

Environmental Monitoring Report

#1 Semestral Report

Reporting period: July- December 2021

January 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 National Environmental External Monitoring Consultant for the Roads Department, Ministry of Regional Development and Infrastructure of Georgia and the Asian Development Bank.

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ACRONYMS & ABBREVIATIONS

ADB	Asian Development Bank
CSEMP	Contract Specific Environmental Management Plan
DR	Department of Roads
DNP	Defects Notification Period
EA	Executing agency
EMP	Environmental Management Plan
EMS	Environmental Management System
GRC	Grievance Redress Committee
GRM	Grievance Redress Mechanism
IEE	Initial Environmental Examination
km	Kilometer
Ministry	Ministry of National Development and Infrastructure
PCU	Project Coordination Unit
PIU	Project Implementation Unit
PMU	Project Management Unit
SMEC	Snowy Mountains Engineering Corporation
SSEMP	Site Specific Environmental Management Plan
TBA	To be Advised
TOR	Terms of Reference

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1 INTRODUCTION

1.1 Preamble

1. This report represents the Semi – Annual Environmental Monitoring Review of construction of Poti Bridge and Access Roads.

2. This report is the first Semi-Annual EMR for the project and covers the period of July-December 2021.

1.2 Headline Information

3. The Contract for Project Management Consultancy Services (PMCS) between RD and “Joint Venture ULUSLARARASI BİRLEŞMİŞ MÜŞAVİRLER MÜŞAVİRLİK HİZMETLERİ A.Ş-IRD Engineering S.R.L” was signed on 11 June 2021 and the Contract for the Construction of 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 design review and construction activities have not been commenced yet.

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 (see **Error! Reference source not found.**).

5. The details of the proposed road project are:

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 Rioni River in the northern outskirts of the city of Poti. The new section of highway will pass next to a residential area (Patara Poti Village) using the same alignment and parallel to the existing railway bridge over the river. A small section (approximately 1 km) of an existing secondary road which runs to the Kulevi Oil Terminal from Patara Poti and parallel to 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 the **Figure 1** below.

Fig. 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 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 has already mobilized national and international EHS specialists (contact details of CSC and CC staff is 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) prior to its acceptance by the Engineer, the Employer and ADB, and thereafter 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 post-construction environmental audit report with filled environmental audit checklist.

11. The Notice to Commence has not yet been given, and construction activity has therefore 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 and Gender Unit (PSG), CWRD	Name: Ninette Pajarillaga Cell: E-mail: npajarillaga@adb.org	
	ADB/RETA International Environmental Safeguards Consultant	Name: Ketil Dgebuadze Cell: +995577232937	Georgian

		E-mail: kdgebuadze.consultant@adb.org ; ketdgeb@adb.org	
	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: sogpia@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 Current Reporting Period

13 construction activities have not been commenced yet.

2.4 Description of Any Changes to Project Design

14. N/A

2.5 Description of Any Changes to Agreed Construction methods

15. N/A

3. ENVIRONMENTAL SAFEGUARD ACTIVITIES

3.1 General Description of Environmental Safeguard Activities

16. The Supervision Consultant 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 environmental management plan (EMP)/SEMP, environmental monitoring, and compliance to the environmental requirements of ADB. CC's Environmental Specialist will prepare section specific report for environment under overall Quarterly Construction Report required by ADB, monitor the environmental compliance of the Construction Contractor.

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 are not performed yet, and should be performed before the construction activities commencement. According to the project EIA, periodic parametric measurements of air, noise and water quality will be carried out by the construction contractor. Monitoring to be undertaken monthly during construction period. Locations of measurements will be defined by the method statement for particular area.

4.2 Trends

22. N/A

4.3 Summary of Monitoring Outcomes

23. N/A

4.4 Material Resources Utilisation

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. Site Specific and Topic Specific EMPs will be prepared by the Contractor before commencement of Construction activities. Specific EMPs will be prepared by the Contractor under guidance of Supervision Consultant, endorsed by the SC and approved by PIU/RD (and ADB as necessary) before commencement of civil works. During preparation of SEMP existing EMP will be used as a baseline document by CC (see **Annex 1**).

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 prepare the site-specific and environmental management plans (SEMPs) before commencement of construction activities - Q1 2022.
- Construction Contractor to prepare the following Topic Specific Environmental and Social Management Plans: Waste Management Plan, Pedestrian and Traffic Management Plan, Health and Safety Plan, COVID-19 Outbreak Management Plan, etc. before commencement of construction activities- April 2022.
- Construction Contractor to conduct baseline measurements of water, air and noise on regular bases before commencement of Construction activities - April 2022
- Carry out pre-construction survey of buildings and structures within 50 m distance from the highway - April 2022
- Conduct parametric measurements for air, water, noise and vibration during next reporting period - April 2022

ANNEXES:

Annex 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 to sturgeon species in the Rioni River	<ul style="list-style-type: none">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)	<ul style="list-style-type: none">Prior to commencement of civil works, the Contractor shall prepare a Specific EMP (SEMP) for Engineer endorsement and RD approval. The SEMP shall also be reviewed by ADB. The SEMP will present detailed implementation plan based on the Contractor’s actual construction methodologies, work schedule, type/specifications, and number of construction plants to be usedThe SEMP shall be (a) consistent with the SEMP template included in the EIA (see Error! Reference source not found.); (b) consistent with the project EMP; and (c) prepared based on the Contractor’s activities and corresponding locations.The SEMP will provide the following:	Contractor Cost	Contractor to Implement Mitigation	Engineer, RD, ADB

Affected Aspect	Potential Impact / Issue	Mitigation/Enhancement Measures (all that apply)	Estimated Cost	Responsibility	
				Development/ Implementation	Control
		<ul style="list-style-type: none"> i. Contractor's organizational structure showing 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 as follows: <ul style="list-style-type: none"> ○ Waste Management Plan <ul style="list-style-type: none"> ▪ 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^{USEP} Plan ○ Noise Management Plan ○ Biodiversity Management Plan 			

Affected Aspect	Potential Impact / Issue	Mitigation/Enhancement Measures (all that apply)	Estimated Cost	Responsibility	
				Development/ Implementation	Control
		<ul style="list-style-type: none"> ○ 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 (see Error! Reference source not found.). ● The Soil Disposal Management Plan shall utilize the assessment template include in the EIA (see Error! Reference source not found.). ● 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	Contractors training and awareness raising programs	<ul style="list-style-type: none"> ● All personnel shall be required to undergo a Project site induction that includes the environmental requirements of the Project. 	Contractor Cost	Contractor to Implement Mitigation	RD, ADB

Affected Aspect	Potential Impact / Issue	Mitigation/Enhancement Measures (all that apply)	Estimated Cost	Responsibility	
				Development/Implementation	Control
Climate Change	Future climate changes may cause damage to the bridge and approach roads	<ul style="list-style-type: none"> • The Project road will be constructed based on an embankment height (road centerline level) which accommodates the historic P1% (1 in 100 year) 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	<ul style="list-style-type: none"> • The status of the buildings nearest to the project site will be surveyed. The surveys will cover the following aspects: <ul style="list-style-type: none"> ○ Overall condition of the structures, both exterior and interior. ○ Documentation of defects and preexisting cracks observed in the structure using digital imagery along with notes, measurements, and sketches. ○ The findings of the survey shall be agreed upon by the property owner who shall be in attendance during the survey and will sign official documentation agreeing to the findings of the survey. • Conduct additional pre-construction noise survey 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

Affected Aspect	Potential Impact / Issue	Mitigation/Enhancement Measures (all that apply)	Estimated Cost	Responsibility	
				Development/Implementation	Control
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 National Park (close to where the gas line crosses the Rioni River).	<ul style="list-style-type: none"> • 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
	Cumulative impacts from the multiple development in the region.	<ul style="list-style-type: none"> • Consultation will be taken with IFI's, donors, and implementing units on other projects that are likely to contribute to cumulative impacts so as 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	<ul style="list-style-type: none"> • Ensure that all guidance on sand and gravel abstraction sites is followed as outlined in the Site Preparation, Construction and Worksite Closure (i.e., 	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 spawning grounds for wild sturgeon species	project closure) Phases EMP table below are followed.			
	Displacement of species due to noise, presence of machinery, and equipment and of staff	<ul style="list-style-type: none"> • 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 activities	<ul style="list-style-type: none"> • 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 operational phase of the project, annually until the third year of operation after defect liability and then twice more at five-yearly intervals. It is recommended that the RD identify parties best placed to undertake such surveys and to report to ADB and other relevant stakeholders on the findings. 	Project Cost	Ecological Contractor to Implement Mitigation	RD, Engineer

Affected Aspect	Potential Impact / Issue	Mitigation/Enhancement Measures (all that apply)	Estimated Cost	Responsibility	
				Development/Implementation	Control
	Mortality of individuals, from operation of equipment and construction activities	<ul style="list-style-type: none"> The Contractor will ensure staging of in-river construction activities are undertaken in periods least likely to affect the sturgeon fish spawning period. All in-river activities will be avoided during March-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.	<ul style="list-style-type: none"> Institutional arrangements will be decided for monitoring of the bridge piers by CCTV throughout the operation period to prevent poaching of sturgeon by using fishing gear on bridge structures. 	Project Cost	RD	ADB
Flora species	Mortality of individuals	<ul style="list-style-type: none"> The Contractor shall conduct a survey prior to construction to identify natural and modified habitat to ensure that natural habitat can be rehabilitated as well as compensated for where it 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 (see Section Error! Reference source not found.). In case walkover surveys pre-construction reveal 	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
		<p>any protected plant species in the area, the latter will be removed from the environment [and translocated] in accordance with sub-paragraph (v), Article 24, first paragraph of the law of Georgia on 'Red List and Red Book'.</p> <ul style="list-style-type: none"> Relocation of any specimens found during the surveys where practical will be provided with the help of biodiversity experts to ensure proper handling. This is especially important for species of conservation importance (e.g., Colchis Water-Chestnut (<i>Trapa colchica</i>) and Spring snowflake (<i>Leucojum venum</i>)). The practice will provide the best possible chance of survival for wildlife. A plan and schedule must be developed by the Contractor prior to implementation of this task. 			
Change of Land Use and Livelihoods	Land acquisition and livelihood loss to affected persons	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> Ensure designs retain a strip of riparian habitat along the edge of the river to reduce impact on species (retain connectivity and possibility for free movement along the river edge). 	Project Cost	Detailed Design Consultant	RD

Affected Aspect	Potential Impact / Issue	Mitigation/Enhancement Measures (all that apply)	Estimated Cost	Responsibility	
				Development/ Implementation	Control
	such as farmlands, aquaculture ponds, etc., across the Project road)				
Services Demand	The disruption of services, including energy, to surrounding communities due to relocation of utilities.	<ul style="list-style-type: none"> • All telephone and electrical poles/wires and underground cables should be shifted before 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	<ul style="list-style-type: none"> • Prior to 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 (see Section Error! Reference source not found.). • The Contractor will inform the communities along the alignment and other stakeholders affected by the Project about 	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
		<p>the GRM in place to handle complaints and concerns about the Project.</p> <ul style="list-style-type: none"> • 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. 			

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 emissions of dust resulting from the use of machinery and equipment and circulation of vehicles.	<ul style="list-style-type: none">• 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 crushing of construction materials is required, crushers will be located away from sensitive receptors. Keeping at least 300 m distance from residences windward to concrete production plants should be ensured.• An environmental impact permit for an asphalt plant (if planned to run own facility) will be obtained before operation.• On-site speed limits will be applied and enforced for trucks travelling on unpaved surfaces (20 km/h).• Trucks transporting spoil or other 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 accumulation of dirt.	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
		<ul style="list-style-type: none"> 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. 			
	Localized and long-term emissions of combustion gas resulting from the use of machinery and equipment and circulation of vehicles.	<ul style="list-style-type: none"> Machines and construction plant items (e.g., trucks) that may be in intermittent use will be shut down or throttled down between work periods. The burning of waste or vegetation on site is prohibited. Special attention will be given in storage and handling of petrochemicals in order to avoid environmental hazards and risks. Maintenance procedures will be implemented in order 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	<ul style="list-style-type: none"> Work hours will be restricted between 07:00 to 20:00 hours within 500 m of the settlements. Optimum travel speed during offsite travel will be established by the Contractor. Install temporary noise barriers made of plywood or acoustical blankets around noisy operation where necessary to comply with project noise limits. 	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
		<ul style="list-style-type: none"> • 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 operation than older equipment. All construction equipment should be inspected at periodic intervals to ensure proper maintenance and 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 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, where practicable, to screen noise sensitive receptors from on-site construction activities. • Record and respond to complaints according to the established grievance redress mechanism. 			

Affected Aspect	Potential Impact / Issue	Mitigation/Enhancement Measures (all that apply)	Estimated Cost	Responsibility	
				Development/ Implementation	Control
		<ul style="list-style-type: none"> • 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 vibration is higher and many residents are away from their homes at work. 			
Soil Quality	Land pollution due to wrong management of solid waste, as well as possible dripping of hydrocarbons from machinery and equipment, and wrong storage of oil and fuel.	<ul style="list-style-type: none"> • Temporary fuel tanks will be located at least 50 m away 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 spills, if any. 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. • Onsite repairs /maintenance and fueling activities will be limited to the extent possible. • On-site vehicles and equipment shall be inspected regularly for leaks and all leaks shall be immediately repaired. Leaking vehicles/equipment will 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 	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
		<p>vehicles or equipment. For small spills, absorbent materials will be used.</p> <ul style="list-style-type: none"> • Tire washing units will be equipped with drainage settling facilities. The washout pit will be cleaned immediately upon 75% filling. • No washing of vehicles etc. in the river will be allowed. • Usage of off-site vehicle wash racks or commercial washing facilities will be used whenever feasible. Bermed wash areas for cleaning activities will be established if on-site cleaning is required. • 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. 			
Soil Structure	Land erosion due to loss of vegetation coverage and changes in its structure	<ul style="list-style-type: none"> • 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. 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. 	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
		<ul style="list-style-type: none"> • 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 properly designed/shaped and managed. • 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. • Store cement in sealed, dust-tight storage silos. All hatches, inspection points and duct work will be dust-tight. • Temporary detention ponds or containment to control silt runoff will be provided. • Construct intercepting ditches and drains to prevent runoff entering construction sites • Soil compaction may be reduced by strictly keeping to temporary road boundaries • Slopes of embankment will be protected from erosion by vegetation and slope drainage. The design considers selection of a reasonable embankment height, establishment of temporary berms, slope drains, temporary pipes, contour ditches, ditch checks, diversions, and sediment traps 			

Affected Aspect	Potential Impact / Issue	Mitigation/Enhancement Measures (all that apply)	Estimated Cost	Responsibility	
				Development/ Implementation	Control
		<ul style="list-style-type: none"> 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 on soil erosion. 			
Relief	Modification of geological formations - Quarries	<ul style="list-style-type: none"> The Contractor will carry out 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 to develop, agree and strictly adhere to 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 of construction materials (e.g., sand, gravel) will avoid use of any 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

Affected Aspect	Potential Impact / Issue	Mitigation/Enhancement Measures (all that apply)	Estimated Cost	Responsibility	
				Development/ Implementation	Control
Water Quality	Pollution of nearby water bodies due to poor storage and management of construction materials	<ul style="list-style-type: none"> • 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. • To prevent runoff contamination, paving will be performed only in dry weather. • In disturbed soil areas, compacted straw (straw bales), silt fence, fibber rolls, gravel bags, or other approved sediment control must be ensured. At a minimum, all bare soil (whether it's an abutment slope or a stockpile) must be protected before it rains. • Drainage systems and erosion control and silt removal facilities will be regularly inspected and maintained to ensure proper and efficient operation at all times. • Vegetation will be preserved where feasible, in particular in the areas near the river bank to avoid erosion/sedimentation. Areas 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 (See Section Error! Reference source not found.) and proper sewage collection and disposal system will be available to prevent pollution 	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
		<p>of watercourses (if discharge in surface water is planned).</p> <ul style="list-style-type: none"> • Storm water drainage and wastewater will be treated in accordance to the applicable World Bank/IFC guidelines. • Where applicable (i.e., to 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 to surface water contamination from inappropriate waste management	<ul style="list-style-type: none"> • Construction materials and wastes will be properly stored to minimize the potential damage or contamination of the materials. • A construction materials inventory management system will be implemented to minimize over-supply of the construction materials, which may lead to disposal of the 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 type 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. • Storm water drainage and wastewater will be treated in accordance to the applicable World Bank/IFC guidelines. 	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
	Impacts to surface water due to contamination from accidental releases of hazardous substances	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • Cofferd dams, silt fences, sediment barriers or other devices to prevent migration of silt during construction within the river will be provided. • Dewatering and cleaning of 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 re-enforced 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 pond. 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. (as long as not contaminated). 	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
	Surface water contamination from accidentally spilled fuel/oil and road surface runoff.	<ul style="list-style-type: none"> • 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 operation phase. • Development of detailed terms of reference on the maintenance requirements for the retention chambers based on final design and technical specifications. The TOR should include the following information with regards to maintenance and servicing 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	<ul style="list-style-type: none"> • Delimitation of areas to be cleared will be made before the beginning of the construction activities in order to limit as much as possible the surface of vegetation to be cleared. • Boundaries of ROW and operation area will be strictly kept to - to avoid impact on the adjacent vegetation; Strict keeping to traffic routes during the construction will be ensured to avoid impact on vegetation. • The planned clearance area for the construction works shall be clearly 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. 	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
		<ul style="list-style-type: none"> • Project will utilize or upgrade existing roads where possible to minimize unnecessary clearing requirements. • Training of the staff in environmental and safety issues, including protection of vegetation outside the boundaries of the project corridor. • Care will be taken to avoid 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. • Implement Clearance, Revegetation, and Restoration Management^[1] Plan (see Section Error! Reference source not found.). • 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 removal of mature/significant trees and maintain connectivity between areas of forest habitats. 			
	Planting of vegetation on the site after rehabilitating disturbed areas	<ul style="list-style-type: none"> • Disturbed sites will be recultivated after completion of works. • Any reseeded 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. 	Contractor Cost	Contractor to Implement Mitigation	Engineer to Monitor Success Rate (RD to determine success

Affected Aspect	Potential Impact / Issue	Mitigation/Enhancement Measures (all that apply)	Estimated Cost	Responsibility	
				Development/ Implementation	Control
		<ul style="list-style-type: none"> The Clearance, Revegetation, and Restoration Management^[SEP] Plan prepared prior to construction will be followed (see Section Error! Reference source not found.). No net loss of natural habitat will be ensured based on the site survey conducted during Pre-Construction Stage. 			rate criteria)
	Tree cutting	<ul style="list-style-type: none"> Plant maintenance will be carried out for at least two years. The Contractor shall be responsible for replanting of any trees cut in these areas on a 1:3 basis using species native to the area. 	Contractor Cost	Contractor and RD to Implement Mitigation	RD, Engineer
Terrestrial and Aquatic Fauna Habitat	Modification, fragmentation, and degradation of habitat	<ul style="list-style-type: none"> Air, water, soil, and noise impact mitigation measures will be implemented. Waste management – regular clean-up of the areas, management of waste according to the type and category. Refueling of all plant, 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 to the natural environment. Oil, chemical, and solid waste will be stored, and 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]. 	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
		<ul style="list-style-type: none"> Construction camp waste areas will be properly managed, so animals are not attracted that could be injured or ingest inappropriate food. 			
	Introduction of invasive alien species	<ul style="list-style-type: none"> Care will be taken to avoid 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. 	Contractor Cost	Contractor to Implement Mitigation	RD, Engineer
Terrestrial Fauna Species	Fauna mortality	<ul style="list-style-type: none"> Speed limits to maximum of 20 km/hr for construction vehicles will be enforced to minimize potential for fauna strike. Commitment will be made to raise awareness of values of natural habitat areas to construction work force and arrangements will be made for restriction of 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 	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
		alternative breeding sites or to disperse after breeding.			
Terrestrial Fauna Distribution	Displacement of species due to noise, presence of machinery and equipment and presence of staff.	<ul style="list-style-type: none"> • Adherence to 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, and equipment and of staff.	<ul style="list-style-type: none"> • 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 avoid 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. • Implement a build-up of activity which slowly increases construction activities within the Rioni River to allow aquatic fauna to exhibit avoidance responses. 	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
Aquatic Fauna Species	Mortality of individuals, from operation of equipment and construction activities, or poaching by construction workers.	<ul style="list-style-type: none"> • 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 using 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	<ul style="list-style-type: none"> • 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 operational phase of the project, annually until the third year of operation after defect liability and then twice more at five-yearly intervals. It is recommended that the RD identify parties best placed to undertake such surveys and to report to ADB and other relevant stakeholders on the findings. 	Project Cost	Ecological Contractor to Implement Mitigation	RD, Engineer
	Cumulative impacts from the multiple development in the region.	<ul style="list-style-type: none"> • Consultation will be taken with IFI's, donors, and implementing units on other projects that are likely to contribute to cumulative impacts so as 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	<ul style="list-style-type: none"> • Noise from pile-driving will be kept below current international interim good practice guidelines. 	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
		<ul style="list-style-type: none"> • Ensure compliance with construction specifications which envisage the arrangement of cofferdams to protect water quality during construction minimize the impacts to aquatic fauna during pile driving in the Rioni River. 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 <i>before</i> starting to pile. 			
Landscape Quality	Change to existing landscape and character	<ul style="list-style-type: none"> • Implementation of mitigation measures defined for soil, vegetation, and waste management. • 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 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. 	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
		<ul style="list-style-type: none"> Commitment to high quality design, materials, and specification for the road and Rioni crossing. 			
Change of Land Use and Livelihoods	Land acquisition and livelihood loss to affected persons	<ul style="list-style-type: none"> Impacts of physical and economic displacement will be addressed through the resettlement plans that have been 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 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
Jobs	Impacts on employment and economy	<ul style="list-style-type: none"> An Employment and Procurement Procedure should be established (see Section Error! Reference source not found.). Development of the plan should involve consultation with relevant stakeholders, including government authorities and local villagers. Opportunities to establish a skills training program with an aim of training interested local villagers to contribute to the Project should be reviewed. Local villagers should be informed of job opportunities in a timely manner. Local businesses should be informed of contracting opportunities in a timely manner. 	Contractor Cost	Contractor to Implement Mitigation	RD, Engineer
Services Demand	Impacts on community infrastructure and services	<ul style="list-style-type: none"> 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 prompt restored. 	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
		<ul style="list-style-type: none"> 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. 			
Community Health and Safety	Impacts on social cohesion	<ul style="list-style-type: none"> Construction camps (if established) will be located away from communities in order to avoid social conflict in competition for resources and basic amenities such as water supply. Local residents should be given priority in 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 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	<ul style="list-style-type: none"> 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. 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 be employed to control traffic when construction equipment is entering or leaving the work area. Strictly impose speed limits on construction vehicles along residential areas and where other sensitive receptors such as schools, 	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
	members of the community.	hospitals, and other populated areas are located.			
Occupational Health and Safety	The exposure of workers to various physical hazards that may result to minor, disabling, catastrophic, or fatal injuries.	<ul style="list-style-type: none"> Measures will be implemented to reduce the likelihood and consequence of the potential hazards. This shall include (but not limited to) the following hazards: <ul style="list-style-type: none"> Falling from height; Falling into water; Entanglement with machinery; Tripping over permanent obstacles or temporary obstructions; Slipping on greasy walkways; Falling objects; Contact with dangerous substances; Electric shock; Variable weather conditions; Lifting excessive weights; and 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. Competent and adequately resourced Subcontractors will be used where construction activities are to be sub-contracted. Provisions will be incorporated into all sub-contracts to ensure the compliance with the SEMP at all tiers of the sub-contracting. All persons working on site will be provided information about risks on Site 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
		<p>arrangements will be made for workers to discuss health and safety with the Contractor.</p> <ul style="list-style-type: none"> • The Contractor will prepare and implement an Occupational and Community Health and Safety Management Plan (see Error! Reference source not found.) prior to 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 properly informed, consulted and trained on health and safety issues. • The areas where risk of injuries from falling objects exist will be marked with rope or flagging to minimize risks and injuries. • Flag persons will be employed to control traffic when construction equipment is entering or leaving the work area. • Road signs will be provided in accordance with approved traffic management plan (See Section Error! Reference source not found.). • Personal Protective Equipment (PPE) shall be worn at all times on the Site. This shall include appropriate safety shoes, safety eyewear, and hard hats. Non-slip or studded boots will be worn to minimize the risk of slips. • Before starting work all the appropriate safety equipment and the first-aid kits will be 			

Affected Aspect	Potential Impact / Issue	Mitigation/Enhancement Measures (all that apply)	Estimated Cost	Responsibility	
				Development/ Implementation	Control
		<p>assembled and checked as being in working order.</p> <ul style="list-style-type: none"> • All lifting equipment and cranes will be tested and inspected regularly. • All scaffolding will be erected and inspected, and the appropriate records maintained by the Contractor. • When there is a risk of drowning, lifebelts shall be provided and it shall be ensured that personnel wear adequate buoyancy equipment or harness and safety lines, and that rescue personnel are present when work is proceeding. • All safety harnesses, life-lines, reviving apparatus and any other equipment provided for use in, or in connection with emergencies will be properly 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 to prevent 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 by workers. • Fire-fighting equipment will be provided at the work areas, as appropriate, and at construction camps where fire hazards and risks are present. 			

Affected Aspect	Potential Impact / Issue	Mitigation/Enhancement Measures (all that apply)	Estimated Cost	Responsibility	
				Development/ Implementation	Control
		<ul style="list-style-type: none"> Report all accidents and near misses and collect statistics to be used 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 that have archaeological, historical, religious, or other cultural value and significance.	<ul style="list-style-type: none"> The chance find procedure for managing cultural heritage (see Error! Reference source not found.) will be implemented if any cultural heritage is discovered during construction. 	Contractor Cost	Contractor and RD to implement mitigation	RD, Engineer
Grievance Redress	Complaints due to Project implementation	<ul style="list-style-type: none"> The Contractor will be responsible for nomination of Community Liaison Officer (CLO) and implementation of grievance procedure. Workers will not be restricted from joining or forming workers organizations 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. Continuous monitoring and review of complaints received from neighboring communities around the Project activity areas as per the grievance redress mechanism. 	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
Waste	Pollution of land, water, or air from poor waste Management	<ul style="list-style-type: none"> • 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 waste water treatment facilities. • The Contractor will conclude an agreement with Poti municipality and solid non-hazardous and inert waste will be removed to the Poti municipal waste dump. • Domestic and Inert Waste <ul style="list-style-type: none"> ○ Provide garbage bins and facilities within the Project site for temporary storage of domestic solid waste and construction waste. ○ 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 <ul style="list-style-type: none"> ○ On the site allocated for temporary, short term keeping of hazardous wastes ensure compliance with the following safety measures: <ul style="list-style-type: none"> ▪ Use containers suitable for each type of 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
		<ul style="list-style-type: none"> ▪ 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 Management Plan (see Section Error! Reference source not found.). 			

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.	<ul style="list-style-type: none">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	<ul style="list-style-type: none">Awareness raising and education of 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.	<ul style="list-style-type: none">Implementation of mitigation measures set for pre-construction and construction stages of the project during the road maintenance works as appropriate.Runoff water from the bridge structures will be handled by the built drainage structures and runoff and spill containment chambers. 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 any spills.Maintenance paving of the road sections and bridge decks will be performed only	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
		<p>in dry weather to prevent runoff contamination.</p> <ul style="list-style-type: none"> • Staging techniques will be used 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. • Roadside strips will be regularly maintained and cleaned. 			
Terrestrial and Aquatic Fauna Habitat	Degradation of habitat	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • Monitoring of the bridge piers will be ensured throughout the operation period to prevent poaching of 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	<ul style="list-style-type: none"> • 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 operational phase of the project, annually until the third year of 	Project Cost	Ecological Contractor to Implement Mitigation	RD, Engineer

Affected Aspect	Potential Impact / Issue	Mitigation/Enhancement Measures (all that apply)	Estimated Cost	Responsibility	
				Development/ Implementation	Control
		operation after defect liability and then twice more at five-yearly intervals. It is recommended that the RD identify parties best placed to undertake such surveys and to report to ADB and other relevant stakeholders on the findings.			
Landscape Quality	Modification of the original landscape from the presence of new infrastructure	<ul style="list-style-type: none"> 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 be done to detect signs of slope instability and ensure revegetation where necessary. 	Included in Operation / Maintenance cost	Road Maintenance Contractor	RD
Occupational Health and Safety	The exposure of workers to various physical hazards that may result to minor, disabling, catastrophic, or fatal injuries.	<ul style="list-style-type: none"> 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
Community Health and Safety	Road accidents resulting from higher travel speeds and increased traffic	<ul style="list-style-type: none"> Road safety facilities have been incorporated in the Project design at both preparatory and detailed design phases. These include traffic separation medians, pedestrian sidewalks, and signs and pavement markings complying with international and Georgian standards. These will be put in place by the 	Included in Operation / Maintenance cost	Road Maintenance Contractor / RD / Local Government and traffic authorities	RD

Affected Aspect	Potential Impact / Issue	Mitigation/Enhancement Measures (all that apply)	Estimated Cost	Responsibility	
				Development/ Implementation	Control
		<p>Contractors during construction and will be maintained by the Project owner during the Project's service life.</p> <ul style="list-style-type: none"> • Monitoring and maintenance of road safety furniture will be done to sustain road safety facilities constructed under the project. 			

Annex 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 (<i>Oxyura leucocephala</i>); Stellate, Russian and Beluga Sturgeon (<i>Acipenser</i>	Habitat	P, C	IP 11: Introduction of invasive alien species.	Care will be taken to avoid 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	Washing of vehicles, equipment and supplies before entry to 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/s pread of invasive alien species in Project area	Project Area of Influence	Surveys by specialist sub-contract	Annually, in summer during preparation,	Construction Contractor or ecological sub-

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
stellatus, A. gueldenstaedtii and Huso huso); Grusinian Scraper (Capoeta ekmekciae)				- control/eradication of invasive species where found.			or	construction and worksite closure phases	contractor
					Control of new/spreading areas of invasive alien species in Project area	Project Area of Influence	Records of invasive species control; inspections	Quarterly, during preparation, construction and worksite closure phases	Construction Supervision, Construction Contractor or ecological subcontractor
Kolkheti National Park, Ramsar Site and Important	Vegetation coverage	P	IP 9: Loss of vegetation coverage in specific	Ensure that the rehabilitation of the secondary road [from Patara Poti to the oil terminal] does	Rehabilitation of secondary road within NP extension	Worksite	Comparison of maps of proposed NP extension	Before finalisation of project workplans	RD

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
Bird Area			areas of the project.	not extend into the proposed extension of the National Park.			n with those of secondary road rehabilitation		
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 - to avoid impact on the adjacent vegetation; Strict keeping to traffic routes during the construction will be ensured to avoid impact on vegetation.	Vegetation disturbance by Project vehicles and contractors; mortality of priority bird 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 (<i>Trapa colchica</i>) and <i>Hibiscus ponticus</i>	Mortality	P, C	IP, IC 10: Mortality of individuals.						

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
White-headed Duck (<i>Oxyura leucocephala</i>)	Habitat	P	IP 12: Modification and fragmentation of habitat due to loss of vegetation coverage.						
	Mortality	P	IP 13: Mortality of individuals due to equipment operation.						
Colchis Water-Chestnut	Mortality	P, C	IP, IC 10: Mortality of	Vegetation will be preserved where feasible, in	Mortality of individuals	Project Area of Influence	Review of Project	Unannounced inspection	RD, Construction

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
(Trapa colchica) and Hibiscus ponticus			individuals.	particular in the areas near the river bank to avoid erosion/sedimentation.			incident logbook; visual inspection	s during preparation, construction and worksite closure phases	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] in accordance with sub-paragraph (v), Article 24, first paragraph of	Number of plants requiring translocation	Within the Project area, where ground/water disturbance may take place	Surveys by specialist subcontractor	During walkover surveys, pre-construction	Construction Contractor or ecological subcontractor

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
				<p>the law of Georgia on 'Red List and Red Book'.</p> <p>Relocation of any specimens found during the surveys where practical will be provided with the help of biodiversity experts to ensure proper handling...</p> <p>A plan and schedule must be developed by the Contractor prior to implementation of this task.</p>					

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
White-headed Duck (<i>Oxyura leucocephala</i>); Stellate, Russian and Beluga Sturgeon (<i>Acipenser stellatus</i> , <i>A. gueldenstaedtii</i> and <i>Huso huso</i>); Grusian Scraper (<i>Capoeta ekmeckiae</i>)	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
Colchis Water-Chestnut (<i>Trapa colchica</i>) and <i>Hibiscus ponticus</i>	Mortality	P, C	IP, IC 10: Mortality of individuals.	Training of the staff in environmental and safety issues, including 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 (<i>Acipenser stellatus</i> , <i>A. gueldenstaedtii</i> and <i>Huso huso</i>); Grusinian	Habitat	C	IC 12: Modification and fragmentation of habitat, including loss of spawning grounds for wild sturgeon species.						

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
Scraper (<i>Capoeta ekmeckiae</i>)	Mortality	C	IC 14: Mortality of individuals, from operation of equipment and construction activities, or poaching by construction workers.						
Colchis Water-Chestnut (<i>Trapa colchica</i>)	Mortality	P, C	IP, IC 10: Mortality of individuals.	Disturbed vegetation must be replanted immediately after the	Physical restoration of the sites to their original state	At all Project-disturbed areas	Inspections	Before the end of the 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
and <i>Hibiscus ponticus</i>				construction/disturbance stops.				phase	
					Successful progress of re-vegetation, and need for any additional re-vegetation	At all Project re-vegetation sites	Surveys by specialist subcontractor	Annually, in summer, from the last year of the worksite closure phase until the fifth year of the operations phase, inclusive	MoEPA, Construction Contract or ecological subcontractor

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 (<i>Acipenser stellatus</i> , <i>A. gueldenstaedtii</i> and <i>Huso huso</i>); Grusinian Scraper (<i>Capoeta ekmeckiae</i>)	Habitat	C	IC 12: Modification and fragmentation of habitat, including loss of spawning grounds for wild sturgeon species.	Slopes of embankment will be protected from erosion by vegetation and slope drainage. Dewatering and cleaning of 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 to the natural	Adherence to approved Project plans for soil and erosion, storage of fuels and chemicals, sewage management, and fuelling 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 subcontractor, using driftnets	Quarterly, during preparation, construction and worksite closure phases,	MoEPA, Construction Contractor or ecological subcontractor

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
				<p>environment. Materials and waste will be stockpiled so as to avoid erosion and washing off into the river. Drainage trenches will be established to divert surface runoff from the site. Ensure no waste materials are dumped in the river, including re-enforced concrete debris. In disturbed soil areas, compacted straw (straw bales), silt fence, fibber rolls, gravel bags,</p>				and first two years of operations phase	

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
				<p>or other approved sediment control must be ensured. At a minimum, all bare soil (whether it's an abutment slope or a stockpile) must be protected before it rains.</p> <p>No concrete waste from concrete mixers will be dumped in the river.</p> <p>Temporary fuel tanks will be located at least 50 m away from any watercourse, drain, or channel leading to a water course.</p>					

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
				<p>The tank will be placed in covered areas with berms or dikes installed to intercept spills, if any. 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.</p> <p>Refueling of all plant, vehicles and machinery will not be allowed within 50 m of any watercourse, drain or channel</p>					

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
				leading to a water course. Oil, chemical and solid waste will be stored, and handled and disposed of by appropriately licensed waste management contractors.					
				Borrowing from the stream [at the project site] will be prohibited. Dropping structures into rivers/streams will be avoided [construction will instead take place from the river bank or pontoons].	Absence of borrowing from; movement of machines or dropping structures in; and discharge of sediment-laden water to the Rioni River at the	Project Area of Influence	Visual inspection	Unannounced inspections monthly, during 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
				Discharge of sediment-laden construction water (e.g., from areas containing dredged soil) directly into surface watercourses will be forbidden. Sediment laden construction water will be discharged into settling lagoons or tanks prior to final discharge.	project site			phases	
Stellate, Russian and Beluga Sturgeon (<i>Acipenser stellatus</i> ,	Habitat	C	IC 12: Modification and fragmentation of habitat, including	Movement of machines inside rivers, streams, or on their banks will be prevented except when it is unavoidable due	Absence of movement of machines in the Rioni River	Project Area of Influence	Visual inspection	Unannounced inspections monthly, during preparatio	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
A. <i>gueldenstaedtii</i> and <i>Huso huso</i> ; Grusinian Scraper (<i>Capoeta ekmeckiae</i>)			loss of spawning grounds for wild sturgeon species.	to the construction of a structure. No washing of vehicles etc. in the river will be allowed.				n, construction and worksite closure phases	
	Distribution	C	IC 13: Displacement of species due to noise, presence of machinery, and equipment and of staff.						

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
	Mortality	C	IC 14: Mortality of individuals, from operation of equipment and construction activities, or poaching by construction workers.						
Stellate, Russian and Beluga Sturgeon (<i>Acipenser</i>	Habitat	C	IC 12: Modification and fragmentation of habitat,	Sourcing of construction materials (e.g., sand, gravel) will avoid use of any licensed or	Sourcing of materials	n/a	Review of records for sourcing of	Unannounced inspections quarterly, during	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
<i>stellatus</i> , <i>A. gueldenstaedtii</i> and <i>Huso huso</i>); Grusinian Scraper (<i>Capoeta ekmeckiae</i>)			including loss of spawning grounds for wild sturgeon species.	unlicensed sites in the Rioni River or on its banks.			materials ; inspections	preparation, construction and worksite closure phases	
Stellate, Russian and Beluga Sturgeon (<i>Acipenser stellatus</i> , <i>A. gueldenstaedtii</i> and <i>Huso huso</i>); Grusinian	Distribution	C	IC 13: Displacement of species due to noise, presence of machinery, and equipment and of	Coffer dams, silt fences, sediment barriers or other devices to prevent migration of silt during construction within the river will be provided. [Coffer dams will also significantly reduce pile-	Use of silt migration barriers	Worksite	Visual inspection	Unannounced inspections, twice-yearly in March-September during the preparation and construction	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
Scraper (<i>Capoeta ekmeckiae</i>)			staff.	driving noise.]				phases	
				Ensure compliance with construction specifications which envisage the arrangement of cofferdams to protect water quality during construction minimize the impacts to aquatic fauna during pile driving in the Rioni River. Noise from pile-driving will be kept below current international interim good	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
				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

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
				Implement a build-up of activity which 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 avoid disturbance to sturgeon during their overall spawning season. Where possible, in-river activities will also	Absence of in-river activities	Worksite	Visual inspection	At least monthly from March-September inclusive, during the preparation, construction and worksite	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
				be avoided in October and November.				closure phases	
				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	Mortality	C	IC 14: Mortality of individuals, from	Fishing and using of illegal fishing gear [by construction workers]	Absence of fishing	Worksite	Visual inspection	Unannounced inspections, quarterly	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
(Acipenser stellatus, A. gueldenstaedtii and Huso huso); Grusinian Scraper (Capoeta ekmeckiae)			operation of equipment and construction activities, or poaching by construction workers.	anywhere along the river will be prohibited.				during the preparation, construction and worksite closure phases	
				Use of propeller-driven boats will be minimised 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

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 (<i>Acipenser stellatus</i> , <i>A. gueldenstaedtii</i> and <i>Huso huso</i>); Grusinian Scraper (<i>Capoeta ekmeckiae</i>)	Habitat	O	IO 8: Degradation of aquatic habitat from accidentally spilled fuel/oil or surface runoff from bridge.	Runoff water from the bridge structures will be handled by the built drainage structures and runoff and spill containment chambers. 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 any spills.	Drainage/retention infrastructure in good technical condition and cleaned regularly	Project site	Inspection	Recurrent [as needed for operational life of the Project]	RD, Maintenance 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 (<i>Acipenser stellatus</i> , <i>A. gueldenstaedtii</i> and <i>Huso huso</i>); Grusinian Scraper (<i>Capoeta ekmekeciae</i>)	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 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

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
					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