



**ROADS DEPARTMENT OF  
THE MINISTRY OF REGIONAL DEVELOPMENT AND INFRASTRUCTURE OF  
GEORGIA**

**Annex to the Environmental and Social Impact Assessment of works  
for construction of local road at pk0+75 - pk35+11 right side of the E-  
60 East-West Highway of Ruisi-Agara-Agara Bypass section (km95 to  
km114)**

## List of acronyms

<b>AASHTO</b>	American Association of State Highway and Transportation Officials
<b>AH</b>	Affected Households
<b>AF</b>	Affected People
<b>EA</b>	Environmental Assessment
<b>ESIA</b>	Environmental and Social Impact Assessment
<b>EMP</b>	Environmental Management Plan
<b>EWB</b>	East-West Highway
<b>FS</b>	Feasibility Study
<b>GoG</b>	Government of Georgia
<b>HGV</b>	Heavy Goods Vehicle
<b>HSE</b>	Health, Safety, Environment
<b>HS</b>	Health and Safety
<b>PK</b>	Post Kilometer
<b>LA</b>	Land Acquisition
<b>MCMP</b>	Ministry of Culture and Monument Protection
<b>MESD</b>	Ministry of Economy and Sustainable Development
<b>MENRP</b>	Ministry of Environment and Natural Resources Protection of Georgia
<b>MLHSA</b>	Ministry of Labour, Health and Social Affairs of Georgia
<b>MRDI</b>	Ministry of Regional Development and Infrastructure of Georgia
<b>NGO</b>	Non-Governmental Organization
<b>NKUK</b>	Nippon Koei UK
<b>OP/BP</b>	World Bank's Operational Policy, Bank Procedures
<b>QC/QA</b>	Quality Control and Quality Assurance
<b>RAP</b>	Resettlement Action Plan
<b>RBG</b>	Red Book of Georgia Protected Species
<b>RD</b>	Roads Department of the Ministry of Regional Development and Infrastructure of Georgia
<b>RoW</b>	Right of Way
<b>SEP</b>	Stakeholder Engagement Plan
<b>SNIP</b>	Construction Norms and Regulations
<b>TEM</b>	Trans-European Motorway
<b>ToR</b>	Terms of Reference
<b>WB</b>	The World Bank
<b>WHO</b>	World Health Organization

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## **1. Introduction**

### **1.1. Background**

This is an annex of the Environmental and Social Impact Assessment prepared under TEWHIP AF/CS/CQS-03 for the E-60 East-West Highway upgrading of Ruisi-Agara-Agara Bypass section (km95 to km114). As a result of highway construction, accessibility to land plots became limited for local population of Ruisi and movement within the village is complicated, because access roads were not considered at the design stage and during construction works of Ruisi-Agara-Agara Bypass road km95 - km114 section of the E-60 East-West Highway.

In order to ensure safe movement of agricultural equipment and domestic animals along the highway, also based on the request from local community concerning accessibility to agricultural lands, on the initiative of Roads Department and with the World Bank's financial support detailed engineering design, bidding documents and supplemental document to the approved Environmental and Social Impact Assessment was prepared for Ruisi local road pk0+72- pk35+11 section (right side) in line with the WB safeguard policy.

Documents for the construction of rural roads along Ruisi-Agara-Agara Bypass km95-km114 section of the E-60 East-West Highway was prepared by "Proektmshenkompani" Ltd. based on the contract №TEWHIP AF/CS/CQS-03 signed with Roads Department of Georgia on August 31, 2015.

### **1.2 Methodology**

This document was prepared in compliance with the World Bank guidelines and safeguard policy and Georgian law on Environmental Protection.

Assessment process includes the following main steps:

- Description of background conditions;
- Environmental Impact Assessment;
- Development of mitigation measures;
- Elaboration of environmental management and monitoring plans;
- Public consultations and information disclosure.

#### **Environmental and social impact and mitigation measures**

As this document, produced for the construction of Ruisi local road, is a supplement to Environmental and Social Impact Assessment of Ruisi-Agara-Agara Bypass road km95 - km114 section of the E-60 East-West Highway, major risks and mitigation measures associated with the construction and operational phases are

considered in the main document (for further details please see Environmental and Social Impact Assessment of works for upgrading of Ruisi-Agara-Agara Bypass road km95-km114 section of the E-60 East-West Highway [http://www.georoad.ge/uploads/files/TEWHIPAFEIA\\_Geo.pdf](http://www.georoad.ge/uploads/files/TEWHIPAFEIA_Geo.pdf)).

### **Environmental impact related to the construction phase**

**Impact on vegetative cover:** removal of grass and top soil, cutting and removal of shrubs and tree felling activities during clearing of RoW, impact on vegetation during vehicle movement. Number of trees to be cut have been identified. In total 28 trees need to be cut along the project road, which are not included in Red List of Georgia, mainly is secondary vegetation. Each removed tree shall be compensated by planting 3 trees of the same species. During offsite traffic movement possibility of soil compaction and caused impact to vegetative cover.

**Water pollution:** As a result of site survey, it was identified that irrigation channels within the RoW need relocation. During construction of local road mentioned channels may be contaminated with waste. Waste management will be required during the local road construction.

**Construction waste:** As a result of site survey, it was identified that petrol station and concrete water collector ditches need to be demolished within the RoW. Construction waste shall be disposed at the landfill of local municipality upon the agreement.

**Management of spoiled soil:** During construction of Ruisi-Agara-Agara Bypass road km95-km114 section of the E-60 East-West Highway, the contractor disposed spoiled soil at the area where construction of Ruisi local road is planned. Mentioned soil should be excavated and stored at the nearest borrow pit.

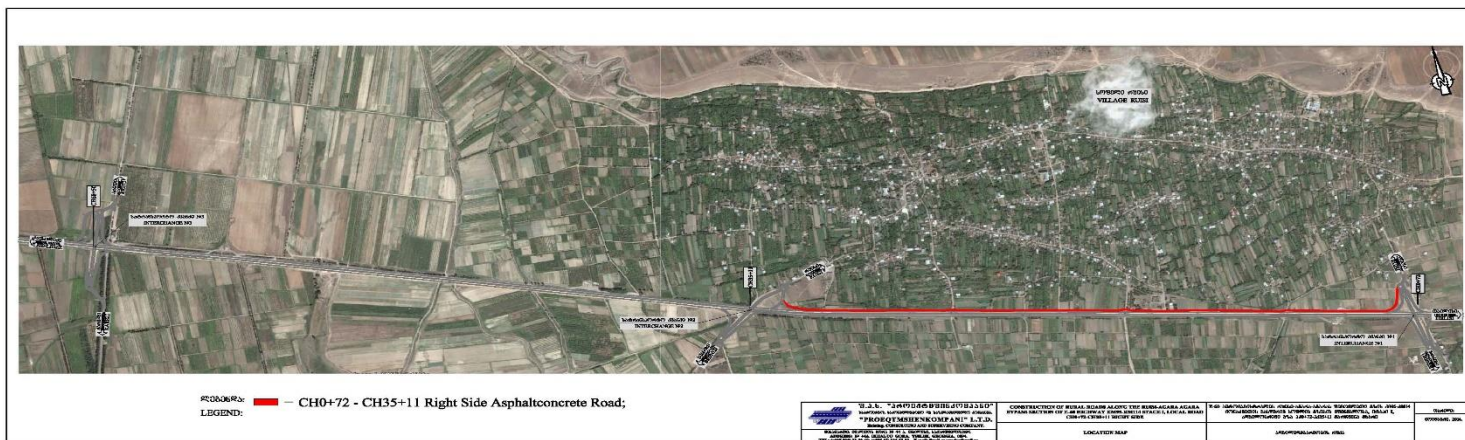
### **Environmental impact related to operational phase**

No negative impact is expected during operational phase.

## **2 Description of additional works**

### **2.1 Overview**

Construction of Ruisi local road is focused at the improvement of transport services thus ensuring fast and safe movement of local population.



## 2.2 Project category and type

Given that the construction of Ruisi local road will be implemented under the EWHIP and it is additional activity related to Ruisi-Agara-Agara Bypass section (km95 to km114) of the E-60 East-West Highway, this document is considered as category “A” according to the World Bank’s policy.

## 2.3 Construction technology and structure of the road

Preparation of the pavement design is a process involving selection of such pavement configuration and pavement related materials which will ensure adequate operation of the pavement and minimal maintenance needs, in view of transport loads calculated in advance. Traditionally, the designs in Georgia were developed based on soviet design standards. According to soviet method, a number of heavy vehicles (divided into categories) are used to determine transport loads and predetermined parameters of the soil in-situ are applied to identify strength of sub-base layer, pavement calculation is made in line with the soviet standard RADON-2 CREDO/DIALOGUE using design-analysis system (“Credo”).

Based on above mentioned, it is planned to construct a local road with asphalt concrete-pavement starting from interchange No.1 - to interchange No.2. Road axis is mainly 3.5-4.5 meters away from the alignment of right lane of the highway to minimize the land take of private land plots. At local crossing pk15+45 and cattle passes km7+10, km24+49 the road axis has been moved 10-12 meters away from the entrance.

- Width of the roadbed including irrigation channel is 15,0 m;
- Width of the carriageway is 6,0m;

Planned works:

- Relocation of the existing 10 kV high voltage power line 1100m;



*Picture 1. Existing high voltage power line*



*Picture 2. Existing high voltage power line*

- Dismantling of concrete posts of air power line (h-9m) and installation in prearranged pits (Ø-30cm, depth 2.0m) – 22 pieces;
- Dismantling of the existing underground steel gas pipe d=75mm and installation of new one 22m;
- Dismantling of the existing fences: reinforced concrete 3.2m<sup>3</sup>; wire net fence 282m<sup>2</sup>;
- Dismantling of the existing culverts and channels: concrete - 54,8m<sup>3</sup>; scrap – 1,8t;





*Picture 3. Dismantling of the existing concrete culverts*

- Dismantling of the existing structures/buildings: 96,6m<sup>3</sup>;



*Picture 4. Structure to be demolished*

- Roadbed: removal of topsoil, loading and transportaiton to reserve 11548m<sup>3</sup>; soil treatment, loading and disposal at dump site 9661m<sup>3</sup>; construction of embankment 27724m<sup>3</sup>;
- For the construcion of local road it became necessary to clear the site from vegetative cover: cutting of shrubs and small trees and clearing the area from roots 15000m<sup>2</sup>; cutting of 28 trees (d=16-20cm – 10 pieces, d=20-30cm – 10 pieces, d=20-30cm – 8 pieces).





*Picture 5. Shrubs and small trees*



*Pic. 6 Existing trees on the territory*

Along the whole section of the local road, under the roadbed in the right line of the highway are placed rectangular and round reinforce-concrete pipes:

- Diameter  $d=0,75\text{m}$  – pk6+42.
- Diameter  $1,0 \times 1,0\text{m}$  - pk1+52, pk32+78.
- Diameter  $1,25 \times 1,5\text{m}$  - pk1+96, pk4+08, pk8+38, pk11+85, pk14+17, pk15+77 pk17+97 pk24+35.

Which are considered to be lengthened in order to arrange roadbed on pk15+77 and on pk24+35 reinforce-concrete channel of irrigation water should be covered with iron tile with dimension of  $3,6 \times 10,0$ . Round reinforce-concrete pipes  $d=1,0\text{m}$  will be used for other channels. The pipes inlets constructions are considered for 12 meters with reinforce-concrete channels.

Figure N 1. Construction of Channel

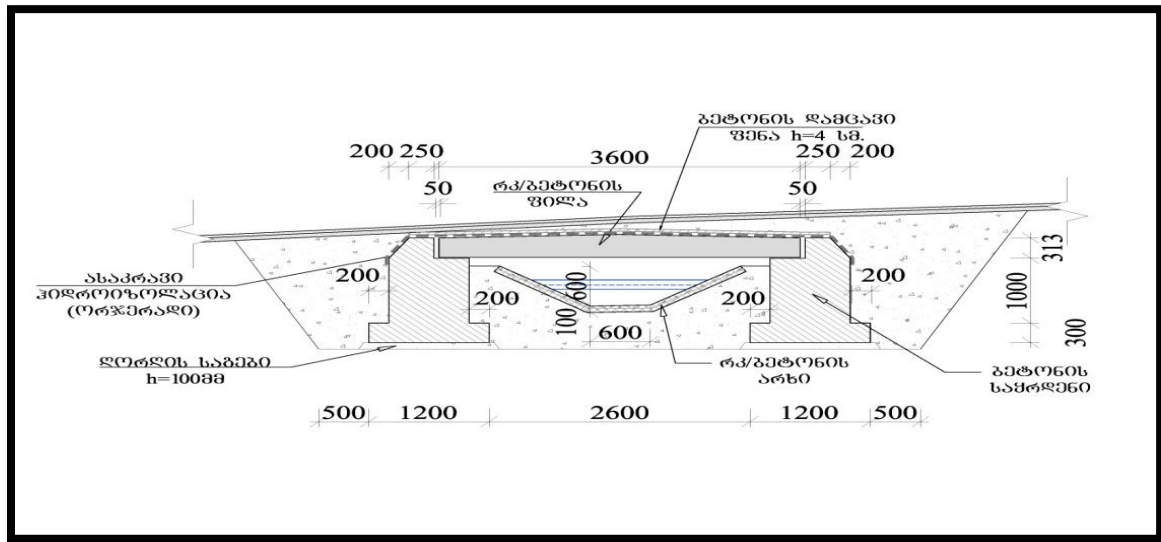
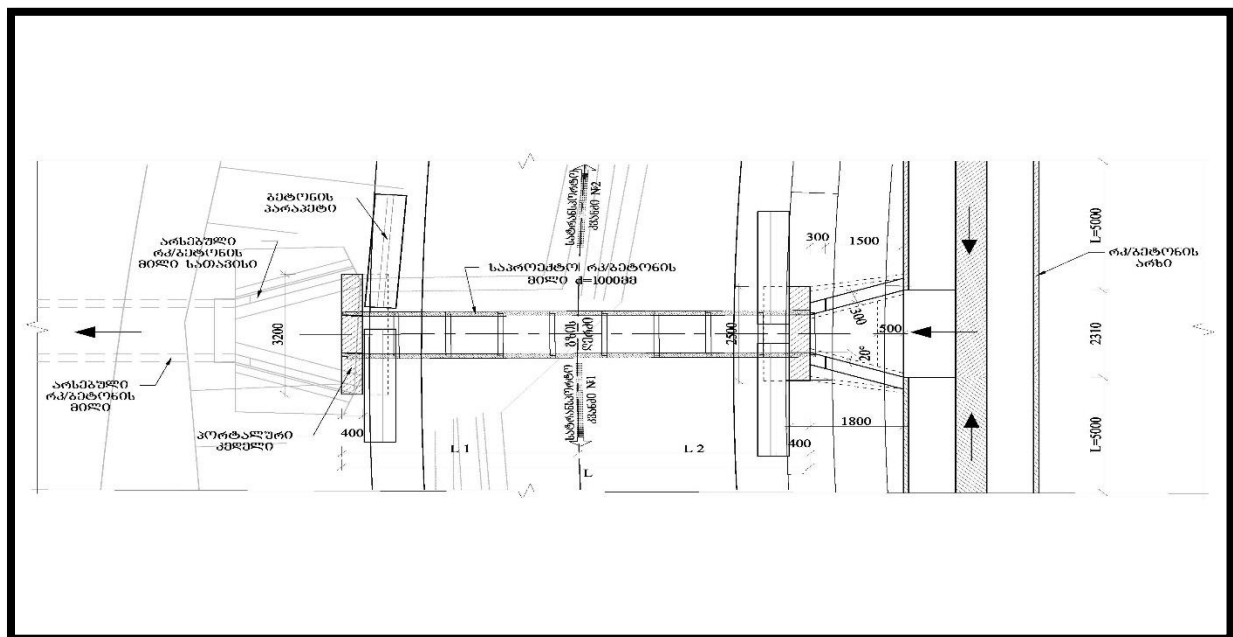
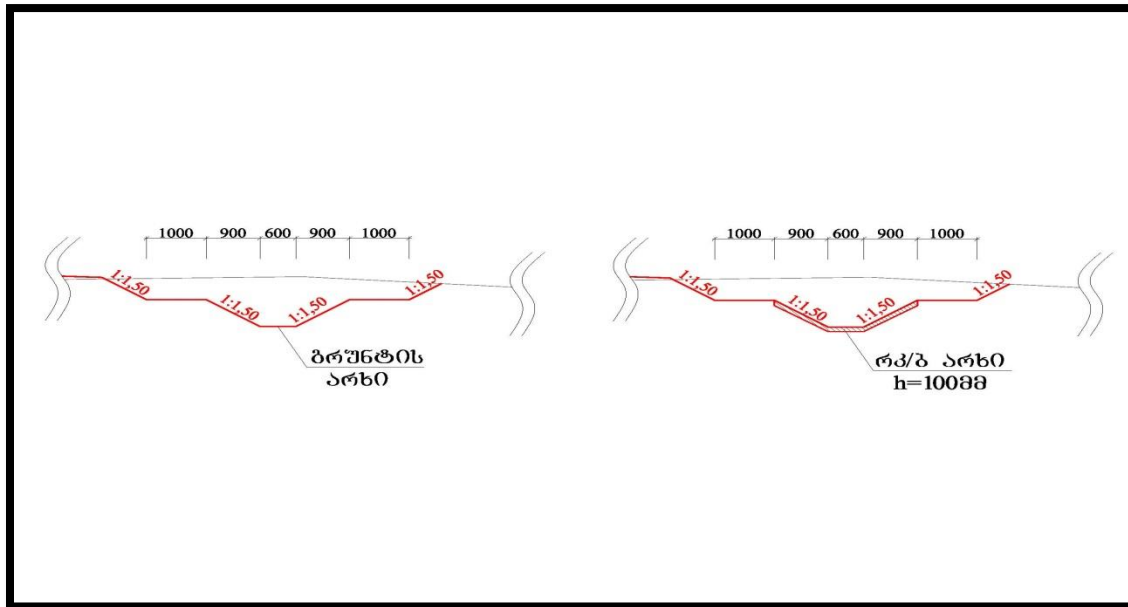


Figure 2. Construction of Channel



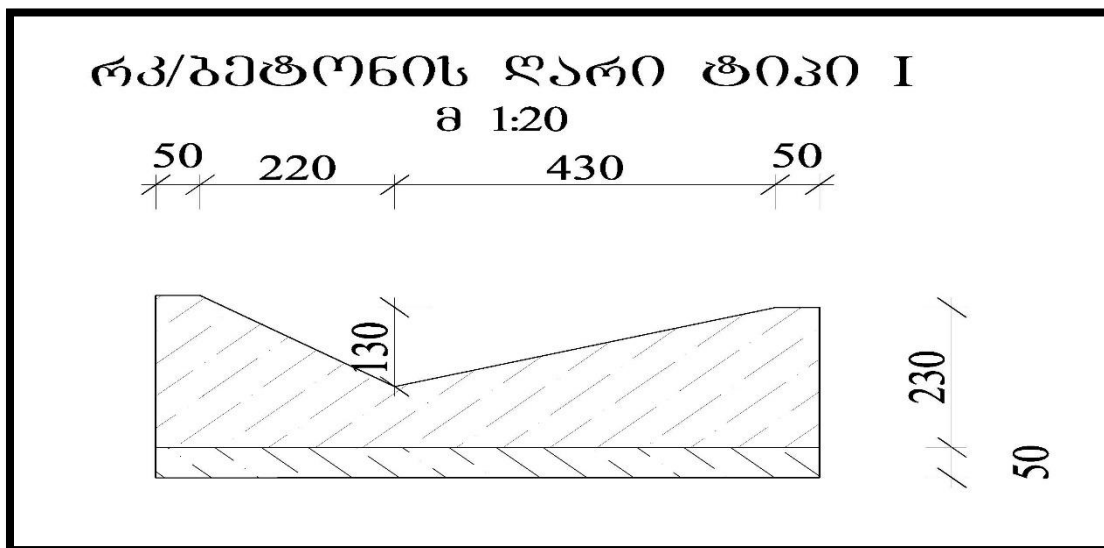
Along the right side of the whole local road is considered construction of trapezoidal irrigation channel, 2800m of soil, 435m of reinforce-concrete, which will also be the ditch and prevent roadbed from impact of water .

Figure 3. Construction of Channel



On the left side of the local road is considered construction of 2458 meter long reinforce-concrete gutter to rid off the water flown from the highway.

Figure 4: Reinforce-concrete gutter



Reinforce-concrete gutters will be constructed on junctions.

## 2.4 Equipment to be used during construction

Exact equipment necessary for the construction will be listed after the contractor is chosen. In table one is indicated probable equipment and its quantity.

**Table 1. Equipment and technique to be used during construction**

#	Type of equipment	Minimal quantity of equipment
1	Bulldozer	4
2	Loader	3
3	Dump Truck	6
4	Grader	2
5	Load excavator	1
6	Shovel excavator	2
7	Vibratory Compactor	2
8	Pneumatic Compactor	1
9	Double drum roller	3
10	Surface vibrator	1
11	Crusher	1
12	Compressor	2
13	Portable Generator	2
14	Water tank with spreader	1
15	Crane	1

## 3. Description of projects biophysical Environment

This document is the Annex to the Environmental and Social Impact Assessment of modernization of Ruisi-Agara-Agara Bypass section (km95 to km114) of the E-60 East-West Highway. The document comprises description of: Climate, meteorology, geology, geomorphology, hydrology, hydrogeology, landscape, land use, soil, air quality, noise level, seismological conditions and dangerous processes, biological environment, flora, fauna, protected areas, socio economic and cultural environment ( For detailed information please see *Environmental and Social Impact Assessment of modernization of Ruisi-Agara-Agara Bypass section (km95 to km114) of the E-60 East- West Highway* [http://www.georoad.ge/uploads/files/TEWHIPAFEIA\\_Geo.pdf](http://www.georoad.ge/uploads/files/TEWHIPAFEIA_Geo.pdf) ).

In order to develop ESIA the territory considered for local roads was examined and studied and following circumstances have been identified:

- There are soil and concrete irrigation channel located along the alignment of the local road. Concrete irrigation channel and its water collectors will be demolished, which causes construction waste creation;
- The Petrol station needs to be demolished, which causes construction waste and possibility of hazardous waste creation;

- There will be cuttings of 8-11 pine trees nearby the village Ruisi;
- There are possibilities of relocation of 10kV power line poles in some places;
- There is possibility to affect the private land plots by cutting some trees during the construction of the local road along the alignment;
- There are naturally grown bushes and trees of Acacia nearby the second interchange (Village Ruisi) of the E-60 East-West Highway Ruisi-Agara-Agara Bypass section (km95 to km114) which should be removed during the construction works of the local road;
- It is planned to remove the top soil and store for subsequent use during the construction works at the Ruisi local road.

#### **4. Mitigation measures:**

##### **Environmental impact related to the construction phase**

**Impact on vegetative cover:** Each removed tree shall be compensated with ratio 1:3 of the same species during the construction of the Ruisi local road. During offsite traffic movement there is possibility of soil compaction and impact to vegetative cover.

**Water pollution:** During construction of Ruisi local road the irrigation channels may be polluted with waste. Waste management will be required during the local road construction.

**Construction waste:** During construction of Ruisi local road the construction or other type of waste shall be disposed at the landfill of local municipality according the agreement.

**Land Management:** During construction of Ruisi local road the removed topsoil must be stored for subsequent use. Spoiled soil must be stored on the nearest borrow pit.

**Irrigation Channels:** The construction contractor, who will be identified by the tender, for the construction works of the Ruisi local road will arrange all procedures and agreements for the relocation of irrigation channels with local municipality.

**Power line poles and gas pipe:** The construction contractor, who will be identified by the tender, for the construction works of the Ruisi local road will arrange all procedures and agreements for the relocation of power line poles and gas pipe with its owner companies.



## **5. Environmental Management Plan (EMP)**

Information included in the EMP is based on the main findings outlined in every chapter of the ESIA report, i.e., all proposed mitigation and monitoring actions set to a timeline, specific responsibility assigned and follow up actions defined.

The EMP is presented in a table format and divided into three main parts, dealing with the physical environment, with the biological environment, and with the socio-economic and cultural environment. Each part is organized by development stages, i.e. pre-construction, construction and road operation.

The overall objective of the EMP is to bring the project into compliance with national environmental and social requirements and environmental and social policies of the World Bank.

EMP will be included into the bidding documents so that bidders can consider and incorporate their environmental responsibilities into their bid proposals. Later EMP becomes an integral part of a contract for the provision of works and is binding for implementation.

### **5.1 Institutional framework**

The RD of the MRDI is responsible for general oversight of environmental compliance of works through ensuring quality performance of the technical supervisor and of the contractor. RD will perform these functions through its Resettlement and Environment Division comprising twelve staff members with relevant education and professional skills, as well as the safeguards consultants with international experience hired for the technical supervision of operations. This in-house capacity will be supported by external individual consultants upon demand.

The supervisor of works commissioned by the RD will be charged with the responsibility to establish strong field presence in the project area and supervise the works. Along with ensuring consistency with the design and quality of works, the supervisor is mandated to track the implementation of the EMP by the contractor, reveal any deviations from the prescribed actions, and identify any environmental / social issues should they emerge at any stage of the works.

Monitoring shall include visual observation and measurements as appropriate. Field testers and hand-held equipment shall be used to monitor short- term impact. Calibrated equipment and approved methods of monitoring must be used. Calibration must be done regularly, all calibration records and monitoring results, along with the copies of the site records, certificates, permits and documents shall be submitted and kept by the Roads Department.

Works supervisor will be responsible for reporting to the RD on the environmental and social performance under the EWHCIP on monthly basis through including safeguard compliance section into the general reporting. Supporting photo material shall also be attached. RD will make monthly reports from the works supervisor available to the World Bank upon demand. Also, RD will include analytical sections on the EMP implementation and overall safeguard performance into the regular project progress reporting to the World Bank. This reporting will be based on the information received from the works supervisor, but should also reflect results of RD's own due diligence (quality control over the supervisor's work) and RD's assessment of supervisor's performance.

## Environmental Management and Monitoring

The environmental management and monitoring required at each individual stage of the Project are presented in the tables below.

**Table 1 Mitigation Plan for Construction Phase**

AIR QUALITY				
Potential impact	Mitigation/Enhancement Measure	Monitoring requirements	Responsibility	
			Development/ Implementation	Control
Exhaust emissions from the engines of construction vehicles and machinery	All vehicles, equipment and machinery used for construction will be regularly maintained and inspected/certificated to ensure that the pollution emission levels conform to the standards prescribed. Avoid idling of engines. Ban the use of poorly maintained machinery or equipment that cause excessive pollution (e.g., visible smoke, fuel/oil leaks).	Details are given in Table 4	Contractor	RD Construction supervisor
Dust generated during hauling of the construction materials	The construction materials (gravel, sand, etc.) will be transported in covered (for example, by tarpaulins) vehicles.	Details are given in Table 4		
Dust generated during the movement of vehicles	Water truck bowser with spray bar will be used to spray water on unsealed road surfaces, asphalt mixing sites and temporary service areas, for dust suppression	Details are given in Table 4		
NOISE AND VIBRATION				
Potential impact	Mitigation/Enhancement Measure	Monitoring requirements	Responsibility	
			Development/ Implementation	Control
Construction-related noise from vehicles, asphalt plants, crushing and batch plants, equipment	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.	Details are given in Table 4	Contractor	RD Construction supervisor
Noise Impact – Disturbance to residents	Restrict work between 06:00 to 21:00 hours within 500 m of the settlements. In addition, limit noise on construction site. Prohibit idling, use shields, if required; Maintain dialogue or use grievance mechanism to allow residents to contact Project staff and ask for additional measures.	Details are given in Table 10.4	Contractor	RD Construction supervisor

Noise impact on workers	Noise standards will be strictly enforced to protect construction workers from noise impacts, in accordance with international Health, Safety and Environment (HSE) standards and procedures. Personal Protection Equipment (PPE) (e. g., ear defenders) will be provided and used. Noise exposure will be limited to 85 dB(A).	Details are given in Table 10.4	Contractor	RD Construction supervisor
<b>SOIL AND WATER</b>				
Potential impact	Mitigation/Enhancement Measure	Monitoring requirements	Responsibility	
			Development/Implementation	Control
Siltation of surface waters during construction and/or impact on soils due to improper disposal of excess materials	<ul style="list-style-type: none"> <li>• Biggest part of excavated soil will be reused, thus potential impacts due to the need for disposal of excess material will be kept to a minimum.</li> <li>• Temporary diversion of the streams will be applied to avoid pollution of the water. For this purpose cofferdams can be used. Another alternative, diversion of the flow via pipe.</li> </ul>	Details are given in Table 4	Contractor	RD Construction supervisor
Soil compaction due to operation of heavy equipment	Operation of heavy equipment will be confined within the corridor to avoid soil compaction and damage to land.	Details are given in Table 4	Contractor	RD Construction supervisor
Loss of top soil	<ul style="list-style-type: none"> <li>• All of the removed top soil within the corridor will be stored for reuse. Long-term stockpiles of topsoil will immediately be protected to prevent erosion or loss of fertility. Topsoil management recommendations are given in Annex 3).</li> <li>• Topsoil shall be stripped and reused during re-cultivation of disturbed sites.</li> <li>• Soil management plan shall be provided. The plan will describe measures to be undertaken to minimize effects of wind and water erosion on stockpiles, measures to minimize loss of fertility of top soil, timeframes, haul routes and disposal sites.</li> <li>• Prior to operation of borrow pits, the contractor shall develop and submit reinstatement plan – indicating location of the borrow pits, rehabilitation measures, implementation schedule (Rehabilitation measures may not be necessary for borrow areas still in operation after road works have finished).</li> </ul>	Details are given in Table 4	Contractor	RD Construction supervisor
Sand and gravel borrow pit- disturbance of river bed, water quality, ecosystem disturbance	It is allowed to use existing borrow pits or buy material at licensed facilities; no borrowing from the stream.	Details are given in Table 4	Contractor	RD Construction supervisor
<b>ECOLOGY AND NATURAL ENVIRONMENT</b>				
Potential impact	Mitigation/Enhancement Measure		Responsibility	

		Monitoring requirements	Development/ Implementation	Control
Potential damage of trees during excavation/ construction activities	Avoiding any damage to the existing trees during construction activities a temporary vegetation protection fence shall be established.	Details are given in Table 4	Contractor	RD Construction supervisor
Impacts on flora	Clearing up and removal of vegetation will be minimized to the extent necessary for the execution of works. Re-vegetation will be performed.	Details are given in Table 4	Contractor	RD Construction supervisor
Domestic and wild animals straying onto the road and being killed	Installation of a protective fence along the road, and fencing of excavated sites as a measure to prevent domestic and wild animals straying onto the road and being killed or falling into the excavations. Protective fences will be of various density. For small animals boards or corrugated metal shields can be used. For larger animals color ribbons can be used as a generally accepted practice.	Details are given in Table 4	Contractor	RD Construction supervisor
<b>VISUAL AND AGRICULTURE</b>				
Potential impact	Mitigation/Enhancement Measure	Monitoring requirements	Responsibility	
			Development/ Implementation	Control
Damage to agricultural lands, including impacts of drainage and irrigation infrastructure	<ul style="list-style-type: none"> <li>Grievance procedure will be developed before start of construction;</li> <li>Machinery and vehicle access will be strictly limited;</li> <li>All the affected areas will be restored.</li> </ul>	Details are given in Table 4	Contractor	RD Construction supervisor
Livestock resources damaged by machinery and vehicles	<ul style="list-style-type: none"> <li>Grievance procedure will be developed before start of construction;</li> <li>Machinery and vehicle access will be strictly limited;</li> <li>All the affected areas will be restored.</li> </ul>	Details are given in Table 4	Contractor	RD Construction supervisor
Arrangement of new borrow pits or stone quarries, possibly damaging agricultural or archaeological	<ul style="list-style-type: none"> <li>Contractor have to use the Borrow pits on a specific locations which are predefined within the Detailed design.</li> <li>Advantage should be given to already license sourcing areas.</li> <li>Use existing quarries or obtain license to run own quarry</li> </ul>	Details are given in Table 4	Contractor	RD Construction supervisor
<b>HEALTH AND SAFETY</b>				
Potential impact	Mitigation/Enhancement Measure	Monitoring requirements	Responsibility	
			Development/ Implementation	Control

Health and safety risks to workers and adjacent communities	<ul style="list-style-type: none"> <li>• The following will be provided: Adequate health care facilities (including first aid facilities) within construction sites;</li> <li>• Training of all construction workers in basic sanitation, general health and safety matters, and on the specific hazards of their work;</li> <li>• Personal protection equipment (PPE) for workers, such as safety boots, helmets, gloves, protective clothing, goggles, and ear protection in accordance with HSE legislation;</li> <li>• Clean drinking water to all workers;</li> <li>• Barriers and warning signs at all hazardous areas for protection to the general public;</li> <li>• Periodic cleaning of latrines and waste container to prevent outbreak of diseases.</li> <li>• Where feasible contractor shall arrange temporary integration of waste collection from work sites into existing waste collection systems and disposal facilities of nearby communities.</li> <li>• Training/briefing about safety – prior to commencement of works in rules for the handling and storage of hazardous substances (fuel, oil, lubricants, bitumen, paint) and cleaning of machinery/equipment.</li> <li>• Keeping to occupational safety rules during operation in tunnel and drill and blast works.</li> <li>• Briefing related to safety during operation in the confines space.</li> <li>• Implement international HSE standards in all contracts.</li> <li>• Working on height and other safety requirements relevant to the task will be enforced.</li> </ul>	Details are given in Table 4	Contractor	RD Construction supervisor MENRP
Residents injured by construction traffic and machinery	Conduct safety awareness campaigns, focusing on schools and children.	Details are given in Table 4	Contractor	RD Construction supervisor
<b>TRAFFIC, MACHINERY</b>				
Potential impact	Mitigation/Enhancement Measure	Monitoring requirements	Responsibility	
			Development/Implementation	Control
Asphalt plants	Use existing asphalt plants or obtain permit from MENRP.	Details are given in Table 4	Contractor	RD Construction supervisor



Traffic disruption	<p>Develop Traffic Management Plan in conjunction with road authorities to manage all temporary accesses, delivery of material and machinery.</p> <p>Submit a traffic management plan to local traffic authorities prior to mobilization.</p> <p>Provide information to the public about the scope and schedule of construction activities and expected disruptions and access restrictions.</p> <p>Allow for adequate traffic flow around construction areas.</p> <p>Provide adequate lighting, well-designed traffic safety signs, barriers and flag persons for traffic control.</p>	Details are given in Table 10.4	Contractor	RD Construction supervisor
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**Table 3 Mitigation Plan for Operation phase**

Activity	Location	Issue	Mitigation measure	Responsible authority (implementation)	Responsible agency (monitoring)
Accidental fuel/oil spill and/or roadside litter washed off/blown off	Surface water	Water pollution	<ul style="list-style-type: none"> <li>• The trained Maintained Contractor during the operation phase will have emergence respond plan for response mitigation measures. The above mentioned team will work according to this plan and will reduce and avoid the contamination of the water at the culverts by covering the spilled areas with the sand, after the sand will absorb the contamination sand will be taken to the specialized landfill areas;</li> <li>• But if the spilled oil/fuel accidentally will be run to the culverts, the spilled oil/fuel is going to the sediment trap with filter (during cleaning of the culverts no water is used). The contaminated soil is excavated and is taken to the specialized landfill areas;</li> <li>• During the ordinary cleaning the Maintained Contractor will clean the culvert from the sediments mechanically without water usage;</li> <li>• Control over truck traffic to minimize spills;</li> </ul>	Road Maintenance Contractor	RD, Traffic Police

Road resurfacing	Road	Water bodies pollution by heavy metals, hydrocarbons and debris	<ul style="list-style-type: none"> <li>• Maintenance paving should be performed only in dry weather to prevent runoff contamination.</li> <li>• Proper staging techniques should 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.</li> </ul>	Road Maintenance Contractor	RD
Noise	Residential area	Disturbance of local residents by traffic related noise	Currently not required	n/a	n/a
Littering	Along the new road	Possible negative impact, Water pollution, Aesthetic impact	<p>Ensure that the community is aware of the range of ways to dispose of their waste correctly;</p> <p>Inform the community of the level of fines that littering incurs;</p> <p>Signage may be an element of a roadside litter prevention program, educating the community that littering is illegal, fines apply and behaviors are monitored. The signs may be suitable for placement in a series of two to four signs at 10 km intervals to repeat the message in different ways.</p> <p>Cleaning up</p>	Road Maintenance Contractor	RD
Status of biodiversity	Along the new road	Impact on vegetation,  Road kills of animals	<p>Remove faded plants, replace them with new</p> <p>Keep records of accidents.</p> <p>If accident hot spots with large mammals is identified, appropriate protective measures shall be elaborated (e.g. reflectors /local fencing, warning signs, speed reduction)</p>	Road Maintenance Contractor	RD
Traffic	Along all road sections	Accidents due to winter typical hazards (snow, ice, fog)	<p>Installation of warning signs</p> <p>Informing</p>	Road Maintenance Contractor	RD

**Table 4      Monitoring Plan**

Issue	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
<b>CONSTRUCTION PHASE</b>					
Waste water	Quality parameters of waste water from construction camps and portable sites, according to relevant standards	At portable facilities at work sites	Inspection of wastewater units, latrines and septic tanks	Frequency defined by Georgian Environmental standards	RD, Construction Supervision
Community tension and disruption	Satisfaction/disturbance level of the residents	Construction sites	Observation, surveys	Regular frequency or when changing operations	RD, Construction Supervision
Impact on topsoil	Striping of the topsoil Stockpiling, Protection from erosion and washing away	Worksite	Inspections; observation	During removal of the topsoil layer and preparation of the sites, After stockpiling, After completion of works on shoulders	RD, Construction Supervision
Oil/fuel spills	Oil/fuel spills	Worksite, car maintenance, servicing area (if available)	Inspections; observations	Unannounced inspections during construction	RD, Construction Supervision
Impacts created by material transport (stone, sand and gravel)	Are the truck loads covered or wetted; Compliance with the Contractor's Method Statement (restricted working hours; haul routes) dust suppression methods where required	Worksite / haul routes	Supervision	Unannounced inspections during work	RD, Construction Supervision
Impacts on trees near the working area	Are the trees located close to the project area protected by fence.	At sites where trees and forests are located along the construction site.	Supervision	After begin of construction works at the respective site	RD Construction Supervision
Air pollution from improper maintenance	Exhaust emissions, dust	At site	Visual inspection, measurements of exhaust emissions	Unannounced inspections during construction works	RD Construction

of equipment/ machinery (general)					Supervision, MENRP
Dustiness	Visual presence of dust	At construction sites	Visual monitoring	Regularly site visits	RD, Construction Supervision
Contamination of soil during construction	Heavy metals and greases and oils	Agricultural land	Soil quality analysis	One month before the commencement of works. During construction - quarterly.	RD, Construction Supervision
Noise	Noise Levels	Village	Noise measurement equipment	Quarterly	RD, Construction Supervision
Material supply Concrete production	Obtaining valid operation license or purchasing from licensed provider	Asphalt /concrete plant	Inspection	Before work begins	RD , Construction Supervision
Material supply Borrow areas	Obtain a license for material extraction	Sand and gravel borrow pit	Inspection	Before work begins	RD, Construction Supervision
Damage to irrigation and other infrastructure	Visual damages	Agricultural lands	Visual observations	Weekly	RD, Construction Supervision
Material production/ extraction	Asphalt/concrete plant - possession of official approval or valid operating license	Asphalt /concrete plants	Supervision inspection	before work begins	RD, MENRP
Material production/ extraction	Stone quarry – availability of license	Quarry	Supervision inspection	before work begins	RD, MENRP
Transportation	Traffic management - hours and alignments selected	Job site	Supervision inspection	Regular inspections during work	RD, Construction Supervision
Vibration (whether appropriate)	Vibration levels	Job site	Supervision, observations	Regular inspections during work and on complain	RD, Construction Supervision
Traffic disruption	Existence of traffic management plan	At job site	inspection; observation	Before works start; once per week at peak periods	RD, Construction Supervision

Workers safety	Protective equipment; organization of bypassing traffic	Work site	inspection	Regular inspections during work	RD, Construction Supervision
Slope stability	Status of slopes	Sensitive areas	Stability , identification of visual traces of possible erosion	Seasonally after adverse weather events(storm, gale)	RD, Construction Supervision
Impact on planted areas	Status of vegetation	Planted vegetation areas	Visual control	Seasonally	RD, Construction Supervision
Noise disturbance (residents, workers)	Noise levels	Worksite, nearest residential areas	Noise meter	Upon receipt of complaints	RD, Construction Supervision
OHS	Use of personal protective equipment (PPE) relevant to the task; Training records; Organization of traffic on the construction site Keeping to the safety rules while working in the tunnel and/or on height	Worksite	Inspection; interviews; comparisons with the Contractor's method statement	Unannounced inspections during construction and upon complaint	RD, Construction Supervision



## **6. Public Consultation**