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**Roads Department
of the Ministry of Regional Development and Infrastructure of Georgia**



**Environmental and Social Impact Assessment of Works for the Improvement
of Chumateleti-Khevi Section of E-60 Highway**



**EXECUTIVE SUMMARY
of
Environmental and Social Impact Assessment Report**

January 2017

Introduction

The Government of Georgia is implementing a program to upgrade the major roads of the country, managed by the Roads Department (RD) of the Ministry of Regional Development and Infrastructure (MRDI). The program aims to improve transportation and transit of goods to surrounding countries, which is a significant and growing contributor to GDP. Transport of goods into and through Georgia has increased over the past 10-15 years as markets have expanded following the breakup of the Soviet Union, and Georgia is now a major transit country. Almost two-thirds of goods in Georgia are transported by road, and haulage by domestic and international truck companies is very evident on the country's highways. However, many roads are poorly equipped to cope with the volume of traffic and the proportion of heavy vehicles, and factors such as insufficient dual carriageways, routing through inhabited areas and inadequate maintenance and repair, hinder throughputs and increase transit times. This creates difficulties for haulage companies and their clients, truck drivers, Georgian motorists and local residents.

The critical target of the program for upgrading major roads in Georgia is the E-60 or the East-West Highway (EWH) - the main route to neighboring Azerbaijan and Russia, also connecting to Turkey and Armenia. For planning purposes, the EWH has been divided into sections of various lengths. The World Bank is providing series of loans to the Government of Georgia for upgrading this highway through East West Highway Improvement Projects (EWHIPs). Three projects of these series are now completed covering the highway section between Agaiani and Agara. EWHIP-4 and East West Highway Corridor Improvement Project (WEHCIP) are currently under implementation covering the sections Agara to Zemo Osiauri and Zemo Osiauri to Chumateleti (shortly before Rikoti tunnel, which takes the EWH from East Georgia to the West).

The next section of EWH targeted for the improvement lies between Chumateleti and Khevi, and includes construction of an additional tunnel through Rikoti mountain pass. Preparatory work for this investment is being financed from EWHCIP and includes conduct of the Environmental and Social Impact Assessment (ESIA) of the proposed infrastructure. Civil works in this section may be supported with the Additional Financing to the EWHCIP as well as from the sources other than the World Bank.

Objective of the ESIA

Objective of the conducted ESIA was to identify expected positive and negative environmental and social impacts of the improvement and operation of EWH between Chumateleti and Khevi in the construction and operation phases; identify likelihood, magnitude and spread of these impacts; and work out measures for avoiding or mitigating these impacts. ESIA contributed to the analysis of routing and design alternatives and the selection of the solutions most suitable from economic, fiscal, technical, social and environmental perspectives. The ESIA report includes an Environmental and Social Management Plan (ESMP) which will become a part of the contract for the provision of upcoming civil works and serve as a field guide for good environmental performance mandatory for adherence by contractor.

Environmental Screening Outcome

Under the Article 4, Paragraph 1, Subparagraph "j" of the Law of Georgia on Environmental Impact Permit, construction of international and intrastate highways and railways, bridges and underway crossings beneath them, as well as engineering structures for the protection of highways, railways and their territories is subject to the State ecological examination. Therefore, improvement of Chumateleti-Khevi section of the EWH is subjected to the ecological examination and issuance of an environmental permit. The permit is to be issued

based on the expert conclusion of the State Ecological examination by the Ministry of Environment and Natural Resources Protection of Georgia (MENRP).

According to the requirements of the World Bank's safeguard policy OP / BP 4.01 Environmental Assessment, upgrading of EWH fall under environmental Category A requiring a full-scale ESIA and the development of an ESMP.

Public Participation

The Bank policies and the Georgian legislation require meaningful public participation and involvement in the process of ESIA and environmental management planning. The main principles of the public consultation include:

- Conduct of at least two public consultation meetings for environmental Category A activities: one at the early stage for agreeing on the Terms of Reference (ToR) of the ESIA and the approach to this study and the second – at the final stage of the process to discuss the draft ESIA report;
- Prior disclosure of the documents to be publicly discussed, and announcement of the time and venue of the consultation meeting through central and local means of public communication;
- Invitation of written comments/questions on the draft ESIA; and
- Incorporation of public feedback into the ESIA report and re-disclosure of the finalized document.

RD carried out the public consultation meeting on ToR for the ESIA on May 6, 2016. As part of the ESIA, consultations were held in September 2016 with the owners and employees of businesses located in the vicinity of the highway corridor, as well as with individual entrepreneurs. Information-sharing meetings were also held with the representatives of Khashuri municipality and population of Khevi village. The draft ESIA report will be posted on the web page of the MRDI. Hard copies of the document will be made available at the offices of Khashuri local self-governments located in the vicinity of the EWH, RD, and the office of *Eco-Spectri* Ltd.

RD will organize a public consultation meetings to discuss the draft ESIA report as well as the draft Resettlement Action Plan (RAP). Members of the potentially affected communities, including elected officials, as well as representatives of the local small and medium businesses and other stakeholders will be invited. RD will seek questions and comments from the stakeholders and will incorporate received feedback into the ESIA report, as appropriate.

Sensitive Environmental Receptors and Potential Impacts

The EWH section covered by this ESIA is 11.2 km long, out of which 2.4 km is the length of two tunnels to be constructed. In terms of environmental and social sensitivities, this section and the adjacent territory may be divided into four categories: (i) section from Chumateleti to the East portal of the Rikoti tunnel (1.5 km, including a smaller tunnel with the length of 0.7 km); (ii) coupled Rikoti tunnel (1.7 km); (iii) section from the West portal of the tunnel up to village Khevi (5 km); and (iv) village Khevi (3 km).

The main environmental impacts are expected at the construction phase and come from clearing of the right-of-way (RoW), establishment/operation of work camps and temporary access roads, operation / servicing of

construction machinery, massive excavation works required for the tunnel construction and works near waterway.

Clearing of the RoW will in certain areas will imply de-listing of land plots from the State Forest Fund. Drilling of the new tube of the Rikoti tunnel will generate vast volume of excess material and its disposal in the environmentally decent way will be a challenge both technically and financially. Establishment of construction camps and access roads will be associated with the generation of solid waste and wastewater, compression of soil, and noise related nuisance. Parking, operating and servicing of construction machinery will carry the risk of operational spills of oils and lubricants (i.e. the risk of soil pollution) and generation of noise, vibration, dust, and emissions. It is expected that the construction material will be purchased from suppliers licensed to operate quarries or borrow pits. License for use of natural resources - in case the contractor decides to use own quarries/borrow pits - will be obtained by the contractor from the National Environment Agency of the MENRP. Construction works will also have implications for the occupational health and safety of workers/personnel.

Impacts of the new road during its operation phase are less diverse. Environmental aspects of the highway operation will be air pollution from automobile emissions, and pollution of soil with litter and drainage from the highway as well as water pollution with liquid/powder cargo and/or fuel and lubricants from the cars as a result of traffic accidents on the road section and runoff from the road. Project design brings the risks of negative impacts on environment to the feasible minimum. Provision for road safety, control over the operation of the Rikoti tunnel, and traffic regulation will contribute to managing risks of accidents. Installation of noise barriers is not required. Traffic safety will be an important issue with health, social, and environmental implications.

Direct social impact of the construction in the first and third sections will affect catering facilities (9) located adjacent to the highway, fueling station (1) and individual road-side vendors whose work is seasonal and lasts for 3 or 4 months a year. As of October 2016, some 14 individual traders were found within the subject section of the EHW corridor. 13 of them were interviewed (1 of them refused). Based on the information obtained from the respondents, the number of vendors is much higher (by 2, 5 or 3 times). They are mainly residents of the adjacent villages and trade with their own harvest (fruit, corn, honey, etc.). All physical and legal bodies affected by the project will receive adequate compensation, amount of which will be specified during preparation of the Resettlement Action Plan.

Village Khevi is located on the both sides of the highway, stretching over the distance of about 3 km. in fact, the highway divides the village into two parts. At present, there are 12 access roads connecting village to the highway. In addition, present configuration of the highway allows pedestrians to cross the highway at any point. This facilitates the movement of the village residents from one part of the village to another. Also, there is a 3 km local motor road branching out from the highway that leads to village Tsakvi. This road provides the only motor access the village with 80 homesteads. Reconstruction of the EWH will result in displacement of road-side small businesses, and alter motor and pedestrian communication within and around Khevi village. Compensation and alternative connectivity will be provided.

Project Alternatives

No-project scenario

No “showstoppers” have been identified during ESIA and the anticipated impacts can be managed by application of adequate construction standards and good environmental practices. Nonetheless, a “no-project” option was considered as one of the project alternatives. While it has no environmental and social impacts resulting from the construction works, continuing operation of the highway in its current poor condition would have negative environmental and social impacts from traffic jams, noise, low speed, and high emissions. In the future, with consideration of the anticipated increase of the traffic flow, the situation will worsen. On the global scale, under the “no-project” scenario, local communities would lose opportunity of benefiting from all positive effects associated with the highway improvement, including profits resulting from increased cargo turnover and tourism. Therefore, as the potential positive impacts of the project surpass its possible negative impacts, the “no-project” option was discarded.

Alternatives for placement of Rikoti tunnel tube

Two alternative routes for drilling the additional tube of the Rikoti tunnel were considered. As per the first alternative, the length of the tunnel would be 2,100 m commencing from the starting point of the bypass road of the existing tunnel and following the existing tunnel from the south, with its west portal to be placed on the right bank of river Rikotula. As for the second alternative, the new tube would run south the existing one and in parallel to it, and will have the length of 1,800 m. Comparing these two alternatives showed that the potential environmental impacts of both of them are equal; however, under alternative 1, the amount of the excess material to be generated is higher than with alternative 2. This is a disadvantage of alternative 1, as disposal of the excess material will be pretty problematic. In addition, the longer the section of the tunnel, the more vulnerable it will be in a hydro-geological respect. With consideration of these factors, alternative 2 is preferable.

Alternatives of the road corridor

For approximately 7.5 km of the highway westwards from the West portal of the tunnel, feasibility of two alternative routes had been studied for placement of the two additional lanes of the highway. Under alternative 1, these new lanes would be separated from the existing ones passing on the right bank of river Rikotula and follow a new alignment on the left bank of the river. This would require clearing and cutting of the forested mountain slope, and building of additional bridges and overpasses. Alternative 2 implied widening the existing corridor on the right bank of the river Rikotula to place additional two lanes adjacent to the present ones.

The main criterion of selection between these two alternatives was the landscape and its geological structure. Several active landslide areas are registered on the right bank of Rikotula River adjacent to the existing road. The slope here is very steep and the bedrock is not strong. Hence the gravitational effects are significant. Several landslides have been activated on this slope quite recently (2014). Several thousand cubic meters of earth and rock collapsed, completely blocking the highway and paralyzing the traffic. Collapsed material was used for widening the road towards the Rikotula River bed, since additional cutting of landslide areas was not considered appropriate. In addition to the above, alternative 2 would require cutting larger volumes of rock and earth for widening the road corridor on the right bank as compared to the amount of spoil which would be generated through building corridor for the additional two lanes on the left bank of the river. Given that disposal of excess material is problematic, this argument is also significant. Negative aspect of alternative 1 is that it implies removal of forest cover along the strip of land to be cleared for the construction on the left bank of the river and certain impact on the habitat integrity caused by limiting animal’s free access to the river bank.

Careful assessment of these two alternatives showed overall advantage of alternative 1, as mitigation of its negative impacts is technically more feasible and financially more affordable than coping with the persistent geohazards related to alternative 2.

Project Description

The EWH section to be upgraded between Chumateleti and Khevi is classified as a road of the “international importance”, with the design speed fixed at 80 km/h.

Construction of two tunnels is planned within the 11.2 km zone of the project area, the length of which are 0.7 km and 1.7 km. Eight existing and new bridges have been proposed within the framework of feasibility study. Locations and length of these bridges may be changed at the detailed design stage.

The cross section of the road will be 26 m, with 13 m each side. The center mall will be 5 m wide. The shoulders will be 3 m and 0.5 m wide, the edges will have the gradient of 2.5% and the width of the roadway on both sides will be 7 m each. As for the sections of bridges, the one-side bridge will be 13.5 m wide, including the emergency side tracks and zone for repairs.

The minimal parameters of the cross section of the tunnel are as follows:

- Min. vertical size: 5.0 m;
- Lane width: 3.75 \varnothing (100 km), 3.50 m (80 km);
- Min. shoulder width: 0.25 \varnothing (edge line);
- Min. pathway width: 0.75 m;
- Pathway height: 0.15 m.

Approximately 200 people will be employed during the construction stage, with 60-70% of them as local people. Hence no tangible influx of work force is expected.

ESIA Methodology

The ESIA process consisted of the six main activities that are common for similar studies conducted according to the international standards:

1. Collection of baseline data describing biophysical and social environment within the study area; desk studies and field surveys to address identified gaps in the existing data; update of information on topics and areas where significant negative impacts are expected.
2. Identification of the expected positive and negative impacts of the proposed works on the highway and of its operation thereafter; assessment of the likelihood and significance of the potential negative impacts; and development of mitigation measures.
3. Analysis of alternatives in terms of location, technology, design and operation, including the "no-project" alternative.
4. Development of the Environmental Management Plan.
5. Drafting of the ESIA report.
6. Information disclosure and stakeholder consultation.

Baseline Information

The area of the EHW between Chumateleti and Khevi is located in the high-mountainous part of Georgia and is included in the Trans-Caucasian intermountain geomorphological zone, eastern part of so called Dzirula Massif, which is called Upper Imereti Plateau.

In a hydrogeographical respect, the ground waters formed in a very thick eluvial cover of crystal rocks are important. According to the Seismic Hazard Map of Building Norms and Rules effective in Georgia “Earthquake-resisting construction (SSM III, 21.10.2009 N 128, article 1477)”, the project area is located in the 8-point earthquake zone (MSK 64 scale) (Figure 4.3) with the dimensionless coefficient of seismicity (A) equaling 0.16 (village Khevi) under the same document. In an orographic respect, the road corridor is located in a mid-mountainous, erosive-denudation relief. In a geological respect, the territory is located within the limits of Palaeozoic and Bathonian crystal sub-stratum. The existing road is located at ten bottom of the forested slope of the river Rikotula gorge. It is characterized by a complex dissected relief.

The study area lies in the river Rikotula watershed. Most of it is located on the territory of Kharagauli municipality and broad-leaved forest zone over Rikoti Pass. Here the forest represents the impoverished variant of Colchic vegetation. The total number of relict Colchic species on the territory of the municipality is not very few, but the number of phytocenosis positions of species is not great. However, such Colchic relicts, as rhododendron (*Rhododendronponticum*), flame azalea (*Rhododendronflavum*), cherry laurel (*Laurocerasus officinalis*), willow (*Buxuscolchica*), ilex (*Ilexcolchica*), Colchic ivy – (*Hederacolchica*) and Israeliruscus (*Ruscusponticus*) are quite many in number. With their appearance, the forests here more look like the forests in east Georgia than some other forests in west Georgia, even more so that the plant marking xerophytization, as oriental hornbeam (*Carpinus orientalis*), is not a rarity here. Within the scope of the studied corridor, the plant species with different conservative value (those included in the Red List of Georgia, endemic and rare) and plants with economic value are presented in great numbers.

The protected area located closest to the study corridor is Borjomi-Kharagauli National Park distanced by 6 km.

Settlements are not located in the immediate proximity to the EWH between villages Chumateleti and Khevi. However, there are 7 active and 3 abandoned restaurants, 1 inactive repair workshop and 1 gas station that will fall under the direct impact of road construction. Private roadside vendors are active along the subject section of the highway. They are selling own agricultural produce and non-timber products collected in the forest. The number of such individuals is approximately 35-40 people. Closer to village Khevi, the road runs across several private land plots and residential houses. In addition, a library, a Police Office and a kindergarten in village Khevi come under the impact. A public school in village Khevi may also be affected.

There are no known monuments of culture and/or history in the suggested corridor of EWH between villages Chumateleti and Khevi, however chance finds were encountered on the territory of Khevi community in the past.

Expected Impacts and Mitigation

Based on the analysis of baseline information and study of the preliminary design documents, impacts expected from the construction and operation of the EWH section between Chumateleti and Khevi were

assessed using evaluation criteria. This was followed by the development of the measures to mitigate the expected negative impact on each receptor.

Emissions of harmful substances into the atmospheric air and noise:

In the construction phase, there will be different sources of these impacts. The sources of stationary emission and noise may be a grinding-comparison shop or concrete or bituminous concrete unit. The mobile sources of emission of harmful substances into the atmospheric air will be construction vehicles and machinery operated during the intense earthworks and the disposal of excess material. These impacts will have higher importance in terms of nuisance to local communities in the final section of the EHW which runs across village Khevi.

In order to reduce the combustion emissions, the sources of pollution must be equipped with filters; vehicles and machinery must be maintained in good technical condition and idling should be disallowed; driving speeds should be limited near the residential zones. Stationary sources of emission such as, crushers and concrete production units, should be located in as much distance from the settled areas as possible (recommended distance of 500 m or more); earth roads should be sprinkled periodically (in hot and windy weather) once in 4 hours and speed of vehicle movement along the earth roads must be controlled at all times; loading and unloading of trucks should be undertaken with respect to impacts of dust generation and be limited in windy weather.

Negative impacts of air pollution, noise and vibration during the exploitation phase are expected as the traffic intensity increases. However, there will be less traffic jams along the improved and widened road and the engines of the driving vehicles will be less loaded. Consequently, the exhaust fumes and engine noise will not raise significantly.

Triggering of geological activity:

The hazardous geological processes are expected to activate during the construction phase. The risks of slope destabilization, erosion and landslides will be associated with creation of the new corridor for EWH that implies clearing of vegetation, especially - removal of trees. Such risks are generally high and must be addressed through application of adequate engineering solutions and good construction practice, including: removal of the active layer from the slopes and reducing the slope inclination angle, building protecting walls and arranging effective drainage systems.

The major cause of activation of the hazardous geological processes in the operation phase will be the diminished vegetative cover. In the first years of the road exploitation, it will be necessary to monitor the adjacent slopes and apply additional stabilizing measures as necessary.

Loss of topsoil:

The highest risks of the damage and erosion of the topsoil will be observed during the earthworks and during the movement of heavy machinery. This may lead to the soil compaction and erosion, and reduction of the soil fertility. The risks of deterioration of the soil quality may also be associated with operational/accidental spills/leakage of fuel and lubricants. These risks will be mitigated by stripping and separate stockpiling of the topsoil, and its use for the site reinstatement. Also, adequate waste management on site will be critical for the protection of topsoil from pollution. No impacts on topsoil are expected at the operation phase.

Deterioration of vegetative cover:

Clearing of the RoW for the new alignment will imply removal of vegetation, including cutting of trees. Loss of vegetation will be kept at the possible minimum. Removal of trees for the road construction needs will not cause functional damage to the ecosystem, and will not affect any critical habitats, however compensatory tree planting will be required within the EWH corridor at the ratio of 1:3 (except for the trees cleared from the private land plots). Selection of species for planting will be based on the natural composition of local flora. The new section of EWH planned to construct on the left bank of the river Rikotula, from the western portal of the new tunnel to village Khevi, runs across the forest fund territory. Clearance from the National Forestry Agency will be obtained authorizing tree felling in the forested areas which are registered with the State Forest Fund. Greening of the construction sites along the RoW, as well as maintenance of the re-planted areas for three years will be included in the contractor works. RD will be responsible for further maintenance of plantations. Cultivation of disturbed areas, including re-planting, will enable to mitigate disturbance of animal species.

Disturbance of fauna:

Impact on fauna will be the highest between the western portal of Rikoti tunnel to village Khevi. This 5-km-long section is covered both, with primary and secondary forest stands. Fauna comprises representatives of various types of wildlife ranging from Protozoa to mammals. Construction of additional lanes of the EWH on the left bank of the river will cause fragmentation of terrestrial habitat of animals (including small mammals, reptiles and amphibian). Movement from forested area to the riverbed will be limited. This will affect food extraction and reproductive behavior of animals. In order to reduce impact caused by habitat fragmentation, arrangement of artificial crossings under the road will be required. Such passes should be designed following the conventional standards and be distanced from each other at 200-300 m to 3-4 km (1-3 km for large animals, up to 1 km for average-sized mammals and 200-300 m for small animals).

Impact on protected areas:

Construction and operation of the EWH within Chumateleti-Khevi section will not have impact on the protected areas as the closest national park of Borjomi-Kharagauli is distanced from the road corridor for 6 km and more.

Disturbance of river ecosystem:

The highway corridor passes along Rikotula River and crosses it in six locations. Impacts on the aquatic life are possible during the construction as well as operation phases. Water contamination may occur in case of operational and accidental leakages of fuel/oil/lubricants from cars and machinery. Solid waste pollution may occur due to improper management of construction materials and waste. Earthworks may cause sedimentation of riverbed, and construction of engineering structures (bridges, riverbank protection structures and etc.) is likely to result in certain changes of the riverbed profile. Rikotula River is not rich in ichthyofauna. Besides, the construction works are planned along small sections what will enable most of the species to move far from the construction site and return to their original habitats after the construction is over. Increased water turbidity will have a negative impact on the spawning. This is particularly true with the species spawning in low water with a stony bed and oxygen-rich current. Such species are: (i) chub (*Leuciscus borysthenicus*), which spawns once a season, in April or May, (ii) khramulya (*Varicorhinus Capoeta*), spawning several times a season, from May through August, and (iii) barbell (*Barbus barbus*), which spawns in May or June, once a

season. Increased water turbidity or spills of hazardous substances during the spawning season of these fish species may lead to the total destruction of hard-roe on the site.

For minimizing impacts on the river ecosystem, fuel, oil, lubricants, construction materials and waste will be placed not less than in 100 metres' distance from the river banks. Hazardous liquids will be kept and handled on impermeable surfaces. Washing of vehicles in the river will be restricted. Emergency response plan for addressing spills should be worked out by the works provider and the staff should receive appropriate training.

Impacts of the operation of work camps and access roads:

In the construction phase, temporary construction camp(s) will be arranged within the project implementation area and will have temporary impacts on the surroundings. Work camp may be used for lodging for the limited number of workforce, for parking of construction vehicles and machinery, and for on-site storage of some types of construction waste. To mitigate impacts from the operation of the work camp, its location shall be properly selected. It is advisable to place the work camp on a degraded site with no or little vegetation. Access to safe drinking water and decent sanitary facilities shall be provided. If the work camp is used for living for a number of workers, residential blocks must be separate from storage facilities, be properly ventilated and illuminated. If the dormitory does not provide a separate space for cupboards/locker rooms, the minimum room space shall be 4 square meters per person (assuming a height of 2.4m); If the dormitory provides a separate space for cupboards/locker rooms, the minimum room space shall be 3 square meters per person (assuming a height of 2.4m). Adequate number of toilets and sanitary fittings shall be provided (1 toilet, 1 hand wash basin, 1 urinal and 1 bathroom with bench per 15 male workers), catering and the first medical aid facilities will also be provided.

Already existing access roads will mostly be used for the construction purposes. As for the section that passes along the left bank of Rikotula River and covers the forested areas, it requires the arrangement of several temporary access roads. Existence of temporary roads is necessary for the access of construction equipment and construction material and for removal of topsoil, soil and wood waste from the project zone. Number of access roads will be specified during the detailed design stage. After the completion of the construction works, local authorities will decide which access roads will remain in constant use and which will be restored. Restoration of temporary access road areas shall be conducted in accordance with the requirements of the Law of Georgia and World Bank.

Landscape transformation and visual impacts:

Construction of the additional two lanes on the left bank of the river will create a significant environmental footprint and have irreversible impact on the landscape. Additional impacts on the landscape are expected from quarrying for the construction materials and disposal of the large amounts of excess material generated from slope cutting and drilling of the tunnel(s).

Cut slopes will be carefully reinstated through landscaping, compacting, provision of drainage and creation of enabling environment for the natural regeneration of vegetation. Tree planting may be performed on the terraces as required.

Works provider will be encouraged to purchase natural construction material from the external providers operating on the existing quarries. Alternatively works provider may opt to operate own quarries, in which case license for natural resource extraction must be provided from the National Environment Agency. Disrespected of the terms of the license, works provider will be required to reinstate used-up sections of quarries by terracing, backfilling, compacting, provision of adequate drainage facilities, and stimulating natural regeneration of vegetation. Extraction of sand and gravel from the watercourse must be prohibited.

At the stage of construction of Chumateleti-Khevi EWH, approximately 1.200.000 m³ excess material is expected to originate. What amount of it will be used for backfilling and building of the roadbed is not known at this stage. Material to be used will be obtained from the sites of its temporary disposal along the highway corridor. However evidently a large amount of spoil will remain and will require adequate permanent disposal. Based on the rough estimation of the excess material volumes, the minimal area of its final disposal must be 10-12 ha, so that the height of piles does not exceed 5 m and impact on landscape as well as a threat of erosion is not excessive. The natural landscape in the vicinity of the Chumateleti-Khevi section of EWH allows no area for the disposal of the estimated amount of excess material. Neither is such area found in Khashuri municipality.

There are two options for disposing the large amounts of excess material and these two ways may be combined as well: splending material low over 10-12 hectares of agricultural land plots and reinstating the area so that neither land take nor change in the land use pattern occurs, and transporting material to already upgraded section of the EWH for backfilling into the partially reinstated quarries.

Impact on socio-economic environment:

While significant positive social and economic pacts are expected from the improvement of the EWH in the Chumateleti-Khevi section, it is also associated with the physical and economic displacement of local residents. In addition, one of the income sources of the local population - the roadside vending - will be lost. Movement will be limited in the construction phase causing certain discomfort for the local population, etc.

General approach to the resettlement impacts is to minimize a need for land take and displacement to the extent possible, provide fair and equitable compensation to all affected people, and assist them in the restoration of livelihoods at least to the level equal to the pre-project level. More specifically, principles that will apply include: (i) constructing the road to avoid residential areas wherever possible to minimize physical relocation of people, and select alignments that minimize acquisition of privately or publicly held productive land; (ii) adopting design standards that minimize the need to impose land use restrictions on adjoining areas; (iii) developing fair and transparent procedures, as defined in the Entitlement Matrix of Resettlement Policy Framework, to determine compensation for the temporary loss of land/assets during construction, permanent acquisition of land and assets, and restrictions on use of land that may be applied to areas adjoining the corridor; and (iv) acquiring land (or right to use land) through negotiated agreements and with the use of the power of eminent domain only as a last resort.

Works on the EWH will have positive impact on the employment of local population. According to the common practice applied in Georgia and often times specified as a requirement in bidding documents, it is envisaged to have 70% of the workforce deployed from local population, as was the case during construction of Agara-Osiauri section of the EWH.

Impact on cultural heritage:

Impact of the planned works on the visible monuments of the historical-cultural heritage will be insignificant. However, likelihood of chance finds in the project area is higher than average. Various finds have been excavated in village Khevi in the past. Blueprint of action in case of chance finds is provided and must be followed through by all parties involved.

Cumulative impact:

Large section of the EHW corridor within Chumateleti-Khevi section runs across the unsettled area and there are no industrial facilities in its vicinity. As per the existing information, development of no large-scale infrastructure is planned in highway corridor in future. Consequently, no cumulative effect is expected.

Residual impact:

Reconstruction of EWH will have significant residual impact due to landscape transformation through slope cutting and tunnel drilling that will lead to the generation and disposal of large amounts of the excess material. Other residual impacts to be observed early in the operation phase may gradually shrink. This includes impacts on vegetation. Providing favorable conditions for natural regeneration and compensatory tree planting will take long to restore vegetation on the cut slopes, however impacts may decrease to minimal in the long term. To achieve such outcome, application of mitigation measures (maintenance of artificial plantations, replacement of deceased greenery, maintenance of drainage systems, etc.) should be carried on beyond closing of EWHCIP AF.

Environmental and Social Management Plan

The goal of the ESMP is to develop the mitigation measures and monitoring indicators for the impacts identified through the ESIA. It also describes institutional arrangements for applying mitigation measures and exercising control over their implementation. In the construction phase, works provider to be contracted by RD will be responsible for applying prescribed mitigation measures. This obligation will be contractually binding, as the ESMP will be attached to the works contract and be its integral part. RD will have overall responsibility for environmental monitoring of works and for ensuring full adherence to the ESMP. It is expected that RD will hire a consultant company for the technical supervision of works and will include day-to-day environmental oversight into the tasks of such consultant. However, RD will use its in-house capacity to organize environmental monitoring and reporting and will bear overall responsibility for it. Environmental Supervision Department of the MENRP will exercise State control over the compliance with the terms of environmental permit to be issued for the works in Chumateleti-Khevi section of the EWH and with the national environmental legislation of Georgia.

Because EWH is an international road, RD owns and operates it. Once the construction works for upgrading the highway section between Chumateleti and Khevi are completed, RD will be responsible for its operation and maintenance. Ensuring road safety and good environmental performance will be a high priority at the operations stage and will comply with the requirements of the national legislation and the best international practices.

The RD, through an outsourcing arrangement, will permanently maintain greenery planted upon completion of road works for landscape reinstatement and compensation for trees removed during the construction.

Regular collection of solid waste will be organized along the highway. State technical control of the highway through regular oversight and inspection will be provided.