concrete. The original mortar flaking disappears as the pavement ages and traffic abrades the surface. Therefore no remedial action were necessary and¸ in consent with the employer, no

remedial work were carried out.

Final inspections with representatives of the employer and contractor were carried at the end of the defects liability period and the certificate on the expiry of defects liability period was issued on 31 May 2013.

All environmental procedures were provided in compliance with Environmental and Social Requirements of the ADB and Georgian environmental legislation. The environmental categorization of project was conducted using ADB's Safeguard Policy and Environmental Guidelines. The project was classified as category B, the required Environmental Impact

Assessment was conducted, and the Initial Environmental Examination (IEE) including EMP was prepared. According to the Law on Environmental Impact Permits (EIP) the project didn't

require Environmental Impact Assessment, preparation of EIA report and obtaining of environmental impact permit.

C. DESCRIPTION OF THE ENVIRONMENT (BASELINE DATA)

Physical Resources

Georgia is situated at the crossroad of South-East Europe and West Asia and it is a transcontinental country by its location although it is part of Europe by its socio-political situation and culture (Figure 7). Total area of the country is 69,700 km^2. Administratively there are 12 administrative units. Each administrative unit is divided into Municipalities (64 municipalities in total). The Zugdidi-Jvari-Mestia-Lasdili motor road section is located on the territory of Mestia Municipality in Samegrelo-Zemo Svaneti administrative region.

Atmosphere

Average annual temperature of air is $+5,8^0$ (Mestia) $10,6^0$ (Khaishi), temperature of the coldest months (I, II, III, XII) fluctuates from $-1,4$-$2,7^0$ (XII) to $-4,9$-5^0 (I, II). Absolute minimum air temperature is -35^0, absolute maximum $+35^0$.

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Average annual speed of wind is _ 0,9 m/s, and the highest and lowest speed of wind in winter is _ 1,4 m/s and 0,2 m/s respectively and in July _ 2,0 m/s and 0,8 m/s respectively. The highest speed of wind was identified in April and May (1,4 mm).

General Physical-Geographic Characteristic

Khaishi-Mestia motor road section entirely goes through river Enguri basin, which structurally belongs to central Caucasus unit and its nature is represented by extremely difficult high-mountainous landscape. Average absolute elevation of the main ridge is over 4,000 m, and maximum elevation is above 5,000 m. The number of mountain massives whose hypsometric indicators exceed 4,000 m reaches 36 and the elevation of the passes among them fluctuates in the following range: 3161-3866 m.

Character of the landscape of Svaneti Caucasus Mountains is defined by its layers' characteristics and hypsometric location. Its Northern part is formed by layers that are especially stable with regard to denudation-erosive processes. Svaneti Caucasus Mountains Southern slope with crystal sub-strata and regional overthrust in the South, which is mainly formed by almost homogenous slate type set, which is easily complaisant to erosive-denudation processes.

Surface water

River Enguri gorge, which is known also as Zemo Svaneti depression, is characterized by sub-latitude direction and morphologically it represents tectonic-erosive cavity.

River Enguri, which originates at Namkvani glacier at 2,800 m elevation, experiences 2,550 m fall over 150 km distance to townlet Jvari. The width of the river gorge, starting from 10-20 meters from the bottom, increases gradually and exceeds 1000-1500 meters. Main tributaries of river Enguri are the following: Odichala (length 15 km), Mulkhura (27 km), Dolra (20 km), Nakra

(22 km), Nenskra (46 km), Tkheisha (18km), Larakvava (17km), Magana (24km), Rukhi (21km), Jumi (61km).

Groundwater

The water-bearing formation built by contemporary alluvial deposits is characterized by free groundwater table declined along the general flow of the rivers. The water table depths vary from 0.5 m to 5.0 m. At some locations nearby riverbeds and groves, groundwater depths are reduced to 0.3 m. The aquifer is characterized by rich water resources, with debits of the springs varying in the range of 0.1-3.5 l/s. The aquifer is mainly fed from river and precipitation waters. Despite the aquifer is rich with water, its practical water use is limited due to restricted distribution of the alluvial deposits. In addition, it shall be stated that impact on this aquifer should be minimal due to limited work quantities to be performed within the grove

Geology/Seismology

Tectonic areas of the gorge of River Enguri built of Lower-Mid Jurassic Period slates, with the Upper Jurassic and Lower Cretaceous Period carbonate flysch and Mid Jurassic volcanogenic sedimentary rocks. All these rocks are tectonically intensively dislocated and have produced many significant folded structures. Among them Mestia-Shovi synclines, Khibiani, Lukhumi, Kheshuri, Dabieri-Tviberi, Dizi-Ushuri, Lablakhi-Tchviberi, Khaisi anticlines, etc are to be highlighted.

The engineering-geological properties of the rocks consisting of these layers differ significantly from each other in terms of stability and strength and belong to the group of low strength hard rocks and semi-hard rocks.

In the area of the slate type sets there is a significantly favorable environment created for the development of landslide and especially mudflow processes.

Within the study territory so called ‘Dizi Series’ of the earliest Paleozoic age which form the tallest elevated largest two anticline folds of coulisses disposition towards the general Caucasus direction.

The biggest danger is created by mudflow processes, landslides and snowslides. Similarly dangerous are earthquakes and landslide and gravitational events provoked by them. The maximum magnitude of earthquakes is 9 points. It is noteworthy, that in the above mentioned areas the earthquakes of 6-9 points’ magnitude have been observed 20 times after 1930. These earthquakes were accompanied with the significant activation of landslide and gravitational processes.

The threat of avalanches is high on the existing sections of the road: km 90; km 95; km 135; km 138. On the100-120km highway the avalanche threat is relatively low. The danger is increases at the sections of the alternative route (km 0; km 3.5; km 6.5 of Tskhumari; and km 9)

Forests

From its source Riv. Enguri flows to the Ushguli community via the quite wide gorge, which was developed as a result of pleistocenic freezing. In this section of the gorge there is almost no trees and vegetation.

Based on the review of the literature and the field surveys the following sensitive areas has been found in the corridor of planned Khaisi-Mestia motor road. They are mainly the forests along the road and immediately adjusting to it:

1. A small section at 100 km (Riv. Manshura Gorge);
2. A small section at km 104 (Riv. Ladlina Gorge);
3. The territory between 120-126 km to the left of the road (from Village Dolasvip up to Village Martskhvarishi).

Protected Area

In Georgia the history of Protected Areas dates back many centuries. The first Protected Area – Lagodekhi Strict Nature Reserve was established as early as 1912. At present the total area of Protected Areas is 495 892 hectares, which is about 7 % of the country's territory

The nearest protected area from project area is Kolxeti National park (Distance from construction area 200 km), which is located in West Georgia, in the Kolkheti coastal plain lying between the mouths of the Tikori and Supsa.

Rare or Endangered Species

The highway corridor to be reconstructed is located in two main landscapes: there are deciduous and mixed forests and the secondary meadows surrounding the settlements and which are used as pastures and cornfields.

According to the zoo-geographical division the South Caucasus belong to the Sub-County of East Meditation Sea of Paleractic County. The highway crosses the Caucasus part of this Sub-County (Vereshagin, 1958; Gazhdiev 1986).

The species included in the red list of Georgia (here we include the species which dwell or may present in the corridor impacted by the Khaisi-Mestia highway).

Table 1. List of rare or endangered species

№	Species	Status	Location
Mammals			
1	Barbastella barbastellus	**VU**	*Construction Area*
2	Sciurus anomalus	**VU**	*Construction Area*
3	Sicista kluchorica	**VU**	*Nearby Construction Area*

№	Species	Status	Location
4	Prometheomys schaposchnikovi	**VU**	*Nearby Construction Area*
5	Lynx lynx	**CR**	*Construction Area*
6	Lutra lutra	**VU**	*Construction Area*
7	Ursus arctos	**VU**	*Construction Area*
8	Capra caucasica	**EN**	*Nearby Construction Area*
9	Capra cylindricornis	**VU**	*Nearby Construction Area*
10	Rupicapra rupicapra	**EN**	*Nearby Construction Area*
Birds			
11	*Aquila chrysaetus*	***VU***	*Construction Area*
12	Buteo rufinus rufinus	**VU**	*Construction Area (Hunting Zone)*
13	Neophron percnopterus	**VU**	*Construction Area (Hunting Zone)*
14	Gypaetus barbatus	**VU**	*Construction Area (Hunting Zone)*
15	Aegypius monachus	**EN**	*Construction Area (Hunting Zone)*
16	Gyps fulvus	**VU**	*Construction Area (Hunting Zone)*
17	Aegolius funereus	**VU**	*Construction Area*
18	Tetrao mlokosiewiczi	**VU**	*Construction Area*
19	Panurus biarmicus	**VU**	*Nearby Construction Area in aquatic zone*
Reptilian			
20	Vipera kaznakovi	**EN**	*Construction Area*
21	Vipera dinniki	**VU**	*Construction Area*
Fishes			
22	Salmo fario	**VU**	Medium and big size rovers
23	Varicorhinus sieboldi	**VU**	River Enguri

D. ENVIRONMENTAL COMPLIANCE AUDIT

D.1 Audit goals and objectives

The overall purpose of a post-construction environmental audit is to ascertain whether appropriate care had been exercised throughout the construction phase in order to prevent or minimize environmental pollution and/or damage. The specific objectives of the audit can be summarized as follows:

- Determine and verify whether all environmental requirements, criteria and constraints, prescribed in IEE, EMP and the Concessionaire's Environmental Policy have been adhered to during the construction phase.
- Determine and verify whether the remedial actions and rehabilitation requirements contained in the EMP have been appropriate and successful to prevent or control environmental pollution and/or damage.
- Determine and verify whether remedial and rehabilitation actions have been conducted adequately and successfully to prevent and/or minimize environmental pollution or damage.
- Ensure that an appropriate environmental monitoring and control program exits to follow up on remedial and rehabilitation works completed during the construction phase.
- Ensure that appropriate environmental monitoring and control program exists for monitoring of all environmental aspects during the operational phase.
- To identify any shortcomings in the EMP and EMS system implemented during the construction phase and to recommend alterations to the EMS applicable to the operational phase.

D.2 Methodology

The final environmental audit of Jvari-Khaishi-Mestia-Lasdili road Project was done in several stages:

1. At stage one so called table audit was conducted and the available materials were studied. The following documents were studied and analyzed at the given stage:

- Initial Environmental Examination (IEE) of Jvari-Khaishi-Mestia-Lasdili road section rehabilitation Project;
- Ecological Expertise Conclusion of the Ministry of Environment and Natural Resources of Georgia issued on May 14, 2010 to Jvari-Khaishi-Mestia-Lasdili road section rehabilitation Project;
- By-annual Reports drafted by the Municipal Development Fund (MDF);
- Quarterly Environmental Report developed by the Consultant;
- Records of Environmental Audits conducted by the Municipal Development Fund.

2. At stage two, the meetings with the Project participants with different degrees of responsibility for meeting the environmental requirements and monitoring were held. The meetings were organized with the following environmentalists:

- Alexander Dumbadze – Head of the department of environmental protection analysis and resettlement.
- Nikoloz Soselia – an environmentalist, Municipal Development Fund.
- Maia Vashakidze – an environmental expert, Project Consultant from a supervisory company KOCKS.
- Rezo Chkadua – Director of ENGURI 2006 LTD.

3. At stage three, visit to the site and collection of evidences was accomplished.

D.3 Environmental Management Plans

Non-compliance # 1

Requirements:

Under the Initial Environmental Examination (IEE), the contractors of all four construction sections had to develop the following environmental plans:

1. The construction contractor will be required to prepare and implement his own Construction Phase EMP explaining in detail the action he will take to provide the mitigation set out in this IEE that is his responsibility (Source of Request: IEE, I.1. Institutional Framework for EMP Implementation. P-160).
2. Construction contractor should develop specific plan of temporary and permanent allocation of debris, where the following should be noted: areas of debris allocations; engineering project of allocation (plan, section, etc.); transportation plan; temporary and permanent allocation plan should be agreed with the local authorities and regional service of the protection of the environment and natural resources (Source of Request: IEE, E.1.2.1 Spoil and Inert Construction Waste. P-132);
3. Direct impacts of the asphalt plants (landscape degradation; emissions and dust; noise etc.) should be considered in case if the constructing company will decide to use its own mobile asphalt plants. In that case relevant EIA should be prepared and environmental Impact Permit should be obtained for installation and operation of the plant (Source of Request: IEE, **E.7.** Construction Related Impacts at the Asphalt Plant Sites. P-144);
4. The Archaeological studies should be conducted by contractor via engaging appropriate organization. Estimated costs for these studies equal 3 000 GEL. These expenses should be considered in the Construction contract (Source of Request: IEE, I.4 Budget for implementation of EMP).

In addition, under the Ecological Expertise Conclusion No. 27 of May 14, 2010 of the Ministry of Environment and Natural Resources of Georgia (Chapter III – Conditions), the following environmental plans were necessary to develop:

1. “The Emergency Response Plan for the possible impact on biodiversity to be presented to the Ministry of Environment and Natural Resources of Georgia” (Condition 3).
2. The detailed design of the “Crossings of the rivers and gullies of the design road to be agreed with the Environmental Agency of the Ministry of Environment and Natural Resources of Georgia”(Condition 5).

Non-compliance: Neither of the Contracts has developed any of the said plans. All Contractors used the “Environmental Management Plan” and “Monitoring Plan” (approved by the Ministry of Environment and Natural Resources of Georgia and Asian Development Bank) included in the EIA document. The said Plans surely include a major part of the required environmental plans mentioned above, but fail to fully meet the requirements developed for such a complex object quite expediently.

Corrective action: At present, the rehabilitation works of Zugdidi-Khaishi-Mestia-Lasdili road section are complete, the “defects liability period” for all four sections is past and there are acceptance reports of the objects drafted with the building contractors. Following the above-mentioned, there is no sense to develop the above-mentioned environmental plans or accomplish any additional studies.

D.4 Institutional Arrangement

D.4.1 Environmental Group of the Municipal Development Fund

Request: „MDF provides a general oversight on the environmental compliance of works through ensuring quality performance of the technical supervisor and of the contractor” (Source of request IEE, chapter I.1. Institutional Framework for EMP Implementation p-160).

Existing situation:

An environmental protection analysis and resettlement division existing under MDF consists of Mr. Alexandre Dumbadze, Head of the division as Manager and Ms. Nino Patarashvili, Mr.David Baindurashvili, Mr. Nikoloz Soselia and Ms. Ekaterine Mumladze as Environment and Resettlement Specialists of division. The responsible person on supervision of EMPs implementation from MDF under reconstruction/rehabilitation project of Zugdidi-Jvari-Mestia-Lasdili motorway SUTIP tranche 1 was Mr. Nikoloz Soselia - specialist of environmental protection analysis and resettlement division.

During project implementation MDF environmental specialist has been involved in the monitoring of implementation of the environmental mitigation measures specified in the EMP. The environmental monitoring was carried out in accordance with the plans and schedules outlined in the EMP and the schedule for conducting of monitoring approved by MDF management.

There were 32 inspections during the construction period (the inspection reports are kept at MDF office). The said inspections have revealed 23 cases of non-compliance, with the corrective actions developed and realized for all 23 of them. 10 of all the violations fixed during the inspection were related to the absence of permits or agreements (see Table 2). The other 12 violations were as follows:

1. Minor spills of fuel materials (6 cases)
2. Absence of needed road signs (4 cases)
3. Provision of the workers with relevant equipment (3 cases).

All cases of non-compliance revealed during the inspection of MDF and environmental specialists were corrected.

Table 2. Dates of fixing and correcting the cases of non-compliance

Date of inspection	Revealed non-compliance	Result
27-28/04/2011 ARKEOPOLISI LTD.	1. A copy of the permit to open a borrow pit was not kept at the construction site. 2. No agreement on removing the construction waste was concluded with the local self-government.	1. Corrected on 23.05.2011; 2. Corrected on 28.09.2011.
23.05.2011 ARKEOPOLISI LTD.	1. No prevention measures against the lubricants spill were provided.	1. Corrected on 26.07.2011.
27.04.2012 SANI LTD.	1. A copy of the permit to open a borrow pit was not kept at the construction site. 2. No agreement on removing the construction waste was concluded with the local self-government.	1. Corrected on 28.09.2011; 2. Corrected on 28.09.2011.
10.03. 2011 ENGURI LTD.	1. The fueling station is not appropriately equipped.	1. Corrected on 26.07.2011.
28.04.2011 ENGURI LTD.	1. The permit to open a borrow pit was not kept on site.	1. Corrected on 24.05.2011.
27.06.2011 ENGURI LTD.	1. No agreement on removing the construction waste was concluded with the local self-government.	1. Corrected on 28.09.2011.
27-28/04/2011 ZIMO LTD.	1. A copy of the permit to open a borrow pit was not kept at the construction site. 2. No agreement on removing the construction waste was concluded with the local self-government.	1. Corrected on 28.09.2011; 2. Corrected on 28.09.2011.

C.4.2 The Supervisory Company - Joint Venture of Kocks Consult GmbH (Germany), DMEC Seoul (Korea) and Design & Consulting Company "BT" (Georgia)

Request: „the supervisor is required to track implementation of the EMP by the contractor, reveal any deviations from the prescribed actions, as well as identify any unexpected environmental issues should they emerge at any stage of works" (Source of request IEE, თავი I.1. Institutional Framework for EMP Implementation. p-160).

The consortium of the consultant companies hired a local Environmental Expert - Maia Vashakidze, who inspected the construction activities monthly. The relevant reports were submitted to MDF on a monthly basis.

C.4.3 Construction Contractors

Request: „Construction Contractor shall be obligated by his contract to follow EMP and good construction practice. In order to meet this obligation, the Contractor shall have at least one environmental specialist in the team, who is able to fully understand the requirements of the EMP and professionally apply the envisaged mitigation measures to the contractor's daily operations" (Source of request IEE, თავი I.1. Institutional Framework for EMP Implementation. p-160).

The section of Zugdidi-Khaishi-Mestia-Lasdili road Rehabilitation Project financed by ADB was divided into 4 lots. Table 4 shows the winning companies of each lot.

Table 4.

Contract #	Employer	Contractor
Contract-1 (P42414-ICB-1.01-L1)	MDF	Ltd Zimo
Contract -2 (P42414-ICB-1.01-L2)	MDF	LTD Sani
Contract -2 (P42414-ICB-1.01-L3)	MDF	JSC Arkeopolisi
Contract -2 (P42414-ICB-1.01-L4)	MDF	JV Enguri 2006 LTD and Arkeopolisi JSC

Each company had a designated person responsible for the compliance with the environmental issues.

None of the environmental experts of the construction companies recorded the results of environmental inspection. Therefore, at present it is difficult to talk about the efficiency of the work they have done.

D.4.4 Grievance Redress Committee

Request: „The MoE and city hall are obliged to respond to the grievances, which have been received from the population or other interested parties in accordance with the requirements of

the Administrative Code of Georgia" (Source of request IEE, chapter H. Grievance Redress Mechanism. p-159).

In the municipality of settlement Mestia, there was a Grievance Redress Committee established headed by Head of Mestia municipality. The Committee was also responsible for receiving and considering the claims/grievances related to the environmental issues from the population and concerned parties. The Committee did not receive any grievances related to the environmental problems during the construction period.

D.5 Analyses and Measurements

The requirement for the obligatory measurement of baseline environmental data and accomplishment of analyses were not envisaged either by the Ecological Expertise Conclusion issued by the Ministry of Environment and Natural Resources of Georgia, or Initial Impact Examination documents approved by the Asian Development Bank.

Therefore, in the course of rehabilitation/construction, no analyses or measurements to assess the environmental quality were accomplished.

D.6 Accountability

D.6.1 Reports developed by the Construction Contractor

Non-compliance # 2

Request: „The Contractor, will be required by the construction consultant to prepare monthly progress reports on the EMP implementation"(Source of request IEE, თავი I.2 Reporting on EMP Implementation).

Non-compliance: None of the Contractors have developed monthly environmental reports.

Correctiv action: At present, the rehabilitation works of Zugdidi-Khaishi-Mestia-Lasdili road section are finished, the "defects liability period" for all four sections is past and acceptance reports with the construction contractors are signed. Following the above-mentioned, there is no sense to develop the required monthly environmental reports.

C.6.2 The Consultant's Environmental Reports

Request: „The technical supervisor shall prepare monthly reports on the progress of EMP implementation and environmental performance of the contractor."(Source of request IEE, chapter I.2, Reporting on EMP Implementation).

The Consultant drafted quarterly reports, which were presented at MDF.

D.6.3 The Environmental Reports Prepared by the MDF

Request: „the MDF administration. The Fund, through its environmental specialists, shall report to ADB on the status of environmental compliance of construction works each quarter"(Source of request: IEE, chapter I.2, Reporting on EMP Implementation).

An Environmental Specialist of the Municipal Development Fund drafted the environmental reports and submitted them to Asian Development Bank once in every six months.

D.7 Management of Inert Waste

The estimated quantity of spoil from drilling and demolition works totals to 47,000m^3 and is about the same for all four sections[1].

Request: "Construction contractor should develop specific plan of temporary and permanent allocation of debris, where the following should be noted: areas of debris allocations; engineering project of allocation (plan, section, etc.); transportation plan; temporary and permanent allocation plan dholes be agreed with the local authorities and regional service of the protection of the environment and natural resources" (Source of request: IEE, article: E.1.2.1 Spoil and Inert Construction Waste).

Existing situation:

As already mentioned, none of the Construction Contracts have prepared Inert Waste Management Plan (Chapter C.3, Incompliance #1). Therefore, the sites of placement of inert materials could not be agreed with the local self-governmental bodies. As the Construction Contractors note, the sites of placement of inert materials were agreed with the representatives of the local self-governmental bodies verbally, and the sites were selected by meeting the major requirement implying that „Debris should be removed from r. Enguri floodplain for about 3-5 km^2".

During the visual inspection of the construction site, the trace of large quantities of inert material poured at some places in the gorge of the river Enguri was obvious (See Fig. 1, 2, 3, 4, 5 and 6). It also should be noted that the amount of the inert material poured into the existing gully is much less than the amount of the waste predicted for the construction stage.

[1] IEE, article C.5.1. "Inert Construction Waste". P-78

[2] IEE Article C.5.1. "Inert Construction Waste". P-78

Fig. 1. KP 100 + 700

Fig. 2. KP 100+700

Fig. 3. KP 99+400

Fig. 4. KP 89 Entrance to the tunnel from Mestia side

Fig. 5. KP 89

Fig. 6. KP 89 entrance to the tunnel from Khaishi side

Proving that the inert materials fixed in the figures were originated during the road rehabilitation and the said waste was removed into the river Enguri gorge by the Construction Contractor is impossible.

Large amounts of inert materials in the river Enguri gorge were fixed before the startup of the construction and rehabilitation works (See Fig. 7, 8, 9, 10, 11 and 12). The said inert materials were removed into the river Enguri gorge by the gangs charged with cleaning the road off the inert material removed from the slopes due to erosion. The inert material in the road was collected and poured into the river Enguri gorge. This was the case for several tens of years. Therefore, it is possible that the inert material presently fixed in the gorge is the result of several-year-long actions of the cleaning gangs.

Fig. 7. KP 93+100

Fig. 8. KP 125

Fig. 9. KP 125+100

Fig. 10. KP 95+500

Fig. 11. KP 90+250 **Fig. 12. KP 95+100**

The described practice of cleaning the roads off the inert material removed down the slopes is the case to present. Consequently, the amount of inert materials placed in the gorge of the river Enguri in an uncontrolled manner is increasing permanently.

As a conclusion, we may say that due to the absence of relevant management plans, records, agreements and other data, the information about the legal or illegal management of inert materials is impossible to obtain at present.

D.8 Borrow Pits, Building Camps and other Auxiliary Facilities

During the construction, the following auxiliary facilities were installed and used by the Construction Contractor:

Construction camp:

1. The construction camp in Jorkvali owned by ARKEOPOLISI LTD. A mini concrete plant, dining hall, warehouse facilities and inert material processing equipment were located on the territory of the camp. KP 80;
2. The construction camp in Lakhamuri owned by ARKEOPOLISI LTD. and ENGURI 2006 LTD. A mini concrete plant, dining hall and warehouse facilities were located on the territory of the camp. The camp was located on the territory of the operating sawing plant, near village Lakhamura. KP 98+200;
3. The construction camp near village Becho owned by ENGURI 2006 LTD. A mini concrete plant, dining hall, warehouse facilities and inert material processing equipment were located on the territory of the camp. KP 120.

Borrow pits:

1. Inert material pit near the river Enguri owned by ARKEOPOLISI LTD. KP 82;
2. Sandpit near village Ipari owned by SANI LTD. KP 85;

3. Inert material borrow pit at the river Dorla, near village Becho owned by ENGURI 2006 LTD. KP 120.

Requests:

1. Direct impacts of the asphalt plants (landscape degradation; emissions and dust; noise etc.) should be considered in case if the constructing company will decide to use its own mobile asphalt plants. In that case relevant EIA should be prepared and environmental Impact Permit should be obtained for installation and operation of the plant. (Source of Request IEE. Article: E.7. Construction Related Impacts at the Asphalt Plant Sites. P-144);
2. No new curries are expected to be opened during the project activities. Inert material, borrowed from only existing and officially registered quarries with valid environmental permits will be used. Apparently the carries located in Enguri riverbed next to Ipari village and somewhere in the middle of Ipari and Jorkveli villages will be utilized coupled with the Mestiachala gravel quarry (Source of request IEE Article: E. 5. Impacts on Quarry Sites Cause by Construction Activities. P 143);

C.8.1 Jorkvali Building Camp

Non-compliance # 3

Existing situation: At present, the territory of the construction camp is abandoned without dismantling the camp or restoring its area. Over the territory of about 1000 m^2, there are two abandoned premises, concrete mixers, minor broken-down techniques; the dismantling of the toilet is not complete and there are foundations of some concrete buildings remained (See Fig. 13, 14, 15, 16, 17 and 18).

Fig. 13. Construction camp in Jorkvali

Fig. 14. Construction camp in Jorkvali

Fig. 15. Construction camp in Jorkvali

Fig. 16. Construction camp in Jorkvali

Fig. 17. Construction camp in Jorkvali

Fig. 18. Construction camp in Jorkvali

Correction action: The present owner of the territory must accomplish the full dismantling of the auxiliary facilities on the territory of the camp and area restoration.

D.8.2 Inert Material Borrow Pit. KP 82

Non-compliance # 4

The borrow pit located across the river Enguri, KP 82 is no more used by the owner. A part of the existing infrastructure is removed from the territory of the pit. The buildings and premises are not dismantled (See Fig. 19, 20 21 and 22). In addition, the concrete foundations of some auxiliary buildings are remained.

Fig. 19. Sandpit KP 82

Fig. 20. Sandpit KP 82

Fig. 21. Sandpit KP 82

Fig. 22. KP Sandpit KP 82

Correctiv action: The present owner of the territory must accomplish the full dismantling of the auxiliary infrastructure on the territory of the camp and area restoration.

D.8.3 Lakhamura Construction Camp

The construction camp in Lakhamura was located on the territory of the operating sawing plant. The area was rented by two companies, ENGURI 2006 LTD. and ARKEOPOLISI LTD.

At present, the management of ARKEOPOLISI LTD. has finished the works and removed all the techniques from the rented area. As the area rented by ARKEOPOLISI LTD. was used before and is used to present as an entrepreneurship object, it needs no restoration (Fig. 23 and 24). The Lessor, the owner of the sawing plant has no claims to the company. The construction techniques in the figure below is the property of the sawing plant owner.


Fig. 23 and 24. The territory of the camp cleaned by ARKEOPOLISI LTD.

As for ENGURI 2006 LTD., the company still rents the area and uses it for another project realized in the region.

D.8.4 Sandpit KP 85 (near village Ipari)

The sandpit in the river Enguri gorge, near village Ipari was owned by ARKEOPOLISI LTD. At present, the pit is not used by the company. The techniques are removed from the area, the auxiliary facilities have been dismantled and the degree of the area restoration is satisfactory (Fig. 25 and 26).


Fig. 25 and 26. Sandpit in the river Enguri gorge. KP 85

D.8.5 Construction Camp in Village Becho KP 120

The owner of the construction camp in village Becho is ENGURI 2006 LTD. Despite the fact that Khaishi-Lasdili road rehabilitation project is complete, the company still uses this camp for another project realized in the region (Fig.27 and 28).


Fig. 27 and 28. Operating building camp of ENGURI 2006 LTD. and related infrastructure

D.8.6 Inert Material Borrow Pit in the river Dolra Gorge

To quarry inert material, ENGURI 2006 LTD. used the borrow pit in the gorge of the river Dortla, 2 km from the construction camp. Since the project completion, the company has not used this pit. The techniques owned by the company and dismantled infrastructure is removed from the camp territory. The quality of the area restoration is satisfactory (Fig. 29 and 30).


Fig. 29 and 30. Restored inert material pit in the gorge of the river Dortla

D.9 Impact on Other Receptors

The data about the impact on other receptors during the construction are taken based on the results of the audits conducted by the Municipal Development Fund and Consultant company. Based on the audit reports during the construction, the impact on the following receptors was fixed:

Air Quality

Construction materials were provided to the site when required. Speedy completion of work and proper site clearance after completion were ensured. Wheels and undercarriage of haul trucks were washed prior to leaving construction site.

Dust was controlled through watering the roads where driving can easily generate dust. Excavated mounds of soil were damped down by water spray. Tarpaulins were used to cover loose materials that are transported to and from the site by track.

Dust generation was controlled while unloading the loose material at the site by sprinkling water inside barricaded area.

Regular and clean maintenance of the temporary labor camps was ensured.

Noise

The Contractor had employed practical means to minimize noise resulting from construction work. The plan of transportation routes were agreed with Municipality and Police.

Drivers were informed to limit speed 20-25 KMPH to avoid use of horn in populated areas. Local population was informed about project works. No nighttime activities took place.

Flora and Fauna

During construction works wasn’t observed serious negative impacts on flora and fauna.

Water Quality

During construction works wasn’t observed the cases of sub-soil and surface water pollution.

Loss of Top Soil

No topsoil was identified and subsequently stripped at the construction site within the reporting period.

Fueling of Machinery

Fueling of machinery was provided through mobile and fuelling vehicles.

Health and Safety Issues

Personnel were provided by health and personal safety equipment. Providing of living conditions for workers. Necessary living conditions for workers were provided by the Contractor in living and on-site camps: Proper waste management, pollution prevention from storages; proper organization of fueling.

Transportation Safety

During civil works construction sites were equipped with transportation and safety traffic signs.

Consultations with Communities

No consultations with local communities were conducted during defects liability period.

E. CONCLUSION

1. Despite the fact that none of the Construction Contractors have developed the required environmental plans and the said Construction Contractors accomplished the environmental protection actions only in line with the requirements of the “Environmental Management Plan” and “Monitoring Plan” included in the Environment Impact Assessment document. The activities of all four Construction Contractors in the environmental protection field can be estimated as satisfactory by the results of the inspection and monitoring conducted by the Project Consultant and PIU.
2. The Municipal Development Fund, as the Project implementing organization shell consider the cases of non-compliance on the part of the Construction Contractor (Non-compliance 1 and 2) and in the course of the next project, strictly require the contractors to prepare monthly environmental reports, inspect environmental activity and make internal audit records.
3. The Acceptance Acts are drafted with all four Construction Contractors. Therefore, none of them is responsible for the restoration of the territories of the construction camps and inert materials borrow pits (Non-compliance 3 and 4). Aiming at conducting the said works, the project owner company has to either hire a contractor, or accomplish the restoration works of above-mentioned two objects itself.
4. If the Road Department undertakes to restore the territories of the construction camps and inert materials borrow pits, Jvari-Khaishi-Mestia-Lasdili road rehabilitation project can be considered as accomplished in respect of meeting the environmental requirements.