Attachment 1 Construction of Poti Bridge and Access Roads

Semi-annual Environmental Monitoring Report

#2 Semestral Report

Reporting period: January- June 2022

July 2022

Batumi Bypass Road Project— Construction of Poti Bridge and Access Roads

(Financed by the Asian Development Bank)

Loan No GEO 3520-GEO

Prepared by Construction Supervision Consultant for the Roads Department, Ministry of Regional Development and Infrastructure of Georgia, and the Asian Development Bank.

ACRONYMS & ABBREVIATIONS

ADB	Asian Development Bank
CSEMP	Contract-Specific Environmental Management Plan
RD	Roads Department
DNP	Defects Notification Period
EA	Executing agency
EMP	Environmental Management Plan
EMS	Environmental Management System
GRC	Grievance Redress Committee
GRM	Grievance Redress Mechanism
EIA	Environmental Impact assessment
km	Kilometer
Ministry	Ministry of National Development and Infrastructure
MS	Method Statement
PIU	Project Implementation Unit
PMU	Project Management Unit
SMEC	Snowy Mountains Engineering Corporation
SSEMP	Site Specific Environmental Management Plan
TBA	Tobe Advised
TOR	Terms of Reference

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1 INTRODUCTION

1.1 Preamble

1. Batumi Bypass Road Project: Major Change in Project (Change in Scope, Amount, and Implementation Arrangements) was conducted September 2019. The major change is an increase in project scope through the addition of a fourth output under the project comprising two additional construction subprojects: a new bridge and approach roads over the Rioni river in Poti and a new bypass road from Bakurtsikhe to Tsnori. Reallocation of existing savings can be utilized to fund the new output, which will reinforce the project's impact of improving regional connectivity in Georgia. The change is considered major because it fundamentally affects the approved project scope and outcome by more than doubling the length of roads and/or bridges to be built.
   The project, managed by the Roads Department under the Ministry of Regional Development and Infrastructure, aims at the Construction of the Poti Bridge and Access Roads, financed by the Asian Development Bank (ADB)

2. This report is the second Semi-Annual EMR for the construction of the Poti Bridge and Access Roads Project and covers the period of January-June 2022.

3. The Contract for Project Management Consultancy Services (PMCS) between RD and "Joint Venture ULUSLARARASI BİRLEŞMİŞ MÜŞAVİRLER MÜŞAVİRLİK HİZMETLERİ A.Ş-IRD Engineering SRL" was signed on 11 June 2021. The Contract for the Construction of the Poti Bridge and Access Roads between RD and Joint Venture MIRBUD-CS (Poland, Georgia) was signed on 29 November 2021. Awarded contracts included EMPs cleared by ADB and conditions of national EIA clearance. The Project construction activities have not been commenced during the reporting period (January-June 2022).

2 PROJECT DESCRIPTION AND CURRENT ACTIVITIES

2.1 Project Description

4. The Poti-Grigoleti-Kobuleti bypass section is part of the E-60 and E-70 highways and the larger East-West road corridor in Georgia, which is an integral part of one of the six key CAREC corridors (Corridor 2) providing the shortest transit link to connect Central Asia with Europe and East Asia. The Project is located along the Black Sea coastal area within the Sanegrelo-Zemo Svaneti Region and on the border between Khobi Municipality and the Poti administrative center.

5. The details of the proposed road project are as follows:

6. The 2.5 km road Project consists of a 2-lane (one lane in each direction) multi-span bridge over the Rioni River and its connection with the existing highway on both sides of the river. The starting point is located on the E-60 highway to Senaki at the right riverbank of the Rioni River on the northern outskirts of the city of Poti. The new section of road will pass next to a residential area (Patara Poti Village) using the exact alignment and parallel to the existing railway bridge over the river. In addition, a small section (approximately 1 km) of an existing secondary road that runs to the Kulevi Oil Terminal from Patara Poti and parallels the river will also be upgraded with a modified alignment to accommodate the new bridge and road approaches.

7. The Project's geometric design standards have been selected based on traffic flow, road category, and relief to ensure safe and unimpeded traffic flow. The road design is based on Georgian National Standard SST 72: 2009 "Standard on Geometrical and Structural Requirements for the Public Motor Roads of Georgia" and Trans-European North-South Motorway (TEM) Standards.

Table 1. Design Parameters

Parameter	Main Alignment	Interchanges: Ramps and Loops
Design speed	100 km/h	40 km/h, 60 km/h, 80 km/h or 100 km/h
Speed limit	90 km/h	90 km/h
Spiral Transition Curves	As per TEM Standards	As per TEM Standards
Bend (Superelevation)	As per Georgian Standards	As per Georgian Standards
Min. crossfall and min. bend	2,50%	2.50%
Max. superelevation	7,00%	7.00%
Expansion width in curves	No necessary widening (each lane is 3,75 m wide)	As per Georgian Standards
Min. Vertical Gradient	0.30%	0.30%
Max. Vertical Gradient	4.00%	5% (100 km/h) and 6% (<100 km/h)
Convex Vertical Curves	22.600	10,000 (100 km/h), 5,000 (80 km/h), 1,800 (60 km/h), 400 (40 km/h)
Concave Vertical Curves	7.700	4,900 (100 km/h), 3,200 (80 km/h), 1.700 (60 km/h), 850 (40 km/h)
Acceleration Lane	-	150 m acceleration lane + 80 m taper
Deceleration Lane	-	100 m deceleration lane + 80 m taper

The map of the project road is given in **Figure 1** below.

Figure 1. Map of Project Road

8. The Project is classified as category **A** for the environment under ADB's Safeguard Policy Statement (2009). Project implementation periods: 2021-2025.

9. The Roads Department of Georgia, under the Ministry of Regional Development and Infrastructure of Georgia, submitted EIA to the Ministry of the Environmental Protection and Agriculture of Georgia on 26.02.2018 for approval. Based on the submitted documentation, Environmental Decision was issued by the Minister of the Environmental Protection and Agriculture of Georgia on 26.04.2018 (order N2-284).

2.2 Project Contracts and Management

10. Following the EIA and the PAM requirements, the Project Management Consultancy Services Company and Construction Contractor have mobilized national and international EHS specialists (CSC and CC staff contact details are presented in **Table 2**).

11. The TOR for the Project Management Consultancy Services Company contains the following tasks for the Environmental Specialists:

a. Ensure that the provisions of the approved Environmental Management Plan are reflected in the Contractor's contract site-specific environmental management plan (SSEMP) before its acceptance by the Engineer, the Employer, and ADB after that, ensure that the Contractor complies in every respect with the provisions of the SSEMP;
b. Develop an environmental auditing protocol for the construction period, regularly supervise the environmental monitoring, and submit periodic reports based on the monitoring data and laboratory analysis reports. These reports will be included as an annex to the Consultant's Monthly Report;
c. Develop a program for hands-on training of Contractor's staff in implementing the SSEMP.
d. Conduct Post-Construction Environmental Audit and prepare a post-construction environmental audit report with a filled environmental audit checklist.

11. The Notice to Commence has yet to be given, and construction activity has not commenced.

12. Contact details of ADB (Asian Development Bank), SC (Supervision Consultant), CC (Construction Contractor), and RD (Road Department) representatives are given in **Table 2** below.

Table 2. Main Environmental Staff of ADB, CC, SC, and RD.

, Organization	Position	Name	Nationality
ADB	Head Office, Environmental Specialist, Portfolio, Results, Safeguards	Name: Ninette Pajarillaga Cell: E-mail: npajarillaga@adb.org	

	and Gender Unit (PSG), CWRD		
	ADB National Environmental Safeguards Consultant	Name: Giorgi Kobaladze Cell: +995599689834 e-mail: gkobaladze.consultant@adb.org	Georgian
	Associate Safeguards Officer Georgia Resident Mission	Name: Nino Nadashvili Cell: +995 595 070442 e-mail: nnadashvili@adb.org	Georgian
RD	Environmental Specialist	Name: Luiza Bubashvili Cell:+9995219141 e-mail: likabubashvili@yahoo.com	Georgian
	Head of Environmental Unit	Name: Gia Sopadze Cell: +10599939209 e-mail: sopgia@gmail.com	Georgian
SC	International Environmental Specialist	Emre Duran Cell:+905325258556 e-mail: duran.emre.tr@gmail.com	Turkish
	Environmental Expert	David Gagoshidze Cell:+995574069922 e-mail: datoeko@gmail.com	Georgian
CC	Project Manager	Name: Nino Gabunia Cell: +995577600660 e-mail: ninogabunia@cs@ge	Georgian
	Environmental Specialist	Name: Nino Jangulashvili Cell: +995592030578 e-mail: ninka72@gmail.com	Georgian

2.3 Project Activities During the Current Reporting Period for Construction of Poti Bridge and Access Roads

13. The Project construction activities have not been commenced during the reporting period (January-June 2022).

2.4 Description of Any Changes to Project Design Period for Construction of Poti Bridge and Access Roads

14. N/A

2.5 Description of Any Changes to Agreed Construction methods Period for Construction of Poti Bridge and Access Roads

15. N/A

3. ENVIRONMENTAL SAFEGUARD ACTIVITIES

3.1 General Description of Environmental Safeguard Activities

16. The Supervision Consultant (SC) will supervise and monitor the project construction process. The SC includes Environment Specialist (national) as part of their team to oversee the overall implementation of the environmental management plan (EMP)/SSEMP, environmental monitoring, and compliance with the environmental requirements of ADB. CC's Environmental Specialist will prepare a section-specific report for the environment under the overall Quarterly Construction Report required by ADB and monitor the environmental compliance of the Construction Contractor.

The EIA report of the Project is shared with stakeholders and two public information meetings with local community representatives in the Project impact corridor and other key stakeholders were held. Both meetings were held in Poti and took place on June 30, 2017, and January 12, 2018.

CC's Environmental consultants started to prepare the site-specific and topic-specific environmental management plans (SSEMP) and will submit them to the SC's environmental team for control. All plans will be forwarded to PIU/RD (and ADB as necessary) for approval before the commencement of civil works. The prepared SEMPs and Method Statements (MS) are in Section 5.1, Table 3.

3.2 Site Audits

17. N/A

3.3 Issues Tracking (Based on Non-Conformance Notices)

18. N/A

3.4 Trends

19. N/A

3.5 Unanticipated Environmental Impacts or Risks

20. N/A

4. RESULTS OF ENVIRONMENTAL MONITORING

4.1 Overview of Monitoring Conducted during Current Period

21. Environmental monitoring will start immediately after the commencement of civil works. Baseline measurements still need to be performed and should be performed before the construction activities' commencement. According to the Project EIA, the construction contractor will perform periodic parametric measurements of air, noise, and water quality. Monitoring is to be undertaken monthly during the construction period. Locations of measurements will be defined by the method statement for a particular area.

CC and SC's environmental specialist will check environmental baseline conditions before the commencement of civil works. A photo log for pre-construction conditions is given in Supplementary document 3.

4.2 Trends

22. N/A

4.3 Summary of Monitoring Outcomes

23. N/A

4.4 Material Resources Utilization

24. N/A

4.4.1 Current Period

25. N/A

4.5 Waste Management

26. N/A

4.5.1 Current Period

27. N/A

4.6 Health and Safety

4.6.1 Community Health and Safety

28. N/A

4.6.2 Worker Safety and Health

29. N/A

4.6.3 Training

30. N/A

5. FUNCTIONING OF THE SEMP

5.1 SEMP Review

31. The Contractor prepared Draft Site Specific and Topic Specific EMPs under the guidance of the Supervision Consultant, endorsed by the SC, and approved by PIU/RD (and ADB as necessary) before the commencement of civil works. During the preparation of SEMPs, existing EMP will be used as a baseline document by CC (Supplementary document 1**)**. The list of prepared SEMPs and Method Statements (MS) is given in Table 3. SC commented on all of the SEMPs and MSs (by the end of June 2022), and updated Plans and MSs are awaited from the Contractor.

Table 3. Reviewed Site Specific Environmental Management Plans and Method Statements

No	Plan / Method Statement
1	Site Specific Environmental Management Plan
2	Environmental Management Plan (updated
3	Waste Management Plan (Construction Phase)
4	Emergency Response Plan
5	Spill Management Plan
6	Wastewater Management Plan
7	Chance Find Procedure
8	Labor Management Procedures
9	Clearance Cultivation Restoration Plan
10	Aggregate and Borrow Pit Management Plan
11	Asphalt Rock Crushing Batching Plant Management Plan
12	Topsoil Disposal and Erosion Management Plan
13	Air Quality Management Plan
14	Bridge Construction Management Plan
15	Laydown Area and Camp Management Plan
16	Spoil Disposal Management Plan
17	Biodiversity Action Plan
18	Method Statement for Temporary Roads
19	Method Statement for River Crossings
20	Waterway Safety plan
21	Tree compensation plan

6. GOOD PRACTICE AND OPPORTUNITY FOR IMPROVEMENT

6.1 Good Practice

32. Not yet applicable.

6.2 Opportunities for Improvement

33. Not yet applicable.

7. SUMMARY AND RECOMMENDATIONS

7.1 Summary

34. Not yet applicable.

7.2 Recommendations

35. The following activities are planned for the next reporting period:

- Construction Contractor to update the site-specific and environmental management plans (SEMPs) before the commencement of construction activities – Q3 2022.
- Construction Contractor to conduct baseline measurements of water, air, and noise on regular bases before the commencement of Construction activities.
- Carry out a pre-construction survey of buildings and structures within 50 m distance from the right of way - August 2022.

Supplementary document 1 – Environmental Management Plan

Environmental Management Plan for Pre-Construction Phase

Affected Aspect	Potential Impact/ Issue	Mitigation/Enhancement Measures (all that apply)	Estimated Cost	Responsibility	
				Development/ Implementation	Control
Pre-Construction Stage					
No Net Loss / Net Gain Approach	Impacts on sturgeon species in the Rioni River	• Measure to achieve no net loss / net gains: Implement high standard monitoring program for sturgeon.	Project Cost	RD, ADB	N/A
EMP contractual obligations	Implementation of Project EMP and Specific Environmental Management Plan (SEMP)	• Before the commencement of civil works, the Contractor shall prepare a Specific EMP (SEMP) for Engineer endorsement and RD approval. ADB shall also review the SEMP. The SEMP will present a detailed implementation plan based on the Contractor's actual construction methodologies, work schedule, type/specifications, and number of construction plants to be used • The SEMP shall be (a) consistent with the SEMP template included in the EIA (see), (b) consistent with the project EMP, and (c) prepared based on the Contractor's activities and corresponding locations. • The SEMP will provide the following: i. The Contractor's organizational structure shows the implementation, supervision and reporting, and responsibilities of key personnel ii. The Project program and work activities iii. The Contractor's topic and site-specific plans are as follows:	Contractor Cost	Contractor to Implement Mitigation	Engineer, RD, ADB

		○ Waste Management Plan ▪ Wastewater Management Plan ▪ Spoil Disposal Management Plan ○ Soil Erosion Management Plan ○ Traffic Management Plan ○ Method Statement for Temporary Roads ○ Aggregate and Borrow Pits Management Plan ○ Employment and Procurement Procedure ○ Occupational and Community Health and Safety Management Plan ○ Emergency Response Plan ○ Waterway Safety Plan ○ Method Statement for River Crossings ○ Air Quality Plan ○ Spill Management Plan ○ Clearance, Revegetation, and Restoration Management Plan ○ Noise Management Plan ○ Biodiversity Management Plan ○ Laydown Area and Construction Camp Management Plan ○ Asphalt, Rock Crushing, and Concrete Batching Plant Management Plans ○ Bridge Construction Plan • The Occupational and Community Health and Safety Management Plan shall be consistent with the template provided in the EIA. • The Soil Disposal Management Plan shall utilize the assessment template included in the EIA. • The Contractor will retain the expertise of a qualified Environment and Social Officer (ESO) and Community Liaison Officer (CLO). • The Contractor will obtain all necessary permits and approvals before commencing construction activities.			

Training	The Contractor's training and awareness-raising programs	• All personnel shall undergo a Project site induction that includes the Project's environmental requirements.	Contractor Cost	Contractor to Implement Mitigation	RD, ADB
Climate Change	Future climate changes may cause damage to the bridge and approach roads	• The Project road will be constructed based on an embankment height (road centerline level) which accommodates the historic P1% (1 in 100 years) flood event. • Further climate change studies must be carried out as necessary to ensure that climate change considerations have been incorporated in the design of the bridge and approach roads.	Project Cost	Detailed Design Consultant	RD
Noise/Vibration	Vibration emissions resulting from the use of machinery and equipment and vehicle circulation	• The Contractor will survey the status of the buildings nearest to the project site. The surveys will cover the following aspects: ○ Overall condition of the structures, both exterior ○ and interior. ○ Document defects and preexisting cracks observed in the structure using digital imagery, notes, measurements, and sketches. ○ The survey findings shall be agreed upon by the property owner, who shall attend the survey and sign official documentation agreeing to the survey findings. • Conduct additional pre-construction noise surveys to confirm site conditions. Incorporate findings of such investigations in the updated EIA and EMP if necessary.	Contractor Cost	Contractor to Implement Mitigation	RD, Engineer
Flora and Fauna Habitat, Distribution, and Species	Rehabilitation of the secondary road from Patara Poti to the oil terminal may extend into a proposed extension of the	• Consult with the MoEPA to determine the extent of the proposed extension of the National Park (currently being considered by parliament), which will cover the Rioni River and may extend as far east as the railway bridge neighboring the Project. • Ensure that the rehabilitation of the secondary road does not extend into the proposed extension of the National Park.	Project Cost	Detailed Design Consultant	RD

	National Park (close to where the gas line crosses the Rioni River).				
	Cumulative impacts from the multiple developments in the region.	• The Consultation will be taken with IFI's, donors, and implementing units on other projects that are likely to contribute to cumulative impacts to reduce uncertainty and, where necessary, take appropriate action to minimize environmental harm.	Project Cost	RD	N/A
Aquatic Fauna Habitat, Distribution, and Species	Modification and fragmentation of habitat, including loss of spawning grounds for wild sturgeon species	• Ensure that all guidance on sand and gravel abstraction sites is followed as outlined in the ***Site Preparation, Construction, and Worksite Closure (i.e., project closure) Phases*** EMP table below are followed.	Contractor Cost	Contractor to Implement Mitigation	RD, Engineer
	Displacement of species due to noise, presence of machinery, and equipment and of staff	• Before starting any in-the-water construction activities, conduct underwater noise measurements using hydrophones to establish in the water background noise levels. • The Contractor shall predict planned impact pile-driving noise levels in the water utilizing interim good practice guidelines before starting to pile. Where planned impact pile-driving appears likely to exceed Project thresholds, alternative pile-driving methods or mitigation will be selected.	Contractor Cost	Contractor to Implement Mitigation	RD, Engineer
	Reduction of sturgeon abundance in the Rioni River from Project	• Sturgeon abundance surveys annually, from before the preparation phase until the end of the defect liability period. • To understand the potential for longer-term impacts, it would be necessary for sturgeon abundance monitoring to continue into the	Project Cost	Ecological Contractor to Implement Mitigation	RD, Engineer

	activities	Project's operational phase annually until the third year of operation after defect liability and then twice more at five-year intervals. It is recommended that the RD identify parties best placed to undertake such surveys and report the findings to ADB and other relevant stakeholders.			
	Mortality of individuals from the operation of equipment and construction activities	• The Contractor will ensure that in-river construction activities are staged in periods least likely to affect the sturgeon fish spawning period. • All in-river activities will be avoided from March to September inclusive. Where possible, in-river activities will also be avoided in October and November.	Contractor Cost	Contractor to Implement Mitigation	RD, Engineer
	Mortality of sturgeon from illegal fishing activities using the bridge structures.	• Institutional arrangements will be decided for monitoring the bridge piers by CCTV throughout the operation period to prevent poaching of the sturgeon by using fishing gear on bridge structures.	Project Cost	RD	ADB
Flora species	Mortality of individuals	• The Contractor shall survey construction to identify natural and modified habitats to ensure that natural habitats can be rehabilitated and compensated for where they will be permanently lost. • The Contractor shall identify through a site survey if any Georgian Red-listed tree species are located within five meters of the site boundary. This survey will form part of the Contractor's Clearance, Revegetation, and Restoration Management Plan. In addition, in case walkover surveys pre-construction reveal any protected plant species in the area, the latter will be removed from the environment [and translocated] following subparagraph (v), Article 24, the first paragraph of the law of Georgia on 'Red List and Red Book.'	Contractor Cost	Contractor to Implement Mitigation	RD, Engineer

		• Relocation of any specimens found during the surveys, where practical, will be provided with the help of biodiversity experts to ensure proper handling. Proper handling is crucial for species of conservation importance (e.g., Colchis Water-Chestnut (*Trapa colchica*) and Spring snowflake (*Leucojum vernum*)). The practice will provide the best possible chance of survival for wildlife. The Contractor must develop a plan and schedule before implementing this task.			
Change of Land Use and Livelihoods	Land acquisition and livelihood loss to affected persons	• Before the commencement of the construction works of the Project, the RD must finalize and implement the Land Acquisition and Resettlement Plan (the LARP) designed in compliance with the ADB Safeguards Policy Statement 2009.	LARP Cost / Project Cost	RD to finalize the LARP and implement the Plan.	ADB to approve the LARP
	Barrier effect (impacts on mobility and access of locals to areas such as farmlands, aquaculture ponds, etc., across the Project road)	• Ensure designs retain a strip of riparian habitat along the edge of the river to reduce the impact on species (keep connectivity and possibility for free movement along the river edge).	Project Cost	Detailed Design Consultant	RD
Services Demand	The disruption of services, including energy, to surrounding communities due to the relocation of utilities.	• All telephone and electrical poles/wires and underground cables should be shifted before the start of construction. • Necessary permission and payments should be made to relevant utility service agencies to allow quick shifting and restoration of utility services. • Local people must be informed through appropriate means about the time of shifting of utility structures and potential disruption of services, if any.	Contractor Cost	Contractor to Implement Mitigation	RD, Engineer

Grievance Redress	Complaints due to project implementation	• Before the commencement of site works, the Contractor will develop a grievance redress mechanism (GRM) or system that will allow for receiving/recording and immediate response to and resolution of construction-related complaints. The GRM shall be consistent with the GRM described in this EIA. • The Contractor will inform the communities along the alignment and other stakeholders affected by the Project about the GRM in place to handle complaints and concerns about the Project. • The Contractor will also install notice boards at the construction sites to publicize the name and telephone numbers of the representatives of the Contractor and the RD.	Contractor Cost	Contractor to Implement Mitigation	RD, Engineer

Environmental Management Plan - for Site Preparation, Construction, and Worksite Closure Phases

Affected Aspect	Potential Impact / Issue	Mitigation/Enhancement Measures (all that apply)	Estimated Cost	Responsibility	
				Development/ Implementation	Control
Site Preparation, Construction, and Worksite Closure (i.e., project closure) Phases					
Air Quality	Localized dust emissions resulted from the use of machinery and equipment and the circulation of vehicles.	• Dust-generating areas will be controlled by water spraying, particularly under dry weather conditions. • Stockpiles will be planned and sited to minimize the potential for dust generation by taking into account prevailing wind directions and the locations of sensitive receptors. • The drop height of potentially dust-generating materials will be kept as low as possible. • Where practicable, stockpiles will be located away from sensitive receptors. • If the crushing of construction materials is required, crushers will be located away from sensitive receptors. Keeping at least a 300 m distance from residences windward to concrete production plants should be ensured. • The Contractor will obtain an environmental impact permit for an asphalt plant (if planned to run its facility) before operation. • Onsite speed limits will be applied and enforced for trucks traveling on unpaved surfaces (20 km/h). • Trucks transporting spoil or dusty materials off-site will be covered before leaving the sites. • Wheel-washing facilities will be available and used so that trucks leaving the Site do not spread dust onto neighboring roads. • Public roads used by site traffic will be swept regularly to prevent the accumulation of dirt. • Conveyor belts (e.g., at batching plants and rock-crushing plants) shall be fitted with wind-boards, and	Contractor Cost	Contractor to Implement Mitigation	RD, Engineer

Affected Aspect	Potential Impact / Issue	Mitigation/Enhancement Measures (all that apply)	Estimated Cost	Responsibility	
				Development/ Implementation	Control
		conveyor transfer points and hopper discharge areas shall be enclosed to minimize dust emission.			
	Localized and long-term combustion gas emissions result from the use of machinery and equipment and the circulation of vehicles.	• Machines and construction plant items (e.g., trucks) in intermittent use will be shut down or throttled between work periods. • The burning of waste or vegetation on Site is prohibited. • Special attention will be given to the storage and handling of petrochemicals to avoid environmental hazards and risks. • Maintenance procedures will be implemented to keep equipment in good working condition to minimize exhaust emissions caused by poor performance. • Wherever possible, use electrically-powered equipment rather than gas or diesel-powered equipment. • Training will be provided for the operators of equipment and truck drivers regarding the air pollution potential of their activities.	Contractor Cost	Contractor to Implement Mitigation	RD, Engineer
Noise	Noise and vibration emissions resulting from the use of machinery and equipment and vehicle circulation	• Work hours will be restricted between 07:00 to 20:00 hours within 500 m of the settlements. • The Contractor will establish the optimum travel speed during off-site travel. • Install temporary noise barriers made of plywood or acoustical blankets around noisy operations where necessary to comply with project noise limits. • Use newer equipment with improved noise muffling and ensure that all equipment items have the manufacturers' recommended noise abatement measures, such as mufflers, engine covers, and engine vibration isolators, intact and operational. Newer equipment will generally be quieter in	Contractor Cost	Contractor to Implement Mitigation	RD, Engineer

Affected Aspect	Potential Impact / Issue	Mitigation/Enhancement Measures (all that apply)	Estimated Cost	Responsibility	
				Development/ Implementation	Control
		operation than older equipment. All construction equipment should be inspected at periodic intervals to ensure proper maintenance and the presence of noise control devices (e.g., mufflers and shrouding, etc.). • The number of equipment operating simultaneously will be reduced as far as practicable. • Reduce the number of equipment operating simultaneously as far as practicable. • Orientate equipment is known to emit noise strongly in one direction so that the noise is directed away from receptors as far as practicable. • Locate noisy plants as far away from receptors as practicable. • Avoid transportation of materials on- and off-site through existing community areas during nighttime hours. • Use material stockpiles and other structures to screen noise-sensitive receptors from onsite construction activities where practicable. • Record and respond to complaints according to the established grievance redress mechanism. • Keep nearby residences informed in advance about noisy activities during various construction phases. • Perform independent periodic noise and vibration monitoring to demonstrate compliance with Project noise and vibration limits. • When there is a possibility of human annoyance from construction activities, conduct such activity only during weekday daytime hours when the ambient background noise and the vibration are higher, and many residents are away from their homes at work.			

Affected Aspect	Potential Impact / Issue	Mitigation/Enhancement Measures (all that apply)	Estimated Cost	Responsibility	
				Development/ Implementation	Control
Soil Quality	Land pollution due to improper management of solid waste, as well as possible dripping of hydrocarbons from machinery and equipment, and improper storage of oil and fuel.	• Temporary fuel tanks will be located at least 50 m from any watercourse, drain, or channel leading to a water course. The tank will be placed in covered areas with berms or dikes installed to intercept any spills. Any fall will be immediately localized and cleaned up with absorbent materials. The bund will be able to accommodate 110% of the volume of the tank. • Onsite repairs /maintenance and fueling activities will be limited to the extent possible. • Onsite vehicles and equipment shall be inspected regularly for leaks, and all leaks shall be immediately repaired. Leaking vehicles/equipment will not be allowed onsite. • 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 minor spills, absorbent materials will be used. • Tire washing units will be equipped with drainage settling facilities. The washout pit will be cleaned immediately upon 75% filling. • No washing of vehicles in the river will be allowed. • Usage of off-site vehicle wash racks or commercial washing facilities will be used whenever feasible. In addition, bermed wash areas for cleaning activities will be established if onsite cleaning is required. • The Contractor will implement a training program to familiarize staff with emergency procedures and practices related to contamination events. Operating personnel will be trained to visually inspect discharged water quality for oil and grease traces (that will be visible on the surface) periodically and take appropriate corrective actions.	Contractor Cost	Contractor to Implement Mitigation	RD, Engineer

Affected Aspect	Potential Impact / Issue	Mitigation/Enhancement Measures (all that apply)	Estimated Cost	Responsibility	
				Development/ Implementation	Control
Soil Structure	Land erosion due to loss of vegetation coverage and changes in its structure	• Materials and waste will 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. In addition, drainage trenches will be established to divert surface runoff from the Site. • Under no circumstances shall the following habitats be used for spoil disposal sites: (i) Kolkheti National Park and the Wetlands of Central Kolkheti Ramsar Site; (ii) Kolheti Important Bird Area; (iii) low grass marsh areas; and (iv) within 50 meters of the Rioni River. • To avoid loss of the productive soil layer, all suitable topsoil and other material shall be saved and stockpiled separately for the future recultivation of the area. • Stockpiles of removed topsoil will be designed appropriately/shaped, and managed. • Sand and aggregates will be stored in a hopper or bunker, shielding 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 two meters above the front of the stockpile. The hopper or bunker will be fitted with water sprays that dampen the stored material. • Store cement in sealed, dust-tight storage silos. All hatches, inspection points, and ductwork will be dust-tight. • Temporary detention ponds or containment to control silt runoff will be provided. • Construct intercepting ditches and drains to prevent runoff from entering construction sites • Soil compaction may be reduced by strictly keeping to temporary road boundaries. • Slopes of the embankment will be protected from erosion by vegetation and slope drainage. The	Contractor Cost	Contractor to Implement Mitigation	RD, Engineer

Affected Aspect	Potential Impact / Issue	Mitigation/Enhancement Measures (all that apply)	Estimated Cost	Responsibility	
				Development/ Implementation	Control
		design considers the selection of a reasonable embankment height, establishing temporary berms, slope drains, temporary pipes, contour ditches, ditch checks, diversions, and sediment traps. • Disturbed vegetation must be replanted immediately after the construction/disturbance stops. • Appropriately set up temporary construction camps (if determined needed) and storage areas to minimize the land area required and impact soil erosion.			
Relief	Modification of geological formations - Quarries	• The Contractor will carry out the operation of quarries and borrow pits, as well as extraction of gravel from river terraces (if utilized), in strict accordance with the conditions of a license issued by the Ministry of Economic Development (MoED) and cleared by the Ministry of Environment Protection and Agriculture (MoEPA); and • The Contractor will be responsible for developing, agreeing, and strictly adhering to the quarry/borrow pit operation and re-cultivation plan (if the Contractor owns or establishes a new quarry site). • Borrowing from the river [at the Project site] will be prohibited. • Sourcing construction materials (e.g., sand, gravel) will avoid using licensed or unlicensed sites in the Rioni River or on its banks. • Borrow areas for materials, other than dredged sand fill, shall not be located in productive land, forested areas, and near water courses such as rivers, streams, etc.	Contractor Cost	Contractor to Implement Mitigation	RD, Engineer
Water Quality	Pollution of nearby water bodies due to poor storage and management	• Discharge of any untreated water into the surface water body will be strictly prohibited. • Discharge of cement /concrete contaminated water will be prohibited unless settled and neutralized first to avoid pollution from water with high alkalinity, which can be toxic to aquatic life.	Contractor Cost	Contractor to Implement Mitigation	RD, Engineer

Affected Aspect	Potential Impact / Issue	Mitigation/Enhancement Measures (all that apply)	Estimated Cost	Responsibility	
				Development/ Implementation	Control
	of construction materials	• To prevent runoff contamination, paving will be performed only in dry weather. • Compacted straw (straw bales), silt fences, fibber rolls, gravel bags, or other approved sediment control must be ensured in disturbed soil areas. At a minimum, all bare soil (whether it's an abutment slope or a stockpile) must be protected before it rains. • Drainage systems, erosion control, and silt removal facilities will be regularly inspected and maintained to ensure proper and efficient operation. • Vegetation will be preserved where feasible, particularly in areas near the river bank, to avoid erosion/sedimentation. Sites will be promptly revegetated where practicable and appropriate. • The construction camp (if needed), permanent or temporary, will not be located within 500 m of any river or irrigation channel. • Wastewater Management Plan and proper sewage collection and disposal system will be available to prevent pollution of watercourses (if discharge in the surface water is planned). • Stormwater drainage and wastewater will be treated according to the applicable World Bank/IFC guidelines. • Where applicable (i.e., to the irrigation canal in Patara Poti), the Project will, as much as possible, control the effluent and runoff discharged to the irrigation channel to below the "Severe" restriction on use according to the FAO Guidelines for Interpretations of Water Quality for Irrigation.			
	Impact on surface water contamination from inappropriate	• Construction materials and wastes will be stored appropriately to minimize the potential damage or contamination of the materials. • A construction materials inventory management system will be implemented to minimize the over-supply of construction materials, which may lead to	Contractor Cost	Contractor to Implement Mitigation	RD, Engineer

Affected Aspect	Potential Impact / Issue	Mitigation/Enhancement Measures (all that apply)	Estimated Cost	Responsibility	
				Development/ Implementation	Control
	waste management	the disposal of surplus materials at the end of the construction period. • Hazardous and non-hazardous waste will be segregated, and appropriate containers for the type of waste will be provided. • Waste will be stored systematically to allow inspection between containers to monitor leaks or spills. • Waste will be disposed of systematically by licensed contractors. • Stormwater drainage and wastewater will be treated according to the applicable World Bank/IFC guidelines.			
	Impacts on surface water due to contamination from accidental releases of hazardous substances	• Implementation of the specific mitigation measures outlined under Contamination of Soils above.	Contractor Cost	Contractor to Implement Mitigation	RD, Engineer
	Water pollution from bridge construction	• Coffer dams, silt fences, sediment barriers, or other devices to prevent the migration of silt during construction within the river will be provided. • Dewatering and cleaning cofferdams to prevent siltation by pumping from cofferdams to a settling basin or a containment unit will be performed. • Ensure no waste materials are dumped in the river, including reinforced concrete debris. • Generators will be placed more than 20 m from the river. • No concrete waste from concrete mixers will be dumped in the river. • Areas where concrete mixers can wash out leftover concrete without polluting the environment, will be provided. This may be in the form of a lined settling	Contractor Cost	Contractor to Implement Mitigation	RD, Engineer

Affected Aspect	Potential Impact / Issue	Mitigation/Enhancement Measures (all that apply)	Estimated Cost	Responsibility	
				Development/ Implementation	Control
		pond. The Contractor will inform drivers of these locations and the requirements to use these settling ponds on a routine basis. • Dried waste from the settling ponds can be used as backfill for culverts, etc. (as long as not contaminated).			
	Surface water contamination from accidentally spilled fuel/oil and road surface runoff.	• Construction of two retention chambers (one on each side of the bridge) to protect water quality from contaminated roadway surface runoff and in the event hazardous substances are accidentally spilled during the operation phase. • Development of detailed terms of reference on the maintenance requirements for the retention chambers based on a final design and technical specifications. The TOR should include the following information with regards to maintenance and servicing of the retention chambers: (i) timing and frequency; (ii) training requirements; (iii) necessary equipment; (iv) procedures; and (v) locations where contents of the chambers can be treated/processed.	Contractor Cost	Contractor to Implement Mitigation	RD, Engineer
Vegetative Coverage	Loss of vegetation coverage in specific areas of the Project	• Delimitation of areas to be cleared will be made before the beginning of the construction activities to limit as much as possible the surface of vegetation to be removed. • Boundaries of ROW and operation area will be strictly kept to - avoid impact on the adjacent vegetation; Strict keeping to traffic routes during the construction will be ensured to prevent impact on vegetation. • The planned clearance area for the construction works shall be identified and marked to avoid accidental clearing. • Fencing of critical root zones of the trees at the boundary with the project area or on the way will be carried out. • The Project will utilize or upgrade existing roads to minimize unnecessary clearing requirements.	Contractor Cost	Contractor to Implement Mitigation	RD, Engineer

Affected Aspect	Potential Impact / Issue	Mitigation/Enhancement Measures (all that apply)	Estimated Cost	Responsibility	
				Development/ Implementation	Control
		• Training the staff in environmental and safety issues, including the protection of vegetation outside the boundaries of the project corridor. • Care will be taken to avoid the introduction of new invasive species to, and spread of existing invasive species within, the Project area through the washing of vehicles, equipment, and supplies before entry to the Project area; monitoring for invasive species; and control/eradication of invasive species where found. • Implement Clearance, Revegetation, and Restoration Management Plan. • Dispersion of fine dust and aerosol will be limited to the narrowest area possible through protective revegetation activities on both sides of the road. • All efforts will be made to minimize the removal of mature/significant trees and maintain connectivity between areas of forest habitats.			
	Planting of vegetation on the Site after rehabilitating disturbed areas	• Disturbed sites will be recultivated after the completion of work. • 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 to facilitate restoration. • The Clearance, Revegetation, and Restoration Management Plan prepared before construction will be followed (see section. • No net loss of natural habitat will be ensured based on the site survey conducted during the Pre-Construction Stage.	Contractor Cost	Contractor to Implement Mitigation	Engineer to Monitor Success Rate (RD to determine success rate criteria)
	Tree cutting	• Plant maintenance will be carried out for at least two years.	Contractor Cost	Contractor and RD to Implement Mitigation	RD, Engineer

Affected Aspect	Potential Impact / Issue	Mitigation/Enhancement Measures (all that apply)	Estimated Cost	Responsibility	
				Development/ Implementation	Control
		• The Contractor shall be responsible for replanting any trees cut in these areas on a 1:3 basis using species native to the Site.			
Terrestrial and Aquatic Fauna Habitat	Modification, fragmentation, and degradation of habitat	• Air, water, soil, and noise impact mitigation measures will be implemented. • Waste management – regular cleanup of the areas and management of waste according to the type and category. • Refueling all plants, vehicles, and machinery will not be allowed within 50 m of any watercourse, drain, or channel leading to a water course. • Construction materials and chemicals will be appropriately secured during flood season to avoid accidental release into the natural environment. • Oil, chemical, and solid waste will be stored, handled, and disposed of by appropriately licensed waste management contractors. • Dropping structures into rivers/streams will be avoided [construction will instead take place from the river bank or pontoons]. • Construction camp waste areas will be managed appropriately, so animals are not attracted that could be injured or ingest inappropriate food.	Contractor Cost	Contractor to Implement Mitigation	RD, Engineer
	Introduction of invasive alien species	• Care will be taken to avoid the introduction of new invasive species to, and spread of existing invasive species within, the Project area through the washing of vehicles, equipment, and supplies before entry to the Project area; monitoring for invasive species; and control/eradication of invasive species where found.	Contractor Cost	Contractor to Implement Mitigation	RD, Engineer
Terrestrial Fauna Species	Fauna mortality	• Speed limits to a maximum of 20 km/hr for construction vehicles will be enforced to minimize the potential for fauna strike. • Commitment will be made to raise awareness of the values of natural habitat areas to the construction	Contractor Cost	Contractor to Implement Mitigation	RD, Engineer

Affected Aspect	Potential Impact / Issue	Mitigation/Enhancement Measures (all that apply)	Estimated Cost	Responsibility	
				Development/ Implementation	Control
		workforce, and arrangements will be made to restrict poaching and forest product collection. • Hunting wild animals will be strictly prohibited to apply for all staff. • Excavations left open at night will be covered. • Any excavations will include slopes or boards to ensure species can self-rescue should they fall in. • Leaving water-filled excavations will be avoided. • Where possible, vegetation will be removed outside the core breeding season from spring to early summer to allow species to find alternative breeding sites or to disperse after breeding.			
Terrestrial Fauna Distribution	Displacement of species due to noise, machinery and equipment, and staff presence.	• Adherence to the no-horn policy will be enforced. • All vehicles, equipment, and machinery used for construction will be regularly maintained and inspected/certificated to ensure that the noise levels conform to the standards prescribed. • Works will not be lit except in exceptional circumstances or required for safety reasons. • If lights are installed on the road or bridge in the future, ensure that lower-wattage lamps are used in street lights which direct light downwards to reduce glare.	Contractor Cost	Contractor to Implement Mitigation	RD, Engineer
Aquatic Fauna Distribution	Displacement of species due to noise, presence of machinery, equipment, and of staff.	• Movement of machines inside rivers, streams, or on their banks will be prevented except when it is unavoidable due to the construction of a structure. • All in-river activities will be avoided during March-September inclusive to prevent disturbance to sturgeon during their overall spawning season. Where possible, in-river activities will also be avoided in October and November. • The central bridge pier and adjoining two piers will be constructed (referring specifically to construction using coffer dams in the river) at two different times.	Contractor Cost	Contractor to Implement Mitigation	RD, Engineer

Affected Aspect	Potential Impact / Issue	Mitigation/Enhancement Measures (all that apply)	Estimated Cost	Responsibility	
				Development/ Implementation	Control
		• Implement a build-up of activity that slowly increases construction activities within the Rioni River to allow aquatic fauna to exhibit avoidance responses.			
Aquatic Fauna Species	Mortality of individuals, from the operation of equipment and construction activities or poaching by construction workers.	• The use of propeller-driven boats will be minimized during construction. • Warning signs and CCTV cameras will be installed on both sides of the bridge to deter and detect illegal fishing activities. • Poaching animals will be strictly prohibited to apply for all staff. • Fishing and use of illegal fishing gear anywhere along the river will be prohibited.	Contractor Cost	Contractor to Implement Mitigation	RD, Engineer
	Reduction of sturgeon abundance in the Rioni River from Project activities	• Sturgeon abundance surveys annually, from before the preparation phase until the end of the defect liability period. • To understand the potential for longer-term impacts, it would be necessary for sturgeon abundance monitoring to continue into the Project's operational phase annually until the third year of operation after defect liability and then twice more at five-year intervals. It is recommended that the RD identify parties best placed to undertake such surveys and report the findings to ADB and other relevant stakeholders.	Project Cost	Ecological Contractor to Implement Mitigation	RD, Engineer
	Cumulative impacts from the multiple developments in the region.	• The Consultation will be taken with IFI's, donors, and implementing units on other projects that are likely to contribute to cumulative impacts to reduce uncertainty and, where necessary, take appropriate action to minimize environmental harm.	Project Cost	Contractor to Implement Mitigation	RD, Engineer
	Pile driving for in-river construction	• Noise from pile-driving will be kept below current international interim good practice guidelines. • Ensure compliance with construction specifications that envisage the arrangement of cofferdams to protect water quality during construction and minimize the impacts on aquatic fauna during pile	Contractor Cost	Contractor to Implement Mitigation	RD, Engineer

Affected Aspect	Potential Impact / Issue	Mitigation/Enhancement Measures (all that apply)	Estimated Cost	Responsibility	
				Development/ Implementation	Control
		driving in the Rioni River. In addition, noise from pile driving will be kept below current international interim good practice guidelines. • The Contractor will model planned pile-driving and assess alignment with international interim good practice guidelines *before* starting to pile.			
Landscape Quality	Change to existing landscape and character	• Implementation of mitigation measures defined for soil, vegetation, and waste management. • The visual impact of construction works will be mitigated by keeping to the boundaries of the worksites and traffic routes; preservation of vegetation; cleanup and good management of construction sites and camps; timely removal of waste from the area; material stock control (to avoid the accumulation of surplus material on the Site) • An approved recultivation plan will be implemented. • After completion of works, the worksite will be cleaned up; surplus materials, temporary structures, and machinery will be removed. • Site compounds within the landform will be carefully placed. • Existing woodland, land features, and other key elements will be retained and protected within the proposed development corridor. • Commitment to high-quality design, materials, and specifications for the road and Rioni crossing.	Contractor Cost	Contractor to Implement Mitigation	RD, Engineer
Change of Land Use and Livelihoods	Land acquisition and livelihood loss to affected persons	• Impacts of physical and economic displacement will be addressed through the resettlement plans designed in compliance with the ADB Safeguards Policy Statement 2009. • Written agreements with local landowners for temporary use of the property will be required, and sites must be restored to a level acceptable to the owner within a predetermined time period.	Project Cost	RD to Implement the Plan / Corrective Action Plan	ADB to Approve the LARP / Corrective Action Plan

Affected Aspect	Potential Impact / Issue	Mitigation/Enhancement Measures (all that apply)	Estimated Cost	Responsibility	
				Development/ Implementation	Control
Jobs	Impacts on employment and economy	• An Employment and Procurement Procedure should be established. In addition, the plan's development should involve Consultation with relevant stakeholders, including government authorities and local villagers. • Opportunities to establish a skills training program with the aim of training interested local villagers to contribute to the Project should be reviewed. • Local villagers should be informed of job opportunities promptly. • Local businesses should be informed of contracting opportunities on time.	Contractor Cost	Contractor to Implement Mitigation	RD, Engineer
Services Demand	Impacts on community infrastructure and services	• Traffic advisory signs (to minimize traffic build-up) will be posted in coordination with local authorities. • Accidentally damaged private property and/or infrastructure should be promptly restored. • The community will be kept informed about the schedule of works which could cause temporary restriction of services and the potential duration of the 'impact' in advance.	Contractor Cost	Contractor to Implement Mitigation	RD, Engineer
Community Health and Safety	Impacts on social cohesion	• Construction camps (if established) will be located away from communities to avoid social conflict in competition for resources and basic amenities such as water supply. • Local residents should be given priority in the hiring of construction workers. • Employment of women will be encouraged. • Goods and services will be sourced from local commercial enterprises to the extent possible.	Contractor Cost	Contractor to Implement Mitigation	RD, Engineer
	Risks to community health and safety due to increased traffic; the	• Air, water, soil, waste, and noise impact mitigation measures will be implemented. • The Contractor shall provide appropriate safety barriers with hazard warning signs attached around all exposed openings and excavations.	Contractor Cost	Contractor to Implement Mitigation	RD, Engineer

Affected Aspect	Potential Impact / Issue	Mitigation/Enhancement Measures (all that apply)	Estimated Cost	Responsibility	
				Development/ Implementation	Control
	transport, storage, and use and/or disposal of materials (e.g., fuel and chemicals); and access to structural elements or components of the Project by members of the community.	• Noise, vibration, and emission impact mitigation measures will be implemented. • Signs advising road users that construction is in progress will be provided, specifically at the points where the new road connects with the E-60. • Flag persons will control traffic when construction equipment enters or leaves the work area. • Strictly impose speed limits on construction vehicles along residential areas and where other sensitive receptors such as schools, hospitals, and other populated places are located.			
Occupational Health and Safety	Workers' exposure to various physical hazards may result in minor, disabling, catastrophic, or fatal injuries.	• Measures will be implemented to reduce the likelihood and consequence of the potential hazards. This shall include (but not be limited to) the following risks: o Falling from height; o Falling into the water; o Entanglement with machinery; o Tripping over permanent obstacles or temporary obstructions; o Slipping on greasy walkways; o Falling objects; o Contact with dangerous substances; o Electric shock; o Variable weather conditions; o Lifting excessive weights; and o Traffic operations. • Conduct orientation for construction workers regarding health and safety measures, emergency response in case of accidents, fire, etc., and prevention of HIV/AIDS and other related diseases.	Contractor Cost	Contractor to Implement Mitigation	RD, Engineer

Affected Aspect	Potential Impact / Issue	Mitigation/Enhancement Measures (all that apply)	Estimated Cost	Responsibility	
				Development/ Implementation	Control
		• Competent and adequately resourced Subcontractors will be used where construction activities are to be subcontracted. • Provisions will be incorporated into all sub-contracts to ensure compliance with the SEMP at all tiers of the sub-contracting. • All persons working on the Site will be provided information about risks on the Site, and arrangements will be made for workers to discuss health and safety with the Contractor. • The Contractor will prepare and implement an Occupational and Community Health and Safety Management Plan before commencing work. This plan will include provisions on clean water, sewage and wastewater, solid waste, liquid chemical waste, personal protection, emergency preparedness and response, records management, safety communication, and training and awareness. • All workers will be adequately informed, consulted, and trained on health and safety issues. • The areas where the risk of injuries from falling objects exists will be marked with rope or flagging to minimize risks and damages. • Flag persons will control traffic when construction equipment enters or leaves the work area. • The approved traffic management plan Error! Reference source not found.will provide road signs. • Personal Protective Equipment (PPE) shall be worn at all times on the Site. This shall include appropriate safety shoes, safety eyewear, and hard hats. In addition, Non-slip or studded boots will be worn to minimize the risk of slips. • Before starting work, all the appropriate safety equipment and first-aid kits will be assembled and checked as being in working order.			

Affected Aspect	Potential Impact / Issue	Mitigation/Enhancement Measures (all that apply)	Estimated Cost	Responsibility	
				Development/ Implementation	Control
		• All lifting equipment and cranes will be tested and inspected regularly. • All scaffolding will be erected and inspected, and the Contractor will maintain the appropriate records. • When there is a risk of drowning, lifebelts shall be provided, and it shall be ensured that personnel wears adequate buoyancy equipment or harness and safety lines and that rescue personnel is present when work is proceeding. • All safety harnesses, lifelines, reviving apparatus, and any other equipment provided for use in or in connection with emergencies will be adequately maintained and thoroughly examined at least once a month and after every occasion on which it has been used. • Drivers will be educated on safe driving practices to minimize accidents and prevent the spill of hazardous substances and other construction materials during transport. • Adequate sanitation facilities will be provided for all workers at the workers'/construction camps. • First aid facilities will be provided that are readily accessible to workers. • Fire-fighting equipment will be provided at the work areas, as appropriate, and at construction camps where fire hazards and risks are present. • Report all accidents and near misses and collect statistics to identify trends and requirements for further training or 'safety stand-downs' where incident numbers are growing.			
Cultural Heritage	Risks to built heritage, objects, and sites with archaeological, historical,	• The chance finds procedure for managing cultural heritage will be implemented if any cultural heritage is discovered during construction.	Contractor Cost	Contractor and RD to implement mitigation	RD, Engineer

Affected Aspect	Potential Impact / Issue	Mitigation/Enhancement Measures (all that apply)	Estimated Cost	Responsibility	
				Development/ Implementation	Control
	religious, or other cultural value and significance.				
Grievance Redress	Complaints due to Project implementation	• The Contractor will be responsible for nominating a Community Liaison Officer (CLO) and implementing the grievance procedure. • Workers will not be restricted from joining or forming workers' organizations or from bargaining collectively. The Contractor will not discriminate or retaliate against workers who create or join collectives or bargain collectively. • Working relationships and work conditions are also to be managed and monitored in implementing the Project. • Continuous monitoring and review of complaints from neighboring communities around the Project activity areas per the grievance redress mechanism.	Contractor Cost	Contractor and RD to implement mitigation	RD, Engineer
Waste	Pollution of land, water, or air from poor waste management	• The Contractor will classify waste streams (hazardous, non-hazardous, or a waste that requires a full assessment to determine classification – so-called 'mirror entry' waste) and manage them according to international best practice and Georgian law. • Construction and work sites will be equipped with sanitary latrines that do not pollute surface waters and are connected to septic tanks or wastewater treatment facilities. • The Contractor will agree with Poti municipality, and solid non-hazardous, and inert waste will be removed to the Poti municipal waste dump. • Domestic and Inert Waste ○ Provide garbage bins and facilities within the Project site to temporarily store domestic solid waste and construction waste.	Contractor Cost	Contractor to Implement Mitigation	RD, Engineer

Affected Aspect	Potential Impact / Issue	Mitigation/Enhancement Measures (all that apply)	Estimated Cost	Responsibility	
				Development/ Implementation	Control
		○ Waste storage containers shall be covered, tip-proof, weatherproof, and scavenger-proof. ○ Ensure that wastes are not haphazardly dumped within the project site and adjacent areas. • Hazardous waste ○ On the Site allocated for the temporary, short-term keeping of hazardous wastes, ensure compliance with the following safety measures: ▪ Use containers suitable for each type of waste; ▪ Prohibit the use of damaged containers. Check the integrity of containers regularly. ▪ Mark containers adequately; ▪ Provide secondary containment; ▪ Refrain from mixing various waste streams. ○ Hire an 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 onsite and waste removed. ○ In case of large-scale spills of hazardous liquids, follow the Spill Management Plan.			

Environmental Management Plan – Operational Phase

Affected Aspect	Potential Impact / Issue	Mitigation/Enhancement Measures (all that apply)	Estimated Cost	Responsibility	
				Development/ Implementation	Control
Operation Phase					
Air Quality	Localized emissions of combustion gas and dust resulting from the circulation of vehicles.	• Local communities should be motivated to maintain greenery in the project area, including protective revegetation on both sides of the road. • Regular maintenance of the road will be done to ensure good surface condition.	Included in Operation / Maintenance cost	Local Communities / Road Maintenance Contractor	RD
Soil Quality	Pollution due to littering	• Awareness raising and education of the community on waste management (no illegal dumping or littering) should be provided. • Regular maintenance and cleanup of the drainage system will be carried out to prevent impact on soil erosion or flooding.	Included in Operation / Maintenance cost	Local Communities / Road Maintenance Contractor	RD
Water Quality	Surface water contamination from accidentally spilled fuel/oil and road surface runoff.	• Implementation of mitigation measures set for pre-construction and construction stages of the Project during the road maintenance works as appropriate. • The built drainage structures and runoff and spill containment chambers will handle runoff water from the bridge structures. The Terms of Reference for the Road Maintenance Contractor for the operations phase will include regular monitoring of retention structures and safe disposal of contents after spills. • Maintenance paving the road sections and bridge decks will be performed only in dry weather to prevent runoff contamination. • Staging techniques will 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	Included in Operation / Maintenance cost	Road Maintenance Contractor / RD	RD

Affected Aspect	Potential Impact / Issue	Mitigation/Enhancement Measures (all that apply)	Estimated Cost	Responsibility	
				Development/ Implementation	Control
		to limit leaks of paving materials and fluids from paving machines. • Roadside strips will be regularly maintained and cleaned.			
Terrestrial and Aquatic Fauna Habitat	Degradation of habitat	• The presence of invasive species will be monitored. • Roadside waste collection and clean up (sweeping) of the road will be done regularly.	Included in Operation / Maintenance cost	Road Maintenance Contractor	RD
Aquatic Fauna Species	Aquatic fauna mortality	• Monitoring of the bridge piers will be ensured throughout the operation to prevent poaching of the sturgeon by using fishing gear bridge structures.	Included in Operation / Maintenance cost	Road Maintenance Contractor / RD	RD / Environmental NGOs
	Reduction of sturgeon abundance in the Rioni River from Project activities	• Sturgeon abundance surveys annually, from before the preparation phase until the end of the defect liability period. • To understand the potential for longer-term impacts, it would be necessary for sturgeon abundance monitoring to continue into the Project's operational phase annually until the third year of operation after defect liability and then twice more at five-year intervals. It is recommended that the RD identify parties best placed to undertake such surveys and report the findings to ADB and other relevant stakeholders.	Project Cost	Ecological Contractor to Implement Mitigation	RD, Engineer
Landscape Quality	Modification of the original landscape from the presence of new infrastructure	• Roadside vegetation will be preserved/maintained to shield the visual change in the landscape related to the new infrastructure (in addition to providing other benefits). • Periodic inspections will detect signs of slope instability and ensure revegetation where necessary.	Included in Operation / Maintenance cost	Road Maintenance Contractor	RD
Occupational Health and Safety	Workers' exposure to various physical hazards may	• Applicable occupational health and safety measures taken during the construction phase will continue to be followed.	Included in Operation / Maintenance cost	Road Maintenance Contractor	RD

Affected Aspect	Potential Impact / Issue	Mitigation/Enhancement Measures (all that apply)	Estimated Cost	Responsibility	
				Development/ Implementation	Control
	result in minor, disabling, catastrophic, or fatal injuries.				
Community Health and Safety	Road accidents resulting from higher travel speeds and increased traffic	• Road safety facilities have been incorporated into the Project design at both preparatory and detailed design phases. These include traffic separation medians, pedestrian sidewalks, signs, and pavement markings complying with international and Georgian standards. These will be put in place by the Contractors during construction and maintained by the Project owner during the Project's service life. • Monitoring and maintenance of road safety furniture will be done to sustain road safety facilities constructed under the Project.	Included in Operation / Maintenance cost	Road Maintenance Contractor / RD / Local Government and traffic authorities	RD

Supplementary document 2 - Biodiversity Monitoring Plan (taken from Biodiversity Action Plan)

Environmental Component	Aspect	Project phase	Issue/Impact	Mitigation action	What parameter is to be monitored?	Where is the parameter to be monitored?	How is the parameter to be monitored?	When is the parameter to be monitored (frequency)?	Institutional responsibility
Kolkheti National Park, Ramsar Site and Important Bird Area; White-headed Duck (*Oxyura leucocephala*); Stellate, Russian and Beluga Sturgeon (*Acipenser stellatus*, *A. gueldenstaedtii* and *Huso huso*); Grusinian Scraper (*Capoeta ekmekciae*)	Habitat	P, C	IP 11: Introduction of invasive alien species.	Care will be taken to avoid the introduction of new invasive species to, and spread of existing invasive species within, the Project area through: - washing of vehicles, equipment, and supplies before entry to the Project area; - monitoring for invasive species; and - control/eradication of invasive species where found.	Washing of vehicles, equipment, and supplies before entry to the Project area	Transit site outside Project Area of Influence	Inspections	Unannounced inspections at least quarterly during preparation, construction, and worksite closure phases	RD, Construction Supervision (referred to as the 'Engineer'' in the ADB EIA)
					Abundance/spread of invasive alien species in Project area	Project Area of Influence	Surveys by specialist sub-contractor	Annually, in summer, during preparation, construction, and worksite closure phases.	Construction Contractor ecological sub-contractor
					Control of new/spreading areas of invasive alien species in the Project area	Project Area of Influence	Records of invasive species control; inspections	Quarterly, during preparation, construction, and worksite closure phases	Construction Supervision Construction Contractor ecological sub-contractor
Kolkheti National Park, Ramsar Site, and Important Bird Area	Vegetation coverage	P	IP 9: Loss of vegetation coverage in specific areas of the Project.	Ensure that the rehabilitation of the secondary road [from Patara Poti to the oil terminal] does not extend into the proposed extension of the National Park.	Rehabilitation of secondary road within NP extension	Worksite	Comparison of maps of proposed NP extension with those of secondary road rehabilitation	Before the finalization of Project work plans	RD
Kolkheti National Park, Ramsar Site, and Important Bird Area	Vegetation coverage	P	IP 9: Loss of vegetation coverage in specific areas of the Project.	Boundaries of ROW and operation area will be strictly kept to - avoid impact on the adjacent vegetation; Strict keeping to traffic routes during the construction will be ensured to prevent impact on vegetation.	Vegetation disturbance by Project vehicles and contractors; mortality of priority birds and plants	Project Area of Influence	Review of Project incident logbook; visual inspection	Unannounced inspections at least quarterly during preparation, construction, and worksite closure phases	RD, Construction Supervision
Colchis Water-Chestnut (*Trapa colchica*) and *Hibiscus ponticus*	Mortality	P, C	IP, IC 10: Mortality of individuals.						
White-headed Duck (*Oxyura*	Habitat	P	IP 12: Modification and habitat fragmentation due						

Environmental Component	Aspect	Project phase	Issue/Impact	Mitigation action	What parameter is to be monitored?	Where is the parameter to be monitored?	How is the parameter to be monitored?	When is the parameter to be monitored (frequency)?	Institutional responsibility
leucocephala)			to vegetation coverage loss.						
	Mortality	P	IP 13: Mortality of individuals due to equipment operation.						
Colchis Water-Chestnut (*Trapa colchica*) and *Hibiscus ponticus*	Mortality	P, C	IP, IC 10: Mortality of individuals.	Vegetation will be preserved where feasible, particularly in areas near the river bank, to avoid erosion/sedimentation.	Mortality of individuals	Project Area of Influence	Review of Project incident logbook; visual inspection	Unannounced inspections during preparation, construction, and worksite closure phases	RD, Construction Supervision
				In case taxation [walkover surveys pre-construction] reveals any protected plant species in the area, the latter will be removed from the environment [and translocated] following subparagraph (v), Article 24, the first paragraph of the law of Georgia on 'Red List and Red Book.' Relocation of any specimens found during the surveys, where practical, will be provided with the help of biodiversity experts to ensure proper handling. The Contractor must develop a plan and schedule before implementing this task.	Number of plants requiring translocation	Within the Project area, where ground/water disturbance may take place	Surveys by specialist sub-contractor	During walkover surveys, pre-construction	Construction Contractor ecological sub-contractor
White-headed Duck (*Oxyura leucocephala*); Stellate, Russian and Beluga Sturgeon (*Acipenser stellatus*, *A. gueldenstaedtii* and *Huso huso*); Grusinian Scraper (*Capoeta*	Distribution	P, C	IP 13, IC 11: Displacement of species due to noise, presence of machinery and equipment, and presence of staff.	All vehicles, equipment, and machinery used for construction will be regularly maintained and inspected/certificated to ensure that the noise levels conform to the standards prescribed.	Noise levels of Project vehicles, equipment, and machinery against prescribed standards	Worksite	Review of certificates; inspections	Unannounced inspections quarterly during preparation and construction phases	RD, Construction Supervision

Environmental Component	Aspect	Project phase	Issue/Impact	Mitigation action	What parameter is to be monitored?	Where is the parameter to be monitored?	How is the parameter to be monitored?	When is the parameter to be monitored (frequency)?	Institutional responsibility
ekmekciae)									
Colchis Water-Chestnut (*Trapa colchica*) and *Hibiscus ponticus*	Mortality	P, C	IP, IC 10: Mortality of individuals.	Training the staff in environmental and safety issues, including the protection of vegetation outside the boundaries of the project corridor.	Staff adherence to best practice	Worksite	Review of training records; review of Project incident logbook; inspections	Unannounced inspections quarterly during preparation and construction phases	RD, Construction Supervision
Stellate, Russian and Beluga Sturgeon (*Acipenser stellatus*, *A. gueldenstaedtii* and *Huso huso*); Grusinian Scraper (*Capoeta ekmekciae*)	Habitat	C	IC 12: Modification and fragmentation of habitat, including loss of spawning grounds for wild sturgeon species.						
	Mortality	C	IC 14: Mortality of individuals from equipment and construction activities or poaching by construction workers.						
Colchis Water-Chestnut (*Trapa colchica*) and *Hibiscus ponticus*	Mortality	P, C	IP, IC 10: Mortality of individuals.	Disturbed vegetation must be replanted immediately after the construction/disturbance stops.	Physical restoration of the sites to their original state	At all Project-disturbed areas	Inspections	Before the end of the worksite closure phase	RD, Construction Supervision
					The successful progress of revegetation and the need for any additional revegetation	At all Project revegetation sites	Surveys by specialist sub-contractor	Annually, in summer, from the last year of the worksite closure phase until the fifth year of the operations phase, inclusive.	MoEPA, Construction Contractor ecological sub-contractor

Environmental Component	Aspect	Project phase	Issue/Impact	Mitigation action	What parameter is to be monitored?	Where is the parameter to be monitored?	How is the parameter to be monitored?	When is the parameter to be monitored (frequency)?	Institutional responsibility
Stellate, Russian and Beluga Sturgeon (*Acipenser stellatus*, *A. gueldenstaedtii* and *Huso huso*); Grusinian Scraper (*Capoeta ekmekciae*)	Habitat	C	IC 12: Modification and fragmentation of habitat, including loss of spawning grounds for wild sturgeon species.	Slopes of the embankment will be protected from erosion by vegetation and slope drainage. Dewatering and cleaning cofferdams to prevent siltation by pumping from cofferdams to a settling basin or a containment unit will be performed. Construction materials and chemicals will be appropriately secured during flood season to avoid accidental release into the natural environment. Materials and waste will be stockpiled so as to avoid erosion and wash off into the river. In addition, drainage trenches will be established to divert surface runoff from the Site. Ensure no waste materials are dumped in the river, including reinforced concrete debris. Compacted straw (straw bales), silt fences, fibber rolls, gravel bags, or other approved sediment control must be ensured in disturbed soil areas. At a minimum, all bare soil (whether it's an abutment slope or a stockpile) must be protected before it rains. No concrete waste from concrete mixers will be dumped in the river. Temporary fuel tanks will be located at least 50 m from any watercourse, drain, or channel leading to a water course. The tank will be placed in covered	Adherence to approved Project plans for soil and erosion, storage of fuels and chemicals, sewage management, and fueling and maintenance.	Project Area of Influence	Inspections	Unannounced inspections at least monthly during preparation, construction, and worksite closure phases	RD, Construction Supervision
					Aquatic macroinvertebrate diversity and abundance	Close downstream of the Project site	Surveys by specialist sub-contractor using driftnets.	Quarterly, during preparation, construction, and worksite closure phases, and the first two years of the operations phase.	EPA, Construction Contractor ecological sub-contractor

Environmental Component	Aspect	Project phase	Issue/Impact	Mitigation action	What parameter is to be monitored?	Where is the parameter to be monitored?	How is the parameter to be monitored?	When is the parameter to be monitored (frequency)?	Institutional responsibility
				areas with berms or dikes installed to intercept any spills. Any spill will be immediately localized and cleaned up with absorbent materials. The bund will be able to accommodate 110% of the volume of the tank. Refueling all vehicles and machinery will not be allowed within 50 m of any watercourse, drain, or channel leading to a water course. Oil, chemical, and solid waste will be stored, handled, and disposed of by appropriately licensed waste management contractors.					
				Borrowing from the stream [at the project site] will be prohibited. In addition, dropping structures into rivers/streams will be avoided [construction will instead take place from the river bank or pontoons]. Discharge of sediment-laden construction water (e.g., from areas containing dredged soil) directly into surface watercourses will be forbidden. Instead, sediment-laden construction water will be discharged into settling lagoons or tanks before final discharge.	Absence of borrowing from; movement of machines or dropping structures in; and discharge of sediment-laden water to the Rioni River at the project site	Project Area of Influence	Visual inspection	Unannounced inspections monthly during preparation, construction, and worksite closure phases.	RD, Construction Supervision
Stellate, Russian and Beluga Sturgeon (*Acipenser stellatus*, *A. gueldenstaedtii* and *Huso huso*); Grusinian Scraper	Habitat	C	IC 12: Modification and fragmentation of habitat, including loss of spawning grounds for wild sturgeon species.	Movement of machines inside rivers, streams, or on their banks will be prevented except when it is unavoidable due to the construction of a structure. No washing of vehicles etc., in	Absence of movement of machines in the Rioni River	Project Area of Influence	Visual inspection	Unannounced inspections monthly during preparation, construction, and worksite closure phases.	RD, Construction Supervision

Environmental Component	Aspect	Project phase	Issue/Impact	Mitigation action	What parameter is to be monitored?	Where is the parameter to be monitored?	How is the parameter to be monitored?	When is the parameter to be monitored (frequency)?	Institutional responsibility
(*Capoeta ekmekciae*)	Distribution	C	IC 13: Displacement of species due to noise, presence of machinery, equipment, and of staff.	the river, will be allowed.					
	Mortality	C	IC 14: Mortality of individuals from the operation of equipment and construction activities or poaching by construction workers.						
Stellate, Russian and Beluga Sturgeon (*Acipenser stellatus*, *A. gueldenstaedtii* and *Huso huso*); Grusinian Scraper (*Capoeta ekmekciae*)	Habitat	C	IC 12: Modification and fragmentation of habitat, including loss of spawning grounds for wild sturgeon species.	Sourcing construction materials (e.g., sand, gravel) will avoid using any licensed or unlicensed sites in the Rioni River or on its banks.	Sourcing of materials	n/a	Review of records for sourcing of materials; inspections	Unannounced inspections quarterly during preparation, construction, and worksite closure phases	RD, Construction Supervision
Stellate, Russian and Beluga Sturgeon (*Acipenser stellatus*, *A. gueldenstaedtii* and *Huso huso*); Grusinian Scraper (*Capoeta ekmekciae*)	Distribution	C	IC 13: Displacement of species due to noise, presence of machinery, equipment, and of staff.	Coffer dams, silt fences, sediment barriers, or other devices to prevent the migration of silt during construction within the river will be provided. [Coffer dams will also significantly reduce pile-driving noise.]	Use of silt migration barriers	Worksite	Visual inspection	Unannounced inspections, twice-yearly in March-September during the preparation and construction phases	RD, Construction Supervision
				Ensure compliance with construction specifications that envisage the arrangement of cofferdams to protect water quality during construction and minimize the impacts on aquatic fauna during pile driving in the Rioni River. In addition, noise from pile driving will be kept below current international	Use of sheet pile cofferdams for in-river construction	Worksite	Visual inspection	Unannounced inspections, twice-yearly in March-September during the preparation and construction phases	RD, Construction Supervision

Environmental Component	Aspect	Project phase	Issue/Impact	Mitigation action	What parameter is to be monitored?	Where is the parameter to be monitored?	How is the parameter to be monitored?	When is the parameter to be monitored (frequency)?	Institutional responsibility
				interim good practice guidelines.					
				The Contractor will model planned pile-driving and assess alignment with international interim good practice guidelines before starting to pile. Where planned pile-driving appears likely to exceed such thresholds, alternative pile-driving methods or mitigation will be selected.	Noise levels from pile-driving against good practice guidelines	Worksite	Inspections	Unannounced inspections quarterly during preparation and construction phases	RD, Construction Supervision
				Implement a build-up of activity that slowly increases construction activities within the Rioni River to allow aquatic fauna to exhibit avoidance responses.	Appropriate construction build-up	Worksite	Inspections	Unannounced inspections quarterly during preparation and construction phases	RD, Construction Supervision
				All in-river activities will be avoided during March-September inclusive to prevent disturbance to sturgeon during their overall spawning season. Where possible, in-river activities will also be avoided in October and November.	Absence of in-river activities	Worksite	Visual inspection	At least monthly from March-September inclusive, during the preparation, construction, and worksite closure phases	RD, Construction Supervision
				The central bridge pier and adjoining two piers will be constructed (referring specifically to construction using coffer dams in the river) at two different times.	Appropriate construction sequencing	Worksite	Visual inspection	At least monthly from March-September inclusive, during the preparation, construction, and worksite closure phases	RD, Construction Supervision
Stellate, Russian and Beluga Sturgeon (*Acipenser stellatus*, *A. gueldenstaedtii* and *Huso huso*);	Mortality	C	IC 14: Mortality of individuals from equipment and construction activities or poaching by	Fishing and using illegal fishing gear [by construction workers] anywhere along the river will be prohibited.	Absence of fishing	Worksite	Visual inspection	Unannounced inspections, quarterly during the preparation, construction, and worksite closure	RD, Construction Supervision

Environmental Component	Aspect	Project phase	Issue/Impact	Mitigation action	What parameter is to be monitored?	Where is the parameter to be monitored?	How is the parameter to be monitored?	When is the parameter to be monitored (frequency)?	Institutional responsibility
Grusinian Scraper (*Capoeta ekmekciae*)			construction workers.					phases	
				The use of propeller-driven boats will be minimized during construction.	Absence of propeller-driven boats except during set-up and removal of pontoons	Worksite	Visual inspection	Unannounced inspections, quarterly during the preparation, construction, and worksite closure phases	RD, Construction Supervision
Stellate, Russian and Beluga Sturgeon (*Acipenser stellatus*, *A. gueldenstaedtii* and *Huso huso*); Grusinian Scraper (*Capoeta ekmekciae*)	Habitat	O	IO 8: Degradation of aquatic habitat from accidentally spilled fuel/oil or surface runoff from	the bridge. The built drainage structures and runoff and spill containment chambers will handle runoff water from the bridge structures. The Terms of Reference for the Road Maintenance Contractor for the operations phase will include regular monitoring of retention structures and safe disposal of contents after spills.	Drainage/retention infrastructure in good technical condition and cleaned regularly	Project site	Inspection	Recurrent [as needed for the operational life of the Project]	RD, Maintenance Contractor
Stellate, Russian and Beluga Sturgeon (*Acipenser stellatus*, *A. gueldenstaedtii* and *Huso huso*); Grusinian Scraper (*Capoeta ekmekciae*)	Mortality	O	IO 9: Mortality of sturgeon from illegal fishing activities using the bridge structures.	Warning signs and CCTV cameras will be installed on both sides of the bridge to deter and detect illegal fishing activities.	Installation of warning signs and CCTV cameras	Project site	Inspection	Before the end of the worksite closure phase	RD, Construction Supervision
				Monitoring of the bridge piers by CCTV will be ensured throughout the operation period to prevent poaching of the sturgeon by using fishing gear on bridge structures.	Illegal fishing using the bridge	Project site	Inspection of CCTV camera footage	At least weekly from March-September inclusive, for the operational life of the Project	RD, Maintenance Contractor
					Sturgeon abundance in the river	Project site	Surveys by specialist Contractor	Annually, from before the preparation phase until the end of the defect liability period.*	RD, ecological Contractor

Supplementary document 3. Preconstruction Site Photo log