APPENDIX A

ENVIRONMENTAL MANAGEMENT PLANS

Table A-1: Lot 1 Pre-construction and Construction Phase EMP

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Responsibility		Target / Indicator	Estimated Cost
			Implementation	Monitoring		
1	Disclosure of project information	Implementation of the **Stakeholder Engagement Plan** (SEP) – Section 6.2.2.3, EIA Disclosure Phase	RD, Engineer (if appointed) and The Detailed Design team if available	ADB, EBRD	1. Consultation completed with the identified stakeholders per the SEP and results of consultations presented to RD and Lenders.	Borne by the RD
2	Development and implementation of the mechanism to resolve environmental complaints due to the project implementation	Prior to start of site works, the Contractor shall: • Communicate a grievance redress mechanism (GRM), as described in the EIA, to communities in the project impact zone • set-up and publicize a 24-hour hotline for complaints. • ensure that names and contact numbers of representatives of RD and contractors are placed on the notice boards outside the construction site. During Construction the Contractor shall complete consultations according to the requirement of the **Stakeholder Engagement Plan** (SEP).	Contractor	Engineer, RD, ADB, EBRD	1. GRM Established. 2. 24 Hour hotline Established and operational. 3. Notice boards located at construction sites. 4. Consultation completed with the identified stakeholders per the SEP and results of consultations presented to RD and Lenders.	24 hour hotline / $500 per month 50 Noticeboards / $5,000
3	Development of SEMP	The Contractor shall prepare a SEMP. The SEMP will describe the precise location of the required mitigation / monitoring, the persons responsible for the mitigation / monitoring, the schedule and reporting methodology. The SEMP will	Preparation: Contractors ESO Approval: Engineer, RD ADB, EBRD	RD/Engineer. Information – included in reports to the Lenders	1. SEMP approved by all parties.	Part of Contractor's ESO staff costs.

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		include all of the sub-plans listed below (#3) unless these works are not scheduled to start until a later date (see specific sub-plans for details). The SEMP will be submitted to the Engineer and RD for approval at least 30 days before taking possession of any work site. No access to the site will be allowed until the SEMP is approved by the Engineer and RD the ADB and EBRD. New topic specific or site specific EMPs may also need to be developed by the Contractor during the construction phase. These new plans will also need to be approved by the Engineer and the RD.				
	Development of sub-plans	***Topsoil Management Plan -*** *The plan shall describe topsoil stripping procedures and rules, topsoil stripping depth and volumes, topsoil stripping supervision, transportation and stockpiling requirements, stockpile location, topsoil stockpile design, stockpile management, erosion hazard and erosion control, runoff drainage/diversion, soil protection measures at the storage area, maintenance of the stockpile and topsoil application procedure.*	*Preparation: Contractor* *Approval: Engineer, RD*	*RD/Engineer. Information – included in reports to the Lenders*	*1. Plan approved as part of the SEMP by relevant parties.*	*Part of Contractor's ESO / EcoW staff costs.*
		Waste Management Plan - *The plan shall describe waste*	*Preparation: Contractor*	*RD/Engineer. Information –*	*1. Plan approved as part of the SEMP by*	*Part of Contractor's*

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		streams and amounts, describe recycling/reuse methods for each material, identify the waste destinations and transport modes, including what materials are being segregated on site for reuse or recycling, specify responsibilities for managing and disposal of waste. Describe special measures for material use and handling. Describe communication and training to support and encourage participation from everyone on site.	*Approval: Engineer, RD*	*included in reports to the Lenders*	*relevant parties.*	*ESO staff costs.*
		***Waste Water Management Plan -** (in case intended to discharge waste water from the camp and/or work area into a surface water body). The plan must provide details on waste water (sewage) volume, disposal scheme, information on capacity and type of waste water treatment facility, location of the discharge point/points with indication of coordinates. A discharge permit will be sought from the MoEPA and Maximum Allowable Discharge Limits (MADLs) will be set which the project must then comply with.*	*Preparation: Contractor* *Approval: Engineer, RD*	*RD/Engineer. Information – included in reports to the Lenders*	*1. Plan approved as part of the SEMP by relevant parties.*	*Part of Contractor's ESO staff costs.*
		***Air Quality Management Plan -** The plan shall provide details of mitigation measures, specific location and schedule where*	*Preparation: Contractor* *Approval: Engineer, RD*	*RD/Engineer. Information – included in reports to the Lenders*	*1. Plan approved as part of the SEMP by relevant parties.*	*Part of Contractor's ESO staff costs.*

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		such measures shall be implemented to minimize impacts to sensitive receptors due to the presence of the camp, construction works, sourcing and transport of construction materials, and other project-related activities. Recommendations provided in the EIA must be considered. Prior to commencement of works likely emissions from crushers, concrete production facilities and other emissions generating facilities must be calculated and agreed with the MoEPA. Separate plan/schedule for air quality control in the tunnel must be provided.				
		***Noise Control Plan -** The plan shall provide details of mitigation measures, specific location and schedule where such measures shall be implemented to minimize impacts to sensitive receptors due to the presence of the camp, construction works, sourcing and transport of construction materials, and other project-related activities. Recommendations provided in the EIA must be considered.*	*Preparation: Contractor* *Approval: Engineer, RD*	*RD/Engineer. Information – included in reports to the Lenders*	*1. Plan approved as part of the SEMP by relevant parties.*	*Part of Contractor's ESO staff costs.*
		***Spill Management Plan** - The plan shall provide details of procedures, responsibilities, resources, documentation and*	*Preparation: Contractor* *Approval: Engineer, RD*	*RD/Engineer. Information – included in reports to the Lenders*	*1. Plan approved as part of the SEMP by relevant parties.*	*Part of Contractor's ESO staff costs.*

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		reporting requirements, training provisions for relevant staff, etc. to avoid spills of hazardous substances and to effectively respond to such incidents. Recommendations provided in the EIA must be considered.				
		Traffic Management Plan - The plan shall be designed to ensure that traffic congestion and traffic safety impacts due to construction activities and movement of construction vehicles, haulage trucks, and equipment is minimized. The plan shall be prepared in consultation with traffic officials. The plan shall identify traffic diversion and management issues, traffic schedules, traffic arrangements showing all detours/lane diversions, modifications to signaling at intersections, necessary barricades, warning/advisory signs, road signs, lighting, and other provisions to ensure that adequate and safe access is provided to motorists and other road users in the affected areas. Pre-construction access road surveys will also form part of the TMP.	Preparation: Contractor Approval: Engineer, RD	RD/Engineer. Information – included in reports to the Lenders	1. Plan approved as part of the SEMP by relevant parties.	Part of Contractor's ESO / H&S staff costs.
		Occupational and Community Health and Safety Plan - Consistent with international	Preparation: Contractor Approval: Engineer, RD	RD/Engineer. Information – included in reports to	1. Plan approved as part of the SEMP by relevant parties.	Part of Contractor's ESO / H&S staff

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		standards (e.g., World Bank Group Environmental, Health, and Safety Guidelines, 2007) and Labour Code of Georgia. The Plan shall address health and safety hazards associated with construction activities (e.g., excavations, tunneling etc.), use of heavy equipment, transport of materials and other hazards associated with various construction activities. The document to be read together with the Camp Management Plan.		*the Lenders*		*costs.*
		Labour and Working Conditions Management Plan - *This will include: policy/legal framework information (including labour and OHS requirements of national legislation, ADB SPS 2009, and EBRD Performance Requirements 2 and 4), workforce induction and information on rights, child and forced labour, equal opportunity, migrant workers, promotion of local employment opportunities, labour union, worker accommodation requirements, provision for retrenchment plans, workforce grievance mechanism, security personnel (Voluntary Principles on Security and Human Rights), etc. Contractor needs to ensure that the core labour requirements are cascaded down across the*	*Preparation: Contractor* *Approval: Engineer, RD, ADB, EBRD*	*RD/Engineer. Information – included in reports to the Lenders*	1. *Plan approved as part of the SEMP by relevant parties.*	*Part of Contractor's ESO / H&S staff costs.*

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		entire contracting chains, including sub-contractors and suppliers of core materials. The plan shall also be in compliance with IFC/EBRD Guidance Note ""Workers' accommodation: processes and standards".				
		Code of Conduct *- outlines camp rules articulating acceptable behaviors of the workforce with local communities. Associated induction training will be provided to ensure rules are well understood and enforced.*	*Preparation: Contractor* *Approval: Engineer, RD, ADB, EBRD*	*RD/Engineer. Information – included in reports to the Lenders*	*1. Plan approved as part of the SEMP by relevant parties.*	*Part of Contractor's ESO / H&S staff costs.*
		Emergency Response Plan *- to prevent, mitigate, respond to and recover from emergency events that could occur due to project activities such as accidents, spills of hazardous substances, fire, extreme weather events, and others; measures to prevent, mitigate, respond to and recover from emergency events that could occur due to project activities such as accidents during tunneling (e.g., tunnel collapse, electrocution, etc.), release of toxic gas during tunneling, spills of hazardous substances, fire, floods, and other events.*	*Preparation: Contractor* *Approval: Engineer, RD*	*RD/Engineer. Information – included in reports to the Lenders*	*1. Plan approved as part of the SEMP by relevant parties.*	*Part of Contractor's ESO / H&S staff costs.*
		Ground Water Management Plan *- covering water diversion,*	*Preparation: Contractor* *Approval: Engineer, RD*	*RD/Engineer. Information – included in reports to the Lenders*	*1. Plan approved as part of the SEMP by relevant parties.*	*Part of Contractor's ESO staff costs.*

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		treatment (settling) and discharge for each tunnel.				
		***Recultivation/Land Restoration Plan** - covering all sited temporarily used for the needs of the project. The plan must state necessity to prohibit the use alien or invasive plant species and need/method for control and removal of Exotic Species. (Note: The plan can be developed/revised at a later stage or stepwise site by site to provide a plan and schedule of re-cultivation works. The plan must be developed in association with biodiversity specialist and the state forestry authorities.*	*Preparation: Contractor* *Approval: Engineer, RD*	*RD/Engineer. Information – included in reports to the Lenders*	1. *Plan approved as part of the SEMP by relevant parties.*	*Part of Contractor's ESO / ECoW staff costs.*
		***Biodiversity Management Plan** – The Contractor will develop a Biodiversity Management Plan covering actions to safeguard, conservation or enhancement of biodiversity on the influence territories or specific sites that tend to be affected due to the planned activity. Compliance with the plan will be responsibility of Contractor and his ECoW.* *The Engineer / Contractor, through the support of contracted third parties, will implement the*	*BMP Preparation: Contractor* *BMP Approval: Engineer, RD, ADB, EBRD* *BAP Implementation: Contractor / Engineer* *BMEP Implementation: Engineer*	*BMP: RD/Engineer. Information – included in reports to the Lenders* *BAP: RD Information – included in reports to the Lenders* *BMEP: RD Information – included in reports to the Lenders*	1. *BMP Plan approved as part of the SEMP by relevant parties.* 2. *BAP implemented.* 3. *BMEP implemented*	*BMP Part of Contractor's ESO /ECoW staff costs.* *BAP: Part of Contractor's ESO /ECoW staff costs and Engineers International Environmental and Biodiversity Specialist.*

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		*Project **Biodiversity Action Plan (BAP)** as additional mitigation.* *To track the performance of the BAP a **Biodiversity Monitoring and Evaluation Program (BMEP)** shall be implemented by the Engineers International Environmental and Biodiversity Specialist.*				*BMEP: Part of Engineers International Environmental and Biodiversity Specialist.*
		***Construction Vibration Management Plan** - Detailing the procedures for vibration surveys, monitoring and control. Such details shall include; procedures to complete condition surveys (for all properties indicated in this EIA), Measurement locations and methods; Method statements for works likely to induce vibrations, including programs of trial construction sections to determine the likely magnitude of vibrations at defined distances from the vibration source, in sufficient detail for the contractor to develop a final method for constructing the works without excessive vibration; Description of the instrumentation and equipment to be used; Copies of the instruction manuals and the laboratory calibration and test equipment certification; The resumes of the vibration monitoring technical support*	*Preparation: Contractor* *Approval: Engineer, RD*	*RD/Engineer. Information – included in reports to the Lenders*	1. *Plan approved as part of the SEMP by relevant parties.*	*Part of Contractor's ESO / H&S / CHM staff costs.*

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		personnel, sufficient to define details of relevant experience; Procedures for data collection and analysis; Frequency of measurements; Means and methods of providing warnings when the specified construction vibration limits are reached; and Action plans to be implemented in the event the specified construction vibration limits are reached. The generalized plans of action shall comprise the positive measures by the Contractor to control vibrations using alternative construction methods. The plan shall also include method statements for the management of all PCR sites identified in Tskere and Kobi. Specifically, the plan shall outline the measures to ensure that vibration levels are minimized at site #17, Zakaidze Tower;				
		Tunnel Blasting Plan *- Provide the methodology for the management of control of tunnel blasting including methods for noise and air quality management and occupational and community health and safety.*	*Preparation: Contractor* *Approval: Engineer, RD*	*RD/Engineer. Information – included in reports to the Lenders*	*1. Plan approved as part of the SEMP by relevant parties.*	*Part of Contractor's ESO / H&S staff costs.*
		Construction camp layout plan *- This is to include: layout of the site, including location of temporary storage areas for*	*Preparation: Contractor* *Approval: Engineer, RD*	*RD/Engineer. Information – included in reports to the Lenders*	*1. Plan approved as part of the SEMP by relevant parties.*	*Part of Contractor's ESO / H&S / CHM / EcoW*

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		waste, equipment maintenance areas, lubricant and fuel storage sites with indication of the distance from watercourses; description of sewage management and waste management activities. The EIA includes criteria/recommendations for site selection, requirements and procedures for approval of the site by RD, MoEPA. Camp site as well as any sites considered associated facilities require ADB and EBRD consideration, due diligence and approval. Note: Consultations with local communities before the construction camp is developed are required.				*staff costs.*
		***Construction Camp Management Plan** - The plan shall cover such aspects as community relations, restriction of access to camp and facilities, induction briefing on camp rules and local issues/sensitivities, camp rules (such as restrictions on alcohol, drugs use; discipline; noisy activities; community liaison; no poaching; environmental protection measures applicable to the camp site; decommissioning and re-cultivation, etc.); workers welfare.*	*Preparation: Contractor* *Approval: Engineer, RD. ADB, EBRD*	*RD/Engineer. Information – included in reports to the Lenders*	1. *Plan approved as part of the SEMP by relevant parties.*	*Part of Contractor's ESO / H&S staff costs.*

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		Spoil Disposal Plan *- to be developed based on site specific topo-geodetic, geotechnical, hydrological data, environmental and social data. The plan shall include information on location, layout of the spoil disposal area (dimensions, slope angle) with 3D view, cross sections, runoff management and bank protection measures, re-cultivation measures, designation of suitable transport routes and schedule for spoil truck movements to minimize traffic disruption/congestion, and environmental mitigation measures to address impacts during transport and disposal of spoils. The plan must be developed in association with a biodiversity specialist and the state forestry authorities. The plan must specify spoil dewatering procedures (and facilities), as necessary, and describe mitigation measures to ensure adequate treatment of wastewater prior to disposal. Framework document describing requirements and procedure of site selection is attached (see* ***Appendix F****). The EIA includes criteria/recommendations for site selection, requirements and procedures for approval of the*	*Preparation: Contractor* *Approval: Engineer, RD, ADB, EBRD*	*RD/Engineer. Information – included in reports to the Lenders*	*1. Plan approved as part of the SEMP by relevant parties.*	*Part of Contractor's ESO / ECoW / CHM staff costs.*

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		site/sites by RD, MoEPA. Spoil disposal site as well as any sites considered associated facilities require ADB and EBRD consideration, due diligence and approval.				
		Asphalt Plant Management Plan - *Describing the layout and management of asphalt plant, including management of bitumen.*	*Preparation: Contractor* *Approval: Engineer, RD*	*RD/Engineer. Information – included in reports to the Lenders*	*1. Plan approved 60 days prior to the establishment of the facility.*	*Part of Contractor's ESO / H&S staff costs.*
		Concrete Batching Plant Management Plan *- Describing the layout and management of concrete batching plant, including waste water discharge, dust management, etc.*	*Preparation: Contractor* *Approval: Engineer, RD*	*RD/Engineer. Information – included in reports to the Lenders*	*1. Plan approved as part of the SEMP by relevant parties.*	*Part of Contractor's ESO / H&S staff costs.*
		Method Statements for Temporary Storage Areas, Temporary river crossings and temporary roads *- The Contractor will be responsible for preparing a method statement for the opening, operation and reinstatement of any temporary storage area he uses, temporary road or temporary river crossing.*	*Preparation: Contractor* *Approval: Engineer, RD*	*RD/Engineer. Information – included in reports to the Lenders*	*1. Statement approved 14 days prior to commencement of works in these areas.*	*Part of Contractor's ESO / H&S / CHM / EcoW staff costs.*
		Bridge Construction Plan *- For each bridge construction site*	*Preparation: Contractor* *Approval: Engineer, RD*	*RD/Engineer. Information – included in reports to the Lenders*	*1. Plan approved at least 30 days prior to the start of works at each site.*	*Part of Contractor's ESO / H&S EcoW staff costs.*
		Method Statement for the Safe Management of Asbestos *–*	*Preparation: Contractor*	*RD/Engineer. Information –*	*1. Statement approved as part of the SEMP by*	*Part of Contractor's*

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		following procedures such as HSE Asbestos Essentials.	*Approval: Engineer, RD*	*included in reports to the Lenders*	*relevant parties.*	*ESO / H&S staff costs.*
		Cultural Heritage Management Plan – *will be prepared to ensure that all of the mitigation measures for cultural heritage are implemented, including items such as vibration monitoring and roles of the Cultural Heritage Monitor.*	*Preparation: Contractor* *Approval: Engineer, RD*	*RD/Engineer. Information – included in reports to the Lenders*	*1. Plan approved as part of the SEMP by relevant parties.*	*Part of Contractor's ESO / CHM staff costs.*
		Local Content Management Plan - *Describing local procurement and local employment actions.*	*Preparation: Contractor* *Approval: Engineer, RD*	*RD/Engineer. Information – included in reports to the Lenders*	*1. Plan approved as part of the SEMP by relevant parties.*	*Part of Contractor's ESO staff costs.*
		Occupational Health and Safety (OHS) Plan for Tunnels *- Specific plans shall be prepared for Tunnel 5 and for Lot 2 tunnels (all included under one plan). The plan shall include sections on air quality and ventilation, plant related risks, visibility, lighting, noise, electrical safety, confined spaces, emergency response, etc.*	*Preparation: Contractor* *Approval: Engineer, RD*	*RD/Engineer. Information – included in reports to the Lenders*	*1. Plan approved as part of the SEMP by relevant parties.*	*Part of Contractor's ESO / H&S staff costs.*
		Accommodation Option Risk Assessment - *This will include aspects such as: siting of the accommodation camp in low proximity to villages/local community members; and determination whether workers can be accompanied by families or whether rosters will enable*	*Preparation: Contractor* *Approval: Engineer, RD, EBRD*	*RD/Engineer. Information – included in reports to the Lenders*	*1. Assessment approved as part of the SEMP by relevant parties.*	*Part of Contractor's ESO / H&S staff costs.*

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		locally engaged workers to go home daily or not.				
		***Tunnel Transition Plan** - At minimum will include: an operations handover process and the documentation required for handover; training requirements including commissioning and staffing requirements; occupational health and safety requirements and risk management and reporting.*	*Preparation: Contractor* *Approval: Engineer, RD*	*RD/Engineer. Information – included in reports to the Lenders*	1. *Plan approved as part of the SEMP by relevant parties.*	*Part of Contractor's ESO staff costs.*
4	*Obtaining licenses, permits and agreement*	• *In case Contractor decides to operate an asphalt production facility the Contractor must receive the required permits from MoEPA. Asphalt production belongs to activities listed in Annex II to Environmental Assessment Code. MoEPA makes decisions on the need of an EIA for this activity based on the screening procedure (ref. Environmental Assessment Code (document code: 360160000.05.001.018492). Environmental Impact Assessment may be requested depending on decision of the screening. If required, the Contractor must complete the EIA process and receive all necessary permits and authorizations from MoEPA prior to the mobilization of any*	*Implementation: Contractor, Approval: Engineer,* *Approval: RD MoEPA*	*RD, MoEPA. Information – included in reports to the Lenders*	1. *Permits for asphalt plants received at least 10 days before construction of plant.* 2. *Authorization for use of spoil site received at least 10 days before works commence in the site.* 3. *Copies of MACs for water discharge received prior to the start of any works.* 4. *Copies of water abstraction permits received prior to the start of any works.* 5. *Agreements with licensed waste management contractors received before the commencement of any works.*	*Part of Contractor's general Project costs*

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		asphalt plant. • Environmental conclusion – authorization to use any spoil disposal site must be obtained from MoEPA. Approval of the national EIA has indicated that only a simple brief environmental assessment is required for this activity, not a full EIA. • Maximum allowable concentration (MAC) of hazardous substances discharged into the surface water body must be agreed with (approved by) the MoEPA. Copies of the MACs shall be provided to the Engineer and RD. • Volume of water abstraction must be agreed with the MoEPA. Copies of the permits shall be provided to the Engineer and RD. • If the Contractor decides to establish its own quarry / borrow pit – a license to operate the facility must be obtained from the MoESD. • Prior to commencement of works agreement with company/companies authorized for utilization of hazardous waste must be signed between the Contractor and the company. Copies of				

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		the agreement shall be provided to the RD and the Engineer. • *For disposal of non-hazardous domestic waste agreement with Solid Waste Management Company of Georgia (responsible for operation of municipal landfills in Georgia) must be signed.*				
5	*Air quality impacts due to exhaust and dust emissions*	*Strictly implement the approved:* • ***Air Quality Management Plan**.* • ***Traffic Management Plan.*** • ***Occupational and Community Health and Safety Plan.*** • ***Emergency Response Plan.*** *Where required, implement the requirements of any:* • ***Temporary Road Method Statement.*** • ***Temporary Storage Area Method Statement.*** • ***Temporary River Crossing Method Statement.*** *Contractor shall also:* • *Follow all of the mitigation and management measures included the EIA for **Section - Air Quality** of the Project EIA and the general measures below.* • *Obtaining environmental impact permit for asphalt plant (if planned to run own*	*Contractor*	*Engineer/RD, MoEPA* *Information – included in reports to the Lenders*	*1. All plans approved by the relevant parties.* *2. All camp sites and ancillary facilities correctly sited.* *3. No visible signs of excessive air emissions or dust at work sites and camps.* *4. Air quality monitoring results within acceptable standards (see **Appendix B** for instrumental monitoring requirements)*	*5 Truck washing facilities / $2,000 per unit* *Rock crushing plant sprinkler's assumed as part of general plant costs.* *Emissions testing part of general construction costs.* *Tarpaulins part of general construction costs.* *Water bowsers part of general construction costs.*

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		facility); • *Ensure that no construction camp, batching plant, asphalt plans or rock crushing plant is located within* ***1km of any residential property and not within 2 km of any nationally or internationally designated site****.* • *Ensure proper state of maintenance of buildings, machinery and vehicles to minimize exhaust emissions. Smoke emitting vehicles and equipment shall not be allowed and shall be repaired or removed from the project.* • *Undertake immediate repairs of any malfunctioning construction vehicles and equipment.* • *Use construction equipment and vehicles that meet national emission standards.* • *Wherever possible, use electrically-powered equipment rather than gas or diesel-powered equipment.* • *Give priority to fuel efficient machinery.* • *Ensure that all diesel and petrol running machinery use equipped with catalytic convertors.* • *Position any stationary*				*All other items considered part of Contractors general construction costs.*

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		emission sources (e.g., portable diesel generators, compressors, etc.) as far as is practical from sensitive receptors. • *Locate support facilities and spoil disposal sites so to reduce trip numbers and distance – as far as feasible.* • *Provide truck-washing facilities at camp sites and also at locations where temporary access roads meet with permanent roads to avoid mud transporting to these roads, particularly for trucks coming from spoil disposal sites.* • *Rock crushing plant equipment shall be fitted with water sprinklers that will run continuously while the plant is operational.* • *If the sprinklers stop working, the plant shall also cease operation until the sprinklers are functioning.* • *Water run-off from the sprinkler system shall not discharge directly to surface water courses without first passing through a silt trap or any other suitable device to prevent siltation of surface waters.*				

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		• *Emissions from on-road and off-road vehicles should comply with national or regional programs.* • *Regardless of the size or type of vehicle, owners / operators should implement the manufacturer recommended engine maintenance programs.* • *Drivers should be instructed on a routine basis by the Contractors EM on the benefits of driving practices that reduced both the risk of accidents and fuel consumption, including measured acceleration and driving within safe speed limits.* • *Implement a regular vehicle maintenance and repair program.* • *Conveyor belts (e.g. at batching plants and rock crushing plants) shall be fitted with wind-boards, and conveyor transfer points and hopper discharge areas shall be enclosed to minimize dust emission.* • *All trucks used for transporting materials to and from the site will be covered with canvas tarpaulins.*				

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		• *Carry out watering for dust control at least 3 times a day: in the morning, at noon, and in the afternoon during dry weather with temperatures of over 25C, or in windy weather. Avoid overwatering as this may make the surrounding muddy.* • *Earthwork operation to be suspended when the wind speed exceeds 20 km/h in areas within 500 m of any community.* • *Provide vegetation planting along roadsides to limit air quality impacts.*				
6	*Soil Pollution and Erosion*	*Strictly implement the approved:* • ***Topsoil Management Plan**.* • ***Recultivation/Land Restoration Plan.*** • ***Spill Management Plan.*** • ***Construction Camp Management Plan.*** • ***Spoil Disposal Plan.*** • ***Waste Management Plan*** *Where required, implement the requirements of any:* • ***Temporary Road Method Statement.*** • ***Temporary Storage Area Method Statement (including topsoils)*** • ***Temporary River Crossing Method Statement.***	*Contractor*	*Engineer/RD, MoEPA Information – included in reports to the Lenders*	1. *All plans approved by the relevant parties.* 2. *No visual signs of soil contamination.* 3. *No visual signs of soil erosion.* 4. *Hazardous liquids correctly stored.* 5. *Regular training to staff provided.*	*Re vegetation of slopes part of general construction costs.* *Monitoring of re-vegetation part of ESO staff costs.* *Secondary containment measures part of general construction costs.* *Training part of*

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		In addition, the following measures shall be applied by the Contractor: • *Sites for temporary storage of the topsoil must be selected prior to commencement of works with due regard to environmental norms and conditions on the sites and approved by local administration, RD, Engineer, MoEPA and the Lenders. The area must be flat, located away from any surface water body, protected from runoff and erosion.* • *Ground clearance must be minimized.* • *Topsoil must be removed from all areas required for permanent and temporary needs of the project.* • *To avoid loss of the productive soil layer, all suitable topsoil and other material shall be saved and stockpiled separately for the future re-cultivation of the area or other areas where excess topsoil is available.* • *Unwanted materials from topsoil such as roots of trees, rubble and waste removed prior to stockpiling.* • *Stockpiles of removed topsoil must be properly*				*Contractor's ESO / H&S staff costs.* *All other items considered part of Contractors general construction costs.*

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Responsibility		Target / Indicator	Estimated Cost
			Implementation	Monitoring		
		designed/shaped and managed, – stability of the stockpile will be achieved through preservation of 'safe' slope inclination and diversion of runoff from the area. • Topsoil and subsoil must be stored separately until reuse. • To ensure stability, the soil piles shall not be higher than 2 meters. The piles must be placed and managed so as to avoid erosion and washing off. Drainage trenches around the piles must be provided. • Soil compaction may be reduced by strict keeping to temporary roads, camp/operation ground boundaries. • Embankments and slopes with disturbed vegetation must be replanted immediately after the construction/disturbance stops - if not covered with gabion baskets and whether the season allows. For replanting native species must be used, placement of fiber mats to encourage vegetation growth and temporary fencing to protect plants from being grazed by cattle.				

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Responsibility		Target / Indicator	Estimated Cost
			Implementation	Monitoring		
		• *Embankments shall be monitored continuously, in particular after a strong rainfall for signs of erosion.* • *Any temporary fuel tank (if contractor decided to have small stock of fuel on the site) shall be placed in a covered area with berms or dikes to contain any spills. Capacity of containment must be 110% of capacity of the tank. Any spill shall be immediately contained and cleaned up with absorbent material.* • *Areas using bitumen shall be constructed on impervious hardstanding to prevent seepage of oils into the soils. No bitumen drums or containers, full or used, shall be stored on open ground.* • *Onsite repairs /maintenance/fueling activities shall be limited. Priority shall be given to offsite commercial facilities. If impossible, a designated area and/or secondary containment for the on-site repair or maintenance activities must be provided.* • *On-site vehicles and equipment shall be inspected regularly for leaks and all leaks shall be immediately*				

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Responsibility		Target / Indicator	Estimated Cost
			Implementation	Monitoring		
		repaired. Incoming vehicles and equipment shall be checked for leaks. Leaking vehicles/equipment shall not be allowed on-site. • Secondary containment devices (drop cloths, drain pans) shall be used to catch leaks or spills while removing or changing fluids from vehicles or equipment. Drip pans or absorbent materials shall be provided. On small spills absorbent materials shall be used. • All valves and trigger guns shall be resistant to unauthorized interference and vandalism and be turned off and securely locked when not in use. • The site will be cleaned regularly, littering will be prohibited. • Waste collection area will be sited so as to avoid receiving a substantial amount of runoff from upland areas and draining directly to a water body. • In case of the fuel/oil spills risk, an oil trap shall be additionally provided. • Discharge of effluents into the water bodies is not planned. Only wastewater cleaned up				

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Responsibility		Target / Indicator	Estimated Cost
			Implementation	Monitoring		
		to the established norms may be discharged to the relief. Receiving area must not be prone to erosion or waterlogging. It is advisable not to drain water to the area where crops are cultivated. • *Contractor will confine operation of heavy equipment within the ROW, as much as possible, to avoid soil compaction and damage to privately owned land. If private lands are disturbed, the contractor should promptly inform the owner and agree on the ways to remedy the situation.* • *Adequate training on environmental protection and safety shall be provided to the staff.*				
7	*Hydrology*	*Strictly implement the approved:* • ***Ground Water Management Plan Waste Water Management Plan*** • ***Bridge Construction Plan Construction Recultivation/Land Restoration Plan.*** • ***Spoil Disposal Plan.*** • ***Waste Management Plan*** *Where required, implement the requirements of any:* • ***Temporary Road Method Statement.***	*Contractor*	*Engineer/RD, MoEPA Information – included in reports to the Lenders*	*1. All plans approved by the relevant parties.* *2. No visual signs of water pollution.* *3. No visual signs of soil erosion.* *4. Hazardous liquids and wastes correctly stored.* *5. Regular training to staff provided.* *6. Water quality monitoring results within acceptable standards (see*	*50 Spill Kits / $200 per unit.* *Oil separators for camp sites and septic waste removal considered part of general construction costs.* *Lined areas for washing out*

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Responsibility		Target / Indicator	Estimated Cost
			Implementation	Monitoring		
		• ***Temporary Storage Area Method Statement*** • ***Temporary River Crossing Method Statement.*** *In order to avoid or mitigate impact during pre-construction and construction activities, works should be performed with due consideration of environmental safety measures:* • *Should any temporary fuel tank be available, it must be located within at least 100m from the riverbed. The tank must be placed in covered areas with berms or dikes installed to intercept spills, if any. Any spill should be immediately localized and cleaned up with absorbent materials.* • *Onsite repairs /maintenance and fueling activities should be limited. Priority should be given to offsite commercial facilities. If impossible, a designated area with secondary containment for possible spills for on-site repair or maintenance activities must be provided. These areas shall be located away from drainage channels and surface water bodies. (distance between the maintenance site and the*			***Appendix B*** *for instrumental monitoring requirements)*	*concrete mixers.* *Training part of ESO staff costs.* *Monitoring part of instrumental monitoring costs per Appendix B.* *Waste Disposal costs part of general construction costs.* *PPE part of general construction costs.* *Portable Toilets part of general construction costs.* *All other items considered part of Contractors general construction costs.*

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Responsibility		Target / Indicator	Estimated Cost
			Implementation	Monitoring		
		river should be at least 100m). • On-site vehicles and equipment shall be inspected regularly for leaks and all leaks shall be immediately repaired. Incoming vehicles and equipment shall be checked for leaks. Leaking vehicles/equipment shall not be allowed on-site. • Secondary containment devices (drop cloths, drain pans) shall be used to catch leaks or spills while removing or changing oils from vehicles or equipment. For small spills, absorbent materials must be used. • Discharge of any untreated water into the surface water body must be strictly prohibited. Treated water discharge must comply with IFC standards for effluent discharge, as well as national standards. • Discharge of cement contaminated water must be avoided as cement pollution results in high alkalinity and raises the pH, which can be toxic to aquatic life. • Materials and waste must be stockpiled so as to avoid erosion (in stockpiles less				

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		than 2 m in height and with a slope gradient of less than 25%) and washing off into the river. Drainage trenches must be established to divert surface runoff from the site. • Runoff control measures can be installed at the time of road/highway and bridge construction to reduce runoff pollution. • To prevent runoff contamination, paving should be performed only in dry weather. • In disturbed soil areas silt fence, fibber rolls, gravel bags, or other approved sediment control must be ensured. At a minimum, bare soil (whether it is an abutment slope or a stockpile) must be protected before it rains. Soil stabilization BMPs such as mulch, soil binders, plastic sheeting or erosion control blankets must be used to protect bare soil. • Due to the design solution direct discharge of the runoff in surface water is reduced to minimum. • Management of material and waste will be carried out in compliance with the plan				

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Responsibility		Target / Indicator	Estimated Cost
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		(waste management plan) developed by contractor. • *The area will be cleaned regularly.* • *Locate stockpiles away from any watercourse or wetlands, outside drainage lines. Protect stockpiles from erosion.* • *Park construction machinery/vehicles at not less than 100m from the riverbed.* • *Locate the storage area not less than in 100m from the riverbed.* • *Check integrity of fuel/hazardous substances containers for integrity. Undertake necessary repair or replacement if required.* • *Store materials in containers suitable for the purpose. Ensure that containers bear clear eligible labels. The same applies to containers for short term storage of used oil.* • *Store all materials above flood level.* • *Ensure availability of spill cleanup materials (e.g., spill kits, etc.) in the areas where accidental spills may occur.* • *Place clean up material in easily accessible locations.*				

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Responsibility		Target / Indicator	Estimated Cost
			Implementation	Monitoring		
		• Avoid fueling/maintenance of machinery and vehicles on the bare ground. Only contained areas can be used. Locate the maintenance/fueling sites (if planned to have on the site away from watercourses and wetland areas. Distance of not less than 100m must be preserved. • Use drip pan beneath equipment likely to leak fuel and/or oil and/or during fueling or changing oil. • Prohibit discharge of any untreated potentially contaminated effluents. • Provide septic tanks for the camp sites servicing less than 150 employees. Contract authorized company to remove the liquid waste regularly. For larger sites, provide multiple septic tank facilities, or package waste water treatment plants. • Keep contract with authorized company responsible for removal of the liquid waste active. If for waste water management, the camp is equipped with a package treatment plant ensure cleanup/sanitation according to manufacturer's instructions				

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Responsibility		Target / Indicator	Estimated Cost
			Implementation	Monitoring		
		and that discharge standards are met for waste water. • *Monitor surface water quality.* • *Use of oil-water separators to extract floating oils wherever appropriate.* • *Clean up spills or leaks immediately.* • *Manage and dispose of the used absorbents, oily rags and other contaminated materials as hazardous waste.* • *Provide areas where concrete mixers can wash out leftover concrete without polluting the environment. This may be in the form of a lined settling pond.* • *Prior to discharge, alkaline water from the concrete batching area shall be settled and neutralized.* • *Arrange settling basins to manage tunnel drainage water. Check quality of drainage water (including pH) from the settling basins prior to discharge into environment.* • *Contract authorized company for hazardous waste disposal.* • *Prohibit use of herbicides/chemical during vegetation clearance.*				

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Responsibility		Target / Indicator	Estimated Cost
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		• Train construction personnel in soil and water protection measures, handling of fuels, spill control and response procedures and requirements. • Develop procedures to manage water discharges under degraded conditions (to ensure compliance with water discharges limits at all times. • To avoid impact on ground water users the water flow in the springs used by local community for water supply will be monitored. • The following measures shall be applied specifically relating to bridges: o Provide spill kits in worksites around rivers. o Ensure no vehicle refueling occurs within 50 meters of any surface water course. o Divert the water flow near the bridge piers. o Provide silt fences, sediment barriers or other devices to prevent migration of silt during construction within streams. o Carry out bridge construction works without				

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Responsibility		Target / Indicator	Estimated Cost
			Implementation	Monitoring		
		interrupting the traffic on existing roads with the provision of suitable diversions. ○ *Ensure no waste materials are dumped in the river, including re-enforced concrete debris.* ○ *Place generators more than 20 meters from the river.* ○ *Ensure that no concrete waste from concrete mixers is dumped in the river.* ○ *Provide areas where concrete mixers can wash out leftover concrete without polluting the environment. This may be in the form of a lined settling pond at each bridge site. Drivers will be informed of these locations and the requirements to use these settling ponds on a routine basis by the Engineer. Dried waste from the settling ponds can be used as backfill for culverts, etc.* ○ *Carefully collect all polystyrene (from expansion joints) so that it does not litter the local environment.*				

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Responsibility		Target / Indicator	Estimated Cost
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		○ Ensure that no hazardous liquids are placed within 10 meters of the river. ○ Provide portable toilets at bridge construction sites to prevent defecation by workers into the river. ○ Ensure that workers are provided with correct PPE including harnesses. ○ In addition, the Contractor, through his Environmental Manager, will be responsible for consulting with MoEPA to establish the fish spawning period in relation to the bridge construction works to ensure that all works are undertaken in periods least likely to affect the fish spawning period.				
9	Natural Hazards	The risk of avalanches shall be monitored by the Contractor throughout the construction phase, this can be achieved with coordination between safety officials in Gudauri ski resort. In addition, no camp site shall be located in an area that maybe prone to avalanches.	Contractor	Engineer/RD, MoEPA Information – included in reports to the Lenders	1. No accidents and injuries to workers involving avalanches.	Part of Contractors ESO / H&S staff costs.
10	Impact on Designated Sites	• Implement mitigation measures set for noise, air, habitat, general notable species, and specific notable species.	Contractors ECoW	Engineer/RD, MoEPA Information – included in reports to the Lenders	1. See specific sections below.	See specific sections below.

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Responsibility		Target / Indicator	Estimated Cost
			Implementation	Monitoring		
		Note: The project ends near Kobi about 130m from the boundary of Kazbegi National Park (aca Emerald Network candidate site), but runs under another portion of the Park.				
11	*Habitat*	• *Strictly implement the **Biodiversity Management Plan**.* • *The Contractor shall ensure that he employs, for the duration of the Project, a suitably qualified **Ecological Clerk of Works**.* • *Strictly apply the mitigation measures proposed in **Generic Habitat Impacts and Mitigation** of **Section F.6.2** the project EIA.* • *Complete the Pre-clearance site surveys proposed in **Generic Habitat Impacts and Mitigation** of **Section F.6.2** the project EIA.* • *Apply Offsetting as outlined in **Section - Areas of Offset required for Notable and Natural Habitats** of the project EIA. Precise locations of these restoration areas will be confirmed and managed under the supervision of the ECoW.*	*Contractors ECoW*	*Engineer/RD, MoEPA Information – included in reports to the Lenders*	1. *Appropriately qualified EcoW employed.* 2. *Offsetting applied.* 3. *For other indicators relating to specific habitat mitigation and management see Project BAP*	*EcoW part of Contractors staff costs.* *Habitat offsetting costs provided in Project BAP.*
12	*General Notable Species*	***Pre-Work Surveys:*** • *Prior to works starting, the proposed route will be further surveyed by suitably qualified*	*Contractors ECoW*	*Engineer/RD, MoEPA Information – included in reports to*	1. *Pre-work surveys completed.* 2. *For other indicators relating to specific*	*Part of contractor's bid cost*

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Responsibility		Target / Indicator	Estimated Cost
			Implementation	Monitoring		
		ecologists to map up-to-date baseline conditions. It will: *1. Consider all vertebrates (mammals, birds, reptiles, amphibians, fish).* *2. Employ survey techniques that are fully auditable, repeatable and in line with good practice guidance and undertaken by a suitably qualified professional.* *3. Be conducted at a suitable time of year for the target habitats and species (likely spring and autumn but to be confirmed for each receptor by the ECoW).* *4. Be used to update the **Biodiversity Management Plan (BMP)** from which the success of the species and habitat restoration can be compared to the BMP targets.* • *The ECoW will be responsible for confirming that adequate information has been collected to ensure that there is an appropriate baseline to inform the bespoke mitigation and monitoring.*		*the Lenders*	*species mitigation and management see Project BAP*	

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Responsibility		Target / Indicator	Estimated Cost
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		• *The ECoW will also reassess the Project RoW ahead of the works through a 'walkthrough' to be conducted ideally one to two days ahead of the works to obtain up to date information on the presence of flooded areas; nesting birds etc.* • *These two types of surveys can be summarized as follows:* *1. Pre-commencement detailed baseline data collection - To be undertaken well in advance of enabling works: These will allow habitat and species distribution to be accurately mapped in order to inform mitigation, confirm baselines and therefore targets for offsetting and KPIs for monitoring. To take place no later than 2 weeks and no more than 6 months before work commences. To be conducted by an appropriately qualified Biodiversity Specialist in Spring / to Autumn and focus on notable habitats and species.*				

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Responsibility		Target / Indicator	Estimated Cost
			Implementation	Monitoring		
		2. *Pre-commencement walkthrough (rapid assessment) - To be undertaken just before enabling works to identify presence of sensitive receptors such as nesting birds, roosting bats and sheltering reptiles etc. Expected to take place no later than 1 day and no more than 2 weeks before work commences. To be conducted by an appropriately qualified Biodiversity Specialist and focus on notable habitats and species.* • *Specific surveys shall be undertaken for:* 1. ***Otters** - Immediately prior to construction, for every river crossing or activity within a river there will be a **pre-enabling dedicated survey** to confirm absence of holts or other resting features within the direct zone of impact of the works. If features are found, exclusion of the features will be ensured prior to works commencing.* 2. ***Bats** - Further bat survey work is to be undertaken*				

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Responsibility		Target / Indicator	Estimated Cost
			Implementation	Monitoring		
		to confirm bat species present within the Project area. The results of the Bat survey shall feed into the BMP or the specific BAPs (see below). *3. **Other Notable Species:** Further work will be commissioned by the RD for other notable species in advance of commencement of works as outlined in the BAP (see **Appendix W**).*				
		Species Biodiversity Action Plans: *Biodiversity Action Plans: Further develop and implement BAPs for notable habitats and species as outlined in the BAP-framework document. This includes the following:* • *Sub-Alpine Birch Krummholz and Low Grass Marshes.* • *Caucasian Chamois, Otters, Bats.* • *Endemic plant species.* • *Caucasian Black Grouse, Egyptian Vulture, Corncrake, Migratory Raptors*	*Contractor / Engineer*	*RD, MoEPA Information – included in reports to the Lenders*	*1. BAPs completed and implemented*	*See BAP for costs*
		***General impacts from works and operation – avoidance**:* • *The works footprint will be*	*Contractors ECoW*	*Engineer/RD, MoEPA Information – included in reports to*	*1. No issues of non-compliance recorded.*	*Part of contractor's bid cost*

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Responsibility		Target / Indicator	Estimated Cost
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		reduced as far as possible e.g. through the use of a single vehicle track policies and use of low-impact vehicles where applicable. • Vehicles will be driven at designated speed limits. • Off-road travel will be prohibited where practical. • Laydown areas and compounds will be sited to avoid unnecessary clearance of vegetation. • Natural breaks in vegetation will be used as preferred access routes where possible. • The workforce will adhere to working corridors. • All staff will be provided with environmental awareness training. • The workforce will not deviate from approved clearance areas. Workforce hunting and fishing bans will be enforced and cutting of wood by workers will be prohibited. • Fencing will be minimized to ensure that areas vital for wildlife are not isolated by workforce activities, unless this is for species protection measures. • Temporary barriers will be		the Lenders		

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Responsibility		Target / Indicator	Estimated Cost
			Implementation	Monitoring		
		used to prevent wildlife from accessing waste disposal areas and similar areas.				
		Habitat Restoration: • Restoration of the identified areas of habitat in the Project EIA. • Any reseeding or replanting of selected areas to be restored will use locally collected seed mixes and saplings. • A local source of indigenous saplings suitable for replanting programs will be identified in advance to facilitate restoration. • All efforts will be made to minimize removal of mature/significant trees and maintain connectivity between areas of forest habitats. • Soils will be removed as subsoil and top soil and these will be stored separately as per good working practice for subsequent restoration. • Workforce will be educated on preventing bush fires and this will not be used as a land clearance method.	Contractors ECoW	Engineer/RD, MoEPA Information – included in reports to the Lenders	1. Restored habitats in good condition and no evidence of invasive species.	Part of contractor's bid cost
		Forest Habitats:	Contractors ECoW	Engineer/RD,	1. Impacts in forest areas	Part of

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Responsibility		Target / Indicator	Estimated Cost
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		• Limiting working RoW within forest habitats, avoiding the felling of mature trees wherever possible and restricting working hours to daytime preventing noise pollution during twilight (dusk and sunrise).		MoEPA Information – included in reports to the Lenders	minimized.	contractor's bid cost
		Riparian Habitats: • Preparation and Implementation of Method Statements for Temporary River Crossings. • Crossing points across rivers will be conducted where there is clear access to the banks and vegetation clearance is minimized. • Standard pollution control measures will be implemented in all sites. • Demarcation and offsets for camp and storage locations and field activities will be at least 50m from watercourses where practical. • Where trees have to be removed to facilitate the crossing, these will be replanted with a similar species composition.	Contractors ECoW	Engineer/RD, MoEPA Information – included in reports to the Lenders	1. Pollution of rivers avoided.	Part of contractor's bid cost
		New Habitats: • New habitat features to include boulder piles, dead wood piles and brash, and	Contractors ECoW	Engineer/RD, MoEPA Information – included in reports to the Lenders	1. Habitat features included at restored sites.	Part of contractor's bid cost

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Responsibility		Target / Indicator	Estimated Cost
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		creation of appropriate ponds.				
		Habitat Pollution: • *Standard pollution control measures will be implemented.* • *The ECoW will determine when further monitoring (e.g. for turbidity) and/or bespoke mitigation are required.*	*Contractors ECoW*	*Engineer/RD, MoEPA Information – included in reports to the Lenders*	*1. Habitat pollution avoided.*	*Part of contractor's bid cost*
		Direct mortality of species: • *All food and food waste will be stored securely to deter opportunistic species and minimize interactions between humans and animals.* • *The location of sensitive species identified by the ECoW will be reported to the workforce appropriately.* • *The ECoW will be present during commencement of all works to conduct pre-construction checks and prevent animals present within the working area being killed or injured during the works.* • *Checks will be for all vertebrate species including ground nesting birds, reptiles, amphibians and bats, amongst others.* • *Checks will include within*	*Contractors ECoW*	*Engineer/RD, MoEPA Information – included in reports to the Lenders*	*1. Waste facilities provided on site.* *2. Regular toolbox training by ECoW.* *3. Pre-construction surveys completed.*	*Part of contractor's bid cost*

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Responsibility		Target / Indicator	Estimated Cost
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		hollow trees and other places of shelter. As far as possible tree and scrub clearance will not be undertaken during the breeding bird season (March to August inclusive). • Should clearance during this time be necessary a pre-clearance nesting bird check of the vegetation to be cleared will be undertaken by the ECoW and a decision on whether to move the nest or defer the clearance will be made by the EcoW.				
		Lighting and Excavations: • Works will not be lit except in exceptional circumstances or required for safety reasons. • Where lighting is required it will be directional and the lighting strategy will be designed with the input of the ECoW. • Only non-UV lighting sources will be employed. • Pits and excavations will be filled in as soon as possible following works. • Trenches and pits to be created for longer than 48h periods will have 45^{O} ground ramps to allow escape by fauna should they fall in. • A pre-start check for fauna will be completed prior to	Contractors ECoW	Engineer/RD, MoEPA Information – included in reports to the Lenders	1. Lighting complies with proposed strategy.	Part of contractor's bid cost

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Responsibility		Target / Indicator	Estimated Cost
			Implementation	Monitoring		
		works commencing in the morning if trenches are left open overnight. • Regular crossing points will be installed to ensure wildlife can cross excavations, berms and drainage channels.				
		***Non-native or invasive species**:* • Native plants that are locally sourced will be used for re-planting.	Contractors ECoW	Engineer/RD, MoEPA Information – included in reports to the Lenders	1. No non-native species used.	Part of contractor's bid cost
13	Specific Notable Species	• Contactor and Engineer to implement relevant specific notable species mitigation measures provided in the ***Project EIA, Section F.6.2**, and Project BAP*	Contractors ECoW / Engineers International Environmental and Biodiversity Specialist	RD, MoEPA Information – included in reports to the Lenders	1. No reported impacts to notable species recorded by ECoW or other NGOs or government departments. 2. For other indicators relating to specific species mitigation and management see Project BAP	Part of contractor's / Engineers bid cost
14	Economy and Livelihoods	Identification of potential candidates and readiness for work.	Assessed by the Contractor prior to appointment of workers with support from the Labour offices of Dusheti and Kazbegi municipalities.	Engineer/RD, MoEPA Information – included in reports to the Lenders	1. Database of potential candidates prepared.	Part of Contractors ESO staff costs.
		Encourage the use of local suppliers (prioritization of suppliers from within the Dusheti and Kazbegi regions)	Contractor	Engineer/RD, MoEPA Information – included in reports to the Lenders	1. At least 25% of goods procures in Georgia for the Project should come from these regions	No specific costs.

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Responsibility		Target / Indicator	Estimated Cost
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		Labour conditions for the workforce (including contractor personnel) will comply with all relevant requirements of the Georgian Labour Law, the ILO Conventions ratified by the country, and labour management provisions of Project Lenders.	*Contractor*	*Engineer/RD, MoEPA Information – included in reports to the Lenders*	*1. Labour conditions meet the specified requirements.*	*No specific costs.*
15	*Social Infrastructure*	*Strictly implement the approved:* • ***Traffic Management Plan (TMP)*** *As part of the TMP complete the* ***Road Condition Survey*** *of all roads included in the Contractors TMP will be conducted by the Engineer prior to construction in order to gauge any damage to the road as a result of the intensive heavy traffic during the construction phase. Before completion of the Project the Engineer shall repeat the survey to determine which, if any roads need to be repaired by the Contractor.*	*Contractor to implement Plan* *Engineer to undertake surveys*	*Engineer/RD, MoEPA Information – included in reports to the Lenders*	*1. Traffic Management Plan Approved.* *2. Road Condition Surveys completed.*	*Plan part of contractor's general construction costs.* *Surveys part of Engineers general Project costs.*
		During the construction phase the Contractor shall implement the following: • *Provide information to the public about the scope and schedule of construction activities and expected disruptions and access restrictions at least 24 hours before the disruptions;*	*Contractor*	*Engineer/RD, MoEPA Information – included in reports to the Lenders*	*1. No complaints from local population regarding traffic delays and disruptions or dust.* *2. No accidents on local access roads.* *3. Access roads rehabilitated at the end of construction.*	*Part of contractor's general construction costs.*

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Responsibility		Target / Indicator	Estimated Cost
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		• Allow for adequate traffic flow around construction areas via diversions or temporary access roads; • If temporary access roads are to be constructed with a gravel surface they shall be routinely watered by the Contractor during dry weather to reduce dust impacts; • Provide adequate traffic signs, appropriate lighting, well-designed traffic safety signs, barriers and flag persons for traffic control; and • Access roads for batching plants, etc, should be maintained during the construction phase and rehabilitated at the end of construction.				
		During construction all gas supply and electricity networks in the Project area shall be kept operational, particularly during the winter months. Some lines and pipes may require temporary relocation during the construction phase and as such the Contractor will be responsible for liaising with the relevant utilities operators to ensure they remain operational. Should utilities need relocating in a different location the Contractor will consult with the relevant utilities and local community to	Contractor	Engineer/RD, MoEPA Information – included in reports to the Lenders	1. Utilities kept operational throughout the year.	Part of contractor's general construction costs.

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Responsibility		Target / Indicator	Estimated Cost
			Implementation	Monitoring		
		ensure that there is no change in supply as a result of these changes. Alternatives must be provided should unreasonable services delays occur (e.g. tanked water, gas bottles).				
16	Population and In-migration	2. **Code of Conduct** strictly implemented. 3. Induction training provided to all new staff in the code of conduct.	Contractor	Engineer/RD, MoEPA Information – included in reports to the Lenders	1. All staff completed induction training in the Code of Conduct.	Part of Contractors ESO staff costs.
17	Land Use and Natural Resources	• Strictly implement the **LARP** • Construction camps and other ancillary facilities, should, as far as possible be sited within the Project buffer or avoid being site on agricultural land.	RD to implement LARP Contractor to ensure correct siting of facilities.	Engineer/RD, MoEPA Information – included in reports to the Lenders	1. LARP Implemented. 2. Facilities sited in correct areas.	For LARP costs, see Project LARP.
18	Spoil Disposal	Recommended to avoid the use of spoil disposal sites; SDL-22.7, SDR-22.3. If these spoil sites are used, sensitive areas of the sites will be avoided and mitigation measures provided as part of the Spoil Disposal Plan and any required national EIA. Under no circumstances shall the following habitats be used for spoil disposal sites: • National Parks (as per the updated boundaries of January 2019) • Low Grass Marshes • Sub-alpine Birch Krummholz	Contractor	Engineer/RD, MoEPA Information – included in reports to the Lenders	1. Sensitive portions of the sites not impacted.	No specific Costs

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Responsibility		Target / Indicator	Estimated Cost
			Implementation	Monitoring		
		Spoil Disposal Site SDL-22.3 - A 50 meter buffer zone should be placed around the river adjacent to the site. The buffer zone shall also be fenced and signposted to prevent machines and workers entering this site. The site will also be inspected weekly by the EcoW to ensure no impacts to this buffer zone. The War Memorial shall be fenced during site works to prevent encroachment into this area by workers and machinery.	*Contractor*	*Engineer/RD, MoEPA Information – included in reports to the Lenders*	*1. No encroachment into the buffer zone.* *2. War memorial suitably fenced.*	*$2,000 for Fencing*
		*For any spoil disposal site a **Spoil Disposal Plan** must be prepared by the Contractor and submitted to ADB, EBRD, RD and the Engineer for review and approval as part of his SEMP before any site can be used. A template for this plan is provided by **Appendix F**. In addition, the Contractor will be required to prepare a simple brief environmental assessment for any spoil disposal site to meet national requirements.*	*Contractor*	*Engineer/RD, MoEPA Information – included in reports to the Lenders*	*1. Spoil disposal plans approved by all parties.* *2. EIA permits received.*	*Plan part of Contractor's ESO / H&S staff costs.* *Cost of EIA TBD depending on type and area of site. Estimated $15,000 per EIA.*
		*Spoil disposal sites shall be graded to fit in with the surrounding landscape (as proposed by the drawings in **Appendix O** of this EIA). The design documents also propose specifications for side slopes of the spoil disposal areas and they shall be strictly followed to prevent collapse and soil erosion.*			*1. Full re-instatement of spoil sites according to the plans.*	*Part of contractor's general construction costs.*

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Responsibility		Target / Indicator	Estimated Cost
			Implementation	Monitoring		
		All spoil sites will be reinstated as per the Contractors ***Re-cultivation/Land Restoration Plan****.*				
19	*Waste Management*	*Strictly implement the approved:* • ***Waste Management Plan*** *Where required, implement the requirements of any:* • ***Spill Response Plan.*** • ***Temporary Road Method Statement.*** • ***Temporary Storage Area Method Statement.*** • ***Temporary River Crossing Method Statement.***	*Contractor*	*Engineer/RD, MoEPA Information – included in reports to the Lenders*	*1. Plans implemented.*	*Part of contractor's general construction costs.*
		Recycling: *options to be implemented include:* *1. Crush and reuse waste concrete as fill material.* *2. Where practical asphalt material should be crushed and re-used for local roads, or as base material if it meets the required technical specifications.* *3. All other waste (plastic, metal, paper, etc.) will be sorted on source and sent for recycling.*	*Contractor*	*Engineer/RD, MoEPA Information – included in reports to the Lenders*	*1. At least 20 % of materials recycled.*	*Part of contractor's general construction costs.*
		Liquid Waste: *Provide septic tanks for the camp sites servicing less than 150 employees. Contract authorized company to remove the liquid waste regularly. For larger sites,*	*Contractor*	*Engineer/RD, MoEPA Information – included in reports to the Lenders*	*1. Contracts with liquid waste disposal company signed and up to date.*	*Waste management part of contractor's general construction*

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Responsibility		Target / Indicator	Estimated Cost
			Implementation	Monitoring		
		provide multiple septic tank facilities, or package waste water treatment plants.				*costs.*
		***Domestic and Inert Waste**:* *2. Collect domestic waste in containers fitted with lids to avoid attraction of scavengers, scattering around. The lid will also protect waste from rain and snow.* *3. Provide garbage bins and facilities within the project site for temporary storage of domestic solid waste and construction waste.* *4. Waste storage containers shall be covered, tip-proof, weatherproof and scavenger proof.* *5. Ensure that wastes are not haphazardly dumped within the project site and adjacent areas.* *6. Remove domestic waste to the nearest landfill under agreement with Solid Waste Management Company of Georgia.*	*Contractor*	*Engineer/RD, MoEPA Information – included in reports to the Lenders*	*1. Work sites free of litter and inert waste.* *2. Contracts with waste management company signed and up to date.*	*Waste management part of contractor's general construction costs.*
		Hazardous Waste: • *On the site allocated for temporary, short term keeping of hazardous wastes ensure compliance with the following safety measures:*	*Contractor*	*Engineer/RD, MoEPA Information – included in reports to the Lenders*	*3. Hazardous waste storage areas at all work sites.* *4. Waste manifests available for inspection.* *5. Contracts with waste management company*	*Waste management part of contractor's general construction costs and ESO*

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Responsibility		Target / Indicator	Estimated Cost
			Implementation	Monitoring		
		○ Use containers suitable for each type of waste; ○ Prohibit use of damaged containers. Check integrity of containers regularly;. ○ Mark containers adequately; ○ Provide secondary containment; ○ Do not mix various waste streams. • Hire authorized contractor for hazardous waste removal and Keep agreements with hazardous waste management companies active. • Keep copies of waste manifests on site. Keep a record of waste on-site and waste removed. • In case of large-scale spills of hazardous liquids, follow the **Spill Response Plan**.			signed and up to date.	staff costs (monitoring od waste).
		Asbestos - Survey buildings for presence of asbestos or asbestos containing material before demolition of properties subject to acquisition. If registered, the Contractor shall prepare a **Method Statement for the Safe Management of Asbestos** following international best practices such as HSE-A14. The	Contractor	Engineer/RD, MoEPA Information – included in reports to the Lenders	1. Safety equipment available. 2. Staff trained.	$2,000 - Asbestos PPE

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Responsibility		Target / Indicator	Estimated Cost
			Implementation	Monitoring		
		method statement shall be submitted to the Engineer for approval before any works involving asbestos materials can commence. General requirements include: *6. Do not break asbestos/asbestos containing articles when dry.* *7. Equip staff handling asbestos with protection clothing, goggles, respirators, rubber boots.* *8. Place material in thick, durable plastic bags (put not more than 40km of asbestos/asbestos containing material per each). Wrap the bags and mark with asbestos warning mark.* *9. Hire Contractor for removal-disposal of asbestos/asbestos containing material to a licensed waste management facility.*				
20	*Tunnels*	*Strictly implement approved:* • ***Ground Water Management Plan**.* • ***Occupational Health and Safety (OHS) Plan for Tunnels.*** • ***Tunnel Transition Plan.*** *In addition, the Contractor shall:* • *Use non-toxic slurry and additives and minimize impact of these materials to*	*Contractor*	*Engineer/RD, MoEPA Information – included in reports to the Lenders*	*1. No pollution of groundwater.*	*Part of contractor's general construction costs.* *Monitoring part of*

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Responsibility		Target / Indicator	Estimated Cost
			Implementation	Monitoring		
		reduce risk of impact on ground water quality. • Ensure that pressure applied to tunneling and ground treatment is controlled to prevent excessive pressure that will drive the slurry out of the desired range increasing the risk of water pollution. • The Contractor will pass all drainage water from the tunnel through a settlement tank. • If the drainage water meets drinking water standards it can be considered for re-use in any potentially depleted wells during the construction phase.				
21	Impacts associated with Asphalt Plants	Strictly implement the approved: • **Asphalt Plant Management Plan.** • **Waste Management Plan.** • **Spill Response Plan.** • **OHS Plan.** • **Air Quality Management Plan.** In addition, the Contractor shall ensure: • Asphalt plants will be located downwind of residential areas and not within one kilometer of any residential area. • Adequate PPE will be provided to staff working in areas of high noise and emissions.	Contractor	Engineer/RD, MoEPA Information – included in reports to the Lenders	1. Air emissions within acceptable limits. 2. PPE worn by all workers. 3. Training provided. 4. MSDS available on-site. 5. First aid kits at site.	PPE part of Contractors general construction costs. Secondary containment part of Contractors general construction costs. Monitoring of waste part of Contractors

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Responsibility		Target / Indicator	Estimated Cost
			Implementation	Monitoring		
		• *Ensure all hazardous materials are stored (including within suitable sized bunds for liquids), handled and disposed of according to their Material Safety Data Sheet (MSDS).* • *Copies of MSDS will be kept on site with all hazardous materials.* • *The Contractor will keep a log of the type and volume of all hazardous wastes on site.* • *The Contractor will keep a plan of site indicating where all hazardous materials are stored.* • *To prevent bitumen burns it will be compulsory for the workers handling hot bitumen to wear full-body protection.* • *All transportation, handling and storage of bitumen will be handled safely by experienced personnel.* • *The dust from the manufacturing process may pose respiratory hazards, hence protective air mask will be provided to the operators for the loading and unloading of aggregates.* • *Ear-muffs will be provided those working on the plant.* • *First Aid kits (compliant with OSHA standard 1910.266 App. A) will be available on site for*				*ESO staff costs.* *First aid kits (compliant with OSHA standard 1910.266 App. A) part of Contractors general construction costs.*

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Responsibility		Target / Indicator	Estimated Cost
			Implementation	Monitoring		
		the workers in case of emergency. • The Material and Data Sheet (MSDS) for each chemical product will be made accessible onsite and displayed.				
22	Impacts associated with Construction Camps	Strictly implement the approved: • **Construction Camp Layout plan.** • **Labour and Working Conditions Management Plan.** • **Spill Management Plan.** • **OHS Plan.** • **Emergency Response Plan.** • **Waste Management Plan.** Where required, implement the requirements of any: • **Temporary Road Method Statement.** • **Temporary Storage Area Method Statement.** • **Temporary River Crossing Method Statement.** In addition, the Contractor shall: • Complete **Environmental and Social Screening** of the camp site location to determine significant environmental and social impacts during site selection. • Not locate camps within one kilometer of a residential area and at least 50 meters	Contractor	Engineer/RD, MoEPA Information – included in reports to the Lenders	1. Environmental and Social Screening completed. 2. Camps located in correct locations. 3. No pollution from camp sites.	Part of contractor's general construction costs.

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Responsibility		Target / Indicator	Estimated Cost
			Implementation	Monitoring		
		from any surface water course and not within 2 kilometers of a protected area. • *Coordinate all construction camp activities with neighboring land uses.* • *Ensure workers accommodation/construction camps will need to follow EBRD/IFC guidance on Workers' accommodation: processes and standards.* • *Coordinate all construction camp activities with neighboring land uses.* *The Contractor will ensure that all of the following conditions are met regarding the site:* • *Rain-water run-off arising on the site will be collected, removed from the site via a suitable and properly designed temporary drainage system and disposed of at a location and in a manner that will cause neither pollution nor nuisance. The drainage system will be fitted with oil and grease interceptors.* • *There will be no direct discharge of sanitary or wash water to surface water.* • *In the absence of functioning sewerage and sewage treatment facilities it is*				

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Responsibility		Target / Indicator	Estimated Cost
			Implementation	Monitoring		
		recommended that the Contractor provides his own on-site wastewater treatment facilities. For sites servicing a small number of employees (less than 150), septic tanks may be used. For larger sites, liquid wastes will as a minimum receive primary treatment in anaerobic tank or pond preceded by a bar screen to remove large solid objects (e.g. sticks, rags). • *There will be no direct discharge of untreated sanitary or oily wastewater to surface water bodies.* • *Licensed contractors will be required to collect and disposal of liquid waste from the septic tanks on regular basis.* • *Disposal of materials such as, but not limited to, lubricating oil and onto the ground or water bodies will be prohibited.* • *Liquid material storage containment areas will not drain directly to surface water.* • *Waste water from vehicle washing bays will be free of pollutants if the wash bay has been constructed correctly.* • *Lubricating and fuel oil spills will be cleaned up immediately and spill cleanup materials will*				

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Responsibility		Target / Indicator	Estimated Cost
			Implementation	Monitoring		
		be maintained at the storage area. • Construction and work sites will be equipped with sanitary latrines that do not pollute surface waters and are connected to septic tanks, or waste water treatment facilities. • Discharge of sediment-laden construction water directly into surface watercourses will be forbidden. Sediment laden construction water will be discharged into settling lagoons or tanks prior to final discharge. • Spill cleanup equipment will be maintained on site (including at the site maintenance yard and vehicle fueling areas). The following conditions to avoid adverse impacts due to improper fuel and chemical storage: • Fueling operations will occur only within containment areas. • All fuel and chemical storage (if any) will be sited on an impervious base within a bund and secured by fencing. The storage area will be located away from any watercourse or wetlands. The base and bund walls will be impermeable and				

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Responsibility		Target / Indicator	Estimated Cost
			Implementation	Monitoring		
		of sufficient capacity to contain 110% of the volume of tanks. • Filling and refueling will be strictly controlled and subject to formal procedures and will take place within areas surrounded by bunds to contain spills / leaks of potentially contaminating liquids. • All valves and trigger guns will be resistant to unauthorized interference and vandalism and be turned off and securely locked when not in use. • The contents of any tank or drum will be clearly marked. Measures will be taken to ensure that no contaminated discharges enter any drain or watercourses. • Disposal of lubricating oil and other potentially hazardous liquids onto the ground or water bodies will be prohibited. • Should any accidental spills occur immediate cleanup will be undertaken, and all cleanup materials stored in a secure area for disposal to a site authorized to dispose of hazardous waste. • If determined warranted by the Engineer, the Contractor will provide a wash pit or a wheel washing and/or vehicle				

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Responsibility		Target / Indicator	Estimated Cost
			Implementation	Monitoring		
		cleaning facility at the exits from the sites. • *If so requested, the Contractor will ensure that all vehicles are properly cleaned (bodies and tires are free of sand and mud) prior to leaving the site areas.* • *The Contractor will provide necessary cleaning facilities on site and ensure that no water or debris from such cleaning operations is deposited off-site.* • *The Contractor will be responsible to maintain and cleanup campsites and respect the rights of local landowners.*				
23	*Impacts Associated with Concrete Batching*	*Strictly implement the approved:* • ***Concrete Batching Plant Management Plan.*** • ***Construction Camp Layout plan.*** • ***Air Quality Management Plan*** • ***Spill Management Plan.*** • ***OHS Plan.*** • ***Emergency Response Plan.*** • ***Waste Management Plan.*** • ***Waste Water Management Plan.*** *To limit impacts from dust, the following conditions will apply:* • *Batching plants will be located downwind of residential areas and not*	*Contractor*	*Engineer/RD, MoEPA Information – included in reports to the Lenders*	1. *Air emissions within acceptable limits.* 2. *Water discharges within acceptable limits.* 3. *PPE worn by all workers.* 4. *Training provided.* 5. *First aid kits at site.*	*Part of contractor's general construction costs.*

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Responsibility		Target / Indicator	Estimated Cost
			Implementation	Monitoring		
		within one kilometer of any residential area. • The entire batching area traversed by vehicles – including driveways leading into and out of the area – will be paved with a hard, impervious material. • Sand and aggregates will be delivered in a dampened state, using covered trucks. If the materials have dried out during transit they will be re-wetted before being dumped into the storage bunker. • Sand and aggregates will be stored in a hopper or bunker which shields the materials from winds. The bunker should enclose the stockpile on three sides. The walls should extend one meter above the height of the maximum quantity of raw material kept on site and extend two meters beyond the front of the stockpile. • The hopper or bunker will be fitted with water sprays which keep the stored material damp at all times. Monitor the water content of the stockpile to ensure it is maintained in a damp condition. • Overhead storage bins will be totally enclosed. The swivel				

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Responsibility		Target / Indicator	Estimated Cost
			Implementation	Monitoring		
		chute area and transfer point from the conveyor will also be enclosed. • Rubber curtain seals may be needed to protect the opening of the overhead bin from winds. • Conveyor belts which are exposed to the wind and used for raw material transfer will be effectively enclosed, to ensure dust is not blown off the conveyor during transit. Conveyor transfer points and hopper discharge areas will be fully enclosed. • Conveyor belts will be fitted with belt cleaners on the return side of the belt. • Weigh hoppers at front end loader plants will be roofed and have weigh hoppers shrouded on three sides, to protect the contents from the wind. The raw materials transferred by the front-end loader should be damp, as they are taken from a dampened stockpile. • Store cement in sealed, dust-tight storage silos. All hatches, inspection points and duct work will be dust-tight. • Silos will be equipped with a high-level sensor alarm and				

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Responsibility		Target / Indicator	Estimated Cost
			Implementation	Monitoring		
		an automatic delivery shut-down switch to prevent overfilling. • *Cement dust emissions from the silo during filling operations must be minimized. The minimum acceptable performance is obtained using a fabric filter dust collector.* • *Totally enclose the cement weigh hopper, to ensure that dust cannot escape to the atmosphere.* • *An inspection of all dust control components will be performed routinely – for example, at least weekly.* • *All contaminated storm water and process wastewater will be collected and retained on site.* • *All sources of wastewater will be paved and bunded. The specific areas that will be paved and bunded include; the agitator washout area, the truck washing area, the concrete batching area, and any other area that may generate storm water contaminated with cement dust or residues.* *Contaminated storm water and process wastewater will be captured and recycled by a*				

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Responsibility		Target / Indicator	Estimated Cost
			Implementation	Monitoring		
		system with the following specifications: • *The system's storage capacity must be sufficient to store the runoff from the bunded areas generated by 20 mm of rain.* • *Water captured by the bunds will be diverted to a collection pit and then pumped to a storage tank for recycling.* • *An outlet (overflow drain) in the bund, one meter upstream of the collection pit, will divert excess rainwater from the bunded area when the pit fills due to heavy rain (more than 20 mm of rain over 24 hours).* • *Collection pits should contain a sloping sludge interceptor, to separate water and sediments. The sloping surface enables easy removal of sludge and sediments.* • *Wastewater will be pumped from the collection pit to a recycling tank. The pit will have a primary pump triggered by a float switch and a backup pump which automatically activates if the primary fails.* • *Wastewater stored in the recycling tank needs to be*				

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Responsibility		Target / Indicator	Estimated Cost
			Implementation	Monitoring		
		reused at the earliest possible opportunity.				
24	Access Roads	Strictly implement the approved: • **Traffic Management Plan** Where required, implement the requirements of any: • **Temporary Road Method Statement.** • **Temporary River Crossing Method Statement** The Contractor shall also: • Provide information to the public about the scope and schedule of construction activities and expected disruptions and access restrictions at least 24 hours before the disruptions; • Allow for adequate traffic flow around construction areas via diversions or temporary access roads; • If temporary access roads are to be constructed with a gravel surface, they shall be routinely watered by the Contractor during dry weather to reduce dust impacts; • Access roads which are also used by local traffic shall include passing places every 200 meters where the roads are narrow; • Provide adequate traffic signs, appropriate lighting, well-designed traffic safety	Contractor	Engineer/RD, MoEPA Information – included in reports to the Lenders	1. No complaints from local residents regarding traffic diversions. 2. Levels of dust within acceptable limits.	Stakeholder communications part of Contractors ESO staff costs. Watering of roads part of Contractors general construction costs. All other items considered part of Contractors general construction costs.

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Responsibility		Target / Indicator	Estimated Cost
			Implementation	Monitoring		
		signs, barriers and flag persons for traffic control. • Access roads for batching plants, etc., should be maintained to their exiting (or better) condition during the construction phase.				
25	Emergency Response	Strictly implement the approved: • **Emergency Response Plan.** Any emergencies, and how they were handled, will be reported in monthly progress reports by the Contractor to the Engineer	Contractor	Engineer/RD, MoEPA Information – included in reports to the Lenders	1. Monthly reporting of emergency situations.	Part of Contractors general construction costs.
26	Community and Livestock Safety	The Contractor will: • Ensure all driving is to occur during daytime hours where possible. • Prepare guidelines for maximum driving hours per day and week. • Adhere to speed limits. • Adhere to spill response measures in the event of a spillage from a vehicle, particularly in the vicinity of the Khada River. • Consult with local households, community groups, police, and emergency services along the transport routes. • Provide driver training programs to ensure that Contractors staff are aware of community sensitivities, such	Contractor	Engineer/RD, Labour union (if available), community representatives. Information – included in reports to the Lenders	1. Safety awareness sessions provided. 2. No accidents between contractors / sub-contractors vehicles and local residents.	Stakeholder communications and training part of Contractors ESO / H&S staff costs. All other items considered part of Contractors general construction costs.

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Responsibility		Target / Indicator	Estimated Cost
			Implementation	Monitoring		
		as specific livestock movement periods. • Provide a series of road safety awareness sessions for schools in the Project area. The sessions will be provided on a six monthly basis throughout the construction phase. As part of the awareness sessions children will be given reflective badges to fix to their coats and school bags. • Prior to the start of construction, and as part of his **Traffic Management Plan**, the Contractor shall consult with local residents to establish key livestock crossing points on the proposed access roads. Flagmen shall be employed at the demarcated crossing points during the day to ensure the safe passage of cattle in these areas.				
27	Occupational Health and Safety and Workers Rights	Strictly implement the approved: • **Occupational Health and Safety Plan** • **Community Health and Safety Plan.** • **Traffic Management Plan.** • **Waste Management Plan.** • **Emergency Response Plan.** • **Air Quality Management Plan.**	Contractor	Engineer/RD, Labour union (if available), community representatives. Information – included in reports to the Lenders	1. Safety induction completed. 2. 24 hour hotline operational. 3. Regular training provided.	Induction courses and monitoring part of Contractors H&S staff costs. All other items considered part of Contractors general

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Responsibility		Target / Indicator	Estimated Cost
			Implementation	Monitoring		
		• **Noise Management Plan.** • **Camp Management Plan.** *The Contractor shall also:* • *Conduct initial safety induction course for construction workers regarding health and safety measures, emergency response in case of accidents, fire, etc. Develop and implement safety training program. Conduct safety meetings on a monthly basis.* • *Implement monitoring of condition at the worksites (this includes control of availability, adequacy quality and use of PPE, implementation of noise measurements, air quality measurements in tunnels).* • *Provide potable water and portable toilet facilities for workers at work sites.* • *Ensure availability of first aid kits and firefighting equipment at the work areas.* • *Provide fencing on all areas of excavation greater than 1 m deep. Install warning signs.* • *Provide appropriate PPE (personnel protection equipment) and harnesses (safety boots, helmets, gloves, protective clothes, breathing mask, goggles, and ear protection) adequate to task/activity.*				*construction costs, or covered elsewhere in the EMP*

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Responsibility		Target / Indicator	Estimated Cost
			Implementation	Monitoring		
		• Regularly inspect, test and maintain all safety equipment. Replace equipment that is not in working order, damaged and not fit to use immediately. • Ensure sufficient fresh air supply to confined work spaces. • Keep air inlet filters clean and free of dust and microorganisms. • Ensure reversing signals are installed on all construction vehicles. • 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. Note: fall prevention/protection measures may include installation of guardrails with mid-rails and toe boards at the edge of any fall hazard area, proper use of ladders and scaffolds by trained employees, use of fall prevention devices, including safety belt and lanyard travel limiting devices to prevent access to fall hazard, fall protection devices such as full body harnesses, etc.				

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Responsibility		Target / Indicator	Estimated Cost
			Implementation	Monitoring		
		• Mark the areas where risk of injuries from falling objects exist with rope or flagging to minimize risks and injuries. • Employ flag persons to control traffic when construction equipment is entering or leaving the work area. • Provide road signs in accordance with approved traffic management plan. • Provide sufficient lighting at night within and in the vicinity of construction sites, but consider need for mitigation of impact on wildlife. • Install temporary accesses to properties affected by disruption to their permanent accesses. • Reinstate good quality permanent accesses following completion of construction. • Impose speed limits on construction vehicles when travelling along residential areas. • Provide induction and OHS training to the staff. • Inform community about need to implement noise generating works outside the planned schedule. • Implement 24-hour community complaints hotline.				

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Responsibility		Target / Indicator	Estimated Cost
			Implementation	Monitoring		
		• A suitably staffed and equipped health clinic for all workers is to be provided on site.				
		For the development of the Project the Contractor shall: • set targets for local employment based on initial assessment of the labour market for unskilled and semi-skilled work force. • For unskilled the Contractor shall use a 'ballot' system to ensure that employment is fair and not weighted to connected people for unskilled roles. Repatriation of locals through recruitment measures will use online resources such as jobs.ge. A retrenchment plan will also be developed by the Contractor for use during the end of the project to ensure that local workers are equipped in some capacity for the end of the project.				Part of Contractors ESO staff costs.
		Regarding HR Policies and workers GRM, the Contractor shall follow the measures listed below: • The development and implementation by the Contractor of Human resources policies to hire, train, assess, and reward the project workforce. These				Part of Contractors ESO staff costs.

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Responsibility		Target / Indicator	Estimated Cost
			Implementation	Monitoring		
		policies should prevent any form of discrimination in the workplace and ensure that all employees are treated fairly and equally, in line with EU non-discrimination requirement. • *Prior to implementing any collective dismissals of the project workforce, the Contractor will be required to conduct an analysis of alternatives to retrenchment.* • *Further, policies should exclude the use of child or forced labour in the project, and that national and international requirements for non-employee workers and supply chain workers are also reflected in these policies.* • *A grievance mechanism for workers will need to be provided for the workforce to be able to raise reasonable workplace concerns. The Contractor will inform the workers of the grievance mechanism at the time of hiring and make it easily accessible to them.* • *The workers will additionally not be restricted from joining or forming workers organisations or from bargaining collectively, and*				

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Responsibility		Target / Indicator	Estimated Cost
			Implementation	Monitoring		
		the contractor will not discriminate or retaliate against workers who form or join collectives or bargain collectively. • *Working relationships and conditions of work are also to be managed and monitored in implementing the project.* • *Aspects include the working environment; the organisation of work; training; health and safety; working hours; fair wages and decent working conditions; and terms of employment.*				
		Regarding sub-contractors, the Contractor shall ensure that: • *All Project sub-contractors will be supplied with copies of the SEMP.* • *Provisions will be incorporated into all sub-contracts to ensure the compliance with the SEMP at all tiers of the sub-contracting.* • *All subcontractors will be required to appoint a safety representative who will be available on the Site throughout the operational period of the respective sub-contract unless the Engineers approval to the contrary is given in writing.*	*Contractor*	*Engineer/RD, MoEPA* *Information – included in reports to the Lenders*	1. *Sub-contractors received SEMP.* 2. *Contracts include clauses relating to SEMP compliance.* 3. *Safety representative appointed.*	*Part of Contractors ESO staff costs.* *Part of sub-contractors costs.*

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Responsibility		Target / Indicator	Estimated Cost
			Implementation	Monitoring		
		Contractor to ensure collective bargaining, retrenchment, worker accommodation and non-employee worker gaps in line with ILO and Lender requirements.	Contractor	Engineer/RD, MoEPA Information – included in reports to the Lenders	1. ILO and lender requirements adopted by the Contractor.	Part of Contractors ESO staff costs.
28	Landscape visual change	The Contractor shall: • Strictly observe the boundaries of the worksites. • Clean up and timely remove waste from the area. • Reinstate all temporarily disturbed sites after completion of works. Plant with vegetation. • Avoid using 'alien' plant species. • Choose colors of above ground sections of technical buildings at tunnel exits so to merge with environment. • Give priority to use of geotextile against shotcrete. • Use irregular shape stones for riprap. • Avoid use of white concrete.	Contractor	Engineer/RD, MoEPA Information – included in reports to the Lenders	1. All sites reinstated.	All items considered part of Contractors general construction costs, or covered elsewhere in the EMP
29	Lighting	• Use of full horizontal cut off glass lens luminaires are installed at 0^{O} uplift. These luminaires, in addition to reducing sky glow, help to minimise visual intrusion within open landscape. • Where possible use lower lamp heights, however, this should not compromise	Detailed design team to include light shields in design.	RD / ADB / EBRD	1. Lighting design includes appropriate shields.	Part of Contractors general construction costs.

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Responsibility		Target / Indicator	Estimated Cost
			Implementation	Monitoring		
		safety aspects, such as the need to see road signs. • *To prevent future pollution issues, it is recommended that the use of sodium light bulbs is prohibited and that LED lights are installed with a "neutral" color temperature of 4000K.*				
		During the Construction Phase: • *Use low wattage lamps directing light downwards at work sites and camps.* • *All lighting related to construction activities shall be shielded or directed to restrict any direct illumination onto property located outside of the Project Site boundaries.* • *All construction site lighting shall be turned off when construction activities have ceased for the day.* • *Follow the mitigation measures for lighting as outlined in* ***Section F.6 – Biodiversity and Nature Conservation*** *of the EIA.*	*Contractor to implement mitigation measures*	*Engineer/RD, MoEPA Information – included in reports to the Lenders*	1. *Light shields provided.* 2. *Lights turned off at work sites at the end of the working day.*	*Part of Contractors general construction costs.*
30	*Construction Noise*	*Strictly implement approved:* • ***Noise Control Plan.*** *In addition, the Contractor will:* • *Ensure that no construction camp, batching plant, asphalt plan or rock crushing plant is located within 1km of any residential area or sensitive*	*Contractor*	*Engineer/RD, MoEPA Information – included in reports to the Lenders*	1. *Camps correctly sited.* 2. *Construction noise within acceptable limits.* 3. *Time constraints observed.* 4. *PPE worn by workers.*	*Temporary noise barriers, if needed, are part of Contractors general construction costs.*

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Responsibility		Target / Indicator	Estimated Cost
			Implementation	Monitoring		
		receptor and not within 2 km of a protected area. • *Use well maintained construction equipment and vehicles.* • *Use construction equipment and vehicles fitted with appropriate noise suppression. Fit all pneumatic tools with an effective silencer on their air exhaust port.* • *Use temporary noise barriers while working in sensitive locations in case accidence of allowable limits is expected. Placing the barrier close to the source proves to be effective.* • *Impose speed limits on the project vehicles to minimize noise emission while moving along/across the sensitive areas.* • *Keep to no horn policy unless vitally necessary.* • *Install less noisy movement/reversing warning systems for equipment and vehicles that will operate for extended periods, during sensitive times or in close proximity to sensitive sites. Occupational health and safety requirements for use of warning systems must be followed.* • *All vehicular movements to and*				*All other items considered part of Contractors general construction costs, or covered elsewhere in the EMP*

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Responsibility		Target / Indicator	Estimated Cost
			Implementation	Monitoring		
		from the site to only occur during the scheduled normal working hours, unless approval has been granted by the Engineer. • *Keep good conditions of trucks that use to transport construction materials so they cause no loud noise and control the truck speed, to be not exceeded 40 km/hr when driving through communities, and not exceeded 80 km/hr when driving on highways.* • *Time and Activity Constraints, i.e., operations will be scheduled to coincide with periods when people would least likely be affected; work hours and work days will be limited to less noise-sensitive times. Hours-of-work will be approved by the Engineer having due regard for possible noise disturbance to the local residents or other activities. Construction activities will be strictly prohibited between 10 PM and 6 AM in the residential areas. When operating close to sensitive areas (within 250 meters) such as residential, nursery, or medical facilities, the Contractor's hours of working shall be limited to 8 AM to 6 PM.*				

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Responsibility		Target / Indicator	Estimated Cost
			Implementation	Monitoring		
		• As much as possible, use quiet equipment and working method: e.g. Diesel hammer piling – substituted with drill piling. • Whenever possible: enclose noisy equipment, restrict non-stop operation of noisy equipment, avoid simultaneous operation of noise generating equipment. • Consider seasons sensitive for birds and other wildlife while planning noise-generating works. • Train staff in best practice. • Inform community on schedule and duration of noisy construction activities in sensitive locations, such as residential areas, etc. • Implement 24-hour community complaints hotline. • Provision of noise protection kits such as ear plug, earmuff, for workers who are working in the area with noise level is higher than 85 dB(A). It is designated as a regulation that workers must wear protection kits in case of working in a noisy area.				
31	Noise Barriers	Undertake further refined noise modelling to determine the specification and precise locations of the proposed noise	Engineer	RD and ADB to review results and designs	1. Model refined.	$20,000

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Responsibility		Target / Indicator	Estimated Cost
			Implementation	Monitoring		
		barriers.				
32	*Road Noise*	*Construction of the noise barriers recommended in **Section F.8.5 – Noise** or per the refined noise modeling above under Item 31.*	*Contractor*	*Engineer/RD, MoEPA Information – included in reports to the Lenders*	*1. Noise barriers constructed.*	*135 / $1,300 m* *Total Cost $175,500*
33	*Construction generated blasting*	*Strictly Implement the approved:* • ***Blasting Management Plan**.* *In addition, the Contractor shall ensure that:* • *Blasting will be scheduled during the day only.* • *Local communities will be informed of blasting timetable in advance and will be provided adequate notice of when blasts are required outside of the planned schedule.* • *Throughout the blasting activity, if required, vibration sensors will be installed at strategic locations to monitor the impact of blasting and to ensure that the vibration levels are within the adopted criteria. The monitoring plan will be part of the **Blasting Management Plan**.* • *Use blasting design with consideration of safety, blast geometry, free faces, burden, spacing, initiation pattern (delayed blasting) and angled holes. Use multi deck blasting technique is*	*Contractor*	*Engineer/RD, MoEPA Information – included in reports to the Lenders*	*1. Blasting time constraints observed.* *2. Blasting timetable provided to local residents.*	*Informing communities part of the Contractors ESO / H&S staff costs.* *For monitoring costs see **Appendix B***

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Responsibility		Target / Indicator	Estimated Cost
			Implementation	Monitoring		
		considered as efficient method creating lower vibration.				
34	Vibration	**Condition Surveys** - Not later than 28 days before the commencement of construction works, the Contractor and the Engineer will carry out joint condition surveys of all buildings within 25 meters of the road alignment that, in the opinion of the Engineer might be affected by vibration resulting from the Contractor's construction operations. The surveys shall be conducted in the presence of and with the permission of the property owners (and with representatives of the Ministry of Culture and Sport for PCR sites). The findings of the building condition surveys shall be recorded in the reports that shall contain the following information, as a minimum: • Building address and location; • A description of the building condition and any cosmetic and/or structural damage; • Sketches and photographs showing the location and extent of any damage; • High resolution video recordings of the surveyed buildings; and	Contractor	Engineer/RD, MoEPA Information – included in reports to the Lenders	1. Condition surveys undertaken.	Part of Contractors construction costs.

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Responsibility		Target / Indicator	Estimated Cost
			Implementation	Monitoring		
		• *Verification of the report by the building owner (and MoCS).*				
		Strictly implement the approved: • ***Construction Vibration Management Plan.*** *Where the results of the vibration monitoring show that the specified construction vibration limit is reached at a particular location, the Contractor shall suspend the construction activities that generate the excessive vibration at such location, notify the Engineer and with the approval of the Engineer take mitigative actions necessary to keep the construction vibration within the specified limit. This may, for example include:* • *The use of low roller vibration settings and performing compaction without vibration.* • *Adjust TBM tunneling speeds and periodicity should the vibration monitoring indicate excessive vibrations;* • *Select charge and delay time in drill and blast tunnels so to avoid excessive vibration; and* • *Provide temporary vibration barriers in sensitive locations.*	*Contractor*	*Engineer/RD, MoEPA* *Information – included in reports to the Lenders*	1. *Zero complaints from local residents regarding vibration.*	*Part of Contractors construction costs.* *For monitoring costs see* ***Appendix B.***
		Regarding vibration impacts to PCR, the Contractor shall:	*Contractor*	*Engineer/RD, MoEPA* *Information –*	1. *No damage to PCR sites.*	*For monitoring costs see* ***Appendix B.***

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Responsibility		Target / Indicator	Estimated Cost
			Implementation	Monitoring		
		• *At a minimum undertake continuous monitoring at all of the PCR sites within 110 m of works sites as identified in the Project EIA or by the Cultural Heritage Monitor.* • *At the end of each work day, after blasting works are completed in areas within 100 m of PCR sites the Cultural Heritage Monitor Shall undertake a visual inspection of each site to determine the extent of any damage to the sites. If damage is identified, works in the area shall cease until the Contractor has contacted the MoCS to inform them of the damage and an action plan has been developed to repair any damage and ensure no further damage to the site.*		*included in reports to the Lenders*		*Observation monitoring part of Contractors CHM staff costs.*
35	*Impact on cultural heritage*	*Strictly implement the approved:* • ***Cultural Heritage Management Plan*** • ***Chance Find Procedure***	*Contractor*	*Engineer/RD, MoEPA Information – included in reports to the Lenders*	*1. No complaints relating to disturbance of PCR* *2. No damage to PCR sites.*	*Part of the Contractors CHM staff costs.*
		The Contractor shall also apply the following overarching commitments: • *Prevent damage and promote preservation of cultural heritage objects / sites.* • *Suspend activity if chance finds are suspected.*	*Contractor*	*Engineer/RD, MoEPA Information – included in reports to the Lenders*	*1. No complaints relating to disturbance of PCR* *2. No damage to PCR sites.*	*Part of the Contractors general construction costs and CHM staff costs.*

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Responsibility		Target / Indicator	Estimated Cost
			Implementation	Monitoring		
		• Cooperate with the Engineer and RD on Chance Finds • Provide site supervision including H&S, labour, tools, equipment (including mechanical excavator as required by Engineer), facilities and attendances to chance find excavations • Provide and install any identified measures such as bog mats over archaeological sensitive areas, demarcation of cultural heritage sites to be avoided (see list below), or other measures to assist the preservation of PCR. This will be in areas to be determined by the **Cultural Heritage Monitor**.				
		More specifically, the Contractor will ensure: • Areas of potential cultural heritage impact (identified in the Project EIA) will be examined, and any necessary excavations conducted prior to construction. • Monitoring of vibration sensitive locations as determined by this EIA. • Archaeological sites identified during construction will be archaeologically recorded by	Contractor	Engineer/RD, MoEPA Information – included in reports to the Lenders	1. No complaints relating to disturbance of PCR 2. No damage to PCR sites.	Part of the Contractors general construction costs and CHM staff costs.

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Responsibility		Target / Indicator	Estimated Cost
			Implementation	Monitoring		
		the Cultural Heritage Monitors. • *Pre-construction works to evaluate, and record known archaeological sites will be agreed with the Ministry of Culture and Sport.* • *A program of archaeological surveillance (watching brief by the Cultural Heritage Monitor) will be implemented during topsoil stripping of work sites, the facility sites, construction camps and equipment lay-down areas and ancillary areas, spoil disposal sites, and those areas identified above in* ***Error! Reference source not found.*** *and* ***Error! Reference source not found.****. The Engineer will be empowered to temporarily stop works, pending archaeological examination, if artefacts are found.* • *If archaeological artefacts or structures are found, archaeological advice will be sought from Georgian National Museum and the Ministry of Culture and Sport, and the Chance Finds Procedure followed.* • *The Cultural Heritage Monitor conducting the watching brief*				

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Responsibility		Target / Indicator	Estimated Cost
			Implementation	Monitoring		
		will advise on procedures to be followed by the construction supervisor in line with the Chance Finds Procedure. • *If works cannot easily be adjusted to avoid damaging the feature, construction activities will be suspended at the site until the excavation and recording required by the authorities has been carried out.* • *Known archaeological sites within 50m of the road centerline or other construction activity (e.g. access roads, spoil disposal sites) will be demarcated throughout construction, e.g. fencing, barriers and/or signage.* • *Issues relating to archaeological awareness (such as ownership of finds, notification of finds and protection of archaeological sites) will be included in induction training.*				
		Particular sites requiring fencing/protection prior to construction commencement include: • *Niche (Jvarkhati), near Kobi - Site #24*	*Contractor*	*Engineer/RD, MoEPA Information – included in reports to the Lenders*	*1. Sites fenced throughout construction phase.*	*Fencing / $5,000*

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Responsibility		Target / Indicator	Estimated Cost
			Implementation	Monitoring		
		• *Giorgitsminda, near Kobi - Site #25* • *Tskere cemetery, Site #3* • *Kobi War Memorial, Site #26* • *Sacred forest around the church located on the top of the hill adjacent to the northern portal in Kobi (Site #25)*				

Table A-4: Lot 2 Pre-construction / Construction Phase EMP

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Responsibility		Target / Indicator	Estimated Cost
			Implementation	Monitoring		
1	Disclosure of project information	Implementation of the **Stakeholder Engagement Plan** (SEP) – Section 6.2.2.3, EIA Disclosure Phase	RD, Engineer (if appointed) and The Detailed Design team if available	ADB, EBRD	1. Consultation completed with the identified stakeholders per the SEP and results of consultations presented to RD and Lenders.	Borne by the RD
2	Development and implementation of the mechanism to resolve environmental complaints due to the project implementation	Prior to start of site works, the Contractor shall: • Communicate a grievance redress mechanism (GRM), as described in the EIA, to communities in the project impact zone • set-up and publicize a 24-hour hotline for complaints. • ensure that names and contact numbers of representatives of RD and contractors are placed on the notice boards outside the construction site. During Construction the Contractor shall complete consultations according to the requirement of the **Stakeholder Engagement Plan** (SEP).	Contractor	Engineer, RD, ADB, EBRD	1. GRM Established. 2. 24 Hour hotline Established and operational. 3. Notice boards located at construction sites. 4. Consultation completed with the identified stakeholders per the SEP and results of consultations presented to RD and Lenders.	24 hour hotline / $500 per month 50 Noticeboards / $5,000
3	Development of SEMP	The Contractor shall prepare a SEMP. The SEMP will describe the precise location of the required mitigation / monitoring, the persons responsible for the mitigation / monitoring, the schedule and reporting methodology. The SEMP will include all of the sub-plans listed below (#3) unless these works are not	Preparation: Contractor Approval: Engineer, RD ADB, EBRD	RD/Engineer. Information – included in reports to the Lenders	1. SEMP approved by all parties.	Part of Contractor's ESO staff costs.

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Responsibility		Target / Indicator	Estimated Cost
			Implementation	Monitoring		
		scheduled to start until a later date (see specific sub-plans for details). The SEMP will be submitted to the Engineer and RD for approval at least 30 days before taking possession of any work site. No access to the site will be allowed until the SEMP is approved by the Engineer and RD the ADB and EBRD. New topic specific or site specific EMPs may also need to be developed by the Contractor during the construction phase. These new plans will also need to be approved by the Engineer and the RD.				
	Development of sub-plans	***Topsoil Management Plan -** The plan shall describe topsoil stripping procedures and rules, topsoil stripping depth and volumes, topsoil stripping supervision, transportation and stockpiling requirements, stockpile location, topsoil stockpile design, stockpile management, erosion hazard and erosion control, runoff drainage/diversion, soil protection measures at the storage area, maintenance of the stockpile and topsoil application procedure.*	*Preparation: Contractor* *Approval: Engineer, RD*	*RD/Engineer. Information – included in reports to the Lenders*	*1. Plan approved as part of the SEMP by relevant parties.*	*Part of Contractor's ESO / EcoW staff costs.*
		***Waste Management Plan -** The plan shall describe waste streams and amounts, describe recycling/reuse methods for each material, identify the waste destinations and transport modes, including what materials are being segregated on site for reuse or recycling, specify responsibilities for managing and disposal of waste. Describe special measures for material*	*Preparation: Contractor* *Approval: Engineer, RD*	*RD/Engineer. Information – included in reports to the Lenders*	*1. Plan approved as part of the SEMP by relevant parties.*	*Part of Contractor's ESO staff costs.*

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Responsibility		Target / Indicator	Estimated Cost
			Implementation	Monitoring		
		use and handling. Describe communication and training to support and encourage participation from everyone on site.				
		Waste Water Management Plan - *(in case intended to discharge waste water from the camp and/or work area into a surface water body). The plan must provide details on waste water (sewage) volume, disposal scheme, information on capacity and type of waste water treatment facility, location of the discharge point/points with indication of coordinates. A discharge permit will be sought from the MoEPA and Maximum Allowable Discharge Limits (MADLs) will be set which the project must then comply with.*	*Preparation: Contractor* *Approval: Engineer, RD*	*RD/Engineer. Information – included in reports to the Lenders*	1. *Plan approved as part of the SEMP by relevant parties.*	*Part of Contractor's ESO staff costs.*
		Air Quality Management Plan - *The plan shall provide details of mitigation measures, specific location and schedule where such measures shall be implemented to minimize impacts to sensitive receptors due to the presence of the camp, construction works, sourcing and transport of construction materials, and other project-related activities. Recommendations provided in the EIA must be considered. Prior to commencement of works likely emissions from crushers, concrete production facilities and other emissions generating facilities must be calculated and agreed with the MoEPA. Separate plan/schedule for air quality control in the tunnel must be provided.*	*Preparation: Contractor* *Approval: Engineer, RD*	*RD/Engineer. Information – included in reports to the Lenders*	1. *Plan approved as part of the SEMP by relevant parties.*	*Part of Contractor's ESO staff costs.*

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Responsibility		Target / Indicator	Estimated Cost
			Implementation	Monitoring		
		Noise Control Plan - *The plan shall provide details of mitigation measures, specific location and schedule where such measures shall be implemented to minimize impacts to sensitive receptors due to the presence of the camp, construction works, sourcing and transport of construction materials, and other project-related activities. Recommendations provided in the EIA must be considered.*	*Preparation: Contractor* *Approval: Engineer, RD*	*RD/Engineer. Information – included in reports to the Lenders*	1. *Plan approved as part of the SEMP by relevant parties.*	*Part of Contractor's ESO staff costs.*
		Spill Management Plan *- The plan shall provide details of procedures, responsibilities, resources, documentation and reporting requirements, training provisions for relevant staff, etc. to avoid spills of hazardous substances and to effectively respond to such incidents. Recommendations provided in the EIA must be considered.*	*Preparation: Contractor* *Approval: Engineer, RD*	*RD/Engineer. Information – included in reports to the Lenders*	1. *Plan approved as part of the SEMP by relevant parties.*	*Part of Contractor's ESO staff costs.*
		Traffic Management Plan *- The plan shall be designed to ensure that traffic congestion and traffic safety impacts due to construction activities and movement of construction vehicles, haulage trucks, and equipment is minimized. The plan shall be prepared in consultation with traffic officials. The plan shall identify traffic diversion and management issues, traffic schedules, traffic arrangements showing all detours/lane diversions, modifications to signaling at intersections, necessary barricades, warning/advisory signs, road signs, lighting, and other provisions to ensure*	*Preparation: Contractor* *Approval: Engineer, RD*	*RD/Engineer. Information – included in reports to the Lenders*	1. *Plan approved as part of the SEMP by relevant parties.*	*Part of Contractor's ESO / H&S staff costs.*

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Responsibility		Target / Indicator	Estimated Cost
			Implementation	Monitoring		
		that adequate and safe access is provided to motorists and other road users in the affected areas. Pre-construction access road surveys will also form part of the TMP.				
		***Occupational and Community Health and Safety Plan** - Consistent with international standards (e.g., World Bank Group Environmental, Health, and Safety Guidelines, 2007) and Labour Code of Georgia. The Plan shall address health and safety hazards associated with construction activities (e.g., excavations, tunneling etc.), use of heavy equipment, transport of materials and other hazards associated with various construction activities. The document to be read together with the Camp Management Plan.*	*Preparation: Contractor* *Approval: Engineer, RD*	*RD/Engineer. Information – included in reports to the Lenders*	*1. Plan approved as part of the SEMP by relevant parties.*	*Part of Contractor's ESO / H&S staff costs.*
		***Labour and Working Conditions Management Plan -** This will include: policy/legal framework information (including labour and OHS requirements of national legislation, ADB SPS 2009, and EBRD Performance Requirements 2 and 4), workforce induction and information on rights, child and forced labour, equal opportunity, migrant workers, promotion of local employment opportunities, labour union, worker accommodation requirements, provision for retrenchment plans, workforce grievance mechanism, security personnel (Voluntary Principles on Security and Human Rights), etc.*	*Preparation: Contractor* *Approval: Engineer, RD, ADB, EBRD*	*RD/Engineer. Information – included in reports to the Lenders*	*1. Plan approved as part of the SEMP by relevant parties.*	*Part of Contractor's ESO / H&S staff costs.*

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Responsibility		Target / Indicator	Estimated Cost
			Implementation	Monitoring		
		Contractor needs to ensure that the core labour requirements are cascaded down across the entire contracting chains, including sub-contractors and suppliers of core materials. The plan shall also be in compliance with IFC/EBRD Guidance Note ""Workers' accommodation: processes and standards".				
		***Code of Conduct** - outlines camp rules articulating acceptable behaviors of the workforce with local communities. Associated induction training will be provided to ensure rules are well understood and enforced.*	*Preparation: Contractor* *Approval: Engineer, RD, ADB, EBRD*	*RD/Engineer. Information – included in reports to the Lenders*	*1. Plan approved as part of the SEMP by relevant parties.*	*Part of Contractor's ESO / H&S staff costs.*
		***Emergency Response Plan** - to prevent, mitigate, respond to and recover from emergency events that could occur due to project activities such as accidents, spills of hazardous substances, fire, extreme weather events, and others; measures to prevent, mitigate, respond to and recover from emergency events that could occur due to project activities such as accidents during tunneling (e.g., tunnel collapse, electrocution, etc.), release of toxic gas during tunneling, spills of hazardous substances, fire, floods, and other events.*	*Preparation: Contractor* *Approval: Engineer, RD*	*RD/Engineer. Information – included in reports to the Lenders*	*1. Plan approved as part of the SEMP by relevant parties.*	*Part of Contractor's ESO / H&S staff costs.*
		***Ground Water Management Plan** - covering water diversion, treatment (settling) and discharge for each tunnel.*	*Preparation: Contractor* *Approval: Engineer, RD*	*RD/Engineer. Information – included in reports to the Lenders*	*1. Plan approved as part of the SEMP by relevant parties.*	*Part of Contractor's ESO staff costs.*

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Responsibility		Target / Indicator	Estimated Cost
			Implementation	Monitoring		
		Recultivation/Land Restoration Plan *- covering all sited temporarily used for the needs of the project. The plan must state necessity to prohibit the use alien or invasive plant species and need/method for control and removal of Exotic Species. (Note: The plan can be developed/revised at a later stage or stepwise site by site to provide a plan and schedule of re-cultivation works. The plan must be developed in association with biodiversity specialist and the state forestry authorities.*	*Preparation: Contractor* *Approval: Engineer, RD*	*RD/Engineer. Information – included in reports to the Lenders*	1. *Plan approved as part of the SEMP by relevant parties.*	*Part of Contractor's ESO / ECoW staff costs.*
		Biodiversity Management Plan *– The Contractor will develop a Biodiversity Management Plan covering actions to safeguard, conservation or enhancement of biodiversity on the influence territories or specific sites that tend to be affected due to the planned activity. Compliance with the plan will be responsibility of Contractor and his ECoW.* *The Engineer / Contractor, through the support of contracted third parties, will implement the Project* ***Biodiversity Action Plan (BAP)*** *as additional mitigation.* *To track the performance of the BAP a* ***Biodiversity Monitoring and Evaluation Program (BMEP)*** *shall be implemented by the Engineers International Environmental and Biodiversity Specialist.*	*BMP Preparation: Contractor* *BMP Approval: Engineer, RD, ADB, EBRD* *BAP Implementation: Contractor / Engineer* *BMEP Implementation: Engineer*	*BMP: RD/Engineer. Information – included in reports to the Lenders* *BAP: RD Information – included in reports to the Lenders* *BMEP: RD Information – included in reports to the Lenders*	1. *BMP Plan approved as part of the SEMP by relevant parties.* 2. *BAP implemented.* 3. *BMEP implemented*	*BMP Part of Contractor's ESO /ECoW staff costs.* *BAP: Part of Contractor's ESO /ECoW staff costs and Engineers International Environmental and Biodiversity Specialist.* *BMEP: Part of Engineers International Environmental and Biodiversity Specialist.*

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Responsibility		Target / Indicator	Estimated Cost
			Implementation	Monitoring		
		Construction Vibration Management Plan *- Detailing the procedures for vibration surveys, monitoring and control. Such details shall include; procedures to complete condition surveys (for all properties indicated in this EIA), Measurement locations and methods; Method statements for works likely to induce vibrations, including programs of trial construction sections to determine the likely magnitude of vibrations at defined distances from the vibration source, in sufficient detail for the contractor to develop a final method for constructing the works without excessive vibration; Description of the instrumentation and equipment to be used; Copies of the instruction manuals and the laboratory calibration and test equipment certification; The resumes of the vibration monitoring technical support personnel, sufficient to define details of relevant experience; Procedures for data collection and analysis; Frequency of measurements; Means and methods of providing warnings when the specified construction vibration limits are reached; and Action plans to be implemented in the event the specified construction vibration limits are reached. The generalized plans of action shall comprise the positive measures by the Contractor to control vibrations using alternative construction methods.*	*Preparation: Contractor* *Approval: Engineer, RD*	*RD/Engineer. Information – included in reports to the Lenders*	*1. Plan approved as part of the SEMP by relevant parties.*	*Part of Contractor's ESO / H&S / CHM staff costs.*

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Responsibility		Target / Indicator	Estimated Cost
			Implementation	Monitoring		
		Tunnel Blasting Plan - Provide the methodology for the management of control of tunnel blasting including methods for noise and air quality management and occupational and community health and safety.	Preparation: Contractor Approval: Engineer, RD	RD/Engineer. Information – included in reports to the Lenders	1. Plan approved as part of the SEMP by relevant parties.	Part of Contractor's ESO / H&S staff costs.
		Construction camp layout plan - This is to include: layout of the site, including location of temporary storage areas for waste, equipment maintenance areas, lubricant and fuel storage sites with indication of the distance from watercourses; description of sewage management and waste management activities. The EIA includes criteria/recommendations for site selection, requirements and procedures for approval of the site by RD, MoEPA. Camp site as well as any sites considered associated facilities require ADB and EBRD consideration, due diligence and approval. Note: Consultations with local communities before the construction camp is developed are required.	Preparation: Contractor Approval: Engineer, RD	RD/Engineer. Information – included in reports to the Lenders	1. Plan approved as part of the SEMP by relevant parties.	Part of Contractor's ESO / H&S / CHM / EcoW staff costs.
		Construction Camp Management Plan - The plan shall cover such aspects as community relations, restriction of access to camp and facilities, induction briefing on camp rules and local issues/sensitivities, camp rules (such as restrictions on alcohol, drugs use; discipline; noisy activities; community liaison; no poaching; environmental protection measures applicable to the	Preparation: Contractor Approval: Engineer, RD. ADB, EBRD	RD/Engineer. Information – included in reports to the Lenders	1. Plan approved as part of the SEMP by relevant parties.	Part of Contractor's ESO / H&S staff costs.

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Responsibility		Target / Indicator	Estimated Cost
			Implementation	Monitoring		
		camp site; decommissioning and re-cultivation, etc.); workers welfare.				
		Spoil Disposal Plan - to be developed based on site specific topo-geodetic, geotechnical, hydrological data, environmental and social data. The plan shall include information on location, layout of the spoil disposal area (dimensions, slope angle) with 3D view, cross sections, runoff management and bank protection measures, re-cultivation measures, designation of suitable transport routes and schedule for spoil truck movements to minimize traffic disruption/congestion, and environmental mitigation measures to address impacts during transport and disposal of spoils. The plan must be developed in association with a biodiversity specialist and the state forestry authorities. The plan must specify spoil dewatering procedures (and facilities), as necessary, and describe mitigation measures to ensure adequate treatment of wastewater prior to disposal. Framework document describing requirements and procedure of site selection is attached (see **Appendix F**). The EIA includes criteria/recommendations for site selection, requirements and procedures for approval of the site/sites by RD, MoEPA. Spoil disposal site as well as any sites considered associated facilities	Preparation: Contractor Approval: Engineer, RD, ADB, EBRD	RD/Engineer. Information – included in reports to the Lenders	1. Plan approved as part of the SEMP by relevant parties.	Part of Contractor's ESO / ECoW / CHM staff costs.

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Responsibility		Target / Indicator	Estimated Cost
			Implementation	Monitoring		
		require ADB and EBRD consideration, due diligence and approval.				
		Asphalt Plant Management Plan - *Describing the layout and management of asphalt plant, including management of bitumen.*	*Preparation: Contractor* *Approval: Engineer, RD*	*RD/Engineer. Information – included in reports to the Lenders*	1. *Plan approved 60 days prior to the establishment of the facility.*	*Part of Contractor's ESO / H&S staff costs.*
		Concrete Batching Plant Management Plan *- Describing the layout and management of concrete batching plant, including waste water discharge, dust management, etc.*	*Preparation: Contractor* *Approval: Engineer, RD*	*RD/Engineer. Information – included in reports to the Lenders*	1. *Plan approved as part of the SEMP by relevant parties.*	*Part of Contractor's ESO / H&S staff costs.*
		Method Statements for Temporary Storage Areas, Temporary river crossings and temporary roads *- The Contractor will be responsible for preparing a method statement for the opening, operation and reinstatement of any temporary storage area he uses, temporary road or temporary river crossing.*	*Preparation: Contractor* *Approval: Engineer, RD*	*RD/Engineer. Information – included in reports to the Lenders*	1. *Statement approved 14 days prior to commencement of works in these areas.*	*Part of Contractor's ESO / H&S / CHM / EcoW staff costs.*
		Bridge Construction Plan *- For each bridge construction site*	*Preparation: Contractor* *Approval: Engineer, RD*	*RD/Engineer. Information – included in reports to the Lenders*	1. *Plan approved at least 30 days prior to the start of works at each site.*	*Part of Contractor's ESO / H&S EcoW staff costs.*
		Method Statement for the Safe Management of Asbestos *– following procedures such as HSE Asbestos Essentials.*	*Preparation: Contractor* *Approval: Engineer, RD*	*RD/Engineer. Information – included in reports to the Lenders*	1. *Statement approved as part of the SEMP by relevant parties.*	*Part of Contractor's ESO / H&S staff costs.*
		Cultural Heritage Management Plan – *will be prepared to ensure that all of the mitigation measures for cultural heritage are implemented, including items such*	*Preparation: Contractor* *Approval: Engineer,*	*RD/Engineer. Information – included in reports to the Lenders*	1. *Plan approved as part of the SEMP by relevant parties.*	*Part of Contractor's ESO / CHM staff costs.*

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Responsibility		Target / Indicator	Estimated Cost
			Implementation	Monitoring		
		as vibration monitoring and roles of the Cultural Heritage Monitor.	RD			
		Local Content Management Plan - Describing local procurement and local employment actions.	Preparation: Contractor Approval: Engineer, RD	RD/Engineer. Information – included in reports to the Lenders	1. Plan approved as part of the SEMP by relevant parties.	Part of Contractor's ESO staff costs.
		Occupational Health and Safety (OHS) Plan for Tunnels - Specific plans shall be prepared for Tunnel 5 and for Lot 2 tunnels (all included under one plan). The plan shall include sections on air quality and ventilation, plant related risks, visibility, lighting, noise, electrical safety, confined spaces, emergency response, etc.	Preparation: Contractor Approval: Engineer, RD	RD/Engineer. Information – included in reports to the Lenders	1. Plan approved as part of the SEMP by relevant parties.	Part of Contractor's ESO / H&S staff costs.
		Accommodation Option Risk Assessment - This will include aspects such as: siting of the accommodation camp in low proximity to villages/local community members; and determination whether workers can be accompanied by families or whether rosters will enable locally engaged workers to go home daily or not.	Preparation: Contractor Approval: Engineer, RD, EBRD	RD/Engineer. Information – included in reports to the Lenders	1. Assessment approved as part of the SEMP by relevant parties.	Part of Contractor's ESO / H&S staff costs.
		Tunnel Transition Plan - At minimum will include: an operations handover process and the documentation required for handover; training requirements including commissioning and staffing requirements; occupational health and safety requirements and risk management and reporting.	Preparation: Contractor Approval: Engineer, RD	RD/Engineer. Information – included in reports to the Lenders	1. Plan approved as part of the SEMP by relevant parties.	Part of Contractor's ESO staff costs.
4	Obtaining licenses, permits and agreement	• In case Contractor decides to operate an asphalt production facility the Contractor must receive the required	Implementation: Contractor, Approval: Engineer,	RD, MoEPA. Information – included in reports to	1. Permits for asphalt plants received at least	Part of Contractor's general Project costs

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Responsibility		Target / Indicator	Estimated Cost
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		permits from MoEPA. Asphalt production belongs to activities listed in Annex II to Environmental Assessment Code. MoEPA makes decisions on the need of an EIA for this activity based on the screening procedure (ref. Environmental Assessment Code (document code: 360160000.05.001.018492). Environmental Impact Assessment may be requested depending on decision of the screening. If required, the Contractor must complete the EIA process and receive all necessary permits and authorizations from MoEPA prior to the mobilization of any asphalt plant. • *Environmental conclusion – authorization to use any spoil disposal site must be obtained from MoEPA. Approval of the national EIA has indicated that only a simple brief environmental assessment is required for this activity, not a full EIA.* • *Maximum allowable concentration (MAC) of hazardous substances discharged into the surface water body must be agreed with (approved by) the MoEPA. Copies of the MACs shall be provided to the Engineer and RD.* • *Volume of water abstraction must be agreed with the MoEPA. Copies of the permits shall be provided to the Engineer and RD.* • *If the Contractor decides to establish*	*Approval: RD MoEPA*	*the Lenders*	*10 days before construction of plant.* *2. Authorization for use of spoil site received at least 10 days before works commence in the site.* *3. Copies of MACs for water discharge received prior to the start of any works.* *4. Copies of water abstraction permits received prior to the start of any works.* *5. Agreements with licensed waste management contractors received before the commencement of any works.*	

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Responsibility		Target / Indicator	Estimated Cost
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		its own quarry / borrow pit – a license to operate the facility must be obtained from the MoESD. • Prior to commencement of works agreement with company/companies authorized for utilization of hazardous waste must be signed between the Contractor and the company. Copies of the agreement shall be provided to the RD and the Engineer. • For disposal of non-hazardous domestic waste agreement with Solid Waste Management Company of Georgia (responsible for operation of municipal landfills in Georgia) must be signed.				
5	Air quality impacts due to exhaust and dust emissions	Strictly implement the approved: • **Air Quality Management Plan**. • **Traffic Management Plan.** • **Occupational and Community Health and Safety Plan.** • **Emergency Response Plan.** Where required, implement the requirements of any: • **Temporary Road Method Statement.** • **Temporary Storage Area Method Statement.** • **Temporary River Crossing Method Statement.** Contractor shall also: • Follow all of the mitigation and management measures included the EIA for **Section** - **Air Quality** of the Project EIA and the general measures below.	Contractor	Engineer/RD, MoEPA Information – included in reports to the Lenders	1. All plans approved by the relevant parties. 2. All camp sites and ancillary facilities correctly sited. 3. No visible signs of excessive air emissions or dust at work sites and camps. 4. Air quality monitoring results within acceptable standards (see **Appendix B** for instrumental monitoring requirements)	5 Truck washing facilities / $2,000 per unit Rock crushing plant sprinkler's assumed as part of general plant costs. Emissions testing part of general construction costs. Tarpaulins part of general construction costs. Water bowsers part of general

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Responsibility		Target / Indicator	Estimated Cost
			Implementation	Monitoring		
		• Obtaining environmental impact permit for asphalt plant (if planned to run own facility); • Ensure that no construction camp, batching plant, asphalt plans or rock crushing plant is located within **1km of any residential property and not within 2 km of any nationally or internationally designated site**. • Ensure proper state of maintenance of buildings, machinery and vehicles to minimize exhaust emissions. Smoke emitting vehicles and equipment shall not be allowed and shall be repaired or removed from the project. • Undertake immediate repairs of any malfunctioning construction vehicles and equipment. • Use construction equipment and vehicles that meet national emission standards. • Wherever possible, use electrically-powered equipment rather than gas or diesel-powered equipment. • Give priority to fuel efficient machinery. • Ensure that all diesel and petrol running machinery use equipped with catalytic convertors. • Position any stationary emission sources (e.g., portable diesel generators, compressors, etc.) as far as is practical from sensitive receptors.				construction costs. All other items considered part of Contractors general construction costs.

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Responsibility		Target / Indicator	Estimated Cost
			Implementation	Monitoring		
		• Locate support facilities and spoil disposal sites so to reduce trip numbers and distance – as far as feasible. • Provide truck-washing facilities at tunnel portal and bridge construction sites to prevent truck-out of mud and dust. Above ground option is deemed to be the priority. • Rock crushing plant equipment shall be fitted with water sprinklers that will run continuously while the plant is operational. • If the sprinklers stop working, the plant shall also cease operation until the sprinklers are functioning. • Water run-off from the sprinkler system shall not discharge directly to surface water courses without first passing through a silt trap or any other suitable device to prevent siltation of surface waters. • Emissions from on-road and off-road vehicles should comply with national or regional programs. In the absence of these, the following should be considered: • Regardless of the size or type of vehicle, owners / operators should implement the manufacturer recommended engine maintenance programs. • Drivers should be instructed on a routine basis by the Contractors EM on the benefits of driving practices				

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Responsibility		Target / Indicator	Estimated Cost
			Implementation	Monitoring		
		that reduced both the risk of accidents and fuel consumption, including measured acceleration and driving within safe speed limits. • *Implement a regular vehicle maintenance and repair program.* • *Conveyor belts (e.g. at batching plants and rock crushing plants) shall be fitted with wind-boards, and conveyor transfer points and hopper discharge areas shall be enclosed to minimize dust emission.* • *All trucks used for transporting materials to and from the site will be covered with canvas tarpaulins.* • *Carry out watering for dust control at least 3 times a day: in the morning, at noon, and in the afternoon during dry weather with temperatures of over 25C, or in windy weather. Avoid overwatering as this may make the surrounding muddy.* • *Earthwork operation to be suspended when the wind speed exceeds 20 km/h in areas within 500 m of any community.* • *Provide vegetation planting along roadsides to limit air quality impacts.*				
6	*Soil Pollution and Erosion*	*Strictly implement the approved:* • ***Topsoil Management Plan**.* • ***Recultivation/Land Restoration Plan.*** • ***Spill Management Plan.*** • ***Construction Camp Management Plan.***	*Contractor*	*Engineer/RD, MoEPA Information – included in reports to the Lenders*	*1. All plans approved by the relevant parties.* *2. No visual signs of soil contamination.* *3. No visual signs of soil erosion.*	*Re vegetation of slopes part of general construction costs.* *Monitoring of re-vegetation part of ESO staff costs.*

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Responsibility		Target / Indicator	Estimated Cost
			Implementation	Monitoring		
		• **Spoil Disposal Plan.** • **Waste Management Plan** *Where required, implement the requirements of any:* • ***Temporary Road Method Statement.*** • ***Temporary Storage Area Method Statement (including topsoils)*** • ***Temporary River Crossing Method Statement.*** *In addition, the following measures shall be applied by the Contractor:* • *Sites for temporary storage of the topsoil must be selected prior to commencement of works with due regard to environmental norms and conditions on the sites and approved by local administration, RD, Engineer, MoEPA and the Lenders. The area must be flat, located away from any surface water body, protected from runoff and erosion.* • *In order to avoid or mitigate impact on topsoil and other impacts caused by accidental fuel/oil spills, poor management of waste and/or polluted runoff, the operation ground must be established with consideration of environmental safety measures, as presented below:* • *Ground clearance must be minimized;* • *Topsoil must be removed from all areas required for permanent and temporary needs of the project;*			4. *Hazardous liquids correctly stored.* 5. *Regular training to staff provided.*	*Secondary containment measures part of general construction costs.* *Training part of Contractor's ESO / H&S staff costs.* *All other items considered part of Contractors general construction costs.*

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Responsibility		Target / Indicator	Estimated Cost
			Implementation	Monitoring		
		• To avoid loss of the productive soil layer, all suitable topsoil and other material shall be saved and stockpiled separately for the future re-cultivation of the area or other areas where excess topsoil is available; • Unwanted materials from topsoil such as roots of trees, rubble and waste removed prior to stockpiling; • Stockpiles of removed topsoil must be properly designed/shaped and managed, – stability of the stockpile will be achieved through preservation of 'safe' slope inclination and diversion of runoff from the area; • Topsoil and subsoil must be stored separately until reuse; • To ensure stability, the soil piles shall not be higher than 2 meters. The piles must be placed and managed so as to avoid erosion and washing off. Drainage trenches around the piles must be provided. • Soil compaction may be reduced by strict keeping to temporary roads, camp/operation ground boundaries; • Embankments and slopes with disturbed vegetation must be replanted immediately after the construction/disturbance stops - if not covered with gabion baskets and whether the season allows. For replanting native species must be used, placement of fiber mats to				

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Responsibility		Target / Indicator	Estimated Cost
			Implementation	Monitoring		
		encourage vegetation growth and temporary fencing to protect plants from being grazed by cattle. • *Embankments shall be monitored continuously, in particular after a strong rainfall for signs of erosion.* • *Any temporary fuel tank (if contractor decided to have small stock of fuel on the site) shall be placed in a covered area with berms or dikes to contain any spills. Capacity of containment must be 110% of capacity of the tank. Any spill shall be immediately contained and cleaned up with absorbent material;* • *Areas using bitumen shall be constructed on impervious hardstanding to prevent seepage of oils into the soils. No bitumen drums or containers, full or used, shall be stored on open ground;* • *Onsite repairs /maintenance/fueling activities shall be limited. Priority shall be given to offsite commercial facilities. If impossible, a designated area and/or secondary containment for the on-site repair or maintenance activities must be provided;* • *On-site vehicles and equipment shall be inspected regularly for leaks and all leaks shall be immediately repaired. Incoming vehicles and equipment shall be checked for leaks. Leaking vehicles/equipment shall not be allowed on-site;*				

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Responsibility		Target / Indicator	Estimated Cost
			Implementation	Monitoring		
		• Secondary containment devices (drop cloths, drain pans) shall be used to catch leaks or spills while removing or changing fluids from vehicles or equipment. Drip pans or absorbent materials shall be provided. On small spills absorbent materials shall be used; • All valves and trigger guns shall be resistant to unauthorized interference and vandalism and be turned off and securely locked when not in use; • The site will be cleaned regularly, littering will be prohibited; • Waste collection area will be sited so as to avoid receiving a substantial amount of runoff from upland areas and draining directly to a water body; • In case of the fuel/oil spills risk, an oil trap shall be additionally provided; • Discharge of effluents into the water bodies is not planned. Only wastewater cleaned up to the established norms may be discharged to the relief. Receiving area must not be prone to erosion or waterlogging. It is advisable not to drain water to the area where crops are cultivated. • Contractor will confine operation of heavy equipment within the ROW, as much as possible, to avoid soil compaction and damage to privately owned land. If private lands are disturbed, the contractor should				

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Responsibility		Target / Indicator	Estimated Cost
			Implementation	Monitoring		
		promptly inform the owner and agree on the ways to remedy the situation; • Adequate training on environmental protection and safety shall be provided to the staff.				
7	Hydrology	Strictly implement the approved: • **Ground Water Management Plan Waste Water Management Plan** • **Bridge Construction Plan Construction Recultivation/Land Restoration Plan.** • **Spoil Disposal Plan.** • **Waste Management Plan** Where required, implement the requirements of any: • **Temporary Road Method Statement.** • **Temporary Storage Area Method Statement** • **Temporary River Crossing Method Statement.** In order to avoid or mitigate impact during pre-construction and construction activities, works should be performed with due consideration of environmental safety measures: • Should any temporary fuel tank be available, it must be located within at least 100m from the riverbed. The tank must be placed in covered areas with berms or dikes installed to intercept spills, if any. Any spill should be immediately localized and cleaned up with absorbent materials.	Contractor	Engineer/RD, MoEPA Information – included in reports to the Lenders	1. All plans approved by the relevant parties. 2. No visual signs of water pollution. 3. No visual signs of soil erosion. 4. Hazardous liquids and wastes correctly stored. 5. Regular training to staff provided. 6. Water quality monitoring results within acceptable standards (see **Appendix B** for instrumental monitoring requirements)	50 Spill Kits / $200 per unit. Oil separators for camp sites and septic waste removal considered part of general construction costs. Lined areas for washing out concrete mixers. Training part of ESO staff costs. Monitoring part of instrumental monitoring costs per **Appendix B**. Waste Disposal costs part of general construction costs. PPE part of general construction costs.

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Responsibility		Target / Indicator	Estimated Cost
			Implementation	Monitoring		
		• Onsite repairs /maintenance and fueling activities should be limited. Priority should be given to offsite commercial facilities. If impossible, a designated area with secondary containment for possible spills for on-site repair or maintenance activities must be provided. These areas shall be located away from drainage channels and surface water bodies. (distance between the maintenance site and the river should be at least 100m). • On-site vehicles and equipment shall be inspected regularly for leaks and all leaks shall be immediately repaired. Incoming vehicles and equipment shall be checked for leaks. Leaking vehicles/equipment shall not be allowed on-site. • Secondary containment devices (drop cloths, drain pans) shall be used to catch leaks or spills while removing or changing oils from vehicles or equipment. For small spills, absorbent materials must be used. • Discharge of any untreated water into the surface water body must be strictly prohibited. Treated water discharge must comply with IFC standards for effluent discharge, as well as national standards. • Discharge of cement contaminated water must be avoided as cement pollution results in high alkalinity and				Portable Toilets part of general construction costs. All other items considered part of Contractors general construction costs.

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Responsibility		Target / Indicator	Estimated Cost
			Implementation	Monitoring		
		raises the pH, which can be toxic to aquatic life. • Materials and waste must be stockpiled so as to avoid erosion (in stockpiles less than 2 m in height and with a slope gradient of less than 25%) and washing off into the river. Drainage trenches must be established to divert surface runoff from the site. • Runoff control measures can be installed at the time of road/highway and bridge construction to reduce runoff pollution. • To prevent runoff contamination, paving should be performed only in dry weather. • In disturbed soil areas silt fence, fibber rolls, gravel bags, or other approved sediment control must be ensured. At a minimum, bare soil (whether it is an abutment slope or a stockpile) must be protected before it rains. Soil stabilization BMPs such as mulch, soil binders, plastic sheeting or erosion control blankets must be used to protect bare soil; • Due to the design solution direct discharge of the runoff in surface water is reduced to minimum; • Management of material and waste will be carried out in compliance with the plan (waste management plan) developed by contractor; • The area will be cleaned regularly.				

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Responsibility		Target / Indicator	Estimated Cost
			Implementation	Monitoring		
		• Locate stockpiles away from any watercourse or wetlands, outside drainage lines. Protect stockpiles from erosion. • Park construction machinery/vehicles at not less than 100m from the riverbed. • Locate the storage area not less than in 100m from the riverbed. • Check integrity of fuel/hazardous substances containers for integrity. Undertake necessary repair or replacement if required. • Store materials in containers suitable for the purpose. Ensure that containers bear clear eligible labels. The same applies to containers for short term storage of used oil. • Store all materials above flood level. • Ensure availability of spill cleanup materials (e.g., absorbent pads, etc.) in the areas where accidental spills may occur. • Place clean up material in easily accessible locations. • Avoid fueling/maintenance of machinery and vehicles on the bare ground. Only contained areas can be used. Locate the maintenance/fueling sites (if planned to have on the site away from watercourses and wetland areas. Distance of not less than 100m must be preserved.				

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Responsibility		Target / Indicator	Estimated Cost
			Implementation	Monitoring		
		• Use drip pan beneath equipment likely to leak fuel and/or oil and/or during fueling or changing oil. • Prohibit discharge of any untreated potentially contaminated effluents. • Provide septic tanks for the camp sites servicing less than 150 employees. Contract authorized company to remove the liquid waste regularly. For larger sites, provide multiple septic tank facilities, or package waste water treatment plants. • Keep contract with authorized company responsible for removal of the liquid waste active. If for waste water management, the camp is equipped with a package treatment plant ensure cleanup/sanitation according to manufacturer's instructions and that discharge standards are met for waste water. • Monitor surface water quality. • Use of oil-water separators to extract floating oils wherever appropriate. • Clean up spills or leaks immediately. • Manage and dispose of the used absorbents, oily rags and other contaminated materials as hazardous waste. • Provide areas where concrete mixers can wash out leftover concrete without polluting the environment. This may be in the form of a lined settling pond.				

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Responsibility		Target / Indicator	Estimated Cost
			Implementation	Monitoring		
		• Prior to discharge, alkaline water from the concrete batching area shall be settled and neutralized. • Arrange settling basins to manage tunnel drainage water. Check quality of drainage water (including pH) from the settling basins prior to discharge into environment. • Contract authorized company for hazardous waste disposal. • Prohibit use of herbicides/chemical during vegetation clearance. • Train construction personnel in soil and water protection measures, handling of fuels, spill control and response procedures and requirements. • Develop procedures to manage water discharges under degraded conditions (to ensure compliance with water discharges limits at all times. • To avoid impact on ground water users the water flow in the springs used by local community for water supply will be monitored. • The following measures shall be applied specifically relating to bridges: o Provide spill kits in worksites around rivers. o Ensure no vehicle refueling occurs within 50 meters of any surface water course. o Divert the water flow near the bridge piers.				

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Responsibility		Target / Indicator	Estimated Cost
			Implementation	Monitoring		
		○ Provide silt fences, sediment barriers or other devices to prevent migration of silt during construction within streams. ○ Carry out bridge construction works without interrupting the traffic on existing roads with the provision of suitable diversions. ○ Ensure no waste materials are dumped in the river, including re-enforced concrete debris. ○ Place generators more than 20 meters from the river. ○ Ensure that no concrete waste from concrete mixers is dumped in the river. ○ Provide areas where concrete mixers can wash out leftover concrete without polluting the environment. This may be in the form of a lined settling pond at each bridge site. Drivers will be informed of these locations and the requirements to use these settling ponds on a routine basis by the Engineer. Dried waste from the settling ponds can be used as backfill for culverts, etc. ○ Carefully collect all polystyrene (from expansion joints) so that it does not litter the local environment. ○ Ensure that no hazardous liquids are placed within 10 meters of the river.				

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Responsibility		Target / Indicator	Estimated Cost
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		○ Provide portable toilets at bridge construction sites to prevent defecation by workers into the river. ○ Ensure that workers are provided with correct PPE including harnesses. ○ In addition, the Contractor, through his Environmental Manager, will be responsible for consulting with MoEPA to establish the fish spawning period in relation to the bridge construction works to ensure that all works are undertaken in periods least likely to affect the fish spawning period.				
9	Natural Hazards	The risk of avalanches shall be monitored by the Contractor throughout the construction phase, this can be achieved with coordination between safety officials in Gudauri ski resort. In addition, no camp site shall be located in an area that maybe prone to avalanches.	Contractor	Engineer/RD, MoEPA Information – included in reports to the Lenders	1. No accidents and injuries to workers involving avalanches.	Part of Contractors ESO / H&S staff costs.
10	Impact on Designated Sites	• Implement mitigation measures set for noise, air, habitat, general notable species, and specific notable species. Note: The project ends near Kobi in about 130m from the boundary of Kazbegi National Park (aca Emerald Network candidate site).	Contractors ECoW	Engineer/RD, MoEPA Information – included in reports to the Lenders	1. See specific sections below.	See specific sections below.
11	Habitat	• Strictly implement the **Biodiversity Management Plan** and **Biodiversity Action Plan (BAP)**. • The Contractor shall ensure that he employs, for the duration of the	Engineers International Environmental and Biodiversity Specialist /	Engineer/RD, MoEPA Information – included in reports to the Lenders	1. Appropriately qualified EcoW employed. 2. Offsetting applied. 3. For other	Part of contractor's bid cost Part of Engineers Costs

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Responsibility		Target / Indicator	Estimated Cost
			Implementation	Monitoring		
		*Project, a suitably qualified **Ecological Clerk of Works**.* • *Strictly apply the mitigation measures proposed in **Generic Habitat Impacts and Mitigation** of **Section F.6.2** the project EIA.* • *Complete the Pre-clearance site surveys proposed in **Generic Habitat Impacts and Mitigation** of **Section F.6.2** the project EIA.* • *Apply Offsetting as outlined in **Section - Areas of Offset required for Notable and Natural Habitats** of the project EIA. **P**recise locations of these restoration areas will be confirmed and managed under the supervision of the ECoW.*	*Contractors ECoW to implement Project BAP* *Other Item: Contractor*		*indicators relating to specific habitat mitigation and management see Project BAP*	
12	*General Notable Species*	***Pre-Work Surveys:*** • *Prior to works starting, the proposed route will be further surveyed by suitably qualified ecologists to map up-to-date baseline conditions. It will:* *5. Consider all vertebrates (mammals, birds, reptiles, amphibians, fish).* *6. Employ survey techniques that are fully auditable, repeatable and in line with good practice guidance and undertaken by a suitably qualified professional.* *7. Be conducted at a suitable time of year for the target habitats and species (likely spring and autumn but to be confirmed for each receptor by the ECoW).*	*Contractors EcoW*	*Engineer/RD, MoEPA Information – included in reports to the Lenders*	*1. Pre-work surveys completed.* *2. For other indicators relating to specific species mitigation and management see Project BAP*	*Part of contractor's bid cost*

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Responsibility		Target / Indicator	Estimated Cost
			Implementation	Monitoring		
		8. *Be used to update the **Biodiversity Management Plan (BMP)** from which the success of the species and habitat restoration can be compared to the BMP targets.* • *The ECoW will be responsible for confirming that adequate information has been collected to ensure that there is an appropriate baseline to inform the bespoke mitigation and monitoring.* • *The ECoW will also reassess the Project RoW ahead of the works through a 'walkthrough' to be conducted ideally one to two days ahead of the works to obtain up to date information on the presence of flooded areas; nesting birds etc.* • *These two types of surveys can be summarized as follows:* 3. *Pre-commencement detailed baseline data collection - To be undertaken well in advance of enabling works: These will allow habitat and species distribution to be accurately mapped in order to inform mitigation, confirm baselines and therefore targets for offsetting and KPIs for monitoring. To take place no later than 2 weeks and no more than 6 months before work commences. To be conducted by an appropriately qualified Biodiversity Specialist in Spring /*				

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Responsibility		Target / Indicator	Estimated Cost
			Implementation	Monitoring		
		to Autumn and focus on notable habitats and species. *4. Pre-commencement walkthrough (rapid assessment) - To be undertaken just before enabling works to identify presence of sensitive receptors such as nesting birds, roosting bats and sheltering reptiles etc. Expected to take place no later than 1 day and no more than 2 weeks before work commences. To be conducted by an appropriately qualified Biodiversity Specialist and focus on notable habitats and species.* • *Specific surveys shall be undertaken for:* *4. **Otters** - Immediately prior to construction, for every river crossing or activity within a river there will be a **pre-enabling dedicated survey** to confirm absence of holts or other resting features within the direct zone of impact of the works. If features are found, exclusion of the features will be ensured prior to works commencing.* *5. **Bats** - Further bat survey work is to be undertaken to confirm bat species present within the Project area. The results of the Bat survey shall feed into the BMP or the specific BAPs (see below).*				

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Responsibility		Target / Indicator	Estimated Cost
			Implementation	Monitoring		
		6. ***Other Notable Species:*** *Further work will be commissioned by the RD for other notable species in advance of commencement of works as outlined in the BAP (see* ***Appendix W****).*				
		Species Biodiversity Action Plans: *Biodiversity Action Plans: Further develop and implement BAPs for notable habitats and species as outlined in the BAP-framework document. This includes the following:* • *Sub-Alpine Birch Krummholz and Low Grass Marshes.* • *Caucasian Chamois, Otters, Bats.* • *Endemic plant species.* • *Caucasian Black Grouse, Egyptian Vulture, Corncrake, Migratory Raptors*	*Contractor / Engineer*	*RD, MoEPA Information – included in reports to the Lenders*	1. *BAPs completed and implemented*	*See BAP for costs*
		General impacts from works and operation – avoidance*:* • *The works footprint will be reduced as far as possible e.g. through the use of a single vehicle track policies and use of low-impact vehicles where applicable.* • *Vehicles will be driven at designated speed limits.* • *Off-road travel will be prohibited where practical.* • *Laydown areas and compounds will be sited to avoid unnecessary clearance of vegetation.*	*Contractors ECoW*	*Engineer/RD, MoEPA Information – included in reports to the Lenders*	1. *No issues of non-compliance recorded.*	*Part of contractor's bid cost*

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Responsibility		Target / Indicator	Estimated Cost
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		• Natural breaks in vegetation will be used as preferred access routes where possible. • The workforce will adhere to working corridors. • All staff will be provided with environmental awareness training. • The workforce will not deviate from approved clearance areas. Workforce hunting and fishing bans will be enforced and cutting of wood by workers will be prohibited. • Fencing will be minimized to ensure that areas vital for wildlife are not isolated by workforce activities, unless this is for species protection measures. • Temporary barriers will be used to prevent wildlife from accessing waste disposal areas and similar areas.				
		Habitat Restoration: • Restoration of the identified areas of habitat in the Project EIA. • Any reseeding or replanting of selected areas to be restored will use locally collected seed mixes and saplings. • A local source of indigenous saplings suitable for replanting programs will be identified in advance to facilitate restoration. • All efforts will be made to minimize removal of mature/significant trees	Contractors ECoW	Engineer/RD, MoEPA Information – included in reports to the Lenders	1. Restored habitats in good condition and no evidence of invasive species.	Part of contractor's bid cost

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Responsibility		Target / Indicator	Estimated Cost
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		and maintain connectivity between areas of forest habitats. • Soils will be removed as subsoil and top soil and these will be stored separately as per good working practice for subsequent restoration. • Workforce will be educated on preventing bush fires and this will not be used as a land clearance method.				
		Forest Habitats: • Limiting working RoW within forest habitats, avoiding the felling of mature trees wherever possible and restricting working hours to daytime preventing noise pollution during twilight (dusk and sunrise).	Contractors ECoW	Engineer/RD, MoEPA Information – included in reports to the Lenders	1. Impacts in forest areas minimized.	1.
		Riparian Habitats: • Preparation and Implementation of Method Statements for Temporary River Crossings. • Crossing points across rivers will be conducted where there is clear access to the banks and vegetation clearance is minimized. • Standard pollution control measures will be implemented in all sites. • Demarcation and offsets for camp and storage locations and field activities will be at least 50m from watercourses where practical. • Where trees have to be removed to facilitate the crossing, these will be replanted with a similar species composition.	Contractors ECoW	Engineer/RD, MoEPA Information – included in reports to the Lenders	1. Pollution of rivers avoided.	Part of contractor's bid cost

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Responsibility		Target / Indicator	Estimated Cost
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		New Habitats: • New habitat features to include boulder piles, dead wood piles and brash, and creation of appropriate ponds.	Contractors ECoW	Engineer/RD, MoEPA Information – included in reports to the Lenders	1. Habitat features included at restored sites.	Part of contractor's bid cost
		Habitat Pollution: • Standard pollution control measures will be implemented. • The ECoW will determine when further monitoring (e.g. for turbidity) and/or bespoke mitigation are required.	Contractors ECoW	Engineer/RD, MoEPA Information – included in reports to the Lenders	1. Habitat pollution avoided.	Part of contractor's bid cost
		Direct mortality of species: • All food and food waste will be stored securely to deter opportunistic species and minimize interactions between humans and animals. • The location of sensitive species identified by the ECoW will be reported to the workforce appropriately. • The ECoW will be present during commencement of all works to conduct pre-construction checks and prevent animals present within the working area being killed or injured during the works. • Checks will be for all vertebrate species including ground nesting birds, reptiles, amphibians and bats, amongst others. • Checks will include within hollow trees and other places of shelter. As	Contractors ECoW	Engineer/RD, MoEPA Information – included in reports to the Lenders	1. Waste facilities provided on site. 2. Regular toolbox training by ECoW. 3. Pre-construction surveys completed.	Part of contractor's bid cost

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Responsibility		Target / Indicator	Estimated Cost
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		far as possible tree and scrub clearance will not be undertaken during the breeding bird season (March to August inclusive). • Should clearance during this time be necessary a pre-clearance nesting bird check of the vegetation to be cleared will be undertaken by the ECoW and a decision on whether to move the nest or defer the clearance will be made by the EcoW.				
		Lighting and Excavations: • Works will not be lit except in exceptional circumstances. • Where lighting is required it will be directional and the lighting strategy will be designed with the input of the ECoW. • Only non-UV lighting sources will be employed. • Pits and excavations will be filled in as soon as possible following works. • Trenches and pits to be created for longer than 48h periods will have 45^{O} ground ramps to allow escape by fauna should they fall in. • A pre-start check for fauna will be completed prior to works commencing in the morning if trenches are left open overnight. • Regular crossing points will be installed to ensure wildlife can cross excavations, berms and drainage channels.	Contractors ECoW	Engineer/RD, MoEPA Information – included in reports to the Lenders	1. Lighting complies with proposed strategy.	Part of contractor's bid cost

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		***Non-native or invasive species**:* • *Native plants that are locally sourced will be used for re-planting.*	*Contractors ECoW*	*Engineer/RD, MoEPA Information – included in reports to the Lenders*	*1. No non-native species used.*	*Part of contractor's bid cost*
13	*Specific Notable Species*	*Contactor and Engineer to implement relevant specific notable species mitigation measures provided in the **Project EIA, Section F.6.2**, and Project BAP*	*Contractors ECoW / Engineers International Environmental and Biodiversity Specialist*	*RD, MoEPA Information – included in reports to the Lenders*	*1. No reported impacts to notable species recorded by ECoW or other NGOs or government departments.* *2. For other indicators relating to specific species mitigation and management see Project BAP*	*Part of contractor's / Engineers bid cost*
14	*State Forest Fund*	• *An inventory of the species to be de-listed has been prepared as part of this EIA (**Appendix I**).* • *The RD shall supply this information to the National Forest Agency in writing in order to complete the de-listing process.* • *The RD will make an appropriate compensation payment for the trees cut as part of the Project based on the criteria of Table 2 of Appendix 7 of The Resolution No.242 of Government of Georgia on Approval of Rules for Forest Use taking into account the area of used land.* • *The payment shall be made before beginning of forest usage.*	*RD*	*None*	*1. Compensation payment made to relevant authority.*	*To be determined by the National Forest Agency*

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Responsibility		Target / Indicator	Estimated Cost
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		The timber resources obtained as a result of cutting of the trees from the SFF, shall be sorted out according to species by the Contractor and collected at the area indicated by National Forest Agency and transferred to the National Forest Agency by the Contractor to a specified state property land plot.	Contractor	Engineer/RD, MoEPA Information – included in reports to the Lenders	None required.	Part of Contractors general construction costs.
		• Re-planting of all SFF trees (over 8cm in diameter) on a 1:3 basis, will be undertaken. • The Contractor will coordinate with the National Forest Agency to identify a site, or sites, within the Project area where such trees can be planted. • Seedlings will obtained from suitable local nursery-gardens. • Plant maintenance will be carried out by the Contractor for at least two years. If the maintenance period extends after the completion of the Contractors contract period the RD will be responsible for contracting an operator to maintain the trees for the remaining period. • During Construction the ECoW will undertake monthly monitoring of the re-planted areas and report on the success rate of the re-planted trees, which should be above 80%. • If the success rate falls below 80% the Contractor will re-plant on a 1:1 basis to compensate for losses.	Contractor	Engineer/RD, MoEPA Information – included in reports to the Lenders	1. Trees cut replaced on a 1:3 basis. 2. Success rate of 80% achieved.	Approximately 5,200 seedings / $26,0000 Replanting part of Contractors general construction costs. Monitoring part of Contractors ESO staff costs. All other items considered part of Contractors general construction costs.

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		• The Contractor will be responsible for paying for any compensational re-planting.				
15	Economy and Livelihoods	Overpass / Underpass to be included in the design for the Zakatkari area.	Detailed Design Team	Design reviewed by ADB, Engineer and RD.	1. Overpass / underpass included in the design.	Part of Contractors ESO staff costs.
		Identification of potential candidates and readiness for work.	Assessed by the Contractor prior to appointment of workers with support from the Labour offices of Dusheti and Kazbegi municipalities.	Engineer/RD, MoEPA Information – included in reports to the Lenders	2. Database of potential candidates prepared.	No specific costs.
		Procurement policies in the EMP will encourage the use of local suppliers (prioritization of suppliers from within the Dusheti and Kazbegi municipalities)	Contractor	Engineer/RD, MoEPA Information – included in reports to the Lenders	1. At least 25% of goods procures in Georgia for the Project should come from these regions	No specific costs.
		Labour conditions for the workforce (including contractor personnel) will comply with all relevant requirements of the Georgian Labour Law, the ILO Conventions ratified by the country, and labour management provisions of Project Lenders.	Contractor	Engineer/RD, MoEPA Information – included in reports to the Lenders	1. Labour conditions meet the specified requirements.	Plan part of contractor's general construction costs. Surveys part of Engineers general Project costs.
16	Social Infrastructure	Strictly implement the approved: • **Traffic Management Plan (TMP)** As part of the TMP complete the **Road Condition Survey** of all roads included in the Contractors TMP will be conducted by the Engineer prior to construction in order to gauge any damage to the road	Contractor	Engineer/RD, MoEPA Information – included in reports to the Lenders	1. Traffic Management Plan Approved. 2. Road Condition Surveys completed.	Part of contractor's general construction costs.

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Responsibility		Target / Indicator	Estimated Cost
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		as a result of the intensive heavy traffic during the construction phase. Before completion of the Project the Engineer shall repeat the survey to determine which, if any roads need to be repaired by the Contractor.				
		During the construction phase the Contractor shall implement the following: • Provide information to the public about the scope and schedule of construction activities and expected disruptions and access restrictions at least 24 hours before the disruptions; • Allow for adequate traffic flow around construction areas via diversions or temporary access roads; • If temporary access roads are to be constructed with a gravel surface they shall be routinely watered by the Contractor during dry weather to reduce dust impacts; • Provide adequate traffic signs, appropriate lighting, well-designed traffic safety signs, barriers and flag persons for traffic control; and • Access roads for batching plants, etc, should be maintained during the construction phase and rehabilitated at the end of construction.	Contractor	Engineer/RD, MoEPA Information – included in reports to the Lenders	1. No complaints from local population regarding traffic delays and disruptions or dust. 2. No accidents on local access roads. 3. Access roads rehabilitated at the end of construction.	Part of contractor's general construction costs.
		During construction all gas supply and electricity networks in the Project area shall be kept operational, particularly during the winter months. Some lines and pipes may require temporary relocation during the construction phase and as such the Contractor will be	Contractor	Engineer/RD, MoEPA Information – included in reports to the Lenders	1. Utilities kept operational throughout the year.	Part of Contractors ESO staff costs.

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Responsibility		Target / Indicator	Estimated Cost
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		responsible for liaising with the relevant utilities operators to ensure they remain operational. Should utilities need relocating in a different location the Contractor will consult with the relevant utilities and local community to ensure that there is no change in supply as a result of these changes. Alternatives must be provided should unreasonable services delays occur (e.g. tanked water, gas bottles).				
17	*Population and In-migration*	• ***Code of Conduct*** *strictly implemented.* • *Induction training provided to all new staff in the code of conduct.*	*Contractor*	*Engineer/RD, MoEPA Information – included in reports to the Lenders*	*1. All staff completed induction training in the Code of Conduct.*	*For LARP costs, see Project LARP.*
18	*Land Use and Natural Resources*	• *Strictly implement the* ***LARP*** • *Construction camps and other ancillary facilities, should, as far as possible be sited within the Project buffer or avoid being site on agricultural land.*	*Contractor*	*Engineer/RD, MoEPA Information – included in reports to the Lenders*	*1. LARP Implemented.*	*No specific Costs*
19	*Spoil Disposal*	*Spoil disposal site LFL-5.8 - All ephemeral wetlands on the Plateau shall be demarcated and fenced prior to the start of works. The spoil disposal site shall not encroach on the wetlands.* *Under no circumstances shall the following habitats be used for spoil disposal sites:* • *National Parks (as per the updated boundaries of January 2019)* • *Low Grass Marshes* • *Sub-alpine Birch Krummholz*	*Contractor*	*Engineer/RD, MoEPA Information – included in reports to the Lenders*	*1. No encroachment into the wetlands.*	*$2,000 for Fencing*

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Responsibility		Target / Indicator	Estimated Cost
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		*For any spoil disposal site a **Spoil Disposal Plan** must be prepared by the Contractor and submitted to ADB, EBRD, RD and the Engineer for review and approval as part of his SEMP before any site can be used. A template for this plan is provided by **Appendix F**. In addition, the Contractor will be required to prepare simple brief environmental assessment for any spoil disposal site to meet national requirements.*	*Contractor*	*Engineer/RD, MoEPA Information – included in reports to the Lenders*	*1. Spoil disposal plans approved by all parties. 2. EIA permits received.*	*Plan part of Contractor's ESO / H&S staff costs. Cost of EIA TBD depending on type and area of site. Estimated $15,000 per EIA.*
		*Spoil disposal sites shall be graded to fit in with the surrounding landscape (as proposed by the drawings in **Appendix O** of this EIA). The design documents also propose specifications for side slopes of the spoil disposal areas and they shall be strictly followed to prevent collapse and soil erosion. All spoil sites will be reinstated as per the Contractors **Re-cultivation/Land Restoration Plan**.*			*1. Full re-instatement of spoil sites according to the plans.*	*Part of contractor's general construction costs.*
20	*Waste Management*	*Strictly implement the approved:* • ***Waste Management Plan*** *Where required, implement the requirements of any:* • ***Spill Response Plan.*** • ***Temporary Road Method Statement.*** • ***Temporary Storage Area Method Statement.*** • ***Temporary River Crossing Method Statement.***	*Contractor*	*Engineer/RD, MoEPA Information – included in reports to the Lenders*	*1. Plans implemented.*	*Part of contractor's general construction costs.*
		Recycling: *options to be implemented include:*	*Contractor*	*Engineer/RD, MoEPA Information –*	*1. At least 20 % of materials recycled.*	*Part of contractor's general construction costs.*

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Responsibility		Target / Indicator	Estimated Cost
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		2. Crush and reuse waste concrete as fill material. 3. Where practical asphalt material should be crushed and re-used for local roads, or as base material if it meets the required technical specifications. 4. All other waste (plastic, metal, paper, etc.) will be sorted on source and sent for recycling.		included in reports to the Lenders		
		Liquid Waste: Provide septic tanks for the camp sites servicing less than 150 employees. Contract authorized company to remove the liquid waste regularly. For larger sites, provide multiple septic tank facilities, or package waste water treatment plants.	Contractor	Engineer/RD, MoEPA Information – included in reports to the Lenders	1. Contracts with liquid waste disposal company signed and up to date.	Waste management part of contractor's general construction costs.
		Domestic and Inert Waste: 2. Collect domestic waste in containers fitted with lids to avoid attraction of scavengers, scattering around. The lid will also protect waste from rain and snow. 3. Provide garbage bins and facilities within the project site for temporary storage of domestic solid waste and construction waste. 4. Waste storage containers shall be covered, tip-proof, weatherproof and scavenger proof. 5. Ensure that wastes are not haphazardly dumped within the project site and adjacent areas. 6. Remove domestic waste to the nearest landfill under agreement with	Contractor	Engineer/RD, MoEPA Information – included in reports to the Lenders	1. Work sites free of litter and inert waste. 2. Contracts with waste management company signed and up to date.	Waste management part of contractor's general construction costs.

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Responsibility		Target / Indicator	Estimated Cost
			Implementation	Monitoring		
		Solid Waste Management Company of Georgia.				
		Hazardous Waste: • *On the site allocated for temporary, short term keeping of hazardous wastes ensure compliance with the following safety measures:* o *Use containers suitable for each type of waste;* o *Prohibit use of damaged containers. Check integrity of containers - regularly;.* o *Mark containers adequately;* o *Provide secondary containment;* o *Do not mix various waste streams.* • *Hire authorized contractor for hazardous waste removal and Keep agreements with hazardous waste management companies active.* • *Keep copies of waste manifests on site. Keep a record of waste on-site and waste removed.* • *In case of large-scale spills of hazardous liquids, follow the **Spill Response Plan**.*	*Contractor*	*Engineer/RD, MoEPA Information – included in reports to the Lenders*	1. *Hazardous waste storage areas at all work sites.* 2. *Waste manifests available for inspection.* 3. *Contracts with waste management company signed and up to date.*	*Waste management part of contractor's general construction costs and ESO staff costs (monitoring od waste).*
		***Asbestos** - Survey buildings for presence of asbestos or asbestos containing material before demolition of properties subject to acquisition. If registered, the Contractor shall prepare a **Method Statement for the Safe Management of Asbestos** following international best practices such as HSE-A14. The method statement shall be*	*Contractor*	*Engineer/RD, MoEPA Information – included in reports to the Lenders*	3. *Safety equipment available.* 4. *Staff trained.*	*$2,000 - Asbestos PPE*

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Responsibility		Target / Indicator	Estimated Cost
			Implementation	Monitoring		
		submitted to the Engineer for approval before any works involving asbestos materials can commence. General requirements include: *4. Do not break asbestos/asbestos containing articles when dry.* *5. Equip staff handling asbestos with protection clothing, goggles, respirators, rubber boots.* *6. Place material in thick, durable plastic bags (put not more than 40km of asbestos/asbestos containing material per each). Wrap the bags and mark with asbestos warning mark.* *7. Hire Contractor for removal-disposal of asbestos/asbestos containing material to a licensed waste management facility.*				
21	*Tunnels*	*Strictly implement approved:* • ***Ground Water Management Plan**.* • ***Occupational Health and Safety (OHS) Plan for Tunnels.*** • ***Tunnel Transition Plan.*** *In addition, the Contractor shall:* • *Use non-toxic slurry and additives and minimize impact of these materials to reduce risk of impact on ground water quality.* • *Ensure that pressure applied to tunneling and ground treatment is controlled to prevent excessive pressure that will drive the slurry out of the desired range increasing the risk of water pollution.*	*Contractor*	*Engineer/RD, MoEPA Information – included in reports to the Lenders*	*1. No pollution of groundwater.*	*Part of contractor's general construction costs.* *Monitoring part of*

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Responsibility		Target / Indicator	Estimated Cost
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		• The Contractor will pass all drainage water from the tunnel through a settlement tank. • If the drainage water meets drinking water standards it can be considered for re-use in any potentially depleted wells during the construction phase.				
22	Impacts associated with Asphalt Plants	Strictly implement the approved: • **Asphalt Plant Management Plan.** • **Waste Management Plan.** • **Spill Response Plan.** • **OHS Plan.** • **Air Quality Management Plan.** In addition, the Contractor shall ensure: • Asphalt plants will be located downwind of residential areas and not within one kilometer of any residential area. • Adequate PPE will be provided to staff working in areas of high noise and emissions. • Ensure all hazardous materials are stored (including within suitable sized bunds for liquids), handled and disposed of according to their Material Safety Data Sheet (MSDS). • Copies of MSDS will be kept on site with all hazardous materials. • The Contractor will keep a log of the type and volume of all hazardous wastes on site. • The Contractor will keep a plan of site indicating where all hazardous materials are stored. • To prevent bitumen burns it will be compulsory for the workers handling	Contractor	Engineer/RD, MoEPA Information – included in reports to the Lenders	1. Air emissions within acceptable limits. 2. PPE worn by all workers. 3. Training provided. 4. MSDS available on-site. 5. First aid kits at site.	PPE part of Contractors general construction costs. Secondary containment part of Contractors general construction costs. Monitoring of waste part of Contractors ESO staff costs. First aid kits (compliant with OSHA standard 1910.266 App. A) part of Contractors general construction costs.

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Responsibility		Target / Indicator	Estimated Cost
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		hot bitumen to wear full-body protection. • All transportation, handling and storage of bitumen will be handled safely by experienced personnel. • The dust from the manufacturing process may pose respiratory hazards, hence protective air mask will be provided to the operators for the loading and unloading of aggregates. • Ear-muffs will be provided those working on the plant. • First Aid kit will be available on site for the workers in case of emergency. • The Material and Data Sheet (MSDS) for each chemical product will be made accessible onsite and displayed.				
23	Impacts associated with Construction Camps	Strictly implement the approved: • **Construction Camp Layout plan.** • **Labour and Working Conditions Management Plan.** • **Spill Management Plan.** • **OHS Plan.** • **Emergency Response Plan.** • **Waste Management Plan.** Where required, implement the requirements of any: • **Temporary Road Method Statement.** • **Temporary Storage Area Method Statement.** • **Temporary River Crossing Method Statement.** In addition, the Contractor shall:	Contractor	Engineer/RD, MoEPA Information – included in reports to the Lenders	1. Environmental and Social Screening completed. 2. Camps located in correct locations. 3. No pollution from camp sites.	Part of contractor's general construction costs.

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Responsibility		Target / Indicator	Estimated Cost
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		• *Complete **Environmental and Social Screening** of the camp site location to determine significant environmental and social impacts during site selection.* • *Not locate camps within one kilometer of a residential area and at least 50 meters from any surface water course and not within 2 kilometers of a protected area.* • *Coordinate all construction camp activities with neighboring land uses.* • *Ensure workers accommodation/construction camps will need to follow EBRD/IFC guidance on Workers' accommodation: processes and standards.* • *Coordinate all construction camp activities with neighboring land uses.* *The Contractor will ensure that all of the following conditions are met regarding the site:* • *Rain-water run-off arising on the site will be collected, removed from the site via a suitable and properly designed temporary drainage system and disposed of at a location and in a manner that will cause neither pollution nor nuisance. The drainage system will be fitted with oil and grease interceptors.*				

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Responsibility		Target / Indicator	Estimated Cost
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		• There will be no direct discharge of sanitary or wash water to surface water. • In the absence of functioning sewerage and sewage treatment facilities it is recommended that the Contractor provides his own on-site wastewater treatment facilities. For sites servicing a small number of employees (less than 150), septic tanks may be used. For larger sites, liquid wastes will as a minimum receive primary treatment in anaerobic tank or pond preceded by a bar screen to remove large solid objects (e.g. sticks, rags). • There will be no direct discharge of untreated sanitary or oily wastewater to surface water bodies. • Licensed contractors will be required to collect and disposal of liquid waste from the septic tanks on regular basis. • Disposal of materials such as, but not limited to, lubricating oil and onto the ground or water bodies will be prohibited. • Liquid material storage containment areas will not drain directly to surface water. • Waste water from vehicle washing bays will be free of pollutants if the wash bay has been constructed correctly. • Lubricating and fuel oil spills will be cleaned up immediately and spill				

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Responsibility		Target / Indicator	Estimated Cost
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		cleanup materials will be maintained at the storage area. • *Construction and work sites will be equipped with sanitary latrines that do not pollute surface waters and are connected to septic tanks, or waste water treatment facilities.* • *Discharge of sediment-laden construction water directly into surface watercourses will be forbidden. Sediment laden construction water will be discharged into settling lagoons or tanks prior to final discharge.* • *Washing out concrete trucks at construction sites will be prohibited unless specific concrete washout areas are provided for this purpose at the construction site (e.g. a bridge site). The washouts will be impermeable and emptied when 75% full.* • *Spill cleanup equipment will be maintained on site (including at the site maintenance yard and vehicle fueling areas). The following conditions to avoid adverse impacts due to improper fuel and chemical storage:* • *Fueling operations will occur only within containment areas.* • *All fuel and chemical storage (if any) will be sited on an impervious base within a bund and secured by fencing. The storage area will be located away from any watercourse or wetlands.*				

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Responsibility		Target / Indicator	Estimated Cost
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		The base and bund walls will be impermeable and of sufficient capacity to contain 110% of the volume of tanks. • *Filling and refueling will be strictly controlled and subject to formal procedures and will take place within areas surrounded by bunds to contain spills / leaks of potentially contaminating liquids.* • *All valves and trigger guns will be resistant to unauthorized interference and vandalism and be turned off and securely locked when not in use.* • *The contents of any tank or drum will be clearly marked. Measures will be taken to ensure that no contaminated discharges enter any drain or watercourses.* • *Disposal of lubricating oil and other potentially hazardous liquids onto the ground or water bodies will be prohibited.* • *Should any accidental spills occur immediate cleanup will be undertaken, and all cleanup materials stored in a secure area for disposal to a site authorized to dispose of hazardous waste.* • *If determined warranted by the Engineer, the Contractor will provide a wash pit or a wheel washing and/or vehicle cleaning facility at the exits from the sites.* • *If so requested, the Contractor will ensure that all vehicles are properly*				

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Responsibility		Target / Indicator	Estimated Cost
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		cleaned (bodies and tires are free of sand and mud) prior to leaving the site areas. • The Contractor will provide necessary cleaning facilities on site and ensure that no water or debris from such cleaning operations is deposited off-site. • The Contractor will be responsible to maintain and cleanup campsites and respect the rights of local landowners.				
24	Impacts Associated with Concrete Batching	Strictly implement the approved: • **Concrete Batching Plant Management Plan.** • **Construction Camp Layout plan.** • **Air Quality Management Plan** • **Spill Management Plan.** • **OHS Plan.** • **Emergency Response Plan.** • **Waste Management Plan.** • **Waste Water Management Plan.** To limit impacts from dust, the following conditions will apply: • Batching plants will be located downwind of residential areas and not within one kilometer of any residential area. • The entire batching area traversed by vehicles – including driveways leading into and out of the area – will be paved with a hard, impervious material. • Sand and aggregates will be delivered in a dampened state, using covered trucks. If the materials have dried out during transit they will be	Contractor	Engineer/RD, MoEPA Information – included in reports to the Lenders	1. Air emissions within acceptable limits. 2. Water discharges within acceptable limits. 3. PPE worn by all workers. 4. Training provided. 5. First aid kits at site.	Part of contractor's general construction costs.

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Responsibility		Target / Indicator	Estimated Cost
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		re-wetted before being dumped into the storage bunker. • Sand and aggregates will be stored in a hopper or bunker which shields the materials from winds. The bunker should enclose the stockpile on three sides. The walls should extend one metre above the height of the maximum quantity of raw material kept on site, and extend two metres beyond the front of the stockpile. • The hopper or bunker will be fitted with water sprays which keep the stored material damp at all times. Monitor the water content of the stockpile to ensure it is maintained in a damp condition. • Overhead storage bins will be totally enclosed. The swivel chute area and transfer point from the conveyor will also be enclosed. • Rubber curtain seals may be needed to protect the opening of the overhead bin from winds. • Conveyor belts which are exposed to the wind and used for raw material transfer will be effectively enclosed, to ensure dust is not blown off the conveyor during transit. Conveyor transfer points and hopper discharge areas will be fully enclosed. • Conveyor belts will be fitted with belt cleaners on the return side of the belt. • Weigh hoppers at front end loader plants will be roofed and have weigh				

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Responsibility		Target / Indicator	Estimated Cost
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		hoppers shrouded on three sides, to protect the contents from the wind. The raw materials transferred by the front-end loader should be damp, as they are taken from a dampened stockpile. • *Store cement in sealed, dust-tight storage silos. All hatches, inspection points and duct work will be dust-tight.* • *Silos will be equipped with a high-level sensor alarm and an automatic delivery shut-down switch to prevent overfilling.* • *Cement dust emissions from the silo during filling operations must be minimized. The minimum acceptable performance is obtained using a fabric filter dust collector.* • *Totally enclose the cement weigh hopper, to ensure that dust cannot escape to the atmosphere.* • *An inspection of all dust control components will be performed routinely – for example, at least weekly.* • *All contaminated storm water and process wastewater will be collected and retained on site.* • *All sources of wastewater will be paved and bunded. The specific areas that will be paved and bunded include; the agitator washout area, the truck washing area, the concrete batching area, and any other area that may generate storm water*				

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Responsibility		Target / Indicator	Estimated Cost
			Implementation	Monitoring		
		contaminated with cement dust or residues. *Contaminated storm water and process wastewater will be captured and recycled by a system with the following specifications:* • *The system's storage capacity must be sufficient to store the runoff from the bunded areas generated by 20 mm of rain.* • *Water captured by the bunds will be diverted to a collection pit and then pumped to a storage tank for recycling.* • *An outlet (overflow drain) in the bund, one metre upstream of the collection pit, will divert excess rainwater from the bunded area when the pit fills due to heavy rain (more than 20 mm of rain over 24 hours).* • *Collection pits should contain a sloping sludge interceptor, to separate water and sediments. The sloping surface enables easy removal of sludge and sediments.* • *Wastewater will be pumped from the collection pit to a recycling tank. The pit will have a primary pump triggered by a float switch and a backup pump which automatically activates if the primary fails.* • *Wastewater stored in the recycling tank needs to be reused at the earliest possible opportunity.*				
25	*Access Roads*	*Strictly implement the approved:*	*Contractor*	*Engineer/RD,*	*1. No complaints*	*Stakeholder*

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Responsibility		Target / Indicator	Estimated Cost
			Implementation	Monitoring		
		• ***Traffic Management Plan*** *Where required, implement the requirements of any:* • ***Temporary Road Method Statement.*** • ***Temporary River Crossing Method Statement*** *The Contractor shall also:* • *Provide information to the public about the scope and schedule of construction activities and expected disruptions and access restrictions at least 24 hours before the disruptions;* • *Allow for adequate traffic flow around construction areas via diversions or temporary access roads;* • *If temporary access roads are to be constructed with a gravel surface they shall be routinely watered by the Contractor during dry weather to reduce dust impacts;* • *Access roads which are also used by local traffic shall include passing places every 200 meters where the roads are narrow;* • *Provide adequate traffic signs, appropriate lighting, well-designed traffic safety signs, barriers and flag persons for traffic control.* • *Access roads for batching plants, etc, should be maintained to their exiting (or better) condition during the construction phase.* • *Prior to the start of construction, and as part of his* ***Traffic Management Plan****, the Contractor shall consult*		*MoEPA Information – included in reports to the Lenders*	*from local residents regarding traffic diversions.* 2. *Levels of dust within acceptable limits.*	*communications part of Contractors ESO staff costs.* *Watering of roads part of Contractors general construction costs.* *All other items considered part of Contractors general construction costs.*

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Responsibility		Target / Indicator	Estimated Cost
			Implementation	Monitoring		
		with local residents to establish key livestock crossing points on the proposed access roads. Flagmen shall be employed at the demarcated crossing points during the day to ensure the safe passage of cattle in these areas.				
26	Emergency Response	Strictly implement the approved: • **Emergency Response Plan.** Any emergencies, and how they were handled, will be reported in monthly progress reports by the Contractor to the Engineer	Contractor	Engineer/RD, MoEPA Information – included in reports to the Lenders	1. Monthly reporting of emergency situations.	Part of Contractors general construction costs.
27	Community and Livestock Safety	The Contractor will: • Ensure all driving is to occur during daytime hours where possible. • Prepare guidelines for maximum driving hours per day and week. • Adhere to speed limits. • Adhere to spill response measures in the event of a spillage from a vehicle, particularly in the vicinity of the Khada River. • Consult with local households, community groups, police, and emergency services along the transport routes. • Provide driver training programs to ensure that Contractors staff are aware of community sensitivities, such as specific livestock movement periods. • Provide a series of road safety awareness sessions for schools in the Project area. The sessions will be provided on a six monthly basis	Contractor	Engineer/RD, Labour union (if available), community representatives. Information – included in reports to the Lenders	1. Safety awareness sessions provided. 2. Zero accidents between contractors / sub-contractors vehicles and local residents.	Stakeholder communications and training part of Contractors ESO / H&S staff costs. All other items considered part of Contractors general construction costs.

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Responsibility		Target / Indicator	Estimated Cost
			Implementation	Monitoring		
		throughout the construction phase. As part of the awareness sessions children will be given reflective badges to fix to their coats and school bags.				
28	*Occupational Health and Safety and Workers Rights*	*Strictly implement the approved:* • ***Occupational Health and Safety Plan*** • ***Community Health and Safety Plan.*** • ***Traffic Management Plan.*** • ***Waste Management Plan.*** • ***Emergency Response Plan.*** • ***Air Quality Management Plan.*** • ***Noise Management Plan.*** • ***Camp Management Plan.*** *The Contractor shall also:* • *Conduct initial safety induction course for construction workers regarding health and safety measures, emergency response in case of accidents, fire, etc. Develop and implement safety training program. Conduct safety meetings on a monthly basis.* • *Implement monitoring of condition at the worksites (this includes control of availability, adequacy quality and use of PPE, implementation of noise measurements, air quality measurements in tunnels).* • *Provide potable water and portable toilet facilities for workers at work sites.* • *Ensure availability of first aid kits and firefighting equipment at the work*	*Contractor*	*Engineer/RD, Labour union (if available), community representatives. Information – included in reports to the Lenders*	1. *Safety induction completed.* 2. *24 hour hotline operational.* 3. *Regular training provided.*	*Induction courses and monitoring part of Contractors H&S staff costs.* *All other items considered part of Contractors general construction costs, or covered elsewhere in the EMP*

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Responsibility		Target / Indicator	Estimated Cost
			Implementation	Monitoring		
		areas. • Provide fencing on all areas of excavation greater than 1 m deep. Install warning signs. • Provide appropriate PPE (personnel protection equipment) and harnesses (safety boots, helmets, gloves, protective clothes, breathing mask, goggles, and ear protection) adequate to task/activity. • Regularly inspect, test and maintain all safety equipment. Replace equipment that is not in working order, damaged and not fit to use immediately. • Ensure sufficient fresh air supply to confined work spaces. • Keep air inlet filters clean and free of dust and microorganisms. • Ensure reversing signals are installed on all construction vehicles. • 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. Note: fall prevention/protection measures may include installation of guardrails with mid-rails and toe boards at the edge of any fall hazard area, proper use of ladders and scaffolds by trained employees, use of fall prevention devices, including safety belt and lanyard travel limiting devices to prevent access to fall				

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Responsibility		Target / Indicator	Estimated Cost
			Implementation	Monitoring		
		hazard, fall protection devices such as full body harnesses, etc. • *Mark the areas where risk of injuries from falling objects exist with rope or flagging to minimize risks and injuries.* • *Employ flag persons to control traffic when construction equipment is entering or leaving the work area.* • *Provide road signs in accordance with approved traffic management plan.* • *Provide sufficient lighting at night within and in the vicinity of construction sites, but consider need for mitigation of impact on wildlife.* • *Install temporary accesses to properties affected by disruption to their permanent accesses.* • *Reinstate good quality permanent accesses following completion of construction.* • *Impose speed limits on construction vehicles when travelling along residential areas.* • *Provide induction and OHS training to the staff.* • *Inform community about need to implement noise generating works outside the planned schedule.* • *Implement 24-hour community complaints hotline.* • *A suitably staffed and equipped health clinic for all workers is to be provided on site.*				

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Responsibility		Target / Indicator	Estimated Cost
			Implementation	Monitoring		
		For the development of the Project the Contractor shall: • set targets for local employment based on initial assessment of the labour market for unskilled and semi-skilled work force. • For unskilled the Contractor shall use a 'ballot' system to ensure that employment is fair and not weighted to connected people for unskilled roles. Repatriation of locals through recruitment measures will use online resources such as jobs.ge. • A retrenchment plan will also be developed by the Contractor for use during the end of the project to ensure that local workers are equipped in some capacity for the end of the project.				Part of Contractors ESO staff costs.
		Regarding HR Policies and workers GRM, the Contractor shall follow the measures listed below: • The development and implementation by the Contractor of Human resources policies to hire, train, assess, and reward the project workforce. These policies should prevent any form of discrimination in the workplace and ensure that all employees are treated fairly and equally, in line with EU non-discrimination requirement. • Prior to implementing any collective dismissals of the project workforce, the Contractor will be required to			1.	Part of Contractors ESO staff costs.

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Responsibility		Target / Indicator	Estimated Cost
			Implementation	Monitoring		
		conduct an analysis of alternatives to retrenchment. • *Further, policies should exclude the use of child or forced labour in the project, and that national and international requirements for non-employee workers and supply chain workers are also reflected in these policies.* • *A grievance mechanism for workers will need to be provided for the workforce to be able to raise reasonable workplace concerns. The Contractor will inform the workers of the grievance mechanism at the time of hiring and make it easily accessible to them.* • *The workers will additionally not be restricted from joining or forming workers organisations or from bargaining collectively, and the contractor will not discriminate or retaliate against workers who form or join collectives or bargain collectively.* • *Working relationships and conditions of work are also to be managed and monitored in implementing the project.* • *Aspects include the working environment; the organisation of work; training; health and safety; working hours; fair wages and decent working conditions; and terms of employment.*				

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Responsibility		Target / Indicator	Estimated Cost
			Implementation	Monitoring		
		Regarding sub-contractors, the Contractor shall ensure that: • All Project sub-contractors will be supplied with copies of the SEMP. • Provisions will be incorporated into all sub-contracts to ensure the compliance with the SEMP at all tiers of the sub-contracting. • All subcontractors will be required to appoint a safety representative who will be available on the Site throughout the operational period of the respective sub-contract unless the Engineers approval to the contrary is given in writing.	Contractor	Engineer/RD, MoEPA Information – included in reports to the Lenders	2. Sub-contractors received SEMP. 3. Contracts include clauses relating to SEMP compliance. 4. Safety representative appointed.	Part of Contractors ESO staff costs. Part of sub-contractors costs.
		Contractor to ensure collective bargaining, retrenchment, worker accommodation and non-employee worker gaps in line with ILO and Lender requirements.	Contractor	Engineer/RD, MoEPA Information – included in reports to the Lenders	1. ILO and lender requirements adopted by the Contractor.	Part of Contractors ESO staff costs.
29	Landscape visual change	The Contractor shall: • Strictly observe the boundaries of the worksites. • Clean up and timely remove waste from the area. • Reinstate all temporarily disturbed sites after completion of works. Plant with vegetation. • Avoid using 'alien' plant species. • Choose colors of above ground sections of technical buildings at tunnel exits so to merge with environment. • Give priority to use of geotextile against shotcrete.	Contractor	Engineer/RD, MoEPA Information – included in reports to the Lenders	1. All sites reinstated.	All items considered part of Contractors general construction costs, or covered elsewhere in the EMP

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Responsibility		Target / Indicator	Estimated Cost
			Implementation	Monitoring		
		• Use irregular shape stones for riprap. • Avoid use of white concrete.				
30	Lighting	• Use of full horizontal cut off glass lens luminaires are installed at 0^{o} uplift. These luminaires, in addition to reducing sky glow, help to minimise visual intrusion within open landscape. • Where possible use lower lamp heights, however, this should not compromise safety aspects, such as the need to see road signs. • To prevent future pollution issues, it is recommended that the use of sodium light bulbs is prohibited and that LED lights are installed with a "neutral" color temperature of 4000K.	Detailed design team to include light shields in design.	RD / ADB / EBRD	1. Lighting design includes appropriate shields.	Part of Contractors general construction costs.
		During the Construction Phase: • Use low wattage lamps directing light downwards at work sites and camps. • All lighting related to construction activities shall be shielded or directed to restrict any direct illumination onto property located outside of the Project Site boundaries. • All construction site lighting shall be turned off when construction activities have ceased for the day. • Follow the mitigation measures for lighting as outlined in **Section F.6 – Ecological Resources**.	Contractor to implement mitigation measures	Engineer/RD, MoEPA Information – included in reports to the Lenders	1. Light shields provided. 2. Lights turned off at work sites at the end of the working day.	Part of Contractors general construction costs.
31	Construction Noise	Strictly implement approved: • **Noise Control Plan.** In addition, the Contractor will:	Contractor	Engineer/RD, MoEPA Information – included in reports to	1. Camps correctly sited. 2. Construction noise within	Temporary noise barriers, if needed, are part of Contractors

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Responsibility		Target / Indicator	Estimated Cost
			Implementation	Monitoring		
		• Ensure that no construction camp, batching plant, asphalt plan or rock crushing plant is located within 1km of any residential area or sensitive receptor and not within 2 km of a protected area. • Use well maintained construction equipment and vehicles. • Use construction equipment and vehicles fitted with appropriate noise suppression. Fit all pneumatic tools with an effective silencer on their air exhaust port. • Use temporary noise barriers while working in sensitive locations in case accidence of allowable limits is expected. Placing the barrier close to the source proves to be effective. • Impose speed limits on the project vehicles to minimize noise emission while moving along/across the sensitive areas. • Keep to no horn policy unless vitally necessary. • Install less noisy movement/reversing warning systems for equipment and vehicles that will operate for extended periods, during sensitive times or in close proximity to sensitive sites. Occupational health and safety requirements for use of warning systems must be followed. • All vehicular movements to and from the site to only occur during the scheduled normal working hours, unless approval has been granted by		the Lenders	acceptable limits. 3. Time constraints observed. 4. PPE worn by workers.	general construction costs. All other items considered part of Contractors general construction costs, or covered elsewhere in the EMP

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Responsibility		Target / Indicator	Estimated Cost
			Implementation	Monitoring		
		the Engineer. • Keep good conditions of trucks that use to transport construction materials so they cause no loud noise and control the truck speed, to be not exceeded 40 km/hr when driving through communities, and not exceeded 80 km/hr when driving on highways. • Time and Activity Constraints, i.e., operations will be scheduled to coincide with periods when people would least likely be affected; work hours and work days will be limited to less noise-sensitive times. Hours-of-work will be approved by the Engineer having due regard for possible noise disturbance to the local residents or other activities. Construction activities will be strictly prohibited between 10 PM and 6 AM in the residential areas. When operating close to sensitive areas (within 250 meters) such as residential, nursery, or medical facilities, the Contractor's hours of working shall be limited to 8 AM to 6 PM. • As much as possible, use quiet equipment and working method: e.g. Diesel hammer piling – substituted with drill piling. • Whenever possible: enclose noisy equipment, restrict non- stop operation of noisy equipment, avoid simultaneous operation of noise generating equipment.				

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Responsibility		Target / Indicator	Estimated Cost
			Implementation	Monitoring		
		• Consider seasons sensitive for birds and other wildlife while planning noise-generating works. • Train staff in best practice. • Inform community on schedule and duration of noisy construction activities in sensitive locations, such as residential areas, etc. • Implement 24-hour community complaints hotline. • Provision of noise protection kits such as ear plug, earmuff, for workers who are working in the area with noise level is higher than 85 dB(A). It is designated as a regulation that workers must wear protection kits in case of working in a noisy area.				
31	Noise Barriers	Undertake further refined noise modelling to determine the specification and precise locations of the proposed noise barriers.	Engineer	RD and ADB to review results and designs	1. Model refined.	$10,000
32	Road Noise	Construction of the noise barriers recommended in **Section F.8.5 – Noise** or those recommended as part of the refined noise model, per Item 31 above.	Contractor	Engineer/RD, MoEPA Information – included in reports to the Lenders	2. Noise barriers constructed.	2,235 / $1,300 m Total Cost $2,905,500
33	Construction generated blasting	Strictly Implement the approved: • **Blasting Management Plan**. In addition, the Contractor shall ensure that: • Blasting will be scheduled during the day only. • Local communities will be informed of blasting timetable in advance and will be provided adequate notice of when blasts are required outside of	Contractor	Engineer/RD, MoEPA Information – included in reports to the Lenders	1. Blasting time constraints observed. 2. Blasting timetable provided to local residents.	Informing communities part of the Contractors ESO / H&S staff costs. For monitoring costs see **Appendix B**

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Responsibility		Target / Indicator	Estimated Cost
			Implementation	Monitoring		
		the planned schedule. • Throughout the blasting activity, if required, vibration sensors will be installed at strategic locations to monitor the impact of blasting and to ensure that the vibration levels are within the adopted criteria. The monitoring plan will be part of the **Blasting Management Plan**. • Use blasting design with consideration of safety, blast geometry, free faces, burden, spacing, initiation pattern (delayed blasting) and angled holes. Use multi deck blasting technique is considered as efficient method creating lower vibration.				
34	Vibration	**Condition Surveys** - Not later than 28 days before the commencement of construction works, the Contractor and the Engineer will carry out joint condition surveys of all buildings within 25 meters of the road alignment that, in the opinion of the Engineer might be affected by vibration resulting from the Contractor's construction operations. The surveys shall be conducted in the presence of and with the permission of the property owners (and with representatives of the Ministry of Culture and Sport for PCR sites). The findings of the building condition surveys shall be recorded in the reports that shall contain the following information, as a minimum: • Building address and location;	Contractor	Engineer/RD, MoEPA Information – included in reports to the Lenders	1. Condition surveys undertaken.	Part of Contractors construction costs.

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Responsibility		Target / Indicator	Estimated Cost
			Implementation	Monitoring		
		• *A description of the building condition and any cosmetic and/or structural damage;* • *Sketches and photographs showing the location and extent of any damage;* • *High resolution video recordings of the surveyed buildings; and* • *Verification of the report by the building owner (and MoCS).*				
		Strictly implement the approved: • ***Construction Vibration Management Plan.*** *Where the results of the vibration monitoring show that the specified construction vibration limit is reached at a particular location, the Contractor shall suspend the construction activities that generate the excessive vibration at such location, notify the Engineer and with the approval of the Engineer take mitigative actions necessary to keep the construction vibration within the specified limit. This may, for example include:* • *The use of low roller vibration settings and performing compaction without vibration.* • *Adjust TBM tunneling speeds and periodicity should the vibration monitoring indicate excessive vibrations;* • *Select charge and delay time in drill and blast tunnels so to avoid excessive vibration; and* • *Provide temporary vibration barriers in sensitive locations.*	*Contractor*	*Engineer/RD, MoEPA* *Information – included in reports to the Lenders*	1. *Zero complaints from local residents regarding vibration.*	*Part of Contractors construction costs.* *For monitoring costs see* ***Appendix B.***

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Responsibility		Target / Indicator	Estimated Cost
			Implementation	Monitoring		
		Regarding vibration impacts to PCR, the Contractor shall: • At a minimum undertake continuous monitoring at all of the PCR sites within 110 m of works sites as identified in the Project EIA or by the Cultural Heritage Monitor. • At the end of each work day, after blasting works are completed in areas within 100 m of PCR sites the Cultural Heritage Monitor Shall undertake a visual inspection of each site to determine the extent of any damage to the sites. If damage is identified, works in the area shall cease until the Contractor has contacted the MoCS to inform them of the damage and an action plan has been developed to repair any damage and ensure no further damage to the site.	Contractor	Engineer/RD, MoEPA Information – included in reports to the Lenders	1. No damage to PCR sites.	For monitoring costs see **Appendix B.** Observation monitoring part of Contractors CHM staff costs.
35	Impact on cultural heritage	Strictly implement the approved: • **Cultural Heritage Management Plan** • **Chance Find Procedure**	Contractor	Engineer/RD, MoEPA Information – included in reports to the Lenders	3. No complaints relating to disturbance of PCR 4. No damage to PCR sites.	Part of the Contractors CHM staff costs.
		The Contractor shall also apply the following overarching commitments: • Prevent damage and promote preservation of cultural heritage objects / sites. • Suspend activity if chance finds are suspected. • Cooperate with the Engineer and RD on Chance Finds			3. No complaints relating to disturbance of PCR 4. No damage to PCR sites.	Part of the Contractors general construction costs and CHM staff costs.

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Responsibility		Target / Indicator	Estimated Cost
			Implementation	Monitoring		
		• *Provide site supervision including H&S, labour, tools, equipment (including mechanical excavator as required by Engineer), facilities and attendances to chance find excavations* • *Provide and install any identified measures such as bog mats over archaeological sensitive areas, demarcation of cultural heritage sites to be avoided (see list below), or other measures to assist the preservation of PCR. This will be in areas to be determined by the* ***Cultural Heritage Monitor****.*				
		More specifically, the Contractor will ensure: • *Areas of potential cultural heritage impact (identified in the Project EIA) will be examined, and any necessary excavations conducted prior to construction.* • *Monitoring of vibration sensitive locations as determined by this EIA.* • *Archaeological sites identified during construction will be archaeologically recorded by the Cultural Heritage Monitors.* • *Pre-construction works to evaluate, and record known archaeological sites will be agreed with the Ministry of Culture and Sport.* • *A program of archaeological surveillance (watching brief by the Cultural Heritage Monitor) will be implemented during topsoil stripping*	*Contractor*	*Engineer/RD, MoEPA Information – included in reports to the Lenders*	3. *No complaints relating to disturbance of PCR* 4. *No damage to PCR sites.*	*Part of the Contractors general construction costs and CHM staff costs.*

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Responsibility		Target / Indicator	Estimated Cost
			Implementation	Monitoring		
		of work sites, the facility sites, construction camps and equipment lay-down areas and ancillary areas, spoil disposal sites, and those areas identified above in ***Error! Reference source not found.*** *and* ***Error! Reference source not found.****. The Engineer will be empowered to temporarily stop works, pending archaeological examination, if artefacts are found.* • *If archaeological artefacts or structures are found, archaeological advice will be sought from Georgian National Museum and the Ministry of Culture and Sport, and the Chance Finds Procedure followed.* • *The Cultural Heritage Monitor conducting the watching brief will advise on procedures to be followed by the construction supervisor in line with the Chance Finds Procedure.* • *If works cannot easily be adjusted to avoid damaging the feature, construction activities will be suspended at the site until the excavation and recording required by the authorities has been carried out.* • *Known archaeological sites within 50m of the road centerline or other construction activity (e.g. access roads, spoil disposal sites) will be demarcated throughout construction, e.g. fencing, barriers and/or signage.*				

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Responsibility		Target / Indicator	Estimated Cost
			Implementation	Monitoring		
		• *Issues relating to archaeological awareness (such as ownership of finds, notification of finds and protection of archaeological sites) will be included in induction training.*				
		Particular sites requiring fencing/protection prior to construction commencement include: • *Tskere cemetery, Site #3* • *Site #23 close to Begoni Plateau Intersection* • *Plateau Tower, Site #2.* • *Mineral Outcrop, Khada Gorge.*	*Contractor*	*Engineer/RD, MoEPA Information – included in reports to the Lenders*	2. *Sites fenced throughout construction phase.*	*Fencing / $5,000*
		Particular sites requiring additional consultations to determine relocation prior to construction commencement include: • *Cross, Kvesheti section, Site #9.*	*Contractor*	*Engineer/RD, MoEPA Information – included in reports to the Lenders*	1. *Consultation completed.* 2. *Findings reported to Lenders, RD and Engineer*	*3.*
		Move the slip road at Begoni Plateau Intersection 20 meters to the north to avoid construction impacts to Site #23	*Detailed Design Team*	*Information included in Detailed Design*	1. *Slip road design changed.*	*2.*

Table A-6: Lot 1 and Lot 2 Operational Phase EMP

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Responsibility			Target / Indicator
			Estimated Cost	Implementation	Monitoring	
1	Air pollution by transport emissions	• Keep roadside vegetation intact. • Ensure proper state of maintenance of tunnel ventilation system. • Apply construction phase mitigation to maintenance works.	Partly covered by operation costs. Tree maintenance can be outsourced. The cost will be set in agreement between the RD and service provider	Contractor hired by RD, tunnel operation staff	RD, MoEPA Information – included in reports to the Lenders	1. Road vegetation maintained. 2. Tunnel ventilation system operational.
2	Impact on soil quality	• Maintenance and clean up the drainage system to prevent impact on erosive sliding of the soil or flooding; • Monitoring of slopes, in particular after strong rains and snowmelt for identification of possible traces of erosion; • Implementation of mitigation measures defined for pre-construction/construction works during road repair/maintenance works; • Analysis of soil for identification of the impact caused by ice breaking salt (after the snow melt – in spring) with subsequent organic amendment and/or amendments to adjust pH or nutrient deficiencies.	The cost of monitoring will be set in agreement between the RD and service provider	Contractor hired by RD	RD, MoEPA Information – included in reports to the Lenders	1. Erosion controlled on slopes. 2. Soil sampling undertaken.
3	Hydrology	• Ensure clean up and waste removal from carriageway and roadsides. • In the technical building area store hazardous and potentially contaminating materials (chemicals, fuels, oils, etc.) in area with watertight flooring, roofing, security fencing and access control and drainage/wastewater collection systems. • Maintain integrity and permeability of storm water drainage system (as described in **Section B.4.3 – Lot 1**	The cost will be set in agreement between the RD and service provider. Cost of	Contractors hired by RD, Tunnel operator staff.	RD, MoEPA Information – included in reports to the Lenders	1. Results of water quality monitoring within acceptable limits. 2. Contracts with waste management companies in force.

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Estimated Cost	Responsibility		Target / Indicator
				Implementation	Monitoring	
		and Lot 2 Drainage *of the EIA) to avoid blockage, overflow and direct discharge of untreated runoff into the rivers.* • *Ensure firefighting water is managed according to the requirements of* ***Section B.4.2*** *and* ***Section B.4.3*** *of the EIA)* • *Control water quality (list of parameters to control include: pH; Suspended Solids; BOD5; COD; Coliforms; Nitrate (NO3); Phosphate (PO4); Oil and Grease) in recipient watercourses seasonally. Collect water samples from upstream and downstream sections of the stream in 50m and 250m distance of the crossing area. The distance may change depending on accessibility of the river for sampling.* • *Ensure maintenance and timely clean-up/removal of sediments accumulated in bridge deck runoff treatment facility and tunnel water drainage systems. Disposal of these sediments following the same procedure as set for the management of sediments from treatment unit (settling basin).* • *Set, implement and adjust clean-up/maintenance schedule to ensure effective operation of the treatment facilities.* • *Check quality of the sediments (list of parameters to control include: heavy metals, petroleum products) prior to making decision on the method of disposal. If contamination detected – use licensed contractor to deal with the waste.* • *Maintain contracts with hazardous waste removal companies to ensure timely and safe removal of skimmed oil, other hazardous waste generated at technical buildings.* • *Monitor water quality in waste water recipient stream quarterly (50m upstream and 250m downstream the point of discharge).* • *Make sure (training) that tunnel operator staff is aware of*	*clean-up and water analysis will be set in respective contract between the RD and service providers.*			

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Estimated Cost	Responsibility		Target / Indicator
				Implementation	Monitoring	
		material and waste management requirements. • Perform maintenance paving of the road sections and bridge decks only in dry weather to prevent runoff contamination. • Use staging techniques to reduce the spread of paving materials during the repair of potholes and worn pavement. These can include covering storm drain inlets and manholes during paving operations, using erosion and sediment controls to decrease runoff from repair sites, and using drip pans, absorbent materials and other pollution prevention materials to limit leaks of paving materials and fluids from paving machines. • Reinstate disturbed areas – if the case. • At drainage discharge points, including interceptor tanks, reinstatement with native wetland plant species in discharge locations to remediate the water and provide soil stability.				
4	Impact to wildlife caused by presence of road infrastructure.	• Register and analyze road kills. Develop additional mitigation measures if found to be necessary. e.g. install reflectors /local fencing, warning signs, speed reduction etc.). • Register and analyze bird – potential noise barrier collision incidents. Develop additional mitigation measures if found to be necessary. Consultation with ornithologist will be required. • Use light-sensitive photocells that activate automatically when light is or is not needed to reduce light pollution in service areas. • Clean up the carriageway and adjacent strip. • Implement monitoring of wildlife in the project corridor seasonally (duration 2 years from operation). • During maintenance works strictly comply with wildlife/vegetation impact mitigation measures set for construction stage. • Make sure (training) that tunnel operator staff is aware of material and waste management requirements.	Part of operation cost. Cost of monitoring will be set in respective contract between the RD and service providers.	Contractors hired by RD	RD, MoEPA Information – included in reports to the Lenders	1. Annual reporting of wildlife monitoring. 2. Training for staff undertaken.

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Estimated Cost	Responsibility		Target / Indicator
				Implementation	Monitoring	
		• Prohibit poaching (ensure that tunnel operator staff is aware of the ban).				
5	Impact on vegetation	• Monitor the status of re-cultivated areas. (Note: monitoring of vegetation within the first 2 years of operation will be carried out by contractor company identified for this task via tendering procedure) • During maintenance of the road and 'above ground' infrastructure implement mitigation measures set for construction stage. • Prohibit dumping of material or waste in the critical root zone of the trees. • Remove waste generating during maintenance activities according to the type and hazard category. • Remove all materials, equipment, tools from the area after completion of works. • Reinstate the sites disturbed during maintenance works.	Part of operation cost. Cost of monitoring will be set in respective contract between the RD and service providers.	Contractors hired by RD	RD, MoEPA Information – included in reports to the Lenders	1. Annual reporting of vegetation monitoring.
6	Health and safety issues - incidence of accidents on the roads/bridges due to winter typical hazards (snow, ice, mist)	• Install warning signs. • Inform community about any hazards and/or restrictions.	Part of operation cost	RD, traffic police	RD Information – included in reports to the Lenders	1. Traffic accidents recorded and analysis of accidents undertaken on an annual basis.
7	Health and safety issues – tunnel sections	• Maintain ventilation in working condition. • Provide fire fighting equipment and other facilities in working order. • Ensure the tunnel is swept and cleaned up regularly. • Ensure that exit doors to the gallery and the passages are not blocked. • Develop and implement an asset management strategy for the tunnel, that covers all aspects of its operation and maintenance requirements.	Part of operational cost	Tunnel operator staff, technical maintenance team	RD Information – included in reports to the Lenders	1. Ventilation system and firefighting system operational.
8	Waste generation	• Install sanitary facilities and waste bins in the rest areas	Part of operational	RD, Tunnel operator staff	RD Information –	1. Contracts with waste management

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Estimated Cost	Responsibility		Target / Indicator
				Implementation	Monitoring	
		along the road. • Install waste collection bins in technical buildings area. • Use garbage bins fitted with lids to avoid scattering around and attraction of scavengers. • Segregate hazardous, non-hazardous and reusable waste streams. • Manage and dispose hazardous waste according to the type and the class of hazard. Note: for hazardous waste removal licensed company must be contracted. • Until removal (temporarily) waste must be stored within secure facilities with weatherproof flooring and roofing. • Dispose garbage according to agreement with Kazbegi and/or Dusheti waste management utilities.	cost		included in reports to the Lenders	companies in force. 2. No signs of excessive littering in the rest areas and technical buildings.
9	Lighting	• Full horizontal cut off glass lens luminaires are installed at 0° uplift. These luminaires, in addition to reducing sky glow, help to minimise visual intrusion within open landscape. • Where possible use lower lamp heights. • To prevent future pollution issues prohibit the use of sodium light bulbs is prohibited and use LED lights with a "neutral" color temperature of 4000K.	Part of operational cost	RD	RD Information – included in reports to the Lenders	1. No complaints from locals / stakeholders regarding light spill.
10	Local Economy and Livelihoods	• Creation of market places for local businesses.	TBD	RD	RD Information – included in reports to the Lenders	1. Market places created.
		• Development of a 'visitor center'.	TBD	RD	RD Information – included in reports to the Lenders	1. Visitor center completed.
11	Noise	• Expropriation of remaining receptors or signed waiver agreements completed.	Included and an addendum to the LARP	RD	RD Information – included in reports to the Lenders	1. All identified receptors expropriated or signed waiver.

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Estimated Cost	Responsibility		Target / Indicator
				Implementation	Monitoring	
12	Safety	• Coordination with police by the RD during construction and operations to ensure regular patrolling as per other international roads • Facilitating planned rest areas along the route to enable better control of spaces within the project area that receive visitors.	Part of operational cost	RD	RD Information – included in reports to the Lenders	1.
13	Use of Spoil Sites	Consultations with residents in Kobi indicated that they would like the chance to develop some of the spoil disposal areas for car parking/cafes/market stalls, etc. This aspect should be considered further by the RD as part of ongoing stakeholder engagement with the local residents.	TBD	RD	RD Information – included in reports to the Lenders	1. Spoil sites developed for community use.
14	Resolve environmental complaints due to the project implementation	During Operation the Contractor shall implement the **Stakeholder Engagement Plan** (SEP) – Section 6.2.4, Operational Phase.	Part of operational cost	RD	RD Information – included in reports to the Lenders	1. Consultation completed with the identified stakeholders per the SEP and results of consultations presented to RD and Lenders.