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GEORGIA: GEORGIAN SUSTAINABLE URBAN TRANSPORT INVESTMENT PROGRAM, Tranche 1

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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

1. 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.

2. 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.

3. 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.

4. 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

5. 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.

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

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

Tbilisi Metro extension project - overview

7. 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.

8. 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.

9. 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.

10. 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.

11. 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.

12. 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.

13. 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.

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

- Delisi Station (total length 131 m, P.K. 56+00);

- Scissor crossing and parking tracks after the platform (total length 285 m);
- 760 m-long twin tunnels between Delisi and Vazha-Pshavela stations;
- Vazha Pshavela Station (total length 205m, P.K. 68+00);
- 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;
- University Station (total length 162m, P.K. 78+20), with the sub-station and other technical rooms;
- 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;
- This hall is located at elevation 535 and the platforms at 487, so that descend 53 meters;
- 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;

15. 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.

16. 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.

17. 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.

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

19. 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

20. 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.

21. 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.

22. 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.

23. Coastal protection structure of underwater breakwaters, according to project design, initially was composed with 6 units (phase 1) constructed from 5 and 10 Ton tetrapods. The space between one to another breakwaters units was 90m. The length of first underwater breakwater (from Enguri river mouth to Tikori river mouth direction) is 200m, the length of the second underwater breakwater is 300m.Therefore, total length of underwater breakwater is 500m. Length of artificial nourishment is 2,300m. Amount of Sand for phase 1 is 50,000 ㎥. 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.

24. Initially the Construction Volume was different, but the Georgian government came to a decision to initiate construction of a deep sea port in Anaklia close to the project site. A risk of potential overlap of the two construction sites was apparent. Therefore the scale or even expediency of the coastal protection project was open to question. In March 2016 the Ministry of Economy and Sustainable Development of Georgia provided MDF with the final coordinates of the deep sea port, which demonstrated that the port was overlapping seven breakwaters (N 3,4,5,6,7,8,and 9) out of ten planned breakwaters (from both phase). As a result MDF took decision to remove four breakwaters (3,4,5,6,) from the scope of work of the present contract (phase 1) and continue the works only for the breakwaters N1 and N 2 and placing of sand on the beach part behind these breakwaters (approximately in front of Hotels and boulevard). The rest of the works under both phases was proposed to be cancelled, through contract amendment, as approved by the MDF Supervisory Board per meeting N66 on 18 April 2016.

25. Significant delays have been experienced in the project implementation and mitigation measures had been taken and agreed between the Engineer, the Contractor and MDF. The original completion date of civil works for Anaklia Phase I, was on 24 April 2014. Since that the completion date was extended four times. MDF, Engineer and Contractor agreed to extend the contract up to November 18, 2015; after till 30 April 2016, afterwards - up to 30 June 2016, and finally- till August 2017. After expiring official agreed period June 30, 2016, according to the ADB's recommendation letter, the Client and the Engineer have discussed about the possibility to extend the Construction period till 31st of August 2017 with the specific conditions that Contractor has to follow. Particularly, Contractor had to implement 50% till end of May 2017 and another 50% - till the end of August 2017. In parallel, the Contractor had to add another setting barge to have a possibility to work on N1 and N2 underwater breakwaters at the same time.

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

Civil works at Tbilisi Metro extension subproject

26. As it was mentioned above, the commencement date of Works was established on June 20th 2015. Contractor was requested to mobilize all necessary equipment on-site. Estimated time for the completion of works is 630 days. .

27. Regarding the evolution of the civil works, these are mainly completed, included **injections works and cleaning and treatment of metal segments**, the two most **critical activities** where the Contractor faced many problems and that incurred in remarkable delays, thus interfering and delaying subsequent activities, as installations. However, the civil works are almost being finalized and quality of performed works is acceptable.

28. Works are being performed according to the work schedule agreed with MD. MDF is monitoring construction progress by attending the regular weekly meetings between the Engineer and the Contractor. Minutes of the meetings are prepared and submitted to MDF for approval. MDF is requesting from the Engineer and Contractor strict and unconditional compliance with ADB requirements and Georgian legislation in terms of safety and safeguards.

29. Communication and signaling systems have been installed. The contractor was requested to provide a pack of spare parts for escalators, electromechanical sub-station, communication and signaling systems for an established number of years which might vary between 2 to 5 years. The list of such spare parts was prepared and agreed between contractor, supplier, engineer and MDF both technically and financially. Testing will start from July.

30. According to the last Amendment N4, signed on 25 May 2017, the time for completion was extended till 30 June, 2017 and the Total Contract Amount was increased up to GEL 84,437,432.19.

31. Performed civil works within reporting period by month, are as follows:

January

- Urbanization works at the uppers station surface (Installation of curbs, laying of asphalt layer);
- Installation of rails and concreting in the left and right tunnels;
- Installation of escalators;
- Cable installation on transformers placed in substation;
- Installation of cable hangers in Delisi Vaja Pshavela tunnel;
- Raised floor installation in the technical rooms.

February

- Laying paving stones in the uppers station;
- Laying paving stones on the surface of exits;
- Rail installation and concreting;
- Steel profiles installation for vitrex panels in the pedestrian passage;
- Epoxy paint in the lower level of substation;
- Permanent lighting installation in the dead ends;

- Raised floor installation in the technical rooms.

March

- Installation Cable tray in the technical level of upper station;
- Installation of waterproofing membrane in the arch of the station;
- Permanent lighting installation in the left and right tunnel;
- Installation of contact rails and contact rail supports;
- Installation of rail and concreting;
- Installation of steel profiles in the aces ramp for the vitrex panels;
- Installation of attenuators in the ventilation tunnel;
- Installation of communication panels in the technical room.

April

- Installation of waterproofing membrane in the access ramp;
- Installation of ventilation ducts in the substation;
- Rail installation in the left tunnel;
- Vitrex panel installation in the station arch;
- Installation of the contact rail;
- Pouring concrete slab for point machine rails installation in chamber 1 and 3;
- Installation of switch points in the chambers 1 and 3;
- Installation of the cross point switch in chamber 2;
- Insaltallation for pipeline and engines for water pumping system in the dead end, the main pump sump chamber;
- Ventilators installed in the ventilation chamber , in the ventilation tunnel.

May

- Installation of vitrex panels in the access ramp;
- Installation of Vitrex panels and Laying tiles in the pedestrian passages;
- Installation of Vitrex panels in the arch of station;
- Exit canopies installation;
- Installation of cable on communication control panels in the technical room;
- Installation of contact rail in the left and right dead ends;
- Permanent lights' installation in the access ramp and station arch;
- The dead end, waterproofing of the main pump sump chamber walls, installation of waterproofing membrane;
- Contact rail installation in chamber;
- installation for fire dumper in the ventilation tunnel.

June

- Dismantling cast iron segments in the shaft 51;
- Greening works of garden areas at the upper station;
- Installing relays for operating panels in technical rooms;
- Testing the communication system panels in the technical room;
- Vitrex panel installation in the entrance hall of the concourse;
- surveillance camera installation in the pedestrian passages , concourse hall, access ramp , station and electric substation;
- Fire signalization installation.

32. **University Station Surface:** The structure stage has been completed in Upper Station and exits No. 1, 2, 3 and 4. Waterproofing, masonry and urbanization and landscaping works in Upper Station and Pedestrian Accesses are almost completed. The Tbilisi City Hall requested some minor changes on final Urbanization that, after agreement, are being executed. Finally, they have been installed the steel canopies for all the Pedestrian Exits

33. **Technical Rooms:** Masonry is completed. Ceiling in upper floor and walls have been painted. Tiling and floors of bathrooms have been completed. Installations of raised floor and false ceiling have been completed. Installation works are ongoing as well.

34. **Substation:** Masonry phase and painting of walls and ceiling have been completed. The floors have been painted with epoxy paint in upper level and lower level. The installation of hangers in the tunnels for the main supply cables is finished in the metal segment areas and the installation of cable trays is completed. Cables and ducting of Electric Power Station are done and a remarkable length of cables of different sections for main supply cells to MDB (Main Distribution Boards) and from MDB to SB (Secondary Boards), as well as for supplying to the Distributed boards for Pump Sumps have been installed. Transformers have been delivered to the site, placed in substation and cables connection is completed. Protection Cells are on site (HV room) and they are connected and installed. Equipment for Rectifiers is on site and connected each other and connection of cables is finished. Electrical boards related to the third rail electrification are on site and connected each other. Switch disconnectors for feeders are installed but as requirement of TTC, it will be necessary the installation of four more disconnectors in the tunnel as in the rest of the Metro lines. Feeding points and lighting points have been installed in lower and upper floors and fire detection points' installation is ongoing. Automatic capacitor Banks (250 Kvar and 75 Kvar) and almost all the Secondary Boards (SB) are installed. Moreover, battery chargers and batteries have been placed and their installation is finished. Finally, the main electrical cells have been powered from the two lines of Vazha-Pshavela Substation in order to make the first tests without load.

35. **The new emergency exit:** Quite advanced. It has been completed the connection under the tunnel and concrete structure and slabs. Masonry in the ventilation tunnel, painting of walls and ceiling and floor has been completed. Moreover it has been discussed with MDF the solution for road access on surface in order to delimitate the required surface occupation. Installations have not yet started. The corresponding Variation Order has been submitted for approval.

36. **Superstructure:** Rails installation and Superstructure concreting was mainly completed in April 2017. During this month the Contractor has performed pending aluminothermy welding in some sections as well as some minor works. Besides, in April 2017 the turnouts were installed as well.

37. **Supply of Rail R-50 and 3rd Rail of contact:** Rails R-50 and 3rd Rail of Contact have been installed.

38. **Tunnel Delisi – Vazha-Pshavela:** The Contractor has completed cleaning works, improved drainage system, repaired damaged areas and installed cable hangers. After no-objection from TTC regarding the replacement of existing fastenings over wooden sleepers, the Contractor has finished to install new fastenings and new rails, as well as contact rails. On the other hand, cable (copper and FO) installation and track equipment connections is ongoing. Lighting and power supply boxes installation in the tunnels is almost finished.

39. **Waterproofing and Drainage:** The installation of sump pumps equipment and connections are almost done. Besides, waterproofing of water tanks is almost completed.

40. **Escalators:** First, second and third escalators have been delivered on site and have been installed. It is pending Test & Commissioning. Moreover, TTC requested some additional works related to access for maintenance purpose, that after agreement between all parties are being executed.

41. **Architecture finishes**: Works are ongoing at a good pace and are almost completed. The Contractor has installed the steel substructure in arch and walls of the Station, in the escalators' access ramp and in the Pedestrian Accesses and Concourse Hall. All VITREX material has been delivered on site and its installation has been almost completed in the station arch and walls, in the escalator's ramp, in the Pedestrian Accesses and in the Concourse Hall walls and ceiling. Besides, flooring is almost completed in the Platform, Pedestrian Accesses and the Concourse Hall.

42. **Radio Communications System**. TTC has confirmed that will proceed to update the radio communication system throughout all existent Metro line. It has been clearly stated that the TETRA system must be implemented at the end of the works in the whole metro lines in order to be able to connect University station with the rest of the line. If it is not, the section from Vazha-Pshavela to University will not be able to be operated with passengers. Equipment for the TETRA installation is on site and the Contractor has already started the works.

43. **Signaling:** On February 1 and 2, 2017, it was performed a Simulation of the Signaling system carried out by Siemens and with the attendance of TTC, the Contractor and Euroestudios. The main objective of this test was to clarify the small doubts remaining over a programmed interface in order to close the comments for the final simulation before the physical installation in Tbilisi. It was shown the interface that will be used to control the University Station that is similar to the interface used by TTC with the rest of the stations currently but Siemens' interface uses drop-down menus in order to provide a more clear view and without so much information at the same time on the screen. They were simulated every single point of the Signaling installation and it was checked all the possible casuistry, testing the signals and interlocking operation depending on the case (fixed route, maintenance operation, etc) and speed codes in the track circuits depending on the occupancy of the surrounding track circuits. They were checked with the TTC technical the control of the interface and how to fix the automatic routes, manual operation, etc. It was checked too one by one the speeds codes in the track circuits comparing with the ones in the project. TTC was glad and agreed with this Simulation. However it was issued a common list agreed by all the parties with all the points to be reprogrammed by Siemens. After this clarification tests, it was expected to make a final simulation performed by Siemens in Tbilisi during the month of March 2017 with the attendance of TTC, the Contractor and Euroestudios to verify every single point and situation as a definitive verification.

44. On a meeting held on February 08, 2017, TTC claimed for detailed information of the Signaling System and the Contractor and Siemens developed a schedule with eight points with detailed information to be submitted from February 17, 2017 to March 17, 2017. The Contractor added six more points (14 in total) to the detailed information schedule and submitted the last point on April 28, 2017.

45. After some clarifications about the test sessions, the Interlocking device ("Brain") had no more objections by TTC and Siemens updated the software programming in order to perform the final tests in Tbilisi during the month of March 2017, with the participation of TTC, the Contractor and Euroestudios.

46. On March 28, 2017 was held the final simulation in Tbilisi with the participation of MDF, TTC, the Contractor, Siemens and Euroestudios. There were some unimportant points (noted in a list) to be reprogrammed by Siemens and were planned for the month of April the FAT (Factory Acceptance Tests) tests to be performed in Madrid and was decided that by the end of April 2017 Siemens would come back to Tbilisi to perform a final "on site" test with all the previous points corrected. TTC agreed with this schedule. Until now these final tests have not yet been done.

47. The Contractor has been required by TTC to purchase testing equipment in order to obtain the quality seal for the signaling devices as previous checking before final installation.

48. Installation of equipment in Interlocking room (frequency generators, track circuits relays, connection racks) is finished. Wiring laying for track equipment is ongoing as well.

49. On May 23, 2017 Siemens arrived to Tbilisi in order to perform the inspection of the installation made by the Contractor and to make the final test with all the devices connected.

50. Regarding the Point Machine, TTC refused the Siemens' device not for the motor and gears but for the bars to connect with the arrows. TTC has provided information about the company ALSTOM indicating that they agree with their point machines. The Contractor stated that Siemens will provide the same certificates that ALSTOM do, so TTC agreed this solution.

51. The installation of power supply equipment, UPSs, cables and Fiber Optic is ongoing.

52. **Electromechanical Installations:** There are ongoing a great number of mechanical installations listed below:
    - Air Conditioning and Ventilation;
    - Drainage
    - Water Supply
    - Lighting
    - LV Power
    - LV Secondary Boards
    - Fire Fighting
    - Fire Detection
    - Cables for Lighting, Power, Communications, Signaling, Fire Detection
    - PAS system
    - BMS/SCADA Substation
    - Electrification
    - Operation telephony
    - Communications.

53. Thus, the most of works are either completed or are in its final phase. Information about completed works is summarized and provided below:
    - Demolition of block wall in left tunnel PK 70+10 -70+20 were performed completely - 100%;
    - Old rail and wooden sleepers' removal works were conducted in left tunnel on PK 70+10. - 100%;

- Asphalt demolition and removal in Upper Station by Sub Contractor, in side walk in Pedestrian Exit 1, 2 and 4, and in Sandro Euli Street between Pedestrian Exit 1 & 2 were completed - 100%;
- Demolition works in right tunnel for cable crossing PK 79+20, and in left tunnel PK 77+70 and 80+12 were conducted - 100%;
- Structural Repair Paint cement based polymer modified and fiber reinforced in left tunnel PK 69+50 - 73+00. - 100%;
- Resin injection works were done in left tunnel on PK 69+50 – 73+40. -100%;
- University Station Surface: Structural repair paint cement based, polymer modified and fiber reinforced in right tunnel PK 71+00 - 73+40 Vitrispan sheet umbrella in University Station Completed the connection under the tunnel and concrete structure and slabs. Masonry in the ventilation tunnel is completed - 100%;
- Linear Drainage Channel. 100 mm and Pipe PVC double wall DN 90 mm in was installed in Vazha Pshavela - Delisi section - 100% ;
- Demolition works of ground slabs for cable crossings were performed in left tunnel on PK 77+30 - 80+12. -100%.

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

54. Civil works contract was signed with Modern Business Group LLC (Azerbaijan). The construction works started on July 24, 2013. According to the contract amendment N9 of 2nd of February 2017, contract period for the construction of coastal protection facilities in Anaklia, was extended till 31st of August 2017. After the contract extension, works restarted in Anaklia project site.

55. In February, Contractor was working on N1 underwater breakwater within the scope of Phase I and placing of sand in front of hotels behind the N1 underwater breakwater area. Particularly, the contractor was working on preparation of the foundation for the main protective structures. Contractor was excavating the sea bottom, removing the existing sand and filling the excavated trench with the stone.

56. 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. As was mentioned above, after establishment of the final coordinates of the deep-sea port, some changes were introduced in the scope of works and currently only the construction of the breakwaters N1 and N 2 are ongoing.

57. During reporting period, the marine works were suspended. According to the information provided by the Contractor, this was due to financial problems and repairs of marine mechanisms. Only Rubble stone was provided and reserved on the project side. Particularly, 600 m^3 of rubble-stone is mobilized for the next period.

58. Jetty was repaired in May-June 2017, which was damaged after the February-May storms. By the end of June 1000-ton Barge PDM-13, tug-boat “JETAN” and transporting barge “EVA” was brought to Anaklia project site and excavation works started. Considering the official completion time for phase I, 31 August 2017, according to the latest agreed schedule, N1 underwater breakwater already must be completed and N2 underwater breakwater also should be started before and half of performance should conducted so far. However, no progress in regards to planned construction activities has been observed.

1.3. Changes of project organization and environmental management team

59. 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 Galaktion Buadze was assigned on November 30, 2016 by the Georgia*n* Prime Minister's Decree.

60. 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.

61. 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 13 and currently consists of: Head of Unit, 3 environmental safeguards specialists, one social and gender specialist, 6 resettlement specialists. There are also two ADB's individual consultants – one on environmental safeguards and one on resettlement issues, who are the members of Environmental and Resettlement Unit. Until October 2014, 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.

62. 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 –Nino Nadashvili, was recruited in 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.

63. The main institutions 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

64. 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.

65. MDF ensures availability of all environmental information and facilitates environmental supervision of the projects. The MDF's local environmental specialist's 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; The MDF through its Local Environmental Consultant, reports to the ADB in every 6 months on the status of environmental compliance of construction works by preparing semi-annual Environmental Monitoring Reports. 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.

66. 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.

67. The SC had a national environmental specialist –Sandro Abzianidze and an international environmental expert – Paula Fernandez to assist the EA supervise and monitor implementation of the EMP during construction activities.

68. 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 needs to be implemented by a date agreed with the SC. Non-compliance should be ranked according to the established criteria.

69. 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.

70. 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.

71. Key responsibilities of the Contractor are preparation of 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, 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.

72. The contractor submits reports of the carrying out of such measures to the employer on a monthly basis; 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

73. As it was already mentioned above, 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.

74. 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.

75. 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.

76. Construction Supervision Company prepares 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.

77. MDF ensures availability of all environmental information and facilitates environmental supervision of the projects. The MDF, through its local environmental Consultant – Nino Nadashvili, reports to the ADB every 6 months on the status of environmental compliance of construction works by EMRs.

2. PART II: ENVIRONMENTAL MONITORING

78. 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.

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

80. 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. Frequency of measurements of air, noise, vibration and etc. are given in **Annex 1**.

81. Environmental monitoring started immediately after the commencement of civil works under the SUTIP T1. Environmental safeguard monitoring is performed as required in the EMPs. MDF submits to ADB semiannual environmental safeguards monitoring reports, describing progress of implementation of EMPs and any compliance issues and corrective actions, within 1 month after each reporting period. If any unanticipated environmental and/or social risks and impacts will arise during construction, implementation or operation of the Project that were not considered in the IEE/ EMP, MDF ensures to promptly inform ADB of the occurrence of such risks or impacts, with detailed description of the event and proposed corrective action plan.

82. During reporting period, environmental aspects, provided bellow, where monitored and managed by construction and supervising companies within the projects. It should be noted that for the monitoring of air, noise, water and other parameters, during measurements, standards, provided by the Decree 297/N on "Approval of norms on environmental quality conditions" elaborated by the Minister of Labor, Health and Social Affairs of Georgia (16. 08. 2001) were used, as mentioned decree determines and approves quality norms of environmental conditions, in order to ensure the safe environment for human health.

Tbilisi Metro extension project

83. The tests taken out during reporting period are as follows:

Subterranean Water (National Environmental Agency)	Air and noise (National Environmental Agency)	Air and noise COBRA ASIGNIA

	14/03/2017	06/01/2017
	27/03/2017	13/01/2017
	27/03/2017	20/01/2017
	23/05/2017	07/02/2017
		14/02/2017
		10/03/2017
		15/03/2017
		30/03/2017
		08/05/2017
		15/05/2017
		19/05/2017
		01/06/2017
		15/06/2017
		21/06/2017
		28/06/2017

Air quality

84. Operation of heavy machinery, vehicles and other construction equipment result in dust generation and fugitive emissions of carbon monoxide, NOx, SO_2, hydrocarbons, and particulate matter.

85. 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, storing material on the surface in places away from where ventilation fresh air intakes could be compromised trough a surface fire or chemical spill, using a ventilation system which is monitored and upgraded to ensure air flows are always provided to the workplace, ensuring bore holes and other penetrations are sealed, monitoring air flows for explosive gases and atmosphere contaminants regularly and etc. could reduce hazards and risks of air pollution.

86. Contractor did visual control, monitored air-flows for explosive gases and specific atmosphere contaminants, Inspected mechanical ventilation system, Inspection moving and diesel machines & vehicles. CC also conducted measurements of noise and atmospheric air chemical parameters (PM, CO, NO2 and SO2) through National Environmental Agency four times: on 14/03/2017, 27/03/2017, 27/03/2017 and 23/05/2017; (See attachment 1.8; 1.19; 1.10; 1.15) and by own measure device - 15 times (See attachments 1.1-1.19). Contactor was conducting above mentioned measurements in accordance to international and Georgian standards on weekly bases. All measurement data are in compliance with established norms of Georgian legislation and WB standards.

Noise and Vibration

87. The activities inside the tunnel, at the depth of 20 to 50 meters, does not generate any noise or vibration that can be perceived by people above the ground;

88. 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, using vibration absorbing handles or rubber-type vibration insulating devices between the tool and the hands implemented by the contractor, using hearing protection for workers inside tunnels and shafts, fixing 'out-of-balance' items reduces noise levels to a moderate magnitude.

89. All measurements (underground water, Air, Noise) were made under subway in different places, where construction works were carried out (Platform, Sub Station, Crossover, Ventilation tunnel, Right tunnel, Left tunnel) and outside the subway tunnel, on surface, at following locations: near subway entrance, near the square, pedestrian passages N2,N4 near the (Market "Fresco", Shops, resident buildings). These measurements were implemented by NEA, results are provided under the attachments: 1.8; 1.9; 1.15.

90. 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.

91. 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

92. There is no top soil in the areas where the contractor has to work. These areas are already free of topsoil.

93. No more trees has been cut since January, 2016.

Fauna

94. 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.

95. Limitation of the dust and emissions from construction machinery/vehicles especially near street trees and the parkland/green recreation area in the middle of Vaja Pshavela are used to control and reduce risks and hazards.

96. 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 in October 2012. This species is listed as "Least Concern" on the IUCN Global Red List and it is not included in the Red List of Georgia. It is however considered as "Near Threatened" in the European regional assessment. Works were scheduled to start in 2015 and in August 2015 when works did start, no bat colony was

seen or detected by CC in the tunnel before and during construction activities. It was unclear as to whether the roost had been permanently abandoned or as it is mentioned in IEE, the roost was only a wintering colony and bats had left the tunnel when winter has finished. For whichever reason, when construction activities started, there was no bat colony in the tunnel, no direct harm occurred to any bats and no specific mitigation measures were required to protect this species. If the bats had returned during a further winter period, due to the noise, light and human presence, this would have caused the bats to abandon the tunnel and search for an alternative roost site to spend the winter time. During reporting period the presence of Bat colony in the tunnel hasn't been detected.

97. Given the historic presence of bats within the project site a further survey will be undertaken within the tunnel network later in November 2017 to identify if any of the other tunnels are being used as a winter roost for bats. Should any roosts be identified, these will be left in place and the MoENRP will be informed of their presence.

Water quality

98. The principal source of construction impacts on ground and water is related to the groundwater. As the project involves only very limited drilling works the main potential impact to these elements is that the underlying ground water and soils may be affected during the construction phase.

99. The contractor conducts the underground water chemical and microbiological tests periodically and monitors groundwater inflow if is necessary. Underground water quality tests have been done by National Environmental Agency. The test results (in Georgian) are provided under Attachment 1: Measurements of noise, underground water and atmospheric air chemical parameter. All measurement data are in compliance with established norms of Georgian legislation and WB standards.

Social affections

100. The disturbances produced by the transit of heavy vehicles on the works is minimal to the community facilities.

Cultural heritage

101. No cultural affections have been detected.

Hazardous and Non-hazardous Waste and Spoils

102. 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).

103. 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.

104. Non-hazardous waste, household and solid waste is disposed to official dump site, particularly Gldani dump area by contractor "Cobra Assignia" and its sub-contractor – "Prime Concrete" Ltd., 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;

105. 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. Time to time, when it necessary (approximately once in three month) it Is passed to a licensed operator Company "Sarini", which has the permit on operation of the hazardous waste. Contract N 25022016 with Company "Sarini" was signed in February, 2016.

106. All relevant Contracts with mentioned companies were presented in previous EMRs.

General clearance

107. The general clearance of the places outside the tunnel has been improved. Inside the tunnel, the wastes have been separated and removed.

PPE

108. In general terms, personnel wear adequate PPE during the working process as per the project HSE requirements. Nevertheless, it has been noticed in different times, as it had been noticed 6 months ago, that some workers don't wear mask when it is required. It has been notified to the contactor to take the required measures to avoid it.

Anaklia Coastal Improvement project

109. 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.

110. As it was mentioned above, during reporting period speed of construction works have been decreased significantly and almost no construction activities have been implemented. Because of decreasing the construction works pace and scale, the possibility of impact level on environment has felt to minimum.

111. 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.

112. No adverse environmental impacts related to the construction works were noted or observed within the reporting period because of limited activities under the project.

Air Quality

113. Dust was controlled through watering the access roads where driving could easily generate dust. During the transportation of contraction material, the trucks were covered with special tarpaulins or other cover means to avoid spreading of fine aggregated material in the air and although, the transportation of materials were carried out by initially selected and determined routs and the speed of the trucks are limited. Wheels and undercarriage of haul trucks were clean and washed prior to leaving construction site.

Sea Water quality and sea water turbidity

114. 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 SSEMP requirements and regulations. 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.

115. Regular check-up and inspection was implementing for monitoring of sea water quality and sea water turbidity.

116. During marine works - dredging, stone filling - works were monitored by the contractor's environmental specialist was visually controlling sea water 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. No deviations from the standards have been identified during measuring.

Sea Biodiversity

117. During marine works, loss of Bio ecology is expected (sea plants), but because of insignificant Influence no specific mitigation measures are required. Only permanent visual control, identifying the degree of turbidity through analysis (in every 4 hrs. during the work) during the works are needed. 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. During the works on underwater breakwater N1 and N2 contractor was taking measurements for turbidity on every day basis, no problems have been detected.

Noise

118. 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 disturbed residential people, even though there are no residential people within 1km range.

119. 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.

Waste

120. 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 was accumulating them separately in special containers. Hazardous waste was removed from construction site by authorized personal only in accordance with safety regulations.

121. Contractor Company had relevant contracts with licensed companies for proper management and final disposal of waste. Construction company had signed contracts with following companies for waste removal. For hazardous waste: Ltd “Sanitari” (contract N2911-13) and “Sandasuptaveba”; For domestic waste: an agreement with Zugdidi municipality; Construction waste: “Georgian Solid waste management company”. All contracts are already provided by previous EMRs.

Soil Contamination

122. 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.

Flora and Fauna

123. The flora and fauna living in Samegrelo region is located out of the project area and thus the project activities has no impact on them;

124. 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.

Landscape

125. 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. This issue is agreed with local municipality and Contractor got the right to use additional surrounding areas for tetrapods placing.

126. At present, MDF with supervision company “Dohwa” is working on finalization of the action plan prepared for tetrapods placing and storing. Action plan will be agreed with ADB.

Social Environment

127. 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.

Ground water contamination

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

Construction Safety

129. 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.

Worker Camps

130. The potential impacts related to the construction and operation of the camp could be summarized as potential damage of topsoil, contamination related to fuel storage and fuelling operations, waste management, wastewater and sanitation.

131. The construction camp is equipped with a biotoilet and other necessary infrastructure. Monitoring activities are implemented by Environmental Specialists on the daily basis.

3. PART III: ENVIRONMENTAL MANAGEMENT

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

Tbilisi Metro extension project

132. 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 managements' 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 submitted as part of SSEMP of waste		
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)	Submitted, approved	First submission on 1 August, 2016,	

		Final submission to the MoEPNR on December 22, 2016.	
6. SSEMP for wastes	Has been prepared by the Contractor and several times revised. Approved.	Last submission of updated document June, 2016	Revision has been implemented by the International Environmental Specialist of Supervision Company, according to provided comments from MDF and RETA's environmental Specialists.
7. Company waste management plan - demanded by the new Waste Management Code of Georgia	Draft document was prepared and submitted by the contractor	22/12/2016	
8. Updated SSEMP	SSEMP was updated by the Supervision Company	October, 2016	Location of emergency exit has been changed and Detailed Design has been prepared and submitted to MDF for approval in September, 2016. International environmental specialist of SC has updated SSEMP in October, 2016 due to changes in the detailed design.

Anaklia Coastal improvement project

133. EEs, 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.

134. 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.

135. 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

136. 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 Regional 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. The schedule of conducted audits and monitoring during the reporting period is given in the Table 2, below:

Table 2: The schedule of conducted audits and monitoring during the reporting period at

Tbilisi Metro extension project

Site visits	Organization		Comments
	SC (Totally 39 visits)	MDF (Local environmental Consultant)	
Site audit	January - **6 days** 09;10;13;23;24;25	One site monitoring visit	MDF representative is permanently on site. Weekly meetings also are conducted in a permanent base. Local

			environmental Consultant attends weekly meetings and discussing pending environmental issues (emission measurements', waste management, reporting issues and etc) with Cobra and Euroestudios Top management.
Site audit	February - **5 days –** 03;13; 17; 24;25		
Site audit	March - **4 days -**12-14;20	One site monitoring visit	
Site audit	April - **3days -** 3;11;14;	One site monitoring visit	
Site audit	May - **4 days -** 08;11;23;29		
Site audit	June - **2 days -** 09;27	One site monitoring visit	

137. MDF is monitoring construction progress by attending the regular weekly meetings between the Engineer and the Contractor. MDS's local environmental consultant is attending weekly meetings and requesting from the Engineer and Contractor strict and unconditional compliance with ADB requirements and Georgian legislation in terms of safety and safeguards.

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

139. Environmental Specialist of Construction Company – Natia Karkuzaeva 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.

140. Local environmental specialist Alexandre Abzianidze was recruited by the SC in January, 2016. He conducts site-monitoring visits 2-3 times per week and supervise and monitor implementation of the EMP during construction activities. He prepares monthly reports and submits to MDF.

141. The international environmental expert - Paula Fernandez of SC has implemented site inspection and audit quarterly. She has done quarterly visits and prepares the quarterly reports, the last visit was taken out in December 2016.

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

143. ADB Mission conducted during March 19-met with the contractor and the Engineer on site and visited the tunnel to examine the construction activities, which were found to be conducted in a satisfactory manner. Mission reminded that all contractual obligations should strictly be met and any cause of potential delay should be flagged upfront with appropriate mitigation measure and action plan. The MDF technical team is closely monitoring the progress including through working meetings between MDF, Engineer and Contractor that are held on a weekly basis. The Mission

also reminded all parties that IPCs and WAs should be submitted on time, as Tbilisi Metro Extension is currently the highest contributor for disbursements under the Investment Program.

Anaklia Coastal improvement project

144. Nine site visits were conducted by the environmental specialist of Supervisor Company during reporting period and 3 non-compliance notices have been issued by him. All non-compliances have been fixed by the contractor in required time.

145. Environmental Specialist of Construction Company is permanently on site and implements 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.

146. 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

147. 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.

148. 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.

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

Tbilisi Metro extension project

Non-Compliance notices and corrective actions

Date of submission	Description of Non-Compliance	Area	Corrective action required	Performance Date of Corrective actions
12.04.2016	There is plenty of dust and smoke in the tunnels, crossover and dead end tunnels. Several ventilators are not working or switched off during construction works. Therefore, there is not proper ventilation on site and the conditions of	Inside the tunnel	Ventilators must be operating always during construction works and PPE Equipment (air masks, eye goggles) must be provided to all workers and it is mandatory to use them.	**Closed** (The Contractor improved the situation fans are working, No Dust) ; response (S 92.1 Date: 14.04.2016

	work are harmful.			
30.03.2017	Smoking in the tunnel. It is strictly forbidden for security reasons.	Inside the tunnel	Collecting the rest of cigarettes existed in the area. New detection of cigarettes in the area would involve the incompliance of this requirement.	**Closed** The Contractor improved the situation, cigarettes remains were removed from the area
06.04.2017	The small amount of construction waste is scattered near the shaft 51 and site camp storage area as well. No plastic bags packaging, no temporary designated secure place.	Near Shaft 51 Camp storage area.	Waste was collected and removed	**Closed**

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
22.03.2017	**Warning signs -** Warning signs have been damaged because of bad weather	Working yard	Warning signs need to be repaired ASAP	**Corrected 22.03.2017.**
08.04.2017	**Waste management** - Domestic waste container has been damaged.	Working yard	Domestic waste container has been damaged, and replaced by new one.	**Corrected on 08.04.2017**
17.05.2017	**Waste management** - Domestic waste has not been removed on time.	Working yard	Domestic waste has not been removed on time.	**Corrected on 17.05.2017**

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

150. During March 17-25, 2016, ADB's Loan Review Mission (the Mission) visited Georgia to follow-up on implementation of SUTIP projects. The Mission met with the Ministry of Finance (MOF), Ministry of Regional Development and Infrastructure (MRDI), Municipal Development Fund (MDF), Tbilisi Municipality City Hall (TCH), Batumi Municipality City Hall, consultants and contractors, and conducted site visits in Tbilisi, Batumi and Mestia.

Findings during the ADB Mission were as follows:

Tbilisi Metro extension project

151. The civil work contract was awarded on 26 March 2015, the commencement date of works was established on June 20th 2015. The contractor was fully mobilized in July 2015 and construction activities are conducted according to schedule which anticipates completion within 24 months. The Mission reminded that all contractual obligations should strictly be met and any cause of potential delay should be flagged upfront with appropriate mitigation measure and action plan. The Mission met with the contractor and the Engineer on site and visited the tunnel to examine the construction activities, which were found to be conducted in a satisfactory manner. MDF technical team is closely monitoring the progress including through working meetings between MDF, Engineer and Contractor that are held on a weekly basis. The Mission also reminded all parties that IPCs and WAs should be submitted on time, as Tbilisi Metro Extension is currently the highest contributor for disbursements under the Investment Program.

Anaklia Coastal improvement project

152. The Mission requested MDF to extend the contract subject to the contractor submitting a revised work plan with weekly outputs, resources plan, and proof of import of the new vessel. The submission should be reviewed and endorsed by the EPCM consultant. The Mission also noted that the EPCM consultant staff should be enhanced for better supervision of the project.

153. There are about 8000 units of 5 ton and 10 ton tetrapods (6,871 5-ton tetrapods and 1,056 10-ton) tetrapods remaining unutilized under both phases of Anaklia Coastal Protection Project. MRDI and MDF decided to explore opportunities for the future use of these tetrapods, either in Anaklia or on other site where coastal protection is needed. MDF started consultations within the government and relevant organizations to find the solution. Agreement was reached that one of the possible options might be to use them for another coastal protection project in the city of Poti.

154. MDF and MRDI indicated that the Poti Coastal Protection Project (design, laying out activities and supervision) would be financed under the World Bank's Second Regional and Municipal Infrastructure Development Project. To date, MDF and MRDI are still refining and finalizing the action plan with focus on: (i) location and plan for storage of tetrapods (including location [in Anaklia and/or Poti], and before/after handover to Poti City Hall); (ii) options for transportation of the remaining tetrapods (under the Anaklia Coastal Protection [Phase 1] contract, or under a new contract, and transportation by sea and/or by land); (iii) modality for the handover of tetrapods to Poti City Hall; and (iv) detailed and time-bound action plan with defined role of each party.

155. The Mission continued discussion on the use of remaining tetrapods with MDF and MRDI. As agreed in previous ADB missions, MRDI should come up with the options for future use of the tetrapods in different locations The Mission noted that MDF is still working on finalizing the action plan for the use of the balance Tertrapods with focus on: (i) location and plan for storage of tetrapods; (ii) options for transportation of the remaining tetrapods (under the Anaklia Coastal Protection [Phase 1] contract, or under a new contract, and transportation by sea and/or by land);.

156. Mission recommended using sea transportation over land transportation to minimize environmental impacts. Regarding storage, the Mission recommended for the tetrapods to be stored according to the stone yard guidelines of Sogrea (design of tetrapod) as indicated by the Engineer. MDF agreed to develop a storage plan with the support of the Engineer, including storage in Anaklia until the the decision is taken on further use of the tetrapods. It was also agreed that the existing storage location in Anaklia will be converted into a proper stone yard. The action plan will be submitted to ADB for review by end May 2017, together with the transportation action plan. ADB will review the plan (including necessary internal consultations), focusing compliance with the loan covenants.

157. MDF agreed to develop a storage plan with the support of the Engineer, including storage in Anaklia until the tetrapods are moved to Poti. Proper storage will then need to be secured in Poti. It was also agreed that the existing storage location in Anaklia will be converted into a proper stone yard. Draft action plan for a storage of tetrapods in Anaklia, has been developed.

Findings of ADB RETA Consultants during the Site-Visit conducted on April 6, 2017

Tbilisi Metro extension project

158. On April 6, 2017 Regional Environmental Consultant of ADB under the RETA project - Keti Dgebuadze with MDF's Local Environmental Consultant – Nino Nadashvili, conducted the site-visit at Tbilisi Metro Extension Project, met with Contractor (JV Cobra and Assignia/Spain) and Supervision consultant (Eurostudio S.L.) representatives and checked whether the implementation processes and activities corresponds the EMP/SSEMP requirements.

159. Findings were as follows:

Specific issues

- The commencement date of works was established on June 20th 2015. The expected time for the completion of the construction activities is June 2017. Till April 2017 the following activities were completed: Drilling and resin for injections in University station; Interlocking in upper station and pedestrian exit 1 & 2; Asphalt in Vazha Pshavela and Sandro Euli Streets; Line drainage channel between Vazha Pshavela – Delisi; Water tanks waterproofing in tunnel (Technical room, substation); Formworks and concrete for superstructure in right tunnel pk 64+45 -75+08; Aluminothermic welding in left tunnel 70+10 – 74+80; 80+40 – 81+87; Demolition for cable crossing in left tunnel pk 77+30; 77+40; 77+50; 77+60; 78+70; 79+30; 80+12. At present, there are on-going activities covering: Traffic signs installation; Pre installation works in Substation, Upper Station, under the Platform, in dead ends and crossover; Pipe installations in upper station; Flooring works in sub station; rail installation in left tunnel pk 70+00 -74+00; Installation superstructure steel panel in platform, escalators tunnel, pedestrian passage; Cable laying in tunnel; Escalator's installation; Traffic signs installation;
- **Requested documents and management plans:** All documents requested by the RETA International-Regional Environmental Consultant (IEE, EMP, SSEMP, monitoring reports, monitoring checklists, licenses, permits, complaints log book, as well as records of trainings) were kept on camp site. SSEMP was updated by International environmental specialist of SC in October, 2016 due to changes in the detailed design. All requested management plans have

been prepared including Company Waste Management Plan submitted to MoENRP in December 2016 and approved in February 2017.

- **Construction Contractor:** CC hired National Environmental and Health and Safety Manager (from June, 2015), who is permanently on the site and undertakes permanent monitoring using daily and weekly checklists. CC has also hired an International Environmental Expert who works one week per two months.
- **Supervision Consultant**: National Environmental Specialist (Sandro Abzianidze) was hired on a part time job by the SC on 16 January 2016. He prepares quarterly reports and submits to PIU.
- **Biodiversity:** Only one tree has been cut since January 2016 in agreement with City Hall.
- **Waste Management**: Non-hazardous waste, household and solid waste is disposed to official dump site in Gldani district municipality dump area by contractor JV 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** (such as oil, solvents, materials used in oil spill cleanups and etc.) is collected and stored on separate place with appropriate covered skips. Periodically it is passed to a licensed operator Company "Sarini", which has the permit on operation of the hazardous waste. Contract N 25022016 with Company "Sarini" was signed in February, 2016.
- **Construction waste:** Construction waste was observed on the platform during the site monitoring. The Mission advised Contractor to make necessary corrective actions to improve the situation till the end of April 2017.
  Current status: Waste observed during the monitoring visit was removed from the area after one week from the visit.
- **Monitoring (noise, air, groundwater, dust):** Based on the contract 3/60 (between Contractor and National Environmental Agency) Contractor performs monthly measurements of air, water and noise in different points (Metro extension tunnel, University station shaft and new tunnel section for cross over and parking tracks). According to the measurement data provided in March 2017 the obtained results did not exceed the National Environmental Standards (Decree No. 297/N "On Approval of Environmental Quality Norms" (August 16, 2001 of the Ministry of Labor, Health and Social Affairs). According to corrective actions requested by the SC related to dust additional fan has been installed in the tunnel in order to improve the ventilation system there. Operation of all ventilators is mandatory every time construction works are being carried out; PPE equipment (air mask, eye goggles) should be used by all workers and it is mandatory to use them. It should be noted that during the site monitoring mission, due to mitigation measures applied by CC, the situation has been improved and dust was not observed in the tunnel.
- **GRM:** In February 2017 only one verbal complaint was fixed related to the construction waste disposal near the shopping boutique. To resolve this non-compliance, Contractor Company ensured implementation of corrective actions for cleaning the territory from construction waste in March 2017.
- **Groundwater:** The contractor conducts the underground water chemical and microbiological tests and monitors groundwater inflow on a quarterly bases via National Environmental Agency. Tests for underground water quality were done in March 2017, test results will be reflected in next Jan-Jun 2017 BAEMR.
- **Vibration:** According to IEE there is no requirement to perform vibration measurements.

Agreed Actions/Recommendations

160. Results of groundwater and air quality measurements to be reflected in next Jan-Jun 2017 BAEMR.
Current status: Measurement results are reflected and attached to this BAEMR.

161. Corrective actions to be implemented by CC to improve construction waste management till the end of April 2017.
Current status: Corrective actions in order to improve waste management issues have been implemented by CC. Currently there are no construction waste remained inside the Metro.

Grievance Redress Mechanism

162. 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.

163. 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.

164. 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.

165. 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.

166. 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.

167. During the reporting period none of complaints have been raised and registered under the projects.

4. PART IV – ACTION PLAN FOR THE NEXT PERIOD

168. 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.

Tbilisi Metro extension project

169. Construction works will be fully completed in July. After completion of civil works Post – Construction Environmental Audit report will be prepared by SC. Findings will be reflected in final EMR, which will be prepared in December 2017 and send to ADB by MDF's local environmental consultant for approval in January, 2018.

Anaklia Coastal improvement Project

170. Construction contract has been extended till August 31, 2017.

171. During the ADB mission conducted within 3-11 May, 2016 MDF was advised to prepare a plan for the storage and use of the tetrapods which were left unused under both projects (Phase 1 and 2). The tetrapods will need to be stored according to the stone yard guidelines of Sogrea (design of tetrapod) as indicated by the Engineer. Various options were discussed and MDF agreed to provide a short to medium term storage plan, till the re-use option is decided. It was agreed that the existing location be converted into a proper stone yard, as the tetrapods should only be moved once, when they are to be installed at their new location, this would have minimum environmental and safety risks.

172. The draft of mentioned plan for storage of tetrapods was prepared by the Engineer in the end of June, 2016 and submitted to the MDF for consideration. Mentioned plan was sent to ADB as well.

173. To date, as it was mentioned above, MDF and MRDI are still refining and finalizing the action plan with focus on: (i) location and plan for storage of tetrapods (including location [in Anaklia and/or Poti], and before/after handover to Poti City Hall); (ii) options for transportation of the

remaining tetrapods (under the Anaklia Coastal Protection [Phase 1] contract, or under a new contract, and transportation by sea and/or by land); (iii) modality for the handover of tetrapods to Poti City Hall; and (iv) detailed and time-bound action plan with defined role of each party.

174. MDF will build on, amend and expand as necessary the previous transportation action plan, and will submit the revised plan to ADB for review by July, 2017. Regarding storage, the Mission recommended for the tetrapods to be stored according to the stone yard guidelines of Sogrea (design of tetrapod) as indicated by the Engineer.

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.	- 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 4.02.2016. 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; • Turbidity analysis	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; Identifying the degree of turbidity	• Maintaining ichthyofauna and microphytes.	Construction Contractor

			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.During this period no problems has been detected	• Protecting the water quality in the river; • Reducing the impact on the receptors (water biodiversity, etc.) depending on the river water quality.	Construction Contractor

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 safety regulations.	• Protection of soil and water quality; • Reduce the risk of negative visual impact; • No dissatisfied population.	Construction Contractor
Labor safety	Working ground	• Inspection;	Monitoring of the labor safety issues has been carried out by contractor	• Ensuring compliance with health and safety norms;	Construction Contractor

		• Availability of personal protection equipment and periodic control over their good maintenance; • Control over the meeting the requirements for labor safety.	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	• Avoiding/minimizing traumatism.	

Annex 2: 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; 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	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. Working Personal is being instructed on environment and safety issues rules and regulations.	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

	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.		
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 sites,Gas station. Taking all measures to avoid the deterioration of the seawater quality.	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	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 this period

		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.	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; 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	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.

	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); Instructing the personnel (particularly, the drivers of vehicles and techniques); Registering and responding to grievances (if any);	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.

	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 issues is 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.	
Vibration	The equipment and vehicles should be maintained in good working order; Driving the vehicles at optimal speeds, particularly in the settled areas; Instructing the personnel (particularly,	Watering of the roads has been 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	Monitoring of the construction process 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;

	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;	grievance has been detected.	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.	

Tbilisi metro extension project

Reference	Requirement	Action to date	Frequency	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.).	Visual controlling is being performed used a ventilation system which is: monitored and upgraded to ensure air flows are always provided to the workplace, monitoring air flows for explosive gases and atmosphere contaminants regularly, Materials transported to site covered/ wetted down to reduce dust.	Daily Daily Daily Daily	Monthly progress report

	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.	Monitoring by Georgia National Environmental Agency include on a quarterly basis air testing at each underground site or confined space		
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	Noise level measurement at all sites, Visual control and inspection (all sites), used hearing protection (inside tunnels and shafts), silenced engines to achieve a noise level not exceeding LAeq 85 dbA, Monitoring by Georgia National Environmental Agency include on a quarterly basis Noise testing.	Monthly Daily Daily	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			
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.	Contractor submitted the transfer notes that spoil amount 630m3 was transported and disposed by "prime Concrete" to Tbilisi Gldani district landfill		Updated Spoil disposal plan was submitted
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	Contractor provided several waste bins and containers on the office and shafts 51,50 territories as well non-hazardous, hazardous and solid wastes are separated.	Daily checking of segregation	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			
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	All personnel was trained and instructed in waste management practices and procedures as a component of the environmental induction process, maintained all construction sites in a cleaner, tidy and safe condition, Separated hazardous wastes and stored temporarily on site in secure facilities with weather proof flooring, security fencing.	Before stating the construction works Daily	

	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	Proper labeling is provided.	Daily	
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 €	N/A	N/A	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	Cutting of trees and site clearance was monitored		The trees that are not going to be cut 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	Checked signs which are installed to control traffic to avoid traffic congestion at streets or near sites, Checked adequate lightening is provided at all sites and at road diversions.	Daily Daily	

	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	Contractor provided the first aid facilities and fire fighting equipment at the work areas, Contractor provided separate hygienic sanitation facilities/toilets for male and female workers on the camp.	Daily Daily	Manpower are trained on daily bases, tool box talks are filled accordingly

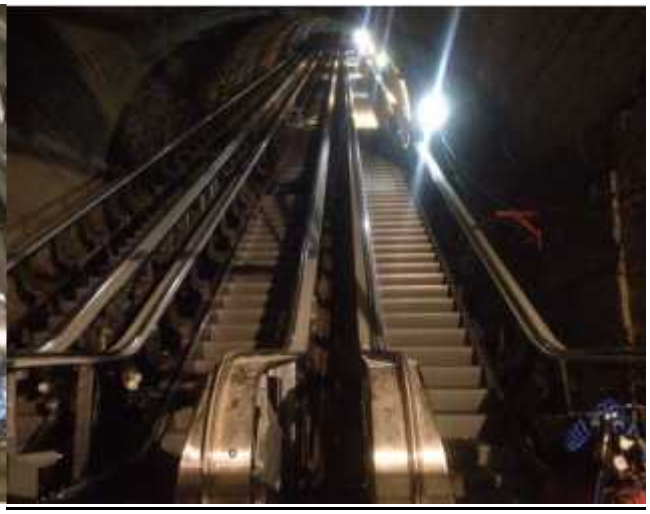
	construction camps consistent with local regulations. e) Provide appropriate personnel safety equipment such as safety boots, helmets, gloves, protective clothes, breathing mask, goggles, and ear protection f) Ensure reversing signals are installed on all construction vehicles. g) Implement precautions 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.	Contractor provided appropriate personnel safety equipment safety boots, helmets, gloves, protective clothes, breathing mask, goggles, and ear protection. The reversing signals are installed on all construction vehicles. Construction sites is being cleaned regularly. People from outside are restricted from entering the construction sites in order to avoid accidents.	Daily Daily Daily Daily	
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	Verified protocol for conducted excavation work, to ensure that any chance finds were recognized and measures were taken to ensure they are protected and conserved.	During pre-construction	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.			

Annex 3: Photos

Anaklia Coastal improvement project

Installation of superstructure steel panel in platform



Escalator's installation

Two specialists of Environmental Agency of Georgia took the samples of noise and air outside and inside the tunnel on 29.05.2017

Escalator is installed

The platform

Attachment 1: Measurements of noise, underground water and atmospheric air chemical parameters

1.1. Measurements implemented by the Contractor

06/01/2017

Report on: Atmospheric air samples for chemical analysis and noise measurement

Date of Inspection:	06.01.2017	Project: Tbilisi Metro line-2	Location :Shaft 50c Construction site

Introduction

Under the project Tbilisi Metro line – 2 Contractor cobra Assignia health, safety and Environmental department conduct Atmospheric air samples for chemical analysis and noise measurement in order to to identify and quantify airborne contaminants in order to determine the level of workplace for manpower welfare.

General description

Contractor HSE representatives Valeri Sadunishvili and Natia Karkuzaevi visited site in order to take measure Co, Co2 and Noise ; The sampling took place at 10.00 in all sections there the activities were in progress, particularly Cross over, Platform, left and right tunnel, technical rooms, Ventilation tunnel and dead ends. The results are show below - figure 1.

Result

Location	Co	Co2	Noise level
	mg/m3	PPM	Db
MPC (maximum Permissible concentration) FOR WORKING AREA	5.0	1000- 2000	80
Platform	0.0	53.0 – 63.0	68.1 – 75.1
Crossover	0.0	550 - 570	71.0
Sub station	0.0	510	68.0
Ventilation tunnel	0.5	540	72.7

Left tunnel	0.0	530	72.1 – 73.1
Dead ends	0.0	550	71.2- 71.7

Site Photos

Attendance list

Natia Karkuzaevi

1.2. Measurements implemented by Contractor
13/01/2017

Report on: Atmospheric air samples for chemical analysis and noise measurement

Date of Inspection:	13.01.2017	Project: Tbilisi Metro line-2	Location :Shaft 50c Construction site

Introduction

Under the project Tbilisi Metro line – 2 Contractor cobra assigna health, safety and Environmental department conduct Atmospheric air samples for chemical analysis and noise measurement in order to to identify and quantify airborne contaminants in order to determine the level of workplace for manpower welfare.

General description

Contractor HSE representatives Valeri Sadunishvili and Natia Karkuzaevi visited site in order to take measure Co, Co2 and Noise ; The sampling took place at 12.45 in all sections there the activities were in progress, particularly Cross over, Platform, left and right tunnel, technical rooms, Ventilation tunnel and dead ends. The results are show below - figure 1.

Result

Location	Co	Co2	Noise level
	mg/m3	PPM	Db
MPC (maximum Permissible concentration) FOR WORKING AREA	5.0	1000- 2000	80
Platform	0.0	51.0 – 55.0	80.8
Crossover	0.0	570	68.1
Sub station	0.0	510	68.0
Ventilation tunnel	0.5	540	72.7

Left tunnel	0.0	550	73.9	
Dead ends	0.0	540	72.7	

Site Photos

Attendance list

Natia Karkuzaevi

1.3. Measurements implemented by Contractor
20/01/2017

Report on: Atmospheric air samples for chemical analysis and noise measurement

Date of Inspection:	20.01.2017	Project: Tbilisi Metro line-2	Location :Shaft 50c Construction site

Introduction

Under the project Tbilisi Metro line – 2 Contractor cobra Assignia health, safety and Environmental department conduct Atmospheric air samples for chemical analysis and noise measurement in order to to identify and quantify airborne contaminants in order to determine the level of workplace for manpower welfare.

General description

Contractor HSE representatives Valeri Sadunishvili and Natia Karkuzaevi visited site in order to take measure Co, Co2 and Noise ; The sampling took place at 16.45 in all sections there the activities were in progress, particularly Cross over, Platform, left and right tunnel, technical rooms, Ventilation tunnel and dead ends. The results are show below - figure 1.

Result

Location	Co	Co2	Noise level
	mg/m3	PPM	Db
MPC (maximum Permissible concentration) FOR WORKING AREA	5.0	1000- 2000	80
Platform	0.0	53.0 – 63.0	68.1 – 75.1
Crossover	0.0	550 - 570	71.0
Sub station	0.0	510	68.0
Ventilation tunnel	0.5	540	72.7

Left tunnel	0.0	530	72.1 – 73.1
Dead ends	0.0	550	71.2- 71.7

Site Photos

Attendance list

Natia Karkuzaevi

1.4. Measurements implemented by Contractor
07/02/2017

Report on: Atmospheric air samples for chemical analysis and noise measurement

Date of Inspection:	07.02.2017	Project: Tbilisi Metro line-2	Location :Shaft 50c Construction site

Introduction

Under the project Tbilisi Metro line – 2 Contractor cobra Assignia health, safety and Environmental department conduct Atmospheric air samples for chemical analysis and noise measurement in order to to identify and quantify airborne contaminants in order to determine the level of workplace for manpower welfare.

General description

Contractor HSE representatives Valeri Sadunishvili and Natia Karkuzaevi visited site in order to take measure Co, Co2 and Noise ; The sampling took place at 15.00 in all sections there the activities were in progress, particularly Cross over, Platform, left and right tunnel, technical rooms, Ventilation tunnel and dead ends. The results are show below - figure 1.

Result

Location	Co	Co2	Noise level
	mg/m3	PPM	Db
MPC (maximum Permissible concentration) FOR WORKING AREA	5.0	1000- 2000	80
Platform	0.0	53.0 – 63.0	68.1 – 75.1
Crossover	0.0	550 - 570	71.0
Sub station	0.0	510	68.0
Ventilation tunnel	0.5	540	72.7

Left tunnel	0.0	530	72.1 – 73.1
Dead ends	0.0	550	71.2- 71.7

Site Photos

Attendance list

Natia Karkuzaevi

1.5. Measurements implemented by Contractor
14/02/2017

Report on: Atmospheric air samples for chemical analysis and noise measurement

Date of Inspection:	14.02.2017	Project: Tbilisi Metro line-2	Location :Shaft 50c Construction site

Introduction

Under the project Tbilisi Metro line – 2 Contractor cobra assignia health, safety and Environmental department conduct Atmospheric air samples for chemical analysis and noise measurement in order to to identify and quantify airborne contaminants in order to determine the level of workplace for manpower welfare.

General description

Contractor HSE representatives Valeri Sadunishvili and Natia Karkuzaevi visited site in order to take measure Co, Co2 and Noise ; The sampling took place at 12.45 in all sections there the activities were in progress, particularly Cross over, Platform, left and right tunnel, technical rooms, Ventilation tunnel and dead ends. The results are show below - figure 1.

Result

Location	Co	Co2	Noise level
	mg/m3	PPM	Db
MPC (maximum Permissible concentration) FOR WORKING AREA	5.0	1000- 2000	80
Platform	0.0	51.0 – 55.0	80.8
Crossover	0.0	570	68.1
Sub station	0.0	510	68.0
Ventilation tunnel	0.5	540	72.7

Left tunnel	0.0	550	73.9	
Dead ends	0.0	540	72.7	

Site Photos

Attendance list

Natia Karkuzaevi

1.6. Measurements implemented by Contractor
10/03/2017

Report on: Atmospheric air samples for chemical analysis and noise measurement

Date of Inspection:	10.03.2017	Project: Tbilisi Metro line-2	Location :Shaft 50c Construction site

Introduction

Under the project Tbilisi Metro line – 2 Contractor cobra assignia health, safety and Environmental department conduct Atmospheric air samples for chemical analysis and noise measurement in order to to identify and quantify airborne contaminants in order to determine the level of workplace for manpower welfare.

General description

Contractor HSE representatives Valeri Sadunishvili and Natia Karkuzaevi visited site in order to take measure Co, Co2 and Noise ; The sampling took place at 15,00 in all sections there the activities were in progress, particularly Cross over, Platform, left and right tunnel, technical rooms, Ventilation tunnel and dead ends. The results are show below - figure 1.

Result

Location	Co	Co2	Noise level
	mg/m3	PPM	Db
MPC (maximum Permissible concentration) FOR WORKING AREA	5.0	1000- 2000	80
Platform	0.5	720	85.5
Crossover	0.0	690	68.1
Sub station	0.0	510	68.0
Ventilation tunnel	0.5	540	72.7

Left tunnel	0.0	550	73.9
Dead ends	0.0	540	74.1

Site Photos

Attendance list

Natia Karkuzaevi

1.7. Measurements implemented by Contractor
15/03/2017

Report on: Atmospheric air samples for chemical analysis and noise measurement

Date of Inspection:	15.03.2017	Project: Tbilisi Metro line-2	Location :Shaft 50c Construction site

Introduction

Under the project Tbilisi Metro line – 2 Contractor cobra Assignia health, safety and Environmental department conduct Atmospheric air samples for chemical analysis and noise measurement in order to to identify and quantify airborne contaminants in order to determine the level of workplace for manpower welfare.

General description

Contractor HSE representatives Valeri Sadunishvili and Natia Karkuzaevi visited site in order to take measure Co, Co2 and Noise ; The sampling took place at 16.25 in all sections there the activities were in progress, particularly Cross over, Platform, left and right tunnel, technical rooms, Ventilation tunnel and dead ends. The results are show below - figure 1.

Result

Location	Co	Co2	Noise level
	mg/m3	PPM	Db
MPC (maximum Permissible concentration) FOR WORKING AREA	5.0	1000- 2000	80
Platform	0.0	850	74.5
Crossover	0.0	580	78.0
Sub station	0.0	510	68.0
Ventilation tunnel	0.5	540	72.7

Left tunnel	0.0	530	72.1 – 73.1
Dead ends	0.0	550	71.2- 71.7

Site Photos

Attendance list

Natia Karkuzaevi

1.8. Measurements implemented by Environmental National Agency
14/03/2017

საქართველოს გარემოსა და ბუნებრივი რესურსების დაცვის სამინისტრო
MINISTRY OF ENVIRONMENT AND NATURAL RESOURCES PROTECTION OF GEORGIA

გარემოს ეროვნული სააგენტო
NATIONAL ENVIRONMENTAL AGENCY

№ 2/1-226 14 03 2017წ.

შპს "თბილისის მეტროს ხაზი 2"-ს უფლებამოსილ
წარმომადგენელს **ბ-ნ ალექსანდრო ხუსტ როდრიგოს**

ბატონო ალექსანდრო,

საქართველოს გარემოსა და ბუნებრივი რესურსების დაცვის სამინისტროს სსიპ "გარემოს ეროვნულ სააგენტო"-სა და შპს "თბილისის მეტროს ხაზი 2"-ს შორის 2016 წლის 15 იანვარს გაფორმებული ფმ 3/60 ხელშეკრულების თანახმად, გაწვდით ქ. თბილისში, ვაგა-ფშაველას გამზირზე თქვენს მიერ მითითებულ ატმოსფერული ჰაერის 2 (ორი) წერტილში, თებერვლის თვეში, ჩატარებული გაზომვის შედეგებს.

დანართი: 1 (ერთი) გვ.

პატივისცემით,

სააგენტოს უფროსი **თამარ ბაგრატია**

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ქ. თბილისში მშენებარე „თბილისის მეტროს ხაზი 2" მიმდებარე ტერიტორიაზე
გაზომვების შედეგები, თებერვალი 2017 წ.

ხელშეკრულება-15.01.2016 წლის №მ-3/60 პასუხის დანართი

№	გაზომვის ადგილი	კონცენტრაცია						ხმაურის დონე დბ
		აზოტის დიოქსიდი მგ/მ³	ნახშირწყალბადები მგ/მ³	მტვერი მგ/მ³	ნახშირბადის მონოოქსიდი მგ/მ³	გოგირდწყალბადი ppm	გოგირდის დიოქსიდი ppm	
1	მაღაროში	0,001	<1	0,248	0,32	<0,1	<0,1	54,2
2	მეტროს სადგურში მესასვლელთან	0,012	-	0,012	0,13	-	<0,1	68,6

გაზომვები ჩატარდა შემდეგი ხელსაწყოების გამოყენებით: გოგირდის დიოქსიდი და გოგირდწყალბადი - GASALERTMICRO 5; მტვერი - CASELLA CEL-712 Microdust Pro; ნახშირბადის მონოოქსიდი და აზოტის დიოქსიდი - ЭЛАН; ნახშირწყალბადები - Колион 1В. ხმაური ბგერის დონე - SLM-700.

გაზომვები ჩაატარეს:
მთავარი სპეციალისტი — სერგო ხაცავა

უფროსი სპეციალისტის
მოვალეობის შემსრულებელი — გიგილა მორგოშია

შეთანხმებულია:
დეპარტამენტის უფროსი — მარიწე არაბიძე

1.9. Measurements implemented by Environmental National Agency
27/03/2017

საქართველოს გარემოსა და ბუნებრივი რესურსების დაცვის სამინისტრო
MINISTRY OF ENVIRONMENT AND NATURAL RESOURCES PROTECTION OF GEORGIA

გარემოს ეროვნული სააგენტო
NATIONAL ENVIRONMENTAL AGENCY

№ 12/1-280 27 03 2017 წ

უსფ"თბილისის მეტროს ხაზი 2"-ს უფლებამოსილ
წარმომადგენელს **ბ-ნ ალეხანდრო ხუსტ როდრიგოს**

ბატონო ალეხანდრო,

საქართველოს გარემოსა და ბუნებრივი რესურსების დაცვის სამინისტროს სსიპ "გარემოს ეროვნულ სააგენტო"-სა და უსფ"თბილისის მეტროს ხაზი 2"-ს შორის 2016 წლის 15 იანვარს გაფორმებული №ფმ-3/60 ხელშეკრულების თანახმად, გაწვდით ქ. თბილისში, ვაჟა-ფშაველას გამზირზე თქვენს მიერ მითითებულ ატმოსფერული ჰაერის 2 (ორი) წერტილში, მარტის თვეში, ჩატარებული გაზომვის შედეგებს.

დანართი: 2 გვ. (ქართულ და ინგლისურ ენაზე)

პატივისცემით,

სააგენტოს უფროსი **თამარ ბაგრატია**

ვ. ალმაშენებლის გამ. 150, 0112, თბილისი, საქართველო
150 D. AGMASHENEBELI AVE, 0112, TBILISI, GEORGIA
Tel.: +995 32 2439502 FAX: +995 32 2439503
E-mail: info@meteo.gov.ge Web: www.meteo.gov.ge

ხელშეკრულება N3/60, 15.01.2016

ქ. თბილისში, ვაჟა-ფშაველას გამზირზე, მეტროპოლიტენის მშენებარე სადგურის დამკვეთის მიერ მითითებულ ორ წერტილში: ზედაპირზე - მეტროს სადგურის შესასვლელის მიმდებარე ტერიტორიაზე (კოორდინატები: 38T0476465; 4619016) და მეტროს გვირაბში ჰაერში მტვრის, ნახშირბადის ოქსიდის (CO), აზოტის დიოქსიდის (NO_2),გოგირდის დიოქსიდის (SO_2), ჯამური ნახშირწყალბადების (TPH), გოგირდწყალბადის (H_2S) კონცენტრაციებისა და ხმაურის მაქსიმალური დონის გაზომვების შედეგები.

გაზომვის ადგილი	მტვერი, მგ/მ³	CO, მგ/³	NO_2მგ /მ³	SO_2მგ/მ³	TPH, მგ/მ³	H_2S, მგ/მ³	ხმაურის დონე,დბ.
ზედაპირზე	0,342	0,14	0,003	<0,265	1	<0,141	63,2
გვირაბში	1,412	1,22	0,002	<0,265	8	<0,141	78,1
ზდკ	2,0	20,0	5,0	10	-	10	80

ზდკ – სამუშაო ზონის ჰაერში ზღვრულად დასაშვები კონცენტრაციების / ხმაურის დონის მნიშვნელობებია.

0,265 მგ/მ³ – SO_2-ის და 0,141 მგ/მ³ – H_2S-ის კონცენტრაციების მზომი ხელსაწყოების აღმოჩენის ზღვარია, შესაბამისად.

გაზომვები ჩატარდა 2017 წლის 20 მარტს 13:30 სთ-დან 15:30 სთ-მდე დროის ინტერვალში ხელსაწყოებით Элан CO-50/NO_2 (CO, NO_2), Gas Alert Micro 5 (SO_2, H_2S), CEL-712 (მტვერი), КОЛИОН-1В (TPH), SLM-700 (ხმაური).

შემსრულებლები:

გ. ნარსია

გ. კარგარეთელი

შეთანხმებულია:

გარემოს დაბინძურების მონიტორინგის დეპარტამენტის უფროსი

მ. არაბიძე

Agreement N 3/60, 15.01.2016

Results ofDust, Carbon Monoxide (CO), Nitrogen Dioxide (NO_2), Sulfur Dioxide (SO_2), Total Petrol Hydrocarbons (TPH), Hydrogen Sulfide (H_2S) maximum concentration and Maximum Noise Level measurements in the air in 2 points of the underground subway station under construction set by the customer – on surface, at the subway station entrance (Tbilisi, Vaja-Pshavela Ave., coordinates: 38T0476525; 4619028) and underground in the subway.

Site	Total Dust, mg/m³	CO, mg/m³	NO_2, mg/m³	SO_2, mg/m³	TPH, mg/m³	H_2S, mg/m³	Noise Level, dB
On surface	0,342	0,14	0,003	<0,265	1	<0,141	63,2
Inthe subway	1,412	1,22	0,002	<0,265	8	<0,141	78,1
MPC	2,0	20,0	5,0	10	-	10	80

MPC - maximum permissible concentrations / noise levelin the air of working area.

0,265 mg/m³and 0,141 mg/m³ – sensitivities of SO_2 – and H_2S– concentrationmeasuring devices, correspondingly.

Measurements were carried out in time interval from 1:30 pm to 3:30 pm with following devices – Элан CO-50 / NO_2 (CO, NO_2), Gas Alert Micro 5 (SO_2, H_2S), CEL-712 (Dust), КОЛИОН-1В (TPH), SLM-700 (Noise).

Executors:

G. Narsia

G. Kargareteli

Agreed:

Head of Environmental
Pollution Monitoring Department

M. Arabidze

1.10. Measurements implemented by Environmental National Agency 27/03/2017

საქართველოს გარემოსა და ბუნებრივი რესურსების დაცვის სამინისტრო
MINISTRY OF ENVIRONMENT AND NATURAL RESOURCES PROTECTION OF GEORGIA

გარემოს ეროვნული სააგენტო
NATIONAL ENVIRONMENTAL AGENCY

№ 12/1-281 27 03 2017 წ.

უსფ"თბილისის მეტროს ხაზი 2"-ს უფლებამოსილ
წარმომადგენელს **ბ-ნ ალეხანდრო ხუსტ როდრიგოს**

ბატონო ალეხანდრო,

საქართველოს გარემოსა და ბუნებრივი რესურსების დაცვის სამინისტროს სსიპ "გარემოს ეროვნულ სააგენტო"-სა და უსფ"თბილისის მეტროს ხაზი 2"-ს შორის 2017 წლის 17 მარტს გაფორმებული №ფმ-3/247 ხელშეკრულების თანახმად, გაწვდით ქ. თბილისში, ვაჟა-ფშაველას გამზირზე მშენებარე მეტროს გვირაბში, თქვენს მიერ მითითებული ადგილიდან აღებულ წყლის ერთ სინჯში ჩატარებული ქიმიური და ბაქტერიოლოგიური კვლევის შედეგებს.

დანართი: 8 (რვა) გვ.

პატივისცემით,

სააგენტოს უფროსი თამარ ბაგრატია

ქ. თბილისი, აღმაშენებლის გამზ. 150, 0112, საქართველო
150 D. AGMASHENEBELI AVE., 0112, TBILISI, GEORGIA
Tel.: +995 32 2439102 Fax: +995 32 2439503
E-mail: info@meteo.gov.ge Web: www.meteo.gov.ge

გარემოს ეროვნული სააგენტო
გარემოს დაბინძურების მონიტორინგის დეპარტამენტი

ატმოსფერული ჰაერის, წყლისა და
ნიადაგის ანალიზის ლაბორატორია

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ხსდ 6

გარემოს ეროვნული სააგენტო

გარემოს დაბინძურების მონიტორინგის დეპარტამენტი

ატმოსფერული ჰაერის, წყლისა და ნიადაგის ანალიზის ლაბორატორია

მე-8 სართული – დავით აღმაშენებლის 150, თბილისი, საქართველო 112

- გამოცდის ოქმი –
№25- 2017

გარემოს ეროვნული სააგენტო
გარემოს დაბინძურების მონიტორინგის დეპარტამენტი

ატმოსფერული ჰაერის, წყლისა და
ნიადაგის ანალიზის ლაბორატორია

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გამოცდის ოქმი №25-2017

რეგისტრირებული სინჯის ნომერი: №261

გამოცდის ოქმის გვერდების რიცხვი: 4

დამკვეთის სახელი: უსფ „თბილისის მეტროს ხაზი 2"

დამკვეთის მისამართი: ქ. თბილისი, 0104, ძმები ზუბალაშვილების ქ. №27/9

ტელ.: (+99532) 591 70 74 04

დამკვეთის მიერ მიცემული ეტიკეტი: №1

სინჯის აღწერა და იდენტიფიკაცია (მატრიცა, ფორმა): ნაჟური წყალი

გამოყენებული მეთოდი/ხელსაწყო: იონ-ქრომატოგრაფი, ტიტრიმეტრული, სპექტროფოტომეტრული, მემბრანული ფილტრაციის მეთოდი

სინჯის მიღების თარიღი CR: 20.03.2017

გამოცდის ჩატარების თარიღი: 20.03.2017-24.03.2017

გამოცდის ოქმის გაცემის თარიღი: 24.03.2017

გარემოს ეროვნული სააგენტო
გარემოს დაბინძურების მონიტორინგის დეპარტამენტი

ატმოსფერული ჰაერის, წყლისა და
ნიადაგის ანალიზის ლაბორატორია

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№261 (1)

„მეტრო" – გვირაბში, ბეტონის ჩასასხმელ ადგილთან
(ნაჟური წყალი)

№	დასახელება	ერთეული	გაზომვის შედეგები	გამოყენებული მეთოდი
1	სიმღვრივე (ტურბულენტობა)	NTU	0.64	ფოტომეტრული
2	მინერალიზაცია	მგ/ლ	1729,85	
3	ტუტიანობა	მგ/ლ	102,0	ტიტრიმეტრული
4	სიხისტე	მგ-ექვ/ლ	25,52	ტიტრიმეტრული
5	ქლ	მგ/ლ	15,68	ISO 6060:2010
6	ამონიუმი	მგN/ლ	0.731	ISO 7150-1:2010
7	ნიტრიტი	მგN/ლ	0,356	ISO 10304-1:2007
8	ნიტრატი	მგN/ლ	0,350	ISO 10304-1:2007
9	ფოსფატი	მგ/ლ	0,054	ISO 10304-1:2007
10	სულფატები	მგ/ლ	1345,40	ISO 10304-1:2007
11	ქლორიდები	მგ/ლ	57,26	ISO 10304-1:2007
12	ფტორი	მგ/ლ	0,081	ISO 10304-1:2007
13	ბრომი	მგ/ლ	0,130	ISO 10304-1:2007
14	ჰიდროკარბონატები	მგ/ლ	124,44	ტიტრიმეტრული
15	კალიუმი	მგ/ლ	1,9	ISO 9964-3:2010
16	ნატრიუმი	მგ/ლ	85,5	ISO 9964-3:2010
17	კალციუმი	მგ/ლ	390,59	ISO 6058:2008
18	მაგნიუმი	მგ/ლ	73,49	ISO 6058:2008
19	ტოტალური კოლიფორმები	1 ლ-ში	არ აღმოჩნდა	მემბრანული ფილტრაციის მეთოდი
20	ფეკალური სტრეპტოკოკები	1 ლ-ში	არ აღმოჩნდა	მემბრანული ფილტრაციის მეთოდი
21	E-Coli	1 ლ-ში	არ აღმოჩნდა	მემბრანული ფილტრაციის მეთოდი

შენიშვნა: გამოცდის შედეგები სადაოა გამოცდის ოქმის მიღების თარიღიდან 14 დღის განმავლობაში.

შემსრულებლები:

გ.კუჭავა

მ.ჭიღიტაშვილი

ე.ქრტოშვილი

ა.ნატრიაშვილი

ს.ხმირადაშვილი

ლაბორატორიის უფროსი: ელინა ბაქრაძე

გარემოს ეროვნული სააგენტო
გარემოს დაბინძურების მონიტორინგის დეპარტამენტი

ატმოსფერული ჰაერის, წყლისა და
ნიადაგის ანალიზის ლაბორატორია

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გარემოს ეროვნული სააგენტო
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მე-8 სართული – დავით აღმაშენებლის 150, თბილისი, საქართველო 112

- გამოცდის ოქმი – №25ა

24.03.2017

გარემოს ეროვნული სააგენტო
გარემოს დაბინძურების მონიტორინგის დეპარტამენტი

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ნიადაგის ანალიზის ლაბორატორია

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გამოცდის ოქმი №25ა- 2017

რეგისტრირებული სინჯის ნომერი: №261

გამოცდის ოქმის გვერდების რიცხვი: 4

დამკვეთის სახელი: უსფ „თბილისის მეტროს ხაზი 2"

დამკვეთის მისამართი: ქ. თბილისი, 0104, ძმები ზუბალაშვილების ქ. №27/9

ტელ.: 995(32) 591 70 74 04

დამკვეთის მიერ მიცემული ეტიკეტი: №1

სინჯის აღწერა და იდენტიფიკაცია (მატრიცა, ფორმა): ნაჟური წყალი

გამოყენებული მეთოდი/ხელსაწყო: ICP-OES

სინჯის მიღების თარიღი: 20.03.2017

გამოცდის ჩატარების თარიღი: 20.03.2017-24.03.2017

გამოცდის ოქმის გაცემის თარიღი: 24.03.2017

გარემოს ეროვნული სააგენტო
გარემოს დაბინძურების მონიტორინგის დეპარტამენტი

ატმოსფერული ჰაერის, წყლისა და
ნიადაგის ანალიზის ლაბორატორია

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№261 (1)

„მეტრო" – გვირაბში, ბეტონის ჩასასხმელ ადგილთან
(ნაჟური წყალი)

№	გაზომილი პარამეტრები	ერთეული	გაზომვის შედეგები	გამოყენებულიმ ეთოდი
1	pH		9,77	ISO 10523:2010
2	რკინა	მგ/ლ	0,1989	ISO 11885:2007

გარემოს ეროვნული სააგენტო
გარემოს დაბინძურების მონიტორინგის დეპარტამენტი

ატმოსფერული ჰაერის, წყლისა და
ნიადაგის ანალიზის ლაბორატორია

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შენიშვნა: გამოცდის შედეგები სადაოა გამოცდის ოქმის მიღების თარიღიდან 14 დღის განმავლობაში.

შემსრულებლები:

გაკუჭავა

ს.ხმიადაშვილი

ლაბორატორიის უფროსი: ელინა ბაქრაძე

1.11. Measurements implemented by Contractor
30/03/2017

Report on: Atmospheric air samples for chemical analysis and noise measurement

Date of Inspection:	30.03.2017	Project: Tbilisi Metro line-2	Location :Shaft 50c Construction site

Introduction

Under the project Tbilisi Metro line – 2 Contractor cobra Assignia health, safety and Environmental department conduct Atmospheric air samples for chemical analysis and noise measurement in order to to identify and quantify airborne contaminants in order to determine the level of workplace for manpower welfare.

General description

Contractor HSE representatives Valeri Sadunishvili and Natia Karkuzaevi visited site in order to take measure Co, Co2 and Noise ; The sampling took place at 16.25 in all sections there the activities were in progress, particularly Cross over, Platform, left and right tunnel, technical rooms, Ventilation tunnel and dead ends. The results are show below - figure 1.

Result

Location	Co	Co2	Noise level
	mg/m3	PPM	Db
MPC (maximum Permissible concentration) FOR WORKING AREA	5.0	1000- 2000	80
Platform	0.0	890	74.5
Crossover	0.0	680	68.9
Sub station	0.0	510	68.0
Ventilation tunnel	0.5	560	72.7

Left tunnel	0.0	510	84.0
Dead ends	0.0	550	71.2- 71.7

Site Photos

Attendance list

Natia Karkuzaevi

1.12. Measurements implemented by Contractor
08/05/2017

Report on: Atmospheric air samples for chemical analysis and noise measurement

Date of Inspection:	08.05.2017	Project: Tbilisi Metro line-2	Location :Shaft 50c Construction site

Introduction

Under the project Tbilisi Metro line – 2 Contractor cobra Assignia health, safety and Environmental department conduct Atmospheric air samples for chemical analysis and noise measurement in order to to identify and quantify airborne contaminants in order to determine the level of workplace for manpower welfare.

General description

Contractor HSE representatives Levaan Gvazava and Natia Karkuzaevi visited site in order to take measure Co, Co2 and Noise ; The sampling took place at 16:00 in all sections there the activities were in progress, particularly Cross over, Platform, left and right tunnel, technical rooms, Ventilation tunnel and dead ends. The results are show below - figure 1.

Result

Location	Co	Co2	Noise level
	mg/m3	PPM	Db
MPC (maximum Permissible concentration) FOR WORKING AREA	5.0	1000- 2000	80
Platform	0.0	680	75.7
Under Platform	0.0	620	73.2
Crossover	1.5	980	71.5
Sub station	0.0	610	64.7

Ventilation tunnel	0.5	520	50.4	
Left tunnel	0.0	580	65.4	
Right tunnel	1.0	600	62.7	
Dead ends	0.0	830	66.8	

Site Photos




Attendance list

Natia Karkuzaevi

1.13. Measurements implemented by Contractor
15/05/2017

Report on: Atmospheric air samples for chemical analysis and noise measurement

Date of Inspection:	15.05.2017	Project: Tbilisi Metro line-2	Location :Shaft 50c Construction site

Introduction

Under the project Tbilisi Metro line – 2 Contractor cobra Assignia health, safety and Environmental department conduct Atmospheric air samples for chemical analysis and noise measurement in order to to identify and quantify airborne contaminants in order to determine the level of workplace for manpower welfare.

General description

Contractor HSE representatives Levaan Gvazava and Natia Karkuzaevi visited site in order to take measure Co, Co2 and Noise ; The sampling took place at 12:15 in all sections there the activities were in progress, particularly Cross over, Platform, left and right tunnel, technical rooms, Ventilation tunnel and dead ends. The results are show below - figure 1.

Result

Location	Co	Co2	Noise level
	mg/m3	PPM	Db
MPC (maximum Permissible concentration) FOR WORKING AREA	5.0	1000- 2000	80
Platform	0.0	650	67.1
Under Platform	0.0	650	71.7
Crossover	1.5	980	71.5
Sub station	0.0	610	64.7

Report on: Atmospheric air samples for chemical analysis and noise measurement

Date of Inspection:	15.05.2017	Project: Tbilisi Metro line-2	Location :Shaft 50c Construction site

Introduction

Under the project Tbilisi Metro line – 2 Contractor cobra Assignia health, safety and Environmental department conduct Atmospheric air samples for chemical analysis and noise measurement in order to to identify and quantify airborne contaminants in order to determine the level of workplace for manpower welfare.

General description

Contractor HSE representatives Levaan Gvazava and Natia Karkuzaevi visited site in order to take measure Co, Co2 and Noise ; The sampling took place at 12:15 in all sections there the activities were in progress, particularly Cross over, Platform, left and right tunnel, technical rooms, Ventilation tunnel and dead ends. The results are show below - figure 1.

Result

Location	Co	Co2	Noise level
	mg/m3	PPM	Db
MPC (maximum Permissible concentration) FOR WORKING AREA	5.0	1000- 2000	80
Platform	0.0	650	67.1
Under Platform	0.0	650	71.7
Crossover	1.5	980	71.5
Sub station	0.0	610	64.7

Ventilation tunnel	0.5	520	50.4	
Left tunnel	0.0	580	65.4	
Right tunnel	1.0	600	62.7	
Dead ends	0.0	830	66.8	
Emergency Tunnel	0.0	510	46.2	

Site Photos




Attendonce list

Natia Karkuzaevi

1.14. Measurements implemented by Contractor
19/05/2017

Report on: Atmospheric air samples for chemical analysis and noise measurement

Date of Inspection:	19.05.2017	Project: Tbilisi Metro line-2	Location :Shaft 50c Construction site

Introduction

Under the project Tbilisi Metro line – 2 Contractor cobra Assignia health, safety and Environmental department conduct Atmospheric air samples for chemical analysis and noise measurement in order to to identify and quantify airborne contaminants in order to determine the level of workplace for manpower welfare.

General description

Contractor HSE representatives Levaan Gvazava and Natia Karkuzaevi visited site in order to take measure Co, Co2 and Noise ; The sampling took place at 18:00 in all sections there the activities were in progress, particularly Cross over, Platform, left and right tunnel, technical rooms, Ventilation tunnel and dead ends. The results are show below - figure 1.

Result

Location	Co	Co2	Noise level
	mg/m3	PPM	Db
MPC (maximum Permissible concentration) FOR WORKING AREA	5.0	1000- 2000	80
Platform	0. 1	660	73.8
Under Platform	0.0	650	71.7
Crossover	1.5	980	71.5
Sub station	0.0	610	64.7

Ventilation tunnel	0.5	520	50.4	
Left tunnel	0.0	580	65.4	
Right tunnel	1.0	600	62.7	
Dead ends	0.0	830	66.8	
Emergency Tunnel	0.0	510	46.2	

Site Photos




Attendance list

Natia Karkuzaevi

1.15. Measurements implemented by Environmental National Agency
23/05/2017

საქართველოს გარემოსა და ბუნებრივი რესურსების დაცვის სამინისტრო
MINISTRY OF ENVIRONMENT AND NATURAL RESOURCES PROTECTION OF GEORGIA

გარემოს ეროვნული სააგენტო
NATIONAL ENVIRONMENTAL AGENCY

№ 12/1-421 23 05 2017წ.

უსფ"თბილისის მეტროს ხაზი 2"-ს უფლებამოსილ
წარმომადგენელს **ბ-ნ ალეხანდრო ხუსტ როდრიგოს**

ბატონო ალეხანდრო,

საქართველოს გარემოსა და ბუნებრივი რესურსების დაცვის სამინისტროს სსიპ "გარემოს ეროვნულ სააგენტო"-სა და უსფ"თბილისის მეტროს ხაზი 2"-ს შორის 2016 წლის 15 იანვარს გაფორმებული ფმ 3/60 ხელშეკრულების თანახმად, გაწვდით ქ. თბილისში, ვაჟა-ფშაველას გამზირზე თქვენს მიერ მითითებულ ატმოსფერული ჰაერის 2 (ორი) წერტილში, აპრილის თვეში, ჩატარებული გაზომვის შედეგებს.

დანართი: 1 (ერთი) გვ.

პატივისცემით,

სააგენტოს უფროსი თამარ ბაგრატია

ა. აღმაშენებლის ბაღი. 150, 0112, თბილისი, საქართველო
150 D. AGMASHENEBELI AVE., 0112, TBILISI, GEORGIA
Tel.: +995 32 2439502 FAX: +995 32 2439503
E-mail: info@meteo.gov.ge Web: www.meteo.gov.ge

ქ. თბილისში მშენებარე „თბილისის მეტროს ხაზი 2" მიმდებარე ტერიტორიაზე
გაზომვების შედეგები, 18.04. 2017 წ.

ხელშეკრულება-15.01.2016 წლის №9-3/60 პასუხის დანართი

№	გაზომვის ადგილი	კონცენტრაცია						ხმაურის დონე დბ
		აზოტის დიოქსიდი მგ/მ³	ნახშირწყალბადები მგ/მ³	მტვერი მგ/მ³	ნახშირბადის მონოოქსიდი მგ/მ³	გოგირდწყალბადი ppm	გოგირდის დიოქსიდი ppm	
1	მაღაროში	<0,001	<1	1,094	0,47	<0,1	<0,1	79,2
2	მეტროს სადგურში შესასვლელთან	0,123	-	0,271	<0,01	-	<0,1	63,2

გაზომვები ჩატარდა შემდეგი ხელსაწყოების გამოყენებით: გოგირდის დიოქსიდი და გოგირდწყალბადი - GASALERTMICRO 5; მტვერი - CASELLA CEL-712 Microdust Pro; ნახშირბადის მონოოქსიდი და აზოტის დიოქსიდი - ЭЛАН; ნახშირწყალბადები - Колион 1В, ხმაური ბგერის დონე - SLM-700.

გაზომვები ჩაატარეთ:
მთავარი სპეციალისტი — სერგო ხაცავა

უფროსი სპეციალისტის
მოვალეობის შემსრულებელი — გიგლა მორგოშია

შეთანხმებულია:
დეპარტამენტის უფროსი — მარინე არაბიძე

1.16. Measurements implemented by Contractor
01/06/2017

Report on: Atmospheric air samples for chemical analysis and noise measurement

Date of Inspection:	01.06.2017	Project: Tbilisi Metro line-2	Location :Shaft 50c Construction site

Introduction

Under the project Tbilisi Metro line – 2 Contractor cobra Assignia health, safety and Environmental department conduct Atmospheric air samples for chemical analysis and noise measurement in order to to identify and quantify airborne contaminants in order to determine the level of workplace for manpower welfare.

General description

Contractor HSE representatives Levaan Gvazava and Natia Karkuzaevi visited site in order to take measure Co, Co2 and Noise ; The sampling took place at 16:00 in all sections there the activities were in progress, particularly Cross over, Platform, left and right tunnel, technical rooms, Ventilation tunnel and dead ends. The results are show below - figure 1.

Result

Location	Co	Co2	Noise level
	mg/m3	PPM	Db
MPC (maximum Permissible concentration) FOR WORKING AREA	5.0	1000- 2000	80
Platform	0.0	680	75.7
Under Platform	0.0	620	73.2
Crossover	1.5	980	71.5
Sub station	0.0	610	64.7

Ventilation tunnel	0.5	520	50.4	
Left tunnel	0.0	580	65.4	
Right tunnel	1.0	600	62.7	
Dead ends	0.0	830	66.8	

Site Photos




Attendance list

Natia Karkuzaevi

1.17. Measurements implemented by Contractor
15/06/2017

Report on: Atmospheric air samples for chemical analysis and noise measurement

Date of Inspection:	15.06.2017	Project: Tbilisi Metro line-2	Location :Shaft 50c Construction site

Introduction

Under the project Tbilisi Metro line – 2 Contractor cobra Assignia health, safety and Environmental department conduct Atmospheric air samples for chemical analysis and noise measurement in order to to identify and quantify airborne contaminants in order to determine the level of workplace for manpower welfare.

General description

Contractor HSE representatives Levaan Gvazava and Natia Karkuzaevi visited site in order to take measure Co, Co2 and Noise ; The sampling took place at 04:00 in all sections there the activities were in progress, particularly Cross over, Platform, left and right tunnel, technical rooms, Ventilation tunnel and dead ends. The results are show below - figure 1.

Result

Location	Co	Co2	Noise level
	mg/m3	PPM	Db
MPC (maximum Permissible concentration) FOR WORKING AREA	5.0	1000- 2000	80
Platform	0.0	650	67.1
Under Platform	0.0	650	71.7
Crossover	1.5	980	71.5
Sub station	0.0	610	64.7

Ventilation tunnel	0.5	520	50.4	
Left tunnel	0.0	580	65.4	
Right tunnel	1.0	600	62.7	
Dead ends	0.0	830	66.8	
Emergency Tunnel	0.0	510	46.2	

Site Photos




Attendonce list

Natia Karkuzaevi

1.18. Measurements implemented by Contractor
21/06/2017

Report on: Atmospheric air samples for chemical analysis and noise measurement

Date of Inspection:	21.06.2017	Project: Tbilisi Metro line-2	Location :Shaft 50c Construction site

Introduction

Under the project Tbilisi Metro line – 2 Contractor cobra Assignia health, safety and Environmental department conduct Atmospheric air samples for chemical analysis and noise measurement in order to to identify and quantify airborne contaminants in order to determine the level of workplace for manpower welfare.

General description

Contractor HSE representatives Levaar Gvazava and Natia Karkuzaevi visited site in order to take measure Co, Co2 and Noise ; The sampling took place at 16:00 in all sections there the activities were in progress, particularly Cross over, Platform, left and right tunnel, technical rooms, Ventilation tunnel and dead ends. The results are show below - figure 1.

Result

Location	Co	Co2	Noise level
	mg/m3	PPM	Db
MPC (maximum Permissible concentration) FOR WORKING AREA	5.0	1000- 2000	80
Platform	0. 1	660	73.8
Under Platform	0.0	650	71.7
Crossover	1.5	980	71.5
Sub station	0.0	610	64.7

Ventilation tunnel	0.5	520	50.4	
Left tunnel	0.0	580	65.4	
Right tunnel	1.0	600	62.7	
Dead ends	0.0	830	66.8	
Emergency Tunnel	0.0	510	46.2	

Site Photos

Attendance list

Natia Karkuzaevi

1.19. Measurements implemented by Contractor
28/06/2017

Report on: Atmospheric air samples for chemical analysis and noise measurement

Date of Inspection:	28.06.2017	Project: Tbilisi Metro line-2	Location :Shaft 50c Construction site

Introduction

Under the project Tbilisi Metro line – 2 Contractor cobra Assignia health, safety and Environmental department conduct Atmospheric air samples for chemical analysis and noise measurement in order to to identify and quantify airborne contaminants in order to determine the level of workplace for manpower welfare.

General description

Contractor HSE representatives Levaan Gvazava and Natia Karkuzaevi visited site in order to take measure Co, Co2 and Noise ; The sampling took place at 16.05 in all sections there the activities were in progress, particularly Cross over, Platform, left and right tunnel, technical rooms, Ventilation tunnel and dead ends. The results are show below - figure 1.

Result

Location	Co	Co2	Noise level
	mg/m3	PPM	Db
MPC (maximum Permissible concentration) FOR WORKING AREA	5.0	1000- 2000	80
Platform	0.0	680	75.7
Under Platform	0.0	770	72.9
Crossover	1.0	970	73.7
Sub station	0.0	540	60.7

Ventilation tunnel	0.0	540	60.7
Left tunnel	0.0	640	71.9
Right tunnel	0.0	650	85.7
Dead ends	0.0	850	67.4
Emergency Tunnel	0.0	510	55.3

Site Photos

Attendance list

Natia Karkuzaevi