Environmental Monitoring Report

#2 Semestral Report
January 2016

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.

Biannual Environmental Monitoring Report

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GEORGIA: GEORGIAN SUSTAINABLE URBAN TRANSPORT INVESTMENT PROGRAM, Tranche 1

(Financed by the Asian Development Bank)

Prepared by: Nino Nadashvili, Local Environmental Consultant for ADB projects
Environmental and Resettlement Unit, Municipal Development Fund (MDF)
Tbilisi, Georgia

Endorsed by: Giga Gvelesiani, Head of Environmental and Resettlement Unit
Municipal Development Fund (MDF)
Tbilisi, Georgia

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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
EPSM	Engineering Procurement and Construction Management
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
MoRDI	Ministry of Regional Development & Infrastructure
SSEMP	Site-Specific Environmental Management Plan

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1. PART I. INTRODUCTION

1.1. Preliminary Information

Program Background

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. Recently several significant programs, financed through state budget, loans and grants, have been implemented with this regard.

On 05 August, 2010 MFF - Sustainable Urban Transport Investment Program Tranche 1 Loan and Project agreements were signed between Georgia and Asian Development Bank. MFF-Sustainable Urban Transport Investment Program – Tranche 1 (SUTIP T1) includes (i) Transport Infrastructure Improvement; (ii) Institutional Capacity Development and (iii) Project Management Facility components.

The program will provide efficient, reliable and affordable urban transport infrastructure and services, thereby increase economic growth potential and competitiveness of urban communities, and improve livelihoods of over 1.5 million people (approx. 35% of Georgian population). The program will also: (I) improve urban, environment and communities' access to economic opportunities and to public and social services; (II) promote efficient and sustainable urban transportation; and (III) generate income and employment opportunities.

The environment classification for Tranche 1 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 was conducted using ADB's Safeguard Policy Statement (2009). Required environmental assessments of sub-projects (SPs) are conducted and IEEs are prepared in accordance with Environmental Assessment and Review Framework approved for SUTIP 1 in May, 2010 and updated in April, 2015.

Program Area

Sustainable Urban Transport Investment program Tranche 1 includes 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.

Among the Sustainable Urban Transport Investment program Tranche 1 subprojects, which are ongoing now, are:

- Tbilisi Metro Line 2 and Creation of University Station EPCM;
- Anaklia coastal improvement EPCM (Phase 1);

Tbilisi Metro extension project - overview

Tbilisi suffers from traffic congestion and air and noise pollution, loss of green areas and degradation of historical buildings and monuments. Serving 250,000 passengers daily, the Tbilisi Metro is playing a significant role in the urban transport system and can serve as the backbone of the city's network. Tbilisi Municipality is now exploring options for expanding the network. A first phase is planned to extend the line

to the station “University” at Saburtalo district, where there is a large population, significant number of students and high traffic flow. The construction of the “Delisi-University” section of the metro started in 1985 but ceased in 1993 for financial and technical reasons. In 1998 construction resumed and “Vaja Pshavela” station was opened in 2000 with only one way in operation. The remaining tunnel has been bored up to the university station, including the station shell, escalator shaft and the exits. This Project aims to resume and complete the construction of the metro tunnel along Vaja Pshavela Avenue and the “University” subway station, to benefit more than 150,000 people and increase ridership of the metro network. Total length of metro station line is 2.2km.

The EPCM consultant (Euroestudios) has been fielded in early August 2012. Geological surveys and investigations of the existing tunnel have been completed and used as a basis for the first draft of detailed design which has been submitted in December 2012.

The international independent metro specialist recruited by MDF provided comments which have been addressed by the EPCM consultant. MDF with the guidance of the independent metro specialist confirmed in June 2013 that the creation of the emergency exit recommended by the EPCM consultant is necessary and will be implemented. ADB confirmed the emergency exit is required according to international standards and best practices. The detailed design has been endorsed by MDF after all comments from Tbilisi Transport Company, MDF and ADB have been incorporated.

The civil works tender was first advertised in June 2014. Bid evaluation report was timely prepared by MDF with the support of the ADB project team. However, as none of the bids were technically substantially responsive, ADB Procurement Committee recommended rebidding. Invitation for bids was advertised on 14 November 2014, and deadline for submission of bids was on 23 January 2015.

Contract was signed with EUROESTUDIO S.L. (Spain) on July 17, 2012 and included preparation of Detailed Engineering Design (DED), Bidding Documentation (BD) Package and Construction Supervision.

Contract with Construction Company Cobra Instalaciones y Servicios, S.A.. Spain, Lead partner with Assignia Infraestructuras, S.A. Spain (“the Contractor"), was signed on March 26, 2015.

The total budget of the project is: GEL 83,000,670.45 (Eighty Three Million Six Hundred Seventy and 45/100 Georgian Lari).

The commencement date of works was established on June 20th 2015.

The project is divided into two main assignments:

- The 2,6 km long (2600 m) Metro extension from Delisi Station to University Station
- Creation of University Station and a 301 m long tunnel section for cross over and parking tracks.

The 2.6 km-long (2600 m) Metro Extension, from Delisi Station to University Station, consists of the following:

1) Delisi Station (total length 131 m, P.K. 56+00);
2) Scissor crossing and parking tracks after the platform (total length 285 m);
3) 760 m-long twin tunnels between Delisi and Vazha-Pshavela stations;
4) Vazha Pshavela Station (total length 205m, P.K. 68+00);
5) 760 m-long twin tunnels between Vazha Pshavela and University stations, including ventilation Shaft n.50, the by-pass galleries from the shaft to the main tunnels and a pump sump;
6) University Station (total length 162m, P.K. 78+20), with the sub-station and other technical rooms;

7) In the University station, it will be designed a 110 meter platform with an access by a hall located at the intersection of Vazha Pshavela Avenue and Sandro Euli Street;
8) This hall is located at elevation 535 and the platforms at 487, so that descend 53 meters;
9) 315 m-long section after University Station consisting of a crossover Tg 0.11, parking tracks, a service gallery connecting the station and the crossover, the ventilation Shaft n.51 and a pump sump;

Delisi and Vazha-Pshavela are willow stations, built as cut-and-cover structures, while University Station is a deep-mined station (about 50 m from the surface). The tunnels between Delisi and Vazha-Pshavela were constructed in cut-and cover, while the tunnels between Vazha-Pshavela and University are mined.

Delisi and Vazha-Pshavela stations are finished and in operation. The line between the two stations is operated on one track, since the second tunnel has been constructed but not equipped.

Tunnels between Vazha-Pshavela and University stations are constructed but the civil works are not finalized (watertight injections and internal finishes). The main cavern of the University Station has been constructed, together with the inclined tunnel for the moving staircase. The atrium at the surface has a single underground level, the excavation is an open-cut and the structures are partially constructed.

After University Station the line ends with a crossover – which is partially excavated parking tracks, chambers for pumping stations and equipment.

In addition to Civil Works, the following systems must be installed:

- Permanent way,
- Power supply substation,
- Electromechanical equipment (tunnel ventilation, water-pump, escalators),
- Signaling system,
- Low voltages equipment: communication, SCADA, fare collection

Anaklia coastal improvement project (Phase 1) - overview

Anaklia is a small town and seaside resort in western Georgia. It is located in the Samegrelo-Zemo Svaneti region, at the place where the Enguri River flows into the Black Sea, near the administrative border with Abkhazia.Anaklia is supposed to become a tourism center in Georgia. Anaklia infrastructure development and rehabilitation plan was announced by the Government of Georgia. Erosion processes take place on various pleases at Georgian Black Sea coastal line and Anaklia is one of them. Today this process is seriously destroyed coastline.

The project aims at Anaklia shoreline rehabilitation, restoration of the full profile of beaches to the possible limits (which is necessary for wave breaking and suppression of its power and assigns to the beach a function of bank protecting structure), selection of the most optimum types and design of hydro-technical coast protecting structures.

Coastal protection structure of underwater breakwaters is totally composed with 6 units (for phase 1) constructed from 5 Ton and 10 Ton tetrapods. The space between one to another breakwaters units is 90m but space between second one to thirdone (from Enguri river mouth to Tikori river mouth direction) is 100m. The length of first underwater breakwater (from Enguri river mouth to Tikori river mouth direction) is 200m, fromNo.2 to No.6 – the spacing is 300m. Therefore, total length of underwater breakwater is1, 700m. Length of artificial nourishment is 2,300m. Amount of Sand for phase1 is 129,000㎥.The area of 300m length from river mouth to start point, where artificial nourishment has to bestarted, will be covered by armor stones to prevent erosion against incident wave. Total Width of artificial nourishment is 60m, from beach line to land

side is 40m and forward to seaside is 20m. Slope of beach line will be composed with 1:20. Enguri river Revetment will be performed from the river mouth (where is located a marina) to starting point of artificial nourishment. The distance will be about 300m.

Infrastructure improvement will support infrastructure investments to rehabilitate, improve and expand the beach of Anaklia and will benefit accrue principally from the protection of land and infrastructure from erosion and damage, the avoidance of some other costs and increasing number of tourists. For the interventions, benefits arise from the protection of (i) rural land, (ii) houses (iii) roads and other infrastructure. Coast protection measures need to be taken to protect the unique place and landscape. The design of approximately 4 kilometers of coastal line will create a new and attractive tourist destination on the Black Sea Coast, able to be the engine of the development of the region of Zugdidi, Ganmukhuri and Anaklia.

Significant delays have been experienced in the first months of project implementation and mitigation measures had been taken and agreed between the Engineer, the Contractor and MDF. Works are still going at a slow pace. The completion date was extended twice, mostly due to bad weather conditions in winter season and the incapacity of the contractor to mobilize all necessary equipment for marine works. The works were anticipated to be completed in April 2015, however they are not completed yet.

1.2. Construction activities and projects' progress during the reporting period

Civil works at Tbilisi Metro extension subproject

As it was mentioned above, the commencement date of Works was established on June 20th 2015.

During reporting period, the Contractor, in order to recover detected delays, has progressively increased both - the staff and the equipment.

At present demolition is completed, which had some delay and the execution of the foundation slab of university station platform has started. Crossover excavation has also started, which was delayed by the program.

As for the activity of injections detected as critical, it has started with drilling in the beginning of December 2015. Contractor should reinforce the equipment and fulfill their proposal to work with various subcontractors.

The activity of university station pedestrian passage is going at a good pace in the first phase and according to the schedule. At the moment the excavation is completed, longitudinal drainage is executed and slab base frame is concreted.

Work schedule has also been extended establishing a night shift to remove excavation debris through the shaft 50, in order not to interfere with daily activity of injections and other activities inside the tunnel.

The summary of performed works by the Contractor during the reporting period and its status are listed below:

University station platform

- Demolition: (100 %) of the platform is demolished. It is completed;

- The excavation for implementation of foundation slab has started. Excavation is done by alternative sections;
- The excavation of the first section has been completed: (265,3 m^3). Excavated material at the depth of one meter is the type of: dry, weathered and loose mudstones, which belong to the rocks of the second category and it was executed by the excavator; but at the bottom, there are main rocks mudstones and sandstones which belong to the rocks of the seventh category;
- These main hard rocks have been excavated by hydraulic hammer;
- In the third section, with the same characteristics as in the first one, to this date it is only excavated 152, 8 m^3
- Totally excavated soil is (40 %);
- The canal for the drainage pipe section is excavated (4,5 m^3), which is 20 % of the total volume;
- 200 mm drainage pipe wrapped in the geotextile was put in 12 meters (12%);
- Water is being pumped in the trench and water has sulphate smell;
- Water test is taken and it is sent to the laboratory;
- Slab foundation: it has not started yet. Delayed;
- Drainage pipe: it has not started yet. Delayed

UNDERGROUND CIVIL WORKS

1. Excavation on Crossover:

- Soil removal started from Crossover;
- Extraction system of rubbles for the ramp: completed and ready. It operates and daily 60m^3 of loose soil are removed;
- To this date it is totally extracted 1,116 m^3 of loose soil.

2. Technical rooms in tunnel:

- Demolitions: (100%) it is completed, except reinforced concrete corbel.
- Removal of Rubbles: (100%) it is completed
- Blinding concrete on foundation is completed (100%)
- At the end of technical rooms the pipe of 400 mm was cleaned to launch concrete into the tunnel, both for the technical rooms and the substation.

3. Substation:

- Blinding concrete: Blocks and solid concrete are completed. (100%);
- Concrete slab: it has not started yet, because earthing system is not installed;
- The right tunnel from P.K 77+60 to 76+80 is being cleaned. (80 meters).

4. University station Surface

- **Pedestrian passage**

- Traffic is diverted according to the approved drawings and permissions.

- **Exit №4:**

- Excavation: it started on October 19th.

- (90% phase 1) of soil is removed.
    - **Technical rooms**
- Demolition of technical rooms: (90%) completed, except the access zone to the "Concourse Entrance Hall".
- Removal of rubbles: (0%) it is not started.
    - **Ventilation**
- Central ventilation is operating on the surface.
    - **Illumination**
- Temporary illumination is all along the pedestrian passage;

5. Tunnel

- **Injection**
- Preparation activities of borehole of injections
- Injection started in the beginning of December.

Civil works at Anaklia coastal improvement project (Phase 1):

Civil works contract was signed with Modern Business Group LLC (Azerbaijan). The construction works started on July 24, 2013. Significant delays have been experienced in the implementation of the project. The original completion date of civil works for Anaklia phase was on 24 April, 2014. Since that the completion date was extended twice. MDF, Engineer and Contractor agreed to extend the contract at first up to 31 of July 2014, after - till November 18, 2015 mostly due to bad weather conditions in winter season and contractor's inability to mobilize all needed marine equipment and vessels for executing marine works.

While, all of the tetrapods are already casted and ready to be placed underwater, the marine works progress was insufficient compared to the works schedule. The project considers construction of 6 sections of underwater breakwater structures, revetment of Enguri river left banckbank and sand nourishment of the beach line. Contractor started construction of N 6 underwater breakwater last year.

The Georgian government came to a decision to initiate construction of a deep sea port in Anaklia close to the Anaklia coastal protection project site. A risk of potential overlap of the two construction sites is apparent. Therefore expediency of the coastal protection project is open to question. Final decision will be made after the location of the Sea port is known and preliminary design will be developed. The works are still going at a slow pace. At this moment the Contractor is only executing limited works under the project.

During reporting period following construction work activities have been carried out by the Contractor Company – Modern Business Group Ltd (Azerbaijan):

- Sea bottom dredging – 974 m^3;
- Placing TTP units in the sea – 83 units;
- Filling with stone in the sea – 321 m^3;
- Leveling – 300 m^2;
- Natural quarried stone – 450 $m^{3.}$

Contractor procures construction materials - sand aggregates, quarry stones and etc. from the following licensed companies: Crushed rock from LTD "Pulsari", contract number HEC-09, LTD "Enguri+"-contract

number -HEC-00 and "Big Energy" – contract number HEC-08/1; Sand- from company: "Lazika", Contract number HEC-12; Natural quarry stones -from company "Grupovia" – contract number HEC-07. Physical progress of construction works by the end of December is 55.38%.

1.3. Changes of project organization and environmental management team

The MDF is the projects' executing, implementing and disbursing agency. MDF has overall responsibility for the projects' management - including environmental, planning and supervision. New Executive Director of MDF Juansher Burchuladze was assigned in July, 2015.

MDF is responsible for general implementation of all safeguards tasks and guarantee that potential adverse environmental impacts arising from the Projects are minimized by implementing mitigation measures presented in the environmental impact assessment ("EIA") or Initial Environmental Examination (IEE), as applicable.

Management of safeguards issues is carried out by the MDF through Environmental and Resettlement Unit, established in October 2014. From that time, number of Environmental and Resettlement team members has increased from 6 to 9 and currently consists of: Head of Unit, 3 environmental safeguards specialists, one safety specialist, one social and gender specialist, 2 resettlement specialists. There are also two ADB's individual consultants – one on environmental safeguards and one on resettlement issues, who also are the members of Environmental and Resettlement Unit. Until October, Environmental and resettlement safeguards team was consisting of 3 environmental safeguards and 2 resettlement specialists, one of which was the ADB's national consultant on resettlement issues. Environmental and Social Safeguards team had a Team Leader who was an advisor to Executive Director of MDF on environmental and social safeguards issues.

The Environmental and Resettlement Unit is involved in addressing of environmental and social safeguard issues throughout the entire projects' cycles. The Environmental and Social Specialists of the MDF, are responsible for management of the environmental and social aspects associated with development of all donor funded projects for which MDF is the responsible Executing Agency (EA). Local Environmental Consultant, was hired from September 2015 and designated to supervise ADB projects, review the IEEs/EIAs, EMPs, and SSEMPs of projects and carry out supervision of the construction performance based on approved EMPs, EIAs, and environmental standards in accordance with ADB "Safeguard Policy Statement" (2009) requirements' and acting Georgian Legislation.

1.4. Relationship with contractors, owner, lender etc.

The main institutions that are involved in IEEs/EMPs/SSEMPs implementation and monitoring, are the executing agency (EA) - MDF, the Supervision Consultants' (SC), the Construction Contractors' and to a lesser extent the Ministry of Environmental and Natural Resources Protection and Municipal Authorities. EA (MDF) and SCs are responsible for ensuring monitoring of the projects' implementation at the construction stage. Ministry of Environmental and Natural Resources Protection has the authority for periodic audits but should not be considered as a party responsible for monitoring according to this IEE and EMPs.

Tbilisi Metro extension project

As it was mentioned above, MDF is responsible for general implementation of all safeguards tasks. EA (MDF) and SC (Euroestudio) are responsible for ensuring monitoring of the project implementation at the construction stage, while Tbilisi Metro - for monitoring at the metro operation stage.

The MDF's Environmental and Social Specialists responsibilities in respect of implementation of the IEE/EMP, are to: ensure that all relevant IEE/EMP requirements (including environmental designs and mitigation measures) are duly incorporated into the project bidding documents; Assist Contractors to obtain necessary permits and/or clearance, as required, from any relevant government agencies (NEA, etc); Ensure that all necessary regulatory clearances are obtained before commencing any civil work on the project; Ensure, that contractors have access to the EMP and IEE report and understand their responsibilities to mitigate environmental problems associated with their construction activities and facilitate training of their staff in implementation of the EMP; Approve the Site-Specific Environmental Management Plan (SEMP) prepared by the Contractor before he takes possession of construction site; Time-to time monitor the contractor's implementation of the SEMP in accordance with the environmental monitoring plan by conducting site monitoring visits; Prepare and submit semi-annual Environmental Monitoring Reports to ADB; In case unpredicted environmental impacts occur during the project implementation, prepare and implement as necessary an environmental emergency program in consultation with relevant government agencies and ADB.

The supervisor company (SC) of works commissioned by MDF is responsible to establish strong field presence in the Project area and keep a close eye on the course of works. Along with ensuring consistency with the design and ensuring quality of works, the supervisor is mandated to track implementation of EMP by the contractor and reveal any deviations from the prescribed actions.

The SC had to include a national environmental specialist to assist the EA supervise and monitor implementation of the EMP during construction. However, in spite of numerous strict requirements from the MDF's and ADB's sides, it was not realized by Euroestudio yet[1]. The reason for this was the difficulty in finding of a qualified person, who could adjust all requirements for this position. Only by the end of December 2015 it became available to found proper candidate for the position (Sandro Abziandize), whose contract will be signed in January, 2016. In the view to above mentioned, should be noted that Euroestudios has recruited an international environmental expert – Paula Fernandez from June, 2015.

A Non-Compliance Notice has to be issued to the contractor if the SC requires action to be taken. The contractor is required to prepare a corrective action plan which is to be implemented by a date agreed with the SC. Non-compliance should be ranked according to the established criteria.

Construction Supervision Company is preparing quarterly progress reports which cover the implementation of the SSEMP, discrepancies from the SSEMP and list all HSE relevant incidents and accidents that occur during the implementation; Submits periodic reports based on the monitoring data and laboratory analysis;

Construction contractor is obligated to follow EMP and good construction practice. In order to meet this obligation, a contractor has established environmental management team and procedures. The Contractor has appointed a full time Environmental Manager (EM) – Natia Karkuzaeva which is a senior member of the construction management team based on site for the duration of the contract.

Key responsibilities of the Contractor are to prepare the Site-Specific Environmental Management Plan (SEMP) for approval by the Employer (EA) prior to the Contractors taking possession of the construction site; Ensure that the SSEMP is implemented effectively throughout the construction period; Carry out the monitoring and mitigation measures set forth in the IEE/EMP/SSEMP; Establish an operational system for managing environmental impacts; Allocate the budget required to ensure that such measures are carried out. Construction contractor is responsible to prepare monthly progress reports on SSEMP implementation,

[1] In January SC has hired Local Environmental Specialist –Sandro Abzianidze who has signed the Contract with Eouroestudio.

which should contain information on the main types of activities carried out during the reporting period, status of any clearances/permits/licenses which are required for carrying out such activities, mitigation measures applied, and any environmental issues that have emerged in relations with suppliers, local authorities, affected communities, etc.

The contractor submits reports of the carrying out of such measures to the employer; Coordinating community relations issues through acting as the Contractor's community relations focal point (proactive community consultation, complaints investigation and grievance resolution); Establishing and maintaining site records of:

- Weekly site inspections using check-lists based on SEMP;
- Environmental accidents/incidents including resolution activities;
- Environmental monitoring data;
- Non-compliance notifications issued by the SC;
- Corrective action plans issued to the SC in response to non-compliance notices;
- Community relations activities including maintaining complaints register;
- Monitoring reports;
- Routine reporting of SEMP compliance and community liaison activities;
- Adhoc reporting to the Employer's Engineer of environmental incidents/spillages including actions taken to resolve issues.

Anaklia coastal improvement project

The MDF is the project executing, implementing and disbursing agency. MDF has overall responsibility for the project management, planning and supervision, including Environmental Management. MDF is responsible for general implementation of all safeguards tasks and guarantee that potential adverse environmental impacts arising from the Projects are minimized by implementing mitigation measures presented in the environmental impact assessment ("EIA") or Initial Environmental Examination (IEE), as applicable.

Construction Contractor of the project is – Modern Business Group Ltd (Azerbaijan). Construction activities are supervised by the DOHWA Engineering Co., Ltd (Republic of South Korea). Construction Contractor company has one National Environmental Specialist on site (Zurab Revazishvili). Environmental issues at Supervision Company are handled by National Environmental Specialist - Revaz Gujabidze, who is mandated to track implementation of EMP by contractor, reveal any deviations from the prescribed actions, as well as identify any unexpected environmental issues, emerged at any stage of works.

Construction Supervision Company is responsible for supervision of all environmental issues during project implementation. Construction contractor is obliged to follow EMP and SSEMP good construction practice during construction activities. All environmental issues, arising from the construction activities are immediately brought to the attention of MDF's environmental safeguards team by the environmental specialists of construction and Supervision Companies' in order to coordinate efforts and ensure immediate mitigation of impacts, protect the environment and safeguard the health and welfare of the local communities. The construction contractor's Environmental specialist responsible for implementation of EMP/SSEMP, daily environmental monitoring and reporting.

Construction contractor is responsible to prepare monthly progress reports on SSEMP implementation, which should contain information on the main types of activities carried out during the reporting period, status of any clearances/permits/licenses which are required for carrying out such activities, mitigation

measures applied, and any environmental issues that have emerged in relations with suppliers, local authorities, affected communities, etc.

Construction Supervision Company is preparing quarterly progress reports which cover the implementation of the SSEMP, discrepancies from the SSEMP and list all HSE relevant incidents and accidents that occur during the implementation.

MDF ensures availability of all environmental information and facilitates environmental supervision of the projects. The MDF through its environmental specialist reports to the ADB every 6 months on the status of environmental compliance of construction works by EMRs.

2. PART II: ENVIRONMENTAL MONITORING

With reference to MFF Sustainable Urban Transport Investment Program – Tranche 1 (SUTIP T1) Environmental Assessment and Review Framework (EARF) is stated that an IEE/EMP will be a part of the overall project monitoring and supervision and will be implemented by the Contractor with oversight from the Supervision Consultant (the Engineer) and MDF.

IEE/EMP is an integral part of construction contracts. MDF requires the Construction and its Supervision Company to implement construction activities in accordance with the environmental management plan (EMP), which is the part of the initial environmental examination document (IEE).

Based on the IEE/EMP requirements, monitoring measures of projects includes construction site supervision, verification of permits, monitoring of compliance of the contractors' performance and specific monitoring of environmental impacts like noise, dust, soil contamination, landscape structure, construction waste, radiation, flora and fauna, water pollution, air emissions and etc. conducted by Contractor's and Engineer's environmental management specialists.

During reporting period the following environmental aspects where monitored and managed by construction and supervising companies within the projects.

Tbilisi Metro extension project

Air quality

Impact of the construction activities on air quality is minor and is easily manageable through application of good construction and vehicle/equipment maintenance practices.

It is not possible to eliminate the emission of dust from a construction sites entirely. Nevertheless, mitigation measures like water spraying inside and around the construction sites, usage of only such vehicles and equipment that are registered and have necessary permits, storage of construction materials far from residential areas reduce gaseous and dust emission during construction activities.

Contractor did visual control, monitored air-flows for explosive gases and specific atmosphere contaminants, Inspected mechanical ventilation system, Inspection moving and diesel machines & vehicles , filed and sent under submittal S 0033 submitted by technical service center stating that the machinery are in acceptable condition. CC also conducted measurements of noise and atmospheric air chemical parameters (PM, CO, NO_2 and SO_2) through specialized company "Eco Service" on 02.11.2015.

Measurement results are provided in Attachment 1. According to data received in December 2015 the obtained results did not exceed the National Environmental Standard (Maximum Permissible Level), therefore no additional mitigations are required.
During the inspections made by the consultant, no corrective actions were required.

Noise and Vibration

It is not possible to eliminate the emission of noise (noise produced by various equipment and activities) entirely from a construction sites, however mitigation measures like usage of vehicles and equipment that are registered and have necessary permits, no noisy construction activities during the nights, usage of silencers, mufflers and acoustic shields on equipment, limitation of the number of machines used one and the same time, implemented by the contractor, reduces noise levels to a moderate magnitude.

According to the project design scope, the use of a large tunnel boring machine is not considered because the underground structures, the excavation, the support and lining are almost fully completed and only some minor works need to be completed.

No vibration impacts were occurred on buildings from the demolition areas, because closest buildings are located more than 20 m away from the construction area and activities inside the tunnel were implemented in the depth of 20-50 meters. Thus, no vibration measurements were conducted during reporting period.

Vegetation and soil

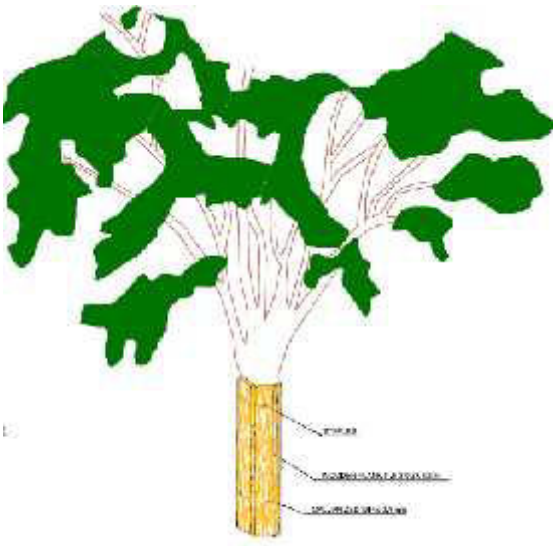
Regarding the top soil, the areas in which the contractor has to work, are already free of topsoil.

Based on permission given by the City Hahall, contractor cut one unit of plane tree located in Vazha Pshavela construction area nearby the flat N 103, at the same time based on City Hhall request Contractor sent letter to municipality requesting to identify area to allocate the tree but the reply is still pending from Municipality side.

In addition, contractor requested City Hall to give permission to cut 21 units of trees that are considered according contract, reply is under process. Representative of city hall visited site and advised to start process stage by stage based on construction activities in order to avoid mistake.

On 07.10.2015 contractor cut branches of three units of trees nearby flat N 98 located in Vazha Pshavela Ave. based on City hall permission.

Regarding the affected trees, it is recommended to mark with a spray the trees that are going to be cut, so that the rest of the trees could be properly protected. It is recommended to use physical protection method as are described in the figure below.



Fauna

Fauna values in the project area are very low. Some temporary disturbance to a range of common urban fauna species (mostly birds) will occur, but the impacts are unlikely to be significant.

According to the IEE, a wintering colony of the Greater Horseshoe Bat *(Rhinolophus ferrumequinum)* consisting of up to 500 individuals was found in the tunnel, from the University station side. This specie is no "Least Concern" and it is not included in the Red List of Georgia. So no specific measures are required to protect this species. Noise and human presence caused bats abandon from the tunnel and search to another habitat. During reporting period it hasn't been detected the presence of Bat colony in the tunnel.

Water quality

The principal source of construction impacts on ground and water is related to the groundwater. Contractor was required to prepare emergency response plan. Specific mitigation measures were implemented at the construction site to prevent the water pollution. It has been detected a smell to Sulphur in the tunnel. Laboratory Checking and sampling of underground water was done and the result was acceptable.

Groundwater analyses were carried out on 14 September 2015 by the licensed laboratory (Attachments 2.1;2.2;2.3.). According to data received in September 2015, the obtained results did not exceed the National Environmental Standard of Maximum Permissible Level during construction activities.

Social affections

The consultant can corroborate that the disturbances produced to the community facilities. The traffic is minimally affected by the transit of the heavy vehicles of the work.

Cultural heritage

No cultural affections have been detected.

Hazardous and Non-hazardous Waste and Spoils

Constructions works generate different type wastes starting from garbage, recycle waste, house hold waste and construction and demolition debris, including, small quantities of hazardous waste generated mainly from the vehicle maintenance activities (liquid fuels, lubricants, hydraulic oils, chemicals and etc).

The most significant solid waste from the project is the construction and demolition debris, followed by spoil from excavations, which is removed from site by an approved waste management contractor.

Non-hazardous waste, household and solid waste is disposed to official dump particularly Gldani dump area by contractor Cobra Assignia and its sub-contractor - Prime concrete, based on the contract signed by all parties (contractor, sub-contractor and solid waste company). According to the contact signed on 09.11.2015 Solid Waste Company of Georgia is serving contactor in two points (shaft 51 and shaft 50) twice a week;

Hazardous waste residuals such as oil, solvent, and materials used in oil spill cleanups and etc. are collected and stored on separate place with appropriate covered skips and will pass it to a licensed operator which will have the permit on operation of the hazardous waste. Contractor sent letter to city hall and will sign the

contract with LTD Sanitari (company having the environmental permit on hazardous waste operation)in January 2016.

Regarding asbestos waste, it will be disposed in Gldani dump area by authorized personal only in accordance with safety regulations specified in Company Waste Management Plan to be prepared by Construction Contractor. Contractor is in process of signing contract with relevant company mentioned above.

General clearance

Contractor made platform with basin for vehicle weal washing at the entrance of upper station from where the construction material and waste has to be disposed (see picture 1 below).

Picture 1: Vehicle washing area

It is highlighting that the area close to the offices of the contractor and consultant presents a lot of wastes that include abandoned cars and old pipes. It is required to remove it.

Until now, the separation of wastes consists of hazardous and non-hazardous materials. It is recommended to make a more selective separation among the non- hazardous materials.

Anaklia Coastal Improvement project

Monitoring measures for Anaklia Coastal Improvement project includes construction site supervision, verification of permits, monitoring of compliance of the contractor performance and specific monitoring of environmental impacts like noise, dust, sea water quality, soil contamination, sea biodiversity, landscape structure, construction waste, radiation, flora and fauna, water pollution and air emissions, etc conducted by Contractor's and Engineer's environmental management specialists.

As it was mentioned above, during the reporting period speed of construction works have been decreased significantly and activities implemented in a very slow pace. Because of decreasing the construction works pace, the posiblility of impact level on environment has felt to minimum.

There are no protected areas, wetlands, mangroves, or estuaries or archeological/cultural heritage within the project area. There are no land acquisition and resettlement issues involved. The nearest residential house is located in 300-400m distance from the working yard. In order to limit soil disturbance, the access to the site was limited to construction workers and the site was fenced.

No adverse environmental impacts related to the construction works were noted or observed within the reporting period. Laboratory tests for the sea water and atmosperic air quality were taken on 15.07.2015 by licensed laboratory. Measurement results are provided in Attachments 3.1 and 3.2. According to data received in July 2015 the obtained results did not exceed the National Environmental Standard (Maximum Permissible Level), therefore no additional mitigations are required.

Air Quality

Dust was controlled through watering the access roads where driving could easily generate dust. During reporting period no transportation of construction materials was carried out.

Sea Water quality

Marine works for excavation and placing stones for leveling bottom of the sea preparing for placing TTP, have been carried out with extreme care from point of view spills, water turbidity, labor safety, taking into consideration EMP and SEMP requirements and regulations.

During marine works - dredging, stone filling and placing TTP units - works were monitored for sea water turbidity level. During this works contractor environment specialist was visually controlling turbidity level, making test checks in every 4 hours. In case if the turbidity measured during marine works at a distance of 250 meters from the point of works exceeds the background turbidity by more than 250mg/l the Contractor will be instructed to take suitable measures to reduce the turbidity.

After starting installation of concrete TTP in the sea, tests of turbidity measuring are carried out according to above mentioned standards. No deviations from the standards have been identified during measuring.

Vehicles fueling place is located approximately 300 m far from sea shore, adequate lining of the ground by concrete and confinement of possible operation and emergency spills are provided.

Soil Contamination

Fuel was kept in the covered containers at the impermeable surface area. Taking into consideration the specific characteristics of coastal protection project, there is no soil contamination in the scope of project.

Noise

The plan of transportation routes and timing were agreed with local Municipality and patrol police since the project has started. Wheels and undercarriage of haul trucks were checked and fixed to maintain good vehicle condition not to make any noise and not to disturb residential people, even though there are no residential people within 1km range.

Drivers were informed to limit speed to 20-25 km/h to avoid use of horn in the town. Local population was informed about project works. The Contractor was working during night time to catch up schedule but according to supervisor’s instruction, materials were transported during the day time. According to the works schedule, not more than 5-6 trucks were working at the same time and the noise created from them were not exceeding the limitation.

Flora and Fauna

There are no trees, vegetation, bushes, plants, land and sea animals in the project area, as sandy coasts with

the hot sun, salty water and wind are not convenient environment for living organisms. Therefore there are few living organisms on the coast surface: crawfish and low plants in the coastline. Thus construction activities have no impact on flora and fauna.

Waste

At construction site produced waste was stored at special storing areas designated for hazardous, domestic and construction waste storage. The part of construction waste (inert materials) was used by contactor for secondary meanings. Regarding the hazardous waste, such as oil contaminated towels or oil contaminated soil, Contractor is accumulating them separately in special containers. Hazardous waste are removed from construction site by authorized personal only in accordance with safety regulations.

Construction Contractor has relevant contracts with licensed companies for proper management and final disposal of waste. For removal of hazardous waste, contract with Ltd "Sanitari" is signed. Household waste is handled by Zugdidi Municipality and construction waste is disposed by the "Georgian Solid Waste Management Company".

Sea Biodiversity

During marine works, loss of Bio ecology is expected (sea plants), but because of insignificant Influence no specific mitigation measures are required.

Landscape

Construction activities caused some impact on the landscape of the territory. A big amount of cast tetrapods (from Phase I and Phase II) are accumulated on surrounding areas, because they were not installed in the water timely, while the production of new TTPs for phase II is in process. However, this issue is agreed with local municipality and Contractor got the right to use additional surrounding areas for tetrapods placing.

Social Environment

There is no any adverse impact on social environment as the nearest residential house is far from 300-400 m. The intensity of traffic caused by the Contractor's transporting equipment is increased not much, around 3 trucks in every 2 hours; it means that, not air contamination or noise is caused. Only positive impact can be mentioned as the almost 90% of people employed by the Contractor Company are locals, and their living conditions have been improved.

Radiation background

Radiation background of the captured territory has not been changed by the construction activities.

Construction Safety

Construction activities are performed in accordance to the construction safety requirements and regulations. Workers are using personal protection equipment. The project area is fenced and warning signs are placed.

Ground water disposal

The places that could be the source of ground water contamination are fenced with ground and special material. Special filter is arranged around the concrete batching plant for accumulation of contaminated water.

3. PART III: ENVIRONMENTAL MANAGEMENT

3.1. The environmental management system, site-specific environmental management plan (SEMP) and work plans

Tbilisi Metro extension project

Following the award of the contract and prior to construction commencing the Contractor has reviewed the EMP and developed this into a detailed Site-Specific Environmental Management Plan (SSEMP) that amplifies the conditions established in the EMP that are specific for the project, the tasks involved and schedule of construction activities. The draft version of SSEMP was prepared by the Contractor and sent to Supervision Consultant (SC) for endorsement on 20.06.2015. SSEMP has been further reviewed and commented for improvement by the MDF's Local environmental Consultant and ADB RETA National Environmental Consultant. It was approved by PIU/MDF in September 2015. SSEMP document was sent to ADB as well on October, 23, 2015, according to ADB requirement (Aid Memoire' (8 - 18 September 2015), Chapter IV. Follow-Up Actions, paragraph (xiv)).

Table 1 below presents the information on statuses of management's plans.

Table 1: Status of Management Plans

Management Plans	Status	Date of Submission and/or deadline	Comments
1.SSEMP	Submitted, approved	June 8, 2015	
2. Spoil disposal management plan	Has not been submitted yet		Contractor is working on the document and It is expected that it will be submitted in January 2016.
3. Emergency Response Plan	Submitted, approved	11/12/2015	
4. Evacuation structure plan	Submitted, approved	11/12/2015	
5. Company Waste Management Plan (according to GEO legislation)	Is under the preparation		
6. SSEMP for wastes	Has been submitted, but not approved yet.	11/12/2015	Revision is ongoing according to provided comments.

Anaklia

IEEs, including EMPs, are integral parts of the contracts and their implementation is mandatory for contactors. Contractor Company, as it was mentioned above, submits monthly progress reports to supervisor Company Dohwa and MDF. Monthly report includes chapter on environmental performance. Consultant Company Dohwa prepares quarterly environmental report and submits to MDF on progress of the environmental management plan.

SSEMP for phase I has been prepared by Construction Company and approved by Consultant Company in June, 2014. SSEMP for phase I has been updated by the Consultant Company and updated document was presented to the MDF in June, 2015. MDF's environmental specialist reviewed updated SSEMP and has not approved it because no cumulative impacts were reflected in the document. Although, she required from Construction Company and Supervision Consultant additional explanations.

MDF's remarks were sent to environmental specialists of both – Consultant and Construction Companies with CC to the National Environmental Safeguards Consultant of RETA 8663 for the consideration. MDF required Consultant Company to present clarifications referring to SSEMP update. However, as the expediency of the Anaklia coastal protection project is still opened because of deep sea port project possible initiation and works are going at a very slow pace, updated SSEMP was not provided by the Contractor yet.

3.2. Site Inspection and audits

Site supervision and inspections, as well as monitoring of compliance of construction activities are important aspects to ensure the proper implementation of EMP/SSEMP requirements. Environmental management team of Construction and Supervisor Companies carry out permanent supervision activities and monitoring of the project performance in regular base. Time to time, MDF's environmental specialist - Local Consultant and National environmental Consultant of ADB (under RETA 8663), are performing site monitoring visits as well. Basically, in every two month ADB review missions are conducted also.

Tbilisi Metro extension project

Environmental Specialist of Construction Company is permanently on site and implementing daily inspections of construction activities in regular base. Inspection is carried out by Environmental Specialist in accordance to check-lists. Completed check-lists are available at camp site.

MDF's local environmental consultant was ensuring that the Contractors understand what is to be done and how to rectify and address any environmental issues raised during project implementation process.

The international environmental expert of SC has implemented site inspection and audit quarterly. Last site inspection was made on November 13- 14, 2015.

During site inspection, the international environmental expert visited the whole work area, and checked the following items:

- **levels of dust** - During the visit, the levels of dust weren't considered higher that without works, due to most of the activities were being done inside the tunnel;

- **Compliance of the maximum high speed limit of 30 km/h** - In the work area, the vehicles were respecting the high speed limit;
- **Presence of abnormal smells** (if there are; mark the type)-it was detected and smell to sulfur inside the tunnel. This data was transmitted to the contractor, that confirmed that water analysis were done in the area and the results weren't avoiding to keep on working;
- **Proper waste management and cleaning of the worksite**- In the area adjacent to the offices, it was notified that there were a lot of wastes of different cars, including abandoned cars. The contractor was notified to take the pertinent measures;
- **Affection to flora, fauna or historical heritage** - the only flora that was seen to be affected has been the trees that were inventoried in previous reports. The cut trees had the pertinent permit, while as some trees that are not going to be cut and are very close to the working area, were required to have a better protection for avoiding damages on it.

As it was mentioned above, the recruitment of the Local environmental expert by the SC is in process, waiting for a writing confirmation. The site inspections and audits made by the national environmental expert of SC will be described in the next report.

In October 2015 National Environmental Consultant of ADB under the RETA project has conducted site visit together with MDF's Local Environmental Specialist and checked whether the implementation processes and activities are corresponding the EMP/SSEMP requirements. Information on findings are provided below, in paragraph 3.4. MDF's Environmental Specialist performed 5 site monitoring visits within the reporting period.

Following the mobilization of the Contractor, an official ceremony to launch the works was organized on 28 July 2015 and attended by key government officials (Minister and First Deputy Minister of MRDI, Mayor of Tbilisi and ED of MDF).

A meeting was held with the Engineer and the Contractor. The ADB Mission reminded all parties of their role and contractual obligations including in terms of safeguards compliance. The Mission also discussed the recommendations formulated by the Metro Individual Consultant, who was in Tbilisi a week before the Mission arrived, and reminded MDF to follow-up and ensure that necessary actions are taken by all parties. In addition, the Mission reminded all parties that weekly progress meetings should be held between MDF, the Engineer, and the Contractor; and that minutes of meeting should be prepared by the Engineer for all meetings. In particular, the construction schedule should be updated regularly and discussed at each scheduled weekly meetings.

Anaklia Coastal improvement project

9 site visits were conducted by the environmental specialist of Supervisor Company during reporting period and 7 non-compliance notices have been issued by him. All non-compliances have been fixed by the contractor in required time.

Environmental Specialist of Construction Company is permanently on site and implementing daily inspections of construction activities on regular bases. Inspection is carried out by Environmental Specialists in accordance to check-lists. Filled check-lists are available at camp site.

MDF's Environmental team was ensuring that the Contractors understand what is to be done to rectify and address any environmental issues raised during project implementation process.

3.3. Non-compliance notices and corrective actions

Identification of problematic issues and non-compliance notice during site inspections is the responsibility of Environmental Specialists of Construction and Supervision Companies. During reporting period the number of site visits has been implemented by environmental specialists of Construction and Supervision Companies in order to check environmental compliance of construction works.

In case of any deviations of EMP/SSEMP requirements corrective actions and mitigation measures are applied. All mitigation measures during pre- and construction phases of SPs are implemented by construction contractors according to EMP/ SSEMP.

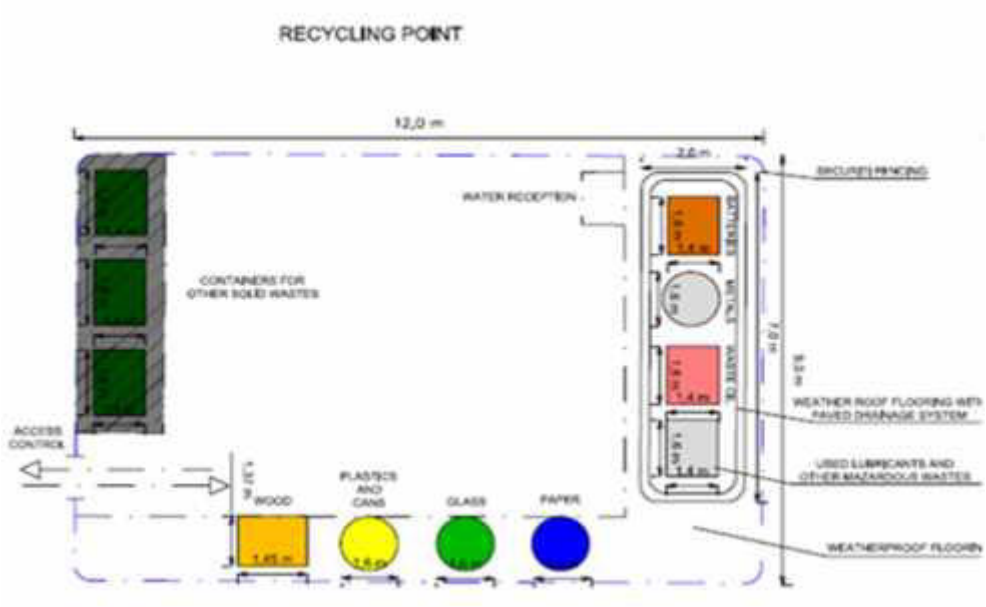
Non-compliances observed during the reporting period, corrective actions required and their current statuses are provided below.

Tbilisi Metro extension project

Since the beginning of the works, the non-compliance notices have been the following:

- Waste removal and treatment: the area close to the offices of the contractor and consultant presents a lot of wastes that include abandoned cars and old pipes. It was required to remove it.

According the information provided by the contractor and the data compiled in situ, there is just a separation in waste materials, that consist on construction waste and hazardous materials, nevertheless, according to EMP/SSEMP of the environmental Project, it is recommended to make a more careful separation, as it is represented in the drawing below:



- Regarding the affected trees, it is recommended to mark with a spray the trees that are going to be cut, so that the rest of the trees could be properly protected.
- It has been detected a smell to Sulphur in the tunnel that should be located. Waters close to this area where this smell has been detected should be analyzed.
- The point in which future samples of water to analyze, or noise data collection or other type of analysis should be located in a drawing.

The rest of the environmental measures taken have been considered adequate.

The methodology used for communicating it to the contractor has been emailing the person in charge from the contractor's part.

It has been a positive response from the contractor, attached below:

- Waste removal and treatment: comment noted;
- Noted we will mark and protect the rest of the trees that need to be cut;
- Please find attached letter to SC and MDF we are dealing the issue;
- Contractor took laboratory sampling and result was acceptable for construction;

As it has been mentioned in the point above, the response from the contractor environmental specialist was positive, and in less than 24 hours the email had been answered. The preparation and completion of the corrective actions will be checked and the time of its completion will be included in the next report.

Anaklia Coastal improvement project

Non-Compliance notices and corrective actions

Date of submission	Description of Non-Compliance	Area	Corrective action required including deadline	Performance Date of Corrective actions
09.09.2015	**PPE equipment -** One of the staff members did not have safety equipment and uniform on site	Working yard	Staff member should be equipped with safety equipment and uniform urgently.	**Corrected on 09.09.2015.**
24.09.2015	**Safety briefing** -Safety briefing has not been conducted on a daily basis.	Working yard	Safety briefing should be conducted next day	**Corrected on 25.09.2015.**
05.10.2015	**Warning signs -** Warning signs have been damaged because of bad weather	Working yard	Warning signs need to be repaired ASAP	**Corrected on 05.10.2015.**
19.10.2015	**Domestic waste –** The domestic waste has not been removed on time.	Working yard entry	The domestic waste should be removed on time.	**Corrected on 19.10.2015.**
14.11.2015	**Waste management** - Domestic waste container has been damaged.	Working yard	Domestic waste container has been damaged, and replaced by new one.	**Corrected on 14.11.2015.**
03.12.2015	**PPE equipment –** One of the staff members did not have safety equipment and uniform on site.	Working yard	Staff member should be equipped with safety equipment and uniform urgently.	**Corrected on 03.12.2015.**
14.12.2015	**Safety briefing** -Safety briefing has not been conducted in a daily basis.	Camp area	Safety briefing should be conducted next day	**Corrected on 15.12.2015.**

3.4. Actions taken to reflect the findings of ADB mission during reporting period

In October 2015 National Environmental Consultant of ADB under the RETA project has conducted site visit together with MDF's Local Environmental Specialist and checked whether the implementation processes and activities are corresponding the EMP/SSEMP requirements. Findings during reporting period are the following:

- **SC** (EUROESTUDIO S.L. (Spain)) hired International Environmental Expert in June 2015 who will be responsible for preparation of quarterly environmental reports. National Environmental Expert has not been hired yet, according to IEE - national environmental expert should be hired on permanent bases, but according to the SC contract duration of working activities of national environmental expert is 2 months in total. Mission advised the SC and PIU to recruit national environmental expert as soon as possible, issue of duration of working activities of national environmental expert during the whole project implementation period should be discussed and accordingly increased.

  Implementation status: From the beginning of the project MDF was requiring SC to hire the local environmental expert. This issue several times was raised by MDF's local environmental consultant as during ADB's missions as well as during the weekly meetings with the contractors. However, in spite of numerous strict requirements from the MDF's and ADB's sides, it was not realized by Euroestudio yet. The reason for this was the difficulty in finding of a qualified person, who could adjust all requirements for this position. Only by the end of December 2015 it became available to found proper candidate for the position, contract will be signed in January, 2016.

- **Construction Contractor** hired National Environmental and Health and Safety Expert (from June, 2015), who is permanently on the site and undertakes permanent monitoring using daily and weekly checklists. She has experience mostly in health and safety issues and need to be trained in ADB's Environmental Safeguards Requirement to be delivered by the NES in November 2015. CC has hired an International Environmental Expert who works one week per two months.

  SSEMP: The draft version of SSEMP was prepared by the Contractor and sent to Supervision Consultant (SC) for endorsement on 20.06.2015. SSEMP has been further reviewed and commented for improvement by the NES and approved by PIU/MDF in September 2015;
  Implementation status: SSEMP has been further reviewed and commented for improvement by the MDF's Local Environmental Consultant and ADB RETA National Environmental Consultant. It was approved by PIU/MDF in September 2015. SSEMP document was sent to ADB as well on October, 23, 2015, according to ADB requirement (Aid Memoire' (8 - 18 September 2015), Chapter IV. Follow-Up Actions, paragraph (xiv)).

- **Management Plans:** Currently the following plans are prepared and submitted to PIU/MDF: Emergency Response Plan; Health and Safety Management Plan and SSEMP. Draft Waste Management Plan covering issues of spoil disposal and asbestos management has been prepared in September, 2015 and submitted to SC and PIU-MDF for review and approval. Final improved

version will be due at the beginning of November 2015. The mission requested CC to prepare Waste Management Plan in Georgian (according to new Waste management Code of Georgia) for submission to MOENRP for approval.

- Implementation status: Waste management plan was prepared by the Contractor and submitted by the SC to the MDF in December 2015. Waste Management Plan was sent to RETA National Environmental Consultant. ADB's national environmental consultant provided comments and remarks, according to which document needs to be updated in accordance with new requirements of Georgian legislation. Comments were sent to the CC and SC. Updated Waste Management Plan will be provided by the end of January 2016;

  - **Monitoring (air, groundwater, and dust):** Air pollution is measured by CC via hired laboratory every month. Groundwater analyses made on 14 September 2015 by the licensed laboratory. According to data received in September 2015, the obtained results did not exceed the National Environmental Standard of Maximum Permissible Level during construction activities. Taking into account that apartment buildings are located near the construction site the Mission advised CC to measure vibration during construction works as well. MDF requested CC to prepare ***Monitoring Plan*** indicating all parameters to be measured (air, water, vibration, noise, etc) and submit within two weeks to SC and MDF for approval (due at the end of October 2015).

    Implementation status: According to the project design scope, the use of a large tunnel boring machine is not considered because the underground structures, the excavation, the support and lining are almost fully completed and only some minor works need to be completed. No vibration impacts were occurred on buildings from the demolition areas, because closest buildings are located more than 20 m away from the construction area and activities inside the tunnel were implemented in the depth of 20-50 meters. Thus, no vibration measurements were conducted during reporting period. Regarding the preparation of Monitoring Plan indicating all parameters which needs to be measured, is in process and will be submitted as soon as local environmental expert will be hired by the SC.

3.5. Consultation and Complaints

Grievance Redress Mechanism

During the projects implementation several issues, related to the environmental and socials safeguards and disputes on entitlement processes', might be occur due to the Projects activities. For example, intensive schedule of construction activities, inappropriate timing of construction vehicle flow, waste, noise and air pollution from construction activities, ecological disturbances, cultural conflicts between migrant workers, are some of the environmental and social safeguard issues that are likely to be raised from the Project activities.

In order to provide a direct channel to the affected persons for approaching project authorities and have their grievance recorded and redressed in an appropriate time frame, Grievance Redress Mechanism was established with efforts of MDF within the projects.

Complaints' registration journal is created and available at construction sites. The copy of journal with mobile numbers of relevant persons is placed at local Municipality as well. Complaints' from the people, regarding the environmental safeguard issues in case of their disturbance and inconvenience, because of improper or inadequate implementation of EMP, can be accepted in both places. Complaints' will be registered in database system, assigning compliant number with date of receipt. Complaints' will be investigated and complainant will be informed about time frame in which the corrective action will be undertaken, in case if the raised problem is realistic.

MDF, as EA, facilitates the grievance resolution by implementing a project-specific Grievance Redress Process (GRP). It will deliver grievances to relevant authorities, in case if such grievances are sent to MDF. The official administrative bodies are obliged to respond to the grievances that have been received from population or other interested parties in accordance with the requirements of the Administrative Code of Georgia.

According to the existing legal and administrative system in Georgia, there are several entities responsible for addressing environmental complaints of population and interested parties. The administrative bodies directly responsible for environmental protection within the projects area are: MoE, municipal offices (gamgeoba) and Tbilisi City Hall. The affected population and stakeholders may send their grievances, related to the project-induced environmental impacts directly to the mentioned administrative bodies responsible for environmental protection.

None of complaints have been raised and registered during reporting period within the projects.

4. PART IV – ACTION PLAN FOR THE NEXT PERIOD

The monitoring of Environmental performance is being carried out by Contractor's and Supervising Company's environmental specialists systematically. During the next reporting period contractors will carry out new necessary tests. Also new monthly and quarterly reports will be prepared and submitted to the MDF. Eurostudio will sign the contract with local environmental specialist in January 2016. Those management plans which need to be prepared will be prepared and submitted by February (latest date), documents needed updating will be updated nearest future (not later than February).

Annexes

Annex 1: Monitoring Data

Tbilisi Metro Extension project

Object of monitoring	Control/Sampling Point	Technique	Frequency/time	Target	Entity responsible for Monitorin
Air pollution inside the tunnel/ underground shafts	- Metro extension tunnel - University station shaft - New tunnel section for -cross over and parking of tracks.	- Visual control - Atmospheric air test (all set general parameters) - Monitoring air-flows for explosive gases and specific atmosphere contaminants -Inspection mechanical ventilation system - Inspection moving and diesel machines & vehicles	- Daily - Baseline and weekly sampling/test - Monthly sampling and testing (specific parameters); - Technical check-up of HVAC equipment - During the transportation operations - During installation and commissioning services for all plants operations	-Ensuring compliance with the established quality norms of ambient air quality; - Minimizing the impact on health for workers operating inside tunnel, stations/shafts - Ensuring the personnel's safety (visitors, machine operators, etc.)	JV "COBRA" and "ASSIGNIA"

		- Technical check-up of permanent plants installed (facilities)	- During installation and commissioning services for all plants		
Air pollution outside the tunnel/ underground shafts	- Delisi Station - University Station - Open sites around new tunnel section for cross over and parking tracks (nearest receptor = Residential houses).	- Visual control - Atmospheric air test (baseline and quarterly basis of general parameters) - Inspection moving and diesel machines/vehicles - Checking for water spraying inside and around (access road) the construction sites (especially at dry season)	- Daily - Baseline and weekly sampling/test - Daily - Daily - Daily - Daily - Daily	- Ensuring compliance with the established quality norms of ambient air quality; - Minimizing the impact on health for residents, commuters and students living around project sites	JV “COBRA” and “ASSIGNIA”

		- Checking for materials transported to site to be covered/ wetted down to reduce dust - Verification of register and permits for all vehicles and plant equipment - Verification on burning sites for wastes generated at the construction sites		- Ensuring the health and safety of personnel operating outside the sites	
Fire prevention	- Metro extension tunnel - University station shaft - New tunnel section for cross over and parking tracks. - Open sites around above sites. - The nearest receptor (residential houses) - Metro extension tunnel - University station shaft	- Visual control - Measuring atmospheric conditions - Firefighting training and procedures incl. emergencies - Technical check-up of firefighting devices - Checking for restriction signals for smoking in all working areas - Checking brake drag	- Daily - Monthly - During pre-construction - Daily (weekly) - Daily (sanctions against smokers at work place to be taken immediately) - Weekly - Weekly - Weekly	-Ensuring compliance with the established quality norms for fire prevention; - Ensuring the health and safety of all personnel and residents in case of fire	JV “COBRA” and “ASSIGNIA”

Surface and underground fueling	- New tunnel section For cross over and parking tracks. - Open sites around above sites	and brake temperature indicators (all machines & moving vehicles) - Checking engine fire walls on loaders - Checking quality of insulating of high current electrical systems (inside tunnel/shafts -Visual control of all fuel storage areas - Developing fuel procedures incl. if necessary fuel underground storage - Designating fueling bays - Technical check-up of fire extinguishers near bays	- Daily - During pre-construction - During pre-construction - Weekly	-Ensuring compliance with the established quality norms for fire prevention; - Ensuring the health and safety of all personnel involved with refueling of plants and vehicles using inside or outside the station shafts and tunnel	JV “COBRA” and “ASSIGNIA”

Erection of plants / installation services inside the stations and tunnels	- Delisi Station - University Station - Open sites around new tunnel section for cross over and parking tracks (nearest receptor residential houses	- Visual control and daily inspection of the works - Inspection of plants in factory and at arrival to site(e.g. plant with automatic cut-off in flammable atmospheres) - Checking if plants at commissioning at operating in safe working environment - Checking of plant levels of emissions e.g. exhaust, noise, vibration and heat (at commissioning) - Verification that plants complies with electrical standards/regulations	- Daily - Factory inspection and inspection at arrival - Commissioning test - Commissioning test - Commissioning test - Commissioning test	Ensuring compliance with standards and regulations of plant operations upon commissioning (electrical compliance, exhaust, noise, vibration, etc.) - Ensuring safety during installation and after commissioning, ensuring all plants operate in safety mode and prevent any incident leading to environmental problems (e.g. oil spell, fire, etc.)	JV “COBRA” and “ASSIGNIA”
Vibration and noise	Metro extension tunnel - University station shaft - New tunnel section for cross over and parking tracks. - Open sites around above sites - The nearest receptor (residential houses	- Noise level measurement at all designated sites - Visual control and inspection of the works (all sites) - Inspection of vibration emission data of tools in use - Inspection of moving machines and vehicles (silencing engines) - Inspection of plants in factory and at arrival to site (e.g. noise insulation of plants)Checking of plant levels of emissions for noise /vibration at commissioning	Monthly - Regular control (particularly during much “noisy” operations) - Inspection at arrival of tools and machineries - Daily - Factory inspection and inspection at arrival - At commissioning of plants - Daily (sanctions against staff not using hearing protection	- Ensuring compliance with health and safety norms - Minimizing the population disturbance; - Ensuring comfortable working conditions for the workforce operating inside underground tunnel and shafts	JV “COBRA” and “ASSIGNIA”

		test) - Checking all workers operating in tunnel/shafts are using hearing protection			
Soil, Flora/fauna, soil/water pollution and construction waste management	- University station construction site - New tunnel section parking tracks site - The nearest receptor (residential houses)	Monitoring of tree cutting and site clearance/top soil - Atmospheric air test for parameters related to biodiversity protection, to verify level of dusts and emissions near parks - Soil and sediment sampling and test Check dewatering system in use (shit piling etc.) - Check hazardous waste storage locations - Checking cleaning of construction area	- During the stripping and storage of the topsoil and during tree cutting' - Baseline and quarterly basis for atmospheric air test - As required, in case of soil and sediment contamination - During dewatering operations - Weekly - Daily	Ensure biodiversity protection at all time - Ensure no surplus/waste soil is accumulated at the site - Avoid soil contamination - Ensure storage of waste including hazardous waste at chosen premises complies with law and good practice; - No storage of fuel, oil or toxic materials at construction sites especially underground	JV "COBRA" and "ASSIGNIA"

Building stability Impacts caused by excavation. Damage to community facilities; Traffic congestion, Protection of cultural heritage; Historical and archeological chance finds during excavation	- Metro extension tunnel - University station shaft - New tunnel section for cross over and parking tracks. -Open sites around above sites. -The nearest receptor (residential houses)	-Monitoring of settlements and damages (geotechnical and structural damage assessment of buildings or project facilities) - Inspection of all buildings around construction sites - Inspection of access roads - Inspection of utilities along access roads and near construction sites - Inspection of eventual damages caused to utilities and estimate of costs and scope for repair works - Check signs are install to control traffic to avoid traffic congestion at streets or near sites affected by the works - Check adequate lightening is provided at all sites and at road diversions - Updating traffic management plan as works progresses - Verify protocol for conducting excavation work, to ensure that any chance finds are recognized and measures are taken to ensure they are protected and conserved. This should	- Weekly - Weekly - Daily - Weekly - Visual inspection upon damages - Daily - Daily - As required -During pre-construction	- Ensure biodiversity protection at all time - Avoid damages to public and private existing buildings and properties - Avoid settlement and damages to new project buildings - Avoid damages to public utilities in access roads or near project facilities - Smooth traffic operations long public roads and access roads to sites	JV “COBRA” and “ASSIGNIA”

Anaklia coastal improvement project

Object of Monitoring	Control/Sampling Point	Technique	Frequency/Time	Target	Entity responsible for Monitoring
1	2	3	4	5	6
Atmospheric air	Business yard, Construction sites	• Visual control • Technical check-up of machinery • Laboratory Checks every tree month.	The monitoring of the Atmospheric Air quality is been carried out by contractor environmental specialist on every day basis and by supervising environmental specialist. During the transportation operations, in dry weather on a periodic basis, technical check-up of machinery before works, during the installation of underwater breakwater. Laboratory test are taken in every three month. Tests were taken on 15.07.2015. During this period no problems has been detected.	• Ensuring compliance with the established quality norms of ambient air quality; • Minimizing the impact on the population health; • Ensuring the personnel's safety.	Construction Contractor
Noise	Business yard Construction sites The nearest receptor (residential houses)	• Control;	Monitoring of the construction process noise level has been carried out by contractor environmental specialist on daily bases and by supervising environmental specialist. Regular control(particularly during with noisy operations);	• Ensuring compliance with health and safety norms; • Minimizing the population disturbance; • Ensuring comfortable working conditions for the workforce.	Construction Contractor

		• Measuring; • Technical check-up of machinery.	Measuring (In case of grievance); Technical check-up of machinery before works. The nearest receptor (residential houses) is approximately 400-500m away from construction site, drivers are maintaining the safe speed limits 30 km/h on main roads and 10 km/h on construction site, there for no noise complains has been detected. During this period no grievance or problems have been detected.		
Soil	Construction camp - Material and waste storage areas;Construction sites	• Visual control • Supervision over the waste management; • laboratory control over the soil quality; • Technical check-up of machinery.	Monitoring of the construction process soil mitigation level has been carried out by contractor environmental specialist on daily basis and by supervising environmental specialist. Laboratory control – as necessary (in case of oil spills). Material and waste storage areas are indicated and isolated. During this period no problems has been detected. Regular check-up; Inspection after completion of works;	• Preserving the soil stability and quality; • Minimizing the impact on other receptors depending on the soil quality (vegetation cover, holiday-makers, etc.).	Construction Contractor
Increased seawater turbidity	Sites in the sea where the sand removed during the seabed treatment and from the seabed is to be placed.	• Visual control;	Monitoring of the Increased seawater turbidity level is been carried out by contractor environmental specialist on daily basis and by supervising environmental specialist. Permanent visual control;	• Maintaining ichthyofauna and microphytes.	Construction Contractor

		• Turbidity analysis	Identifying the degree of turbidity through analysis (in every 4 hrs. During the work). Upon intensive commencement of works in the sea, water testing has been conducted together with turbidity control, which should be constantly ongoing.		
Underground water	Construction camp - Material and waste storage areas;Construction sites Gas station	• Visual controlof soil quality; • Laboratory controlof soil quality (in case of spills); • Technical check-up of machinery.	Monitoring of the underground water mitigation level has been carried out by contractor environmental specialist on daily bases basis and by supervising environmental specialist.Regular check-up; Laboratory control as necessary (in case of oil spills). Material and waste storage, Gas station areas are indicated and isolated. During this period no problems or oil spills has been detected	• Guaranteed protection of the underground water quality	Construction Contractor
Surface water: the Black Sea, the rivers Kitori and Enguri	Construction ground Business yard	• Visual control; • Supervision over the waste management and sanitary conditions. • Surface water laboratory control.	Monitoring of the Surface water mitigation level is been carried out by contractor environmental specialist on every day basis and by supervising environmental specialist Regular check-up and inspection; Laboratory control – as necessary (in case of oil spills). Sea water Laboratory test are taken in every three month. Tests were taken on 15.07.2015 (See attachments 3).	• Protecting the water quality in the river; • Reducing the impact on the receptors (water biodiversity, etc.) depending on the river water quality.	Construction Contractor

			During this period no problems has been detected		
Negative visual impact	Construction camp - Material and wastestorage areas;Construction sites	• Visual control; Supervision over the waste management and sanitary conditions.	Monitoring of the negative visual impact has been carried out by contractor environmental specialist on every day basis and by supervising environmental specialist Regular check-up and inspection; After completion of works. During this period no problems has been detected	• No dissatisfied population; • No dissatisfied pedestrians.	Construction Contractor
Waste	Business yard and/or adjacent area;	• Visual control of the area;] • Control over the waste management.	Monitoring of waste management issues is been carried out by contractor environmental specialist on daily bases and by supervising environmental specialist. Regular check-up and inspection; After completion of works. Construction waste is accumulated on construction site in special isolated areas divided by hazardous, domestic and construction waste. Construction company has signed contract with the companies for waste removal. Waste has been removed from construction site buy authorized personal only in accordance of safety regulations. The waste is removed from construction site by authorized personal only in accordance of	• Protection of soil and water quality; • Reduce the risk of negative visual impact; • No dissatisfied population.	Construction Contractor

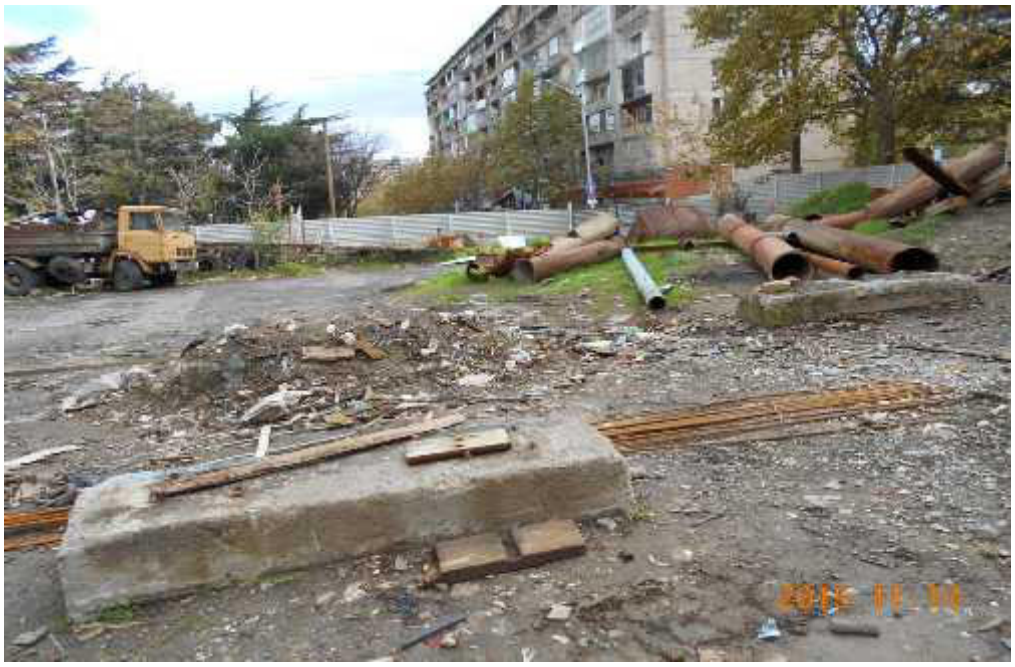
			safety regulations.		
Labor safety	Working ground	• Inspection; • Availability of personal protection equipment and periodic control over their good maintenance; • Control over the meeting the requirements for labor safety.	Monitoring of the labor safety issues has been carried out by contractor environmental specialist on daily based and by supervising environmental specialist. Before the works;Periodic control during the works.Some of the labors don't have PPE equipment problem detected by supervising environment specialist and corrected	• Ensuring compliance with health and safety norms; • Avoiding/minimizing traumatism.	Construction Contractor

Annex 2: Photos

Anaklia Coastal improvement project

Tbilisi Metro Extension Project

Photograph 1. Area close to the offices that must be cleaned. Details of abandoned vehicles



Photograph 2. Area close to the offices that must be cleaned, details of old pipes

Photograph 3. Cut tree (the permits to do it were processed)

Photograph 4: Area inside the tunnels with zones of water accumulation

hotograph 5: area behind one of the air conduct. There is accumulation of wastes that must be removed.

Photograph 6: Details of the area mentioned in the photograph 5.

Photograph 7. Three that is going to be affected by the works and shall be cut later on

Photograph 8: thress that must be properly protected for not being affected by the execution of the works

Photograph 9: Area inside the tunnels with rubbish accumulation that must be removed

Annex 3: Implementation report on the environmental impact assessment (EIA)/initial environmental examination (IEE)/Site Specific Environmental Management Plan (SEMP) mitigation requirements

Anaklia Coastal improvement Project

Reference	Requirement	Action to date	Action required/comment
Sea water pollution	The construction activities must be accomplished only in dry weather to avoid the pollution of the water currents; The construction activities must be accomplished by observing relevant safety measures; the materials and waste must not be in uncontrolled way over the site, etc. Locating the construction machinery and other equipment at a distance of at least 50 m from surface water bodies (where possible. If this seems impossible, taking permanent control and safety measures to avoid water pollution); Prohibition of washing of vehicles and other machinery near surface water bodies - The vehicles and equipment are recommended to wash by using commercial washing services;	All works has been accomplished only in dry weather working conditions. All construction materials and machinery has been located 50 M away from surface of the water. All equipment and machinery has been maintained in good working conditions. The construction waste has been accumulated in special designated areas away from the water bodies and removed buy authorized personal only. On site environment specialists are maintaining visual monitoring for oils spills and equipment conditions, no accidents has been detected.	Monitoring of the Surface water mitigation level is been carried out by contractor environmental specialist on every day basis and by supervising environmental specialist Regular check-up and inspection; Laboratory control – as necessary (in case of oil spills). During reporting period no problems has been detected

	Limiting fueling and/or maintaining the vehicles/equipment to the specially designated places only; The equipment and vehicles should be maintained in good working order to avoid the risk of spills of fuel/lubricants; Expedient materials and waste management; The waste generated during the works will be collected and temporarily stored at the specially designated places, distanced from the water bodies; In case of fuel/oil spills, locating and spilt material and cleaning the polluted area immediately to avoid long soil pollution; Installing drainage systems around the areas with the potential pollutants of surface flows (e.g. along the perimeter of groudn or construction materials storage areas); Instructing the personnel on the environmental and safety issues.	Working Personal is being instructed on environment and safety issues rules and regulations.	
Pollution of underground waters	Control for the Pollution of underground waters must be maintained in the areas like: Construction camp - Material and waste storage areas;Construction	All works has been accomplished only in dry weather working conditions.	Monitoring of the Surface water mitigation level is been carried out by contractor environmental specialist on every day basis and by supervising environmental specialist

	sites,Gas station. Taking all measures to avoid the deterioration of the seawater quality.	All construction materials and machinery has been located 50 M away from surface of the water. All equipment and machinery has been maintained in good working conditions. The construction waste has been accumulated in special areas away from the water bodies and removed buy authorized personal only. On site environment specialists are maintaining visual monitoring for oils spills and equipment conditions, no accidents has been detected. Personal is being instructed on environment and safety issues rules and regulations.	Regular check-up and inspection; Laboratory control – as necessary (in case of oil spills). During this period noproblems has been detected
Noise	The equipment and vehicles should be maintained in good working order; Driving the vehicles at optimal speeds; Instructing the personnel (particularly, the drivers of vehicles and techniques); Registering and responding to grievances (if any); Driving the vehicles along optimal routes and at optimal speeds;	On site Environmental specialists are conducting visual control (on regular basis) of soil quality, laboratory controlof soil quality (in case of spills) no oil spills has been detected, technical check-up of machinery.	Regular monitoring has been carried out to provide guaranteed protection of the underground water quality.

	Switching off the vehicle drives or running at minimal speed when the vehicles are not used; Carry out noisy operations during day time; Reaching preliminary agreement with the population living near the road about particularly noisy works.		
Dust	Watering of the non-asphalted ground or bare ground surfaces once in four hours on working days and in dry or windy weather; Observing the rules for storing the fill construction material to avoid their dusting in windy weather; Covering the lorries with tarpaulin when transporting loose materials, when there is probability of dusting; Taking necessary precautions (e.g. avoiding throwing the materials from heights when unloading them) to avoid excess dust emission during the earthworks and loading and unloading the materials; Driving the vehicles at optimal speeds; Washing the vehicle tires (recommended to use commercial services for this purpose);	All vehicles are maintained in good working conditions. Drivers are instructed to follow the limitations of driving speed (On construction site 10 km/h, 30 km/h on main roads). All noisy operations have been carried out during day time. No grievance has been detected concerning noisy works.	Monitoring of the construction process noise level has been carried out by contractor environmental specialist on every day basis and by supervising environmental specialist. Regular control(particularly during much “noisy” operations); Measuring (In case of grievance); During this period no grievance or problems has been detected. Technical check-up of machinery before works. The nearest receptor (residential houses) is approximately 400-500 m away from construction site, drivers are maintaining the safe speed limits 30 km/h on main roads and 10 km/h on construction site, there for no noise complains has been detected.

	Instructing the personnel (particularly, the drivers of vehicles and techniques); Registering and responding to grievances (if any); Driving the vehicles along optimal routes and at optimal speeds; Switching off the vehicle drives or running at minimal speed when the vehicles are not used.		
Waste	Visual control of the area; Control over the waste management. Protecting soil and water quality; Reducing the risk of negative visual impact; No dissatisfied population.	Monitoring of waste management issuesis being carried out by contractor environmental specialist on every day basis and by supervising environmental specialist. Regular check-up and inspection; Construction waste is accumulated on construction site in special isolated areas divided by hazardous, domestic and construction waste. Construction company has signed contract with the companies for waste removal. The waste is being removed from construction site buy authorized personal only in accordance of safety regulations.	On16.01.2015 and on 16.03.2015 the domestic waste has not been removed on time. Corrected on 17.01.2015. Corrected on 17.03.2015.
Vibration	The equipment and vehicles should	Watering of the roads has been	Monitoring of the construction process

	be maintained in good working order; Driving the vehicles at optimal speeds, particularly in the settled areas; Instructing the personnel (particularly, the drivers of vehicles and techniques); Registering and responding to grievances (if any); Driving the vehicles along optimal routes and at optimal speeds; Switching off the vehicle drives or running at minimal speed when the vehicles are not used; Carry out noisy operations during day time;	carried out by the contractor on every day basis. All lorries have been covered buy tarpaulin to avoid dusting. Drivers are instructed to follow the limitations of driving speed (On construction site 10 km/h, 30 km/h on main roads). No grievance has been detected.	soil mitigation level (including dusting problems) is been carried out by contractor environmental specialist on every day basis and by supervising environmental specialist. Regular check-up; Inspection after completion of works; Laboratory control – as necessary (in case of oil spills). Material and waste storage areas are indicated and isolated. During this period no problems has been detected.
Air Pollution of emissions	The equipment and vehicles should be maintained in good working order; Driving the vehicles along optimal routes and at optimal speeds; Switching off the vehicle drives or running at minimal speed when the vehicles are not used. Instructing the personnel before the start-up of the works.	All vehicles are maintained in good working conditions. Drivers are instructed to follow the limitations of driving speed (On construction site 10 km/h, 30 km/h on main roads). All noisy operations have been carried out during day time. No grievance has been detected concerning vibration.	Monitoring of the construction process noise level is been carried out by contractor environmental specialist on every day basis and by supervising environmental specialist. Regular control(particularly during much “noisy” operations); Measuring (In case of grievance); During this period no grievance or problems has been detected.

			Technical check-up of machinery before works. The nearest receptor (residential houses) is approximately 400-500 m away from construction site, drivers are maintaining the safe speed limits 30 kph on main roads and 10 km/h on construction site, there for no noise complains has been detected.
Disturbance of the seawater during installation of tetrapods	During the works to level the seabed, permanent seawater analyses are needed to identify the degree of the water turbidity; If the degree of the water turbidity is in excess of the admissible limit (25 gr/l), the works must be stopped and relevant corrective measures must be taken.	Monitoring of the Increased seawater turbidity level is been carried out by contractor environmental specialist on every day basis and by supervising environmental specialist. Permanent visual control; Identifying the degree of turbidity through analysis (in every 4 hrs. During the work). Upon intensive commencement of works in the sea, water testing has been conducted together with turbidity control, no problems has been detected.	During installation of TTP units environmental specialists are conducting visual control, taking turbidity analysis. No increased seawater turbidity has been detected.

Labor safety	Site -Inspections; Availability of personal protection equipment and periodic control over their good maintenance; Control over the meeting the requirements for labor safety. Ensuring compliance with health and safety norms; Avoiding/minimizing traumatism.	Monitoring of the labor safety issuesis being carried out by contractor's environmental specialist on every day basis and by supervising environmental specialist. Before the works; Periodic control during the works. Some of the labors don't have PPE equipment.	On 11.02.2015 and on 11.03.2015 one of the staff members did not have safety equipment and uniform on site. Corrected on 11.02.2015. Corrected on 11.03.0215.

Tbilisi metro extension project

Reference	Requirement	Action to date	Action required/comment
Air quality impacts due to gaseous and dust emissions	a) Use only vehicles and equipment that are registered and have necessary permits. b) Burning of wastes generated at the construction sites, work camps and other project-related activities shall be strictly prohibited. c)Construction equipment and vehicles shall be well-maintained so that their noise and emissions do not cause nuisance to workers or local people. d) All vehicles will be checked and repaired in case of need to eliminate increased emission due to damaged parts. e) Protective equipment will be provided to workers as necessary. f) Keep stockpiles moist and cover vehicles with tarpaulin sheets or other suitable materials to minimize dust emission and prevent spillage of materials (e.g., soil, cement, stone, sand, aggregates, etc.). g) Provide temporary covers (e.g., tarpaulins, grass, etc.) on long term materials stockpiles.	Done	Monthly progress report n 3

	h) Provide truck-washing facilities to prevent truck-out of mud and dust onto city streets. i) All construction equipment and machinery shall be fitted with emission control equipment in full compliance with the national regulations. j) Ensure water spreading to suppress dust particularly during dry and windy weather. k) Impose speed limits on construction vehicles to minimize road dust.		
Noise and vibration impacts due to operation of construction equipment/ vehicles and various construction activities	To control noise impacts the following mitigation actions are recommended: a) Truck drivers and equipment operators shall minimize the use of horns. b) Position any stationary equipment that produce high noise levels as far as is practical from sensitive receptors; c) All construction equipment and vehicles shall be well maintained, regularly inspected for noise emissions, and shall be fitted with appropriate noise suppression equipment consistent with applicable national and local regulations. d) Use only vehicles and equipment that are registered and have necessary permits. e) No noisy construction-related activities will be carried out during the	Done	Contractor will take 7 points until the end of the project as per BoQ

	night. f) Impose speed limits on construction vehicles to minimize noise emission		
Spoils generation from excavation works (5.247,99 m3) at underground station sites	Contractor will submit a spoil disposal plan (as a part of the SEMP) to the MDF and MoEP for approval. The spoil plan should show the location of proposed sites (landfill or borrow pits) to be used and the measures to be taken to rehabilitate these pits upon finalization of the Project. The capacity of disposal sites shall be adequate to accept the quantity of spoils without alienating areas outside the site boundaries. Trucks transporting spoils shall be tightly covered with tarpaulin or other suitable materials to minimize dust emission and spills.	Done	Spoil disposal plan will be submitted in the next days
Generation of solid wastes (construction waste and domestic waste), including 4,250.00 m3 of different types of materials will be generated as a	Regarding the generation of solid waste, the waste procedures included in SEMP prepared by the contractor should contain, at least, the following mitigation actions: a) Provide garbage bins and facilities within the project site for temporary storage of construction waste and domestic solid waste. b) Separate solid waste into hazardous, non-hazardous and reusable waste streams and store temporarily on site in secure facilities with weatherproof flooring, security fencing and access control and drainage/wastewater collection systems.	Done	Contractor submitted Waste Management Plan. Submittal N S 044

result of the demolition activities	c) Ensure that wastes are not haphazardly dumped within the project site and adjacent areas d) Undertake regular collection and disposal of wastes to sites approved by local authorities or contract municipal waste operators for disposing household waste, garbage and small amounts of nonhazardous construction waste etc..		
Generation of hazardous waste	Constructing Contractor shall collect all hazardous waste residuals, such as oil, solvent, material used in oil spill cleanups… and store them within appropriate covered skips, and pass it to a licensed operator, having environmental permit on operation of the hazardous wastes. Regarding the generation of hazardous waste, the waste management procedures included in SEMP prepared by the Contractor should contain, at least, the following mitigation actions: a) Store fuel and hazardous substances in paved areas. If spills or leaks do occur, undertake immediate clean up. b) Ensure availability of spill clean-up materials (e.g., absorbent pads, etc.) specifically designed for petroleum products and other hazardous substances where such materials are being stored. c) Train relevant construction personnel in handling of fuels and spill control procedures.	Done	

	d) Ensure all storage containers are in good condition with proper labeling. e) Regularly check containers for leakage and undertake necessary repair or replacement f) Store waste oil, used lubricant and other hazardous wastes in tightly sealed containers to avoid contamination of soil and water resources. g) Transport and off-site disposal of such wastes shall be consistent with national and local regulations		
Topsoil losses due to improper storage and handling	Top soil protection: The storage of topsoil in stockpiles, no more than 2 m high with side slopes at a maximum angle of 45º. Dedicate storage locations that prevent the stockpiles being compacted by vehicle movements or contaminated by other materials. Top soil collection: 100 m3 x 3.98 €/m3 = 398 € Reinstatement of Topsoil Topsoil removed from University station will be used for reinstatement of the topsoil in adjacent zones affected by the project activities or other zones designed by the municipality. Top soil replacement: 100 m3 x 1.40 €/m3 = 140 €	Done	There is no need to take these measures, because the top soil had been taken in previous work stages.

Trees that are directly (need to be cut) or indirectly (need to be protected) affected by the project	As a result of construction activities, 21 trees along the project area will be destroyed and 46 will need protection. Compensatory planting of the species should be facilitated with a proportion bigger than 1:3, so that 63 trees will be planted. - Removal of trees: 3.751,80 GEL - Ripping and scarifying: 218,50 GEL - Hidroseeding: 851,00 GEL - Tree planting, including stakes: 4.444,09 GEL - Protection of trees: 741,24 GEL	Done	The trees that are not going to be cutted should be protected
Traffic congestion and access problems	To avoid traffic congestion and access problems the following mitigation actions are recommended: a) Provide signs advising road users that construction is in progress b) Employ flag persons to control traffic at the station sites for safety reasons when construction equipment is entering or leaving the work area. c) Provide sufficient lighting at night within and in the vicinity of construction sites. d) As much as possible, schedule delivery of construction materials and	Done	

	equipment as well as transport of spoils during non-peak hours. e) Avoid movements of noisy vehicles during night time in vicinity of sensitive receivers. f) Implement suitable safety measures to minimize risk of adverse interactions between construction works and traffic flows through provision of temporary signals or flag controls, adequate lighting, fencing, signage and road diversions.		
Hazards to health and safety of workers and the public due to construction works	Training in special skills, environment, emergency and safety regulation will be provided for workers before hiring, especially for those that will work underground. The underground section construction process needs to be supervised and monitored much more carefully in order to be able to detect the early sign of subsidence. To avoid this impact the following mitigation actions are recommended: a) Provide first aid facilities that are readily accessible by workers. b) Provide firefighting equipment at the work areas, as appropriate, and at construction camps. c) Provide separate hygienic sanitation facilities/toilets for male and female workers d) Ensure proper collection and disposal of solid wastes within the	Done	Manpower are trained on daily bases, tool box talks are filled accordingly

	construction camps consistent with local regulations. e) Provide appropriate personnel safety equipment such as safety boots, helmets, gloves, protective clothes, breathing mask, goggles, and ear protection f) Ensure reversing signals are installed on all construction vehicles. g) Implement precautions to ensure that objects (e.g., equipment, tool, debris, etc.) do not fall onto or hit construction workers. h) Implement fall prevention and protection measures whenever a worker is exposed to the hazard of falling more than two meters, falling into operating machinery or through an opening in a work surface, etc. i) People from outside will be restricted from entering the construction sites in order to avoid accidents. j) Construction sites shall be cleaned regularly and provided with adequate sanitary equipment in order to reduce risk of spreading diseases.		
Cultural and archaeological sites protection;	Construction Contractor should engage an archaeologist (archaeological supervisor) for conducting daily supervision activities during excavation activities. Permanent monitoring by the archaeologist during excavation activities. Chance Finds Procedure included in section 5.2.11 of the IEE should be	Done	N/A

	implemented, including: stoppage and suspension of construction activities in case of archaeological findings; Completion of required archaeological works before restarting construction activities; Conservation of remnants.		
Noise	Principles and instruments for railway noise reduction to be studied: - Reduce noise generation by smooth wheels on smooth tracks - Composite block brakes, disc or drum brakes - Good maintenance of running surfaces - Fewer wheels - Smaller wheels and/or wheel dampers, optimized geometry - Wheelmounted disc brakes - Reduce sound radiation by shielding - Wheel-mounted, bogie-mounted or vehicle-mounted		
Vibration	Maintenance procedures: effective maintenance programs are essential for controlling ground-borne vibration. When the wheel and rail surfaces are allowed to degrade the vibration levels can increase by as much as 20 dB compared to a new or well-maintained system.	done	

Attachment 1: Measurements of noise and atmospheric air chemical parameters

ეკო სერვისი
ტელ. (995)32218127
მობ. (995)599181753
E-mail: geoecoservice@yahoo.com
ქ. თბილისი ვაჟა ფშაველას VII კვარ. კორ. 13

Eco Service
Tel. (995)32218127
Mob. (995)599181753
E-mail: geoecoservice@yahoo.com
13, VII Block Vaja-pshavela ave, Tbilisi

ატმოსფერული ჰაერის სინჯების ქიმიური ანალიზისა და ხმაურის დონის გაზომვის შედეგები

№	გაზომვის ადგილი	GPS კოორდინატები WGS 84	გაზომვის შედეგები								
			მტვერი (PM), მგ/მ³		ნახშირბადის მონოქსიდი (CO), მგ/მ³		აზოტის დიოქსიდი (NO_2), მგ/მ³		გოგირდის დიოქსიდი (SO_2), მგ/მ³		ხმაური, დბ
			გაზომვის შედეგი	ზდკ	გაზომვის შედეგი	ზდკ	გაზომვის შედეგი	ზდკ	გაზომვის შედეგი	ზდკ	გაზომვის შედეგი
1	ქ. თბილისი, ვაჟა-ფშაველას გამზირის ბოლო	N4619030 E476506	0.17	0.5	0.22	5.0	0.002	0.2	<0.1	0.5	69
2	ქ. თბილისი, მშენებარე მეტრო "უნივერსიტეტი"-ს გვირაბი (მუშაობდა ექსკავატორი)		0.25		1.8		0.001		<0.1		91 (იმპულსური ხმების დამცავი საშუალების გამოყენება)

შემსრულებელი

გარემოსდაცვითი ინჟინერი /[illegible] ნანგაშვილი/

შპს "ეკო სერვისი"-ს დირექტორი

პაატა ჭანკოტაძე

02.11.2015

Attachment 2.1: Chemical analysis for ground water for its usage in concrete production

[illegible]

შ.პ.ს. გ. ნათაძის სახელობის სანიტარიის, ჰიგიენის და სამედიცინო ეკოლოგიის სამეცნიერო კვლევითი ინსტიტუტის საგამოცდო ლაბორატორია

[illegible] N: GAC-TL-0091

([illegible] : 2018-02-04)

[illegible] **N 78** [illegible] **info@hygiene.ge;** [illegible] **+995 (32) 2 96 16 83;**

14 09

1010

გამოცდის ოქმი №: 1010

[illegible] : გრუნტის წყალი **(3,0 ლ.)**

[illegible] : „თბილისი, მეტროს ხაზი **2"**

[illegible] : 8.09.2015, აქტი #148

[illegible] : მეტროს სადგურ ვაჟა-ფშაველადან გამომავალი წყალი, შახტა **#50**

[illegible] : 08.09.2015/ 11.09.2015

[illegible] : გრუნტის წყლის ქიმიური ანალიზი, ბეტონის წარმოებაში გამოყენების მიზნით

[illegible]	[illegible]	[illegible]	[illegible]
[illegible]			
[illegible]	მგ/ლ	0,00	[illegible] 268-1.3-0755
[illegible]	მგ/ლ	0,21	[illegible] 3351-74
[illegible]			
pH	-	6,95	[illegible] 10523
[illegible]	[illegible]	8,40	[illegible] 4151-72
[illegible] (Ca^{2+})	მგ/ლ	128,26	[illegible] 6058
[illegible] (Mg^{2+})	მგ/ლ	24,32	[illegible] 6059
[illegible] (Cl^-)	მგ/ლ	24,50	[illegible] 4245-72
[illegible] (SO_4^{2-})	მგ/ლ	160,0	[illegible] 4389-72
[illegible] (HCO_3^-)	მგ/ლ	292,80	[illegible] 268-1.3-2557
[illegible]	[illegible]	1,24	[illegible] 268-1.3-2754
[illegible]	მგ/ლ	641,88	[illegible] 18164-72

ლაბორატორიის ხელმძღვანელის მოვალეობის შემსრულებელი /დარეჯან დოლაშვილი/

შემსრულებლები : /ნ. [illegible]/

[illegible]

1/1

Attachment 2.2. Chemical analysis of ground water

შპს გ. ნათაძის სახელობის სანიტარიის, ჰიგიენის და სამედიცინო ეკოლოგიის სამეცნიერო კვლევითი ინსტიტუტის საგამოცდო ლაბორატორია

„14" სექტემბერი 2015წ.

გამოცდის ოქმი №107/ი

ნიმუშის დასახელება (რაოდენობა) – გრუნტის წყალი (3ლ)

დამკვეთი - „თბილისის მეტროს ხაზი 2"

ნიმუშის აღების ადგილი – მეტროს სადგურ ვაჟა-ფშაველადან გამომავალი წყალი, შახტა #50

ნიმუშის აღების აქტის N და თარიღი (დრო) – N148; 08.09.15

ანალიზის დაწყებისა და დამთავრების დრო – 08.09.15– 11.09.15

გამოცდის მიზანი – გრუნტის წყლის ქიმიური ანალიზი

ცხრილი

გამოსაკვლევი მაჩვენებელი	გაზომვის ერთეული	მიღებული შედეგი	გამოცდის მეთოდი
ქიმიური მაჩვენებლები			
აგრესიული ნახშირმჟავა	მგ/ლ	0.00	მეთოდი N268-1.3-0762-08

ლაბორატორიის ხელმძღვანელი: დარეჯან დუღაშვილი

შემსრულებლები: ნუნუ მუზიაიძე

Attachment 2.3. Chemical and microbiological analysis of ground water on selected indicators

14/09/2015

შ.პ.ს. გ. ნათაძის სახელობის სანიტარიის, ჰიგიენის და სამედიცინო ეკოლოგიის სამეცნიერო კვლევითი ინსტიტუტის საგამოცდო ლაბორატორია

აკრედიტაციის მოწმობა N: GAC-TL-0041

(ძალაშია : 2018-02-04)

მისამართი: ქ. თბილისი ლუბლიანას ქუჩა **N 78** ელ-ფოსტა: **info@hygiene.ge;** ტელ: **+995 (32) 2 96 16 83;**

14 09 2015

1014

გამოცდის ოქმი №: 1014

ნიმუშის დასახელება (რაოდენობა) : მიწისქვეშა წყალი **(4 ლ)**

დამკვეთი: „თბილისის მეტროს ხაზი **2**

ნიმუშის აღების აქტის N (თარიღი) : 149, 08.09.2015

ნიმუშის აღების ადგილი : მშენებარე მეტროსადგურ „უნივერსიტეტის" დახრილ გვირაბში **15**მ სიღრმეზე

ანალიზის დაწყების და დამთავრების დრო : 08.09.2015/ 11.09.2015

გამოცდის მიზანი : გრუნტის წყლის ქიმიური და მიკრობიოლოგიური ანალიზი შერჩეულ მაჩვენებლებზე

განსაზღვრული მაჩვენებელი	ერთეული	შედეგი	გამოცდის მეთოდი
ორგანოლეპტიკური მაჩვენებლები			
სუნი	ბალი	0	გოსტ 3351-74
გემო	ბალი	2	გოსტ 3351-74
ფერიანობა	გრადუსი	0	გოსტ P 52769-2007
სიმღვრივე	მგ/ლ	2,20	გოსტ 3351-74
მიკრობიოლოგიური მაჩვენებლები			
მეზოფილური აერობული და ფაკულტატიური ანაერობული მიკროორგანიზმები - 37°C	კწე/მლ	21	ისო 6222:2008
მეზოფილური აერობული და ფაკულტატიური ანაერობული მიკროორგანიზმები - 22°C	კწე/მლ	88	ისო 6222:2008
საერთო კოლიფორმული ბაქტერიები	კწე/300მლ	15	ისო 9308-1:2014
E.coli	კწე/300მლ	არ აღმოჩნდა	ისო 9308-1:2014
ფიზიკურ-ქიმიური მაჩვენებლები			
pH	-	7,18	ისო 10523
ელექტროგამტარობა	მშ/სმ	1,22	ს.ს. 268-1.3-0754
სიხისტე	მგ-ეკვ/ლ	17,30	გოსტ 4151-72
ტუტიანობა	მგ-ეკვ/ლ	5,62	ს.ს. 268-1.3-0557
ამონიუმი(NH_4^+) და ამიაკის ჯამი	მგ/ლ	<0,001	გოსტ 4192-82
ნიტრიტი(NO_2^-)	მგ/ლ	<0,05	გოსტ 4192-82
ნიტრატი(NO_3^-)	მგ/ლ	26,00	გოსტ 18826-73
ქლორიდები(Cl^-)	მგ/ლ	29,00	გოსტ 4245-72
სულფატები (SO_4^{2-})	მგ/ლ	590,00	გოსტ 4389-72
რკინა(Fe, ჯამური)	მგ/ლ	<0,05	გოსტ 4011-72
კალციუმი(Ca^{2+})	მგ/ლ	264,53	ისო 6058
მაგნიუმი(Mg^{2+})	მგ/ლ	49,88	ისო 6059
ნატრიუმი(Na^+)	მგ/ლ	33,10	ისო 9964-3
კალიუმი(K^+)	მგ/ლ	7,80	ისო 9964-3
ჰიდროკარბონატები(HCO_3^-)	მგ/ლ	329,45	ს.ს. 268-1.3-0557
საერთო მინერალიზაცია (მშრალი ნაშთი)	მგ/ლ	1322,50	გოსტ 18164-72

ლაბორატორიის ხელმძღვანელი

Attachment 3.1: Air test results

საქართველო
შ.პ.ს „ლაბორატორიული
კვლევის ცენტრი"

Georgia
L.T.D „Laboratory
Researche Center"

ქ. ფოთი მიქაბერიძის ქ. №2 ტელ: (0493 22-17-35) POTI Miqaberidze st. №2 Tel: (0493 22-17-35)

Air Test Results

Registration 516/16 laboratory test research
Sample Description: Air
Sample Location Construction of coastal Protection Facility in Anaklia
Research Objective: Bacterial and Chemical Indication
Date of sample collection 15.07.2015

Bacterial and Chemical Indicators	Discovered Composition	Maximum Permissible Concentration
Mesophiles and Micro Particles	25- p.u.	100 p.u.
Dust	0,17 gr/l	0.2 gr/l
Background radiation	0,01 micro/h	0.02 micro/h

Performer: Physician Laboratorian: L. Mamaladze
The Laboratory Supervisor: Ts. Daushvili
Result date: 16.07.15

Attachment 3.2.: Act of test result

The Act of Test Result № 512

„16„ July„ 2015

Client: L.T.D „Hydro Engineering Company"

Sample Description: Sea Water

Sample Location: Time. The number of Act №516; The Construction Site, Anaklia; 15.07.15, 12^{00} o'clock.

Description of Normative Document: Government Resolution of Georgia 425 31.12.13. Technical Resolution for the Protection of Surface Water from the Pollution: Resolution of the Government of Georgia 26 03.01.2014: Technical Resolution for the Approval Regulations of Taking Water test sample.

Starting and completion Date, Time: 15.07.15, 16.07.15.

The Act of Test Result has been given for the submitted sample:

Chemical Indicators

	Description of Specific Characteristics	Detected Concentration	Documentation of Technical Normative
	Smell	-	GOSTI 3351-74
	Turbidity	-	GOSTI3351-74
	Colour	10 cm is not in column	GOSTI3351-74
	Hardness	-	GOSTI 4151-72
	Calcium	-	LURIA PG.118
	Mg	-	LURIA PG.122
	Hydrogen Indicators	-	ISO 10523-08
	Dissolved Oxygen	-	LURIA GV.176
	Oxygen's Chemical Requirement	-	LUIA PG.74
0	Biochemical Usage of Oxygen. Usage of Oxygen 5 and Total Usage of Oxygen.	-	LURIA PG.82

1	Dry Residue	17650 mg/l	GOSTI 18164-72
2	Nitrates	-	GOSTI 18826-73
3	Chloride	-	GOSTI 4245-72
4	Hydrogen Sulphide	-	LURIA PG.412
5	Nitrite	-	GOSTI 4192-82
6	Iron	-	GOSTI 6332
7	Arsenic	-	GOSTI 4152-89
8	Copper	-	GOSTI 4388-72
9	Sulphates	-	GOSTI 4389-78
0	Manganese	-	GOSTI 4974-72
1	Polyphosphates	-	GOSTI 18309-72
2	Suspended Particulates	2.5 mg/l	LURIE pg.43
3	Floating particles	-	GONCHATUKI pg-66
4	Ammonia	-	GOSTI 4192-82
5	The acidity/ alkalinity	-	LURIE pg-57.51
6	Permanganate Oxygen	-	ISO 8467-93
7	Petroleum products	0,07 mg/l	LURIE pg.306
8	Background radiation	-	

№	Description of Determining Characteristics	Detected Concentration	Documentation of Technical Normative
1	Mesophiles Aerobic and Facultative Anaerobes Micro Organisms	-	ISO 6222:1999
2	Total Coliforms	-	ISO 9308-1-2007
3	E. Coli	-	ISO 9308-1-2007
4	Salmonella	-	ISO 19250:2010
5	Str. faecalis	-	ISO 7899-2:2000
6	Thermo tolerant coliforms	-	ISO 9308.2:2012
7	Sulphide Reducing Clostridium	-	ISO 6461-2-1986