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M. Chelidze

Transmission Grid Strengthening Project

Akhalsikhe-Batumi 220kV Double Circuit Power Transmission Line



Environment Impact Assessment EIA of the Change and Commissioning

Additional Information and Clarifications

Tbilisi 2019

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1. Introduction

The Ministry of Environment Protection and Agriculture has reviewed JSC GSE's Letter N 8454 dated June 11, 2019, concerning the Environmental Impact Assessment (EIA) of the amendments to the design of Shuakhevi-Akhalsikhe Section of the Akhalsikhe-Batumi 220 kV Power Transmission Line. A scoping Conclusion N 17 (11.02.2019) was issued for the afore-mentioned projects based on the Minister's Order N 2-148 dated February 15, 2019. It has been noted in the course of administrative process started for taking an environmental decision that the submitted EIA did not include certain issues indicated in the Scoping Conclusion N 17 (11.02.2019) and, hence, the Ministry of Environment Protection and Agriculture demanded additional information and clarifications on the mentioned issues. The presented document – “Additional Information and Clarifications” is produced in response to the above request of the Ministry and becomes an Annex to the main report on the EIA of the Change and Commissioning of Akhalsikhe-Batumi 220kV Double Circuit Power Transmission Line.

A full text of the Ministry of Environment Protection and Agriculture Letter N 7780/01 dated 07/08/2019 is provided below. It contains the list of issues to be specified and clarified and relevant demands.

The following chapters of this Annex address the issues set out in the Ministry letter, and they are grouped by topics.



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N 7780/01
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07/08/2019

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To: JSC Georgian State
Electrosystem
Address: N 2, Baratashvili, Tbilisi

The Ministry of Environment Protection and Agriculture has reviewed your Letter N8454 dated June 11, 2019, concerning the EIA of the Change and Commissioning of Shuakhevi-Akhaltzikhe section of the Construction and Operation of Akhaltzikhe-Batumi 220 kV Power Transmission Line Project.

A Scoping Conclusion N 17 (11.02.2019) was issued for the above-mentioned projects, based on the Minister's Order N 2-148 dated February 15, 2019.

In the course of administrative process commenced for taking environmental decision it has been identified that the submitted EIA report did not address certain matters indicated in N 17 (11.02.2019) scoping conclusion, in particular:

1. According to N 17 (11.02.2019) Scoping Conclusion, during the public discussions (Shuakhevi Municipality, Village Nenia/22.01.19/12:00) of the Scoping Report, in Village Nenia participants said that drinking water may disappear in the village as a result of the overhead line (OHL) passing near the village (Village Tavi/Nakanafevi), felling the forest, organizing roads and relevant infrastructure; in relation to the above-mentioned, the information about the study of the sources of potable water was to be included in the EIA report. The presented EIA report does not reflect the above-mentioned information. Information concerning the study of the sources of potable water for the given area (and not only) and possible impact of the project on these sources (it should be noted that a similar comment was raised again on July 24, 2019 during the discussion of the EIA report in Village Nenia) should be specified. Furthermore, relevant mitigation/compensatory measures should be identified in case the sources of potable water and impact on these sources are identified in the given section;
2. The EIA report does not include the following information, which should be specified: detailed projects for the disposal of dumpsite, location coordinates, as well as engineering hydrogeological conditions of the sections under the examination at the site of the placement of waste rock by riverbanks and the impact of the river on the area of the location of dumpsites;

3. Information about groundwater level and aquifers should be specified based on engineering-geological study;
 4. According to the Scoping Conclusion #17 (11.02.2019), the matters of observation over the impact on specific components of biodiversity should have been included in the EIA Report's Monitoring Plan. This matter should be specified in the EIA Report;
 5. Since the Program of Monitoring of the Impact on Natural and Social Environment presented in the EIA Report and the Plan for Managing the Impact on Natural and Social Environment – Measures for the Prevention or Mitigation of Potential Impact, is general, the specified information submitted to the Ministry shall be accompanied by the plan of detailed mitigation measures to be implemented during the construction and operation of the OHL, along with detailed measures and activities for preventing, minimizing or mitigating negative impact on environment. Furthermore, a detailed environmental monitoring plan for the period of the OHL Construction and Operation stages should be submitted;
- Moreover, some issues have been identified in the EIA Report and they should also be specified:
6. The submitted EIA Report does not contain detailed research data for landslides for the section of the projected change (relevant detailed mitigation/preventive activities);
 7. As can be seen in the EIA report, the planned works are major, while the assessment of possible impact on geological environment and relevant mitigation activities are general. The EIA does not stipulate detailed measures necessary for the protection/stabilization of specific sensitive sections and they should be specified;
 8. Given the geologically complex and sensitive characteristics of the Adjara High Mountainous region, approximate volume of the removed ground --180,000 m³, has powerful impact on geological environment, hence, the EIA Report should provide detailed information about mitigation and re-cultivation activities;
 9. Maps for engineering-geological conditions provided in the EIA Report do not allow us to fully understand the engineering-geological conditions of the studied territory, since the presented maps are not standard (small scale and low resolution), hence, it needs to be specified;
 10. Given complex geotectonic characteristics of the Shuakhevi-Akhaltzikhe section, the EIA report should include detailed mitigation activities and the matters of monitoring during construction as well as operation process, furthermore, the mitigation activities shall include specific risk prevention measures, rather than general mitigation measures. In the course of implementation of activities, in case of the cutting of the trees, the intensification of rock avalanche, rockfall, mountain creep and slide bodies are expected; hence, the EIA report shall specify the information about protective measures on such sections;
 11. The EIA report shall provide specifics about the distance and altitude of the towers closest to rivers, what is maximum discharge, levels of the rivers within the impact area; as well as information about embankment works should be specified. Furthermore, the EIA report should specify detailed activities for minimizing impact on underground waters;

12. The EIA Report indicates that in places where the OHL route crosses the rivers, on the places of crossing, works should be implemented in compliance with all requirements. Although, no specifics are provided concerning such requirements and they should be specified;

13. The EIA Report should specify information about existing and new access roads, by indicating relevant parameters. The works of constructing new access roads should be described. Detailed description of possible impact on environment as a result of the construction of access roads and as necessary, relevant mitigation/preventive activities should be included;

14. Sub-Chapter 3.8.4 of the EIA report indicates that main objective of the project is to minimize impact on sensitive sections in the course of the construction of the transmission line. Relevant requirements and procedures are described in the present Report's Chapter 7 -- about the analysis of potential impact of the project. The above-mentioned does not correspond with the content of Chapter 7 of the EIA, since EIA's Chapter 7 addresses current socio-economic context;

15. Information about Adigeni-Beshumi 110 kV OHL indicated in the submitted EIA report should be specified (detailed information about the proximity with the project corridor, crossing the project corridor, overlapping of OHL corridors, etc.).

Based on all the afore mentioned, based on Article 83 of the General Administrative Code of Georgia, the Ministry is suspending the administrative process. Please submit the specified EIA report, along with relevant additional documentation to the Ministry, following which the Ministry will resume administrative process pursuant to the applicable legislation in order to make an environmental decision.

Giorgi
Khanishvili

First Deputy Minister



2. Geological environment, hydrogeology, hazardous geological processes

(Issues # 3; 6; 7; 8; 9; 10)

2.1 Additional clarifications about geological studies and assessments in the EIA

The description of the geological environment and the assessment of the risk of hazardous geological processes provided in the EIA is based on field studies and extensive desktop works conducted by highly qualified and reputable geologists.

Geological studies on old routes: The route study report (Mott MacDonald, 2012) has been produced based on the field investigations. Moreover, satellite photos from 2012, 0.5 m resolution aerial photos dated 2005, Google Earth photos, 1:25,000 topographic maps, Adjaristskali water catchment 1:50,000 geological map, 1:50,000 engineering-geological map and geotechnical and geological studies report for the cascade of Adjaristskali hydros were used for collecting information about geological hazards. As part of the route study (Mott MacDonald, 2012), geological hazards were assessed for all OHL alternatives, in 500 m radius from the middle line of the OHL corridor. Moreover, such landslide bodies falling outside this area that may have an impact on the projected OHL were also included in the report.

Geological investigation on a new route:

The geological and geomorphological description of the project region and the OHL corridor itself is based on the field study and existing reference materials. In particular, various publications, library materials and various thematic geological maps (including maps showing geological risks) have been used for describing region-wide geological risks.

In November-December 2018, geological study (visual study, field identification of constituent rocks, determination of active hazardous geological processes in the corridor; assessment of the risks of development of erosional, landslide and other hazardous geodynamic processes in the future and recommendations concerning mitigation activities) of the OHL new route (37km/ from tower 158 to tower #250) was performed in the Skhalta gorge and dividing crest. The EIA provides the description of engineering-geological conditions of the project OHL construction corridor by picquets.

During the field study, not a single active landslide or other hazardous geological process that may have an impact on the project, or which may get intensified as a result of construction activity has been identified in the OHL corridor or its adjacent territory. Please note that there were such active landslides near the old, rejected route.

Although there are no active geodynamic processes found in the corridor, the zoning of specific sections of new and old routes was assessed according to geotechnical complexities and the risks of hazardous geological processes (development in the future or intensification as a result of construction works).

It has been established that:

- the new route is considerably safer as regards to possible activation of hazardous geological processes, as compared to the old route;
- The location of towers on a new route has been selected optimally (primarily on crests). Ground is stable in all these areas. Currently no active landslide or other

geodynamic processes (erosional processes, mudflows) can be observed within the target area.

- Although project sections are primarily made up of hard rocks, one cannot exclude the development of erosional processes and gulying of land surface, or local, small-scale collapse of unstable slope during the construction of access roads (especially, if building standards and norms are not followed). Zoning of sections based on geotechnical difficulties and hazardous geological processes is aimed at the assessment of the probability and the impact of the development of such events and relevant planning of preventive and mitigation activities. Since it is about the mitigation of not existing threats, but about possible future geological hazards, the suggested mitigation activities are not and cannot be specific (specific to a concrete area); rather, they are non-specific and offer a listing of those effective activities that are relevant for possible scenarios of hazardous geological processes on the project territory. These activities provided in Chapter 8.3 of the EIA comprise monitoring of erosional processes, anti-erosion measures, management of surface waters, minimizing forest felling and maximum restoration of the terrain and the vegetation cover; adhering to building norms and rules in the course of building a road, minimizing the cutting of slopes; restricting explosive works in higher risks zone; re-cultivation of the territories damaged during the construction upon the completion of construction works.

It is also important to add here that according to the design and construction contract, the building contractor will be required to carry out additional geological studies and prepare a package of anti-erosion activities specific to the location:

- Detailed engineering-geological study will be performed (drilling, geophysical investigation, etc.) on the sections where the towers are to be installed. We would like to underscore that these studies are not aimed at verifying the presence of landslides or other hazardous geological processes – this matter has already been established and is included in the EIA. Detailed engineering-geological study is necessary for specifying optimal loads and other engineering-construction technical parameters (geotechnical parameters of constituent rocks, in case of possible detection of groundwaters, determine their aggressiveness, etc.) for organizing the foundations of towers. At the same time, evidently, the results of detailed engineering geological study (levels of groundwaters; specific geological sections) will be used for erosion prevention and developing location specific projects for monitoring;
- For every construction site and access road, as necessary, the construction company will develop a package of anti-erosion activities and projects for maintaining slope stability that will be based on the results of detailed engineering geological study.

2.2 Answers to the issues raised in the letter of the Ministry

Issue 3. Information about groundwater line should be specified based on engineering-geological study.

Answer: a more detailed description of this matter is provided below, in Chapter 3. A brief summary, a conclusion is included here: Effectively all OHL support towers will be installed

on the crests of dividing ridges and hillocks and crest-side lines. The depth of the foundations for support towers is 3m. As for the areas (levels) occupied by underground waters, they are at least several scores of meters, based on morphological, geological and hydrogeological conditions of the region. The EIA provides a conclusion of qualified geologists that the “locations for the OHL support towers are selected in a way that during the period of their construction and operation, effectively any impact on the regime of underground waters (qualitative as well as quantitative) is excluded and no negative impact will occur. The only impact can occur on “infiltrated waters” that develop only during rains that create temporary streams of groundwaters near the surface. The installation of towers on the crests significantly minimizes the probability of this impact as well. Hence, the determination of exact marks of groundwaters as part of the EIA is irrelevant from the standpoint of assessment of the impact on environment: this does not offer significant additional information for assessment.

Nevertheless, “information about the groundwater marks” will be specified during the construction stage, when the building contractor will perform drilling and geophysical study at the sections of each tower and access road and along with other engineering-geological parameters will establish stable groundwater lines. Additional information obtained about groundwaters will help the building organization to prepare the projects for managing surface waters and groundwaters near the surface which will be a significant component of anti-erosional activities.

Issue 4. The submitted EIA Report does not contain detailed research data for landslides for the section of the projected change (relevant detailed mitigation/preventive activities).

Issue 6. As can be seen in the EIA report, the planned works are major, while the assessment of possible impact on geological environment and relevant mitigation activities are general. The EIA does not stipulate detailed measures necessary for the protection/stabilization of specific sensitive sections and they should be specified.

Issue 10. Given complex geotectonic characteristics of the Shuakhevi-Akhaltzikhe section, the EIA Report should include detailed mitigation activities and the matters of monitoring during construction as well as operation process, furthermore, the mitigation activities shall include specific measures for risks prevention rather than general mitigation measures. In the course of implementation of activities, in case of the cutting of the trees, the intensification of rock avalanche, rockfall, mountain creep and slide bodies are expected; hence, the EIA report shall specify the information about protective measures on such sections.

Answer: As has been mentioned above, in November-December, 2018, a geological study (visual assessment of the corridor, field identification of constituent rocks, identifying active hazardous geological processes in the corridor; assessment of the risks of the development of erosional, landslide or other hazardous geodynamic processes in the future, etc.) was performed in the Skhalta valley and adjacent dividing crests and hilly ridges (37 km/ from tower 158 to tower #250). During the field study, not a single active landslide or other hazardous geological process that may have an impact on the project or that may intensify as a result of the construction activity has been observed in the OHL corridor or on its adjacent territory.

Although project sections are primarily made up of hard rocks, one cannot exclude the development of erosional processes and gullyng of land surface, or local, small-scale collapse of unstable slope during the construction of access roads (especially, if building standards and norms are not followed). Zoning of sections based on geotechnical difficulties and hazardous geological processes is aimed at the assessment of the probability and the impact of the development of such events and relevant planning of preventive and mitigation activities. Since it is about the mitigation of not already existing threats, but about possible future geological hazards, the suggested mitigation activities are not and cannot be specific (specific to a concrete area); rather, they are non-specific and offer a listing of the effective activities that are relevant for possible scenarios of hazardous geological processes on the project territory.

As you are aware, the OHL construction corridor's section being reviewed is a changed section of the Akhaltsikhe-Batumi OHL common corridor. The reason for the change of the section was to avert natural hazards, as well as proximity with settlements and respectively, protest of residents. The newly selected section is effectively distanced from settlements in all points and we would like to reiterate that it has been selected in a way that the installation of support towers is planned on the crests of dividing ridges and hillocks and crest side lines. Considering morphological and geological conditions of the region, construction sites and as necessary, access roads, in all places are made up of hard rocks that are very stable to landslide and erosional processes. Therefore, there is no need for carrying out specific preventative activities.

The hard rocks that constitute the OHL construction corridor are distinguished by high bearing capacity; furthermore, construction sites selected in advance for the installation of support towers maximally exclude the emergence and intensification of geodynamic processes (rockfall, rock avalanches, landslides). Nevertheless, monitoring is envisaged during the period of construction and operation of the support towers; and, relevant decision will be made (protective activity will be carried out) in case of any complication (which we practically exclude); in particular, the following protective activities will be envisaged during the construction and operation period:

- organized discharging of surface torrents to the nearest waterway, by building water diversion ditches and drainage canals;
- reinforcing the bottoms ravines;
- filling up the ravines;
- setting up outfall drains;
- prevent intensified water infusion in ground masses of the slopes due to Infiltration (water-drainage gutters and ditches systems, agroforestry land improvement, upper side ditches);
- Developing grass and vegetation cover (bioengineering).

The listed protective activities will be implemented for each specific section, pursuant to a project developed based on the studies implemented in advance.

<p>Issue 8. Given the geologically complex and sensitive characteristics of the Adjara High Mountainous region, approximate volume of the removed ground--180,000 m³, has powerful impact on geological environment, hence, the EIA Report should provide detailed information about mitigation and re-cultivation activities.</p>
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Answer: 180,000 m³ - is incorrect information provided in the EIA. On this matter, see a detailed answer to Comment # 2 (**Issue 2**) below. We would also like to note here that prior to the installation of support towers, engineering-geological (geotechnical) studies will be implemented on construction sites; these studies will enable us to determine exact volume of tailings.

Issue 9. Maps for engineering-geological conditions provided in the EIA report do not enable to fully perceive the engineering-geological conditions of the study territory, since, the presented maps are not standard (small scale and low resolution), hence, this matter needs to be specified.

Answer: We are presenting additionally electronic versions of geological maps; drawing can be scaled up to the desired size which will allow viewing desired details. This does not require any correction in hard copies. The maps of geological and geological hazards zoning provided in the EIA report have been designed based on the analysis and generalization of historical and field studies and have been produced in GIS format, hence, modern computer technologies make it possible to render the maps provided in the report discernable for experts.

3. Impact on springs, ground and surface water resources

Issue 1. According to N 17 (11.02.2019) Scoping Conclusion, during the public discussions (Shuakhevi Municipality, Village Nenia/22.01.19/12:00) of the Scoping Report, opinions were expressed in Village Nenia that drinking waters may disappear in the village as a result of OHL passing near the village (Village Tavi/Nakanafevi), felling the forest, organizing roads and relevant infrastructure; in relation to the above-mentioned, the information about the study of the springs of potable water was to have been included in the EIA report. The presented EIA report does not reflect the above-mentioned information. Information concerning the study of the sources of potable water for the given section (and not only) and possible impact of the project on these sources (it should be noted that a similar comment was raised again on July 24, 2019 during the discussion of the EIA report held in Village Nenia) should be specified. Furthermore, relevant mitigation/compensatory measures should be identified in case the sources of potable water and impact on these sources are discovered in the given section.

Issue 3. Information about groundwater line should be specified based on engineering-geological study.

Answer: As you are aware, the construction of power transmission lines is one of the types of line infrastructure facilities, although it differs cardinaly from other line infrastructure sites (motor roads, railroad, oil pipeline, gas pipelines, etc.), which involve massive excavation works and powerful impact on environment, namely, frequent cases of negative impact on underground waters. During the construction of these facilities deep excavation works are performed and quite high “shelves” are organized on slopes. Another reason for the scale of the impact is the fact that the excavation and the cutting into the rocks is performed continuously along the route. In case of such massive intervention, the

assessment of the current situation of underground waters as well as potential manifestations in target areas is truly necessary during the EIA stage. In case any complications are expected during the construction or operation of the facilities with respect to underground waters, then relevant mitigation/compensation activities should be performed.

The situation is different in case of the construction of the OHL in general, and especially (due to the reasons listed below) in case of the project under review. As has been mentioned above, the installation of OHL support towers is envisaged on the crests of dividing ridges and hillocks. The depth of the foundations of support towers is maximum 3 meters and this shallow excavation is performed at local (20mX20m) sections that are distanced from one another on average by 300-500m. While the areas of the distribution of underground waters (levels) given morphological, geological and hydrogeological conditions of the region, are determined as at least several scores of meters. The EIA includes a conclusion of qualified geologists that “the locations for OHL support towers have been selected in a way that during their construction and operation period any impact on the underground waters regime (qualitative as well as quantitative) is effectively excluded and there will not be any negative impact. Furthermore, it should also be considered that most underground waters are characterized by deep circulation, while the depth of the foundation for support towers is just several meters”. The impact on somewhat deep circulation underground waters that are important source for local water supply (local sources or significant horizons of groundwaters that are also used for wells) is excluded. The impact is possible only on very surface, the so-called “seepage waters” that do not form stable and continuous horizons. The slope waters, seepage waters are the currents of waters that infiltrate ground during rains; these are local, emerge periodically during rain and do not mix with deep circulation underground waters used for drinking. The stirring up of “infiltrated waters” as a result of excavation and concrete works performed at the depth of several meters, or, their pollution with the fuels and lubricants leaked from equipment can be of very local nature (several meters radius), it cannot spread and cannot have impact on either underground waters or surface waters (since surface water bodies are at a significant distance from project sections). Hence, determining exact levels of groundwaters as part of the EIA has no significance for assessing the impact on environment: this does not give any additional information for assessing impact.

Nevertheless, “information about groundwater levels will still be specified during the construction stage, when the construction contractor will perform drilling and geophysical research at every tower and access road area and along with other engineering-geological parameters, will establish in case of possible identification of groundwaters – their stable levels and the degree of aggressiveness of groundwaters. These parameters will be significant more for the selection concrete quality and planning of construction works and will have less importance for the assessment of impact on groundwaters and underground waters. At the same time, additional information received about groundwaters will help the construction organization to prepare the projects for managing surface waters and groundwaters near the surface, and it will be a significant component of ant erosion activities.

As for the opinion expressed in Comment # 1, about possible impact on Village Nenia springs during the OHL support towers construction and operation, we would like to note that, the OHL support towers are set to be installed south of Village Nenia, in the zones of the crest of dividing hillocks (tower 2) and crestline (tower 1). The OHL corridor where high trees will be cut or lopped, is 62 m (31 meters on each side from the central line). The

sources are not identified in a considerably wider line (500 m line – 250 m on both sides from the central line). The source concerning which the residents of Village Nenia raise question is distanced from the line by more than 500m. The depth for the foundations of the towers in the OHL corridor will be mere several meters. Furthermore, no large-scale construction of access roads is planned for the installation of the mentioned 3 towers (the existing village earth-road will be extended by 200 meters to two towers and by 100m for one tower). The construction process does not require explosion works. We would also like to mention here that the existing underground waters on the territories under review are characterized by deep circulation; this, once again excludes any negative impact on Vill. Nenia (and not only) sources. The construction may not have impact on deep circulation groundwaters that feed the village spring and or on the section of the outlet of a spring which is more than 500 meters away from the areas of the construction of towers.

Nevertheless, considering the currency of the matter for Village Nenia residents, the monitoring plan includes periodic observation during the OHL construction and operation on the Village Nenia spring and if necessary, planning compensation and mitigation activities.



Fig.: three towers (blue posts) and access roads (red lines) near Village Nenia.

Issue 11. The EIA report shall provide specifics about the distance and altitude of the towers closest to rivers, what is the maximum discharge, levels of the rivers within the impact area; as well as information about embankment works should be specified. Furthermore, detailed activities for minimizing impact on underground waters should be specified in the EIA report.

Issue 12. The EIA report indicates that in places where the OHL route crosses the rivers, on the places of crossing, works should be implemented in compliance with all requirements. Although, no specifics are provided for the requirements that will be met at the places of crossing the river; hence, these requirements should be specified.

As for the local impact, it is less likely that the impact spreads to the territories that are more than 100 m distance from construction areas. Respectively, only those water bodies that are within the indicated radius from the tower area can be envisaged as the receptor of impact. The level of precipitation in the Adjara Region is quite high, due to which there are many small mountain rivers and brooks in the project corridor. Although, the impact on these surface waters should not be considered significant since the turbidity of the surface discharge will decrease before they flow into large rivers (due to sedimentation or dilution). Such impact on surface waters will be short and will be resolved upon the completion of construction works.

1. The impact on the Mtkvari River

The OHL goes parallel to River Mtkvari from Village Zikilia to Vill. Giorgitsminda (Tower # 1-16). On almost the entire length of this section, the OHL corridor distance from River Mtkvari is 1.2 km/OHL gets near the Mtkvari River only on a limited section (1 km length) between Village Persa and Village Giorgitsminda, where Mtkvari River forms a loop. The distances from nearest towers to River Mtkvari bank is: Tower # 13-225m; tower # 12-285m; tower # 14-300m; and tower # 15-325m.

We can conclude that the project will not have the impact on the Mtkvari River.



Fig. OHL's Zikilia-Tsnisi section – the closest section to the Mtkvari River

2. The impact on the Potskhovi River

The OHL goes parallel to the Potskhovi River from Village Giorgitsminda to Vill. Parekhi (Tower # 16-66). On almost the entire length of this section the distance of the OHL corridor from Potskhovi River is 3-4 km. OHL gets close to Potskhovi River only on a limited section (1.2 km length) in the area of Village Parekha (Towers #62-66). The distances from nearest towers to Potskhovi riverbed are: Tower # 64-488m;

We can conclude that the project will not have impact on the Potskhovi River.



Fig. OHL's Parekha section – the nearest section with River Potskhovi.

3. The impact on River Kvabliani

The OHL goes parallel to River Kvabliani from Vill. Parekha to Vill. Ude (Tower # 66-84), then it crosses the Kvabliani River in the section of Tower 84-Tower 85. On this section of the OHL the distance of the OHL corridor to Kvabliani River varies from 250 m to 1.5 km. OHL's nearest tower is distanced from Kvabliani River by 250 m. At the intersection area, Tower #84 is distanced from the river by 185 m, while Tower # 85 – by 395 meters. Hence, the nearest tower to Kvabliani River is Tower # 84 and its distance from the riverbed is 185m.

We can conclude that the Project will have no impact on Kvabliani River.

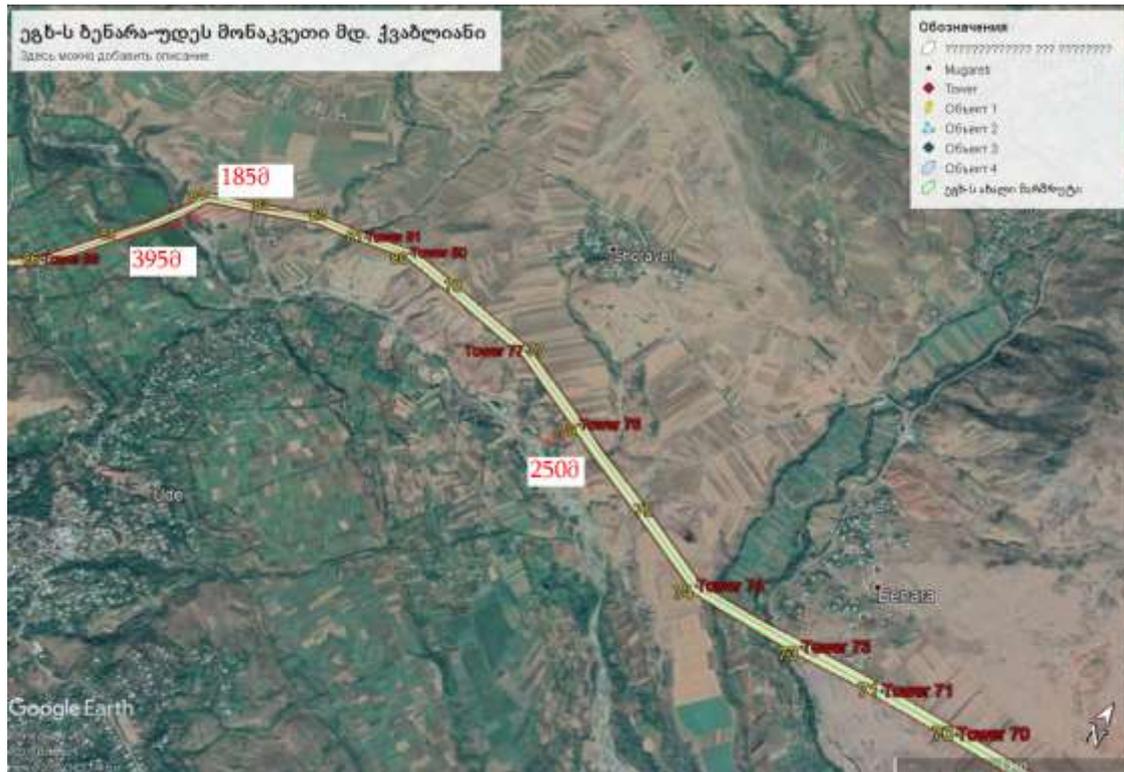


Fig. OHL's Benara-Ude section – nearest section to River Kvabliani.

4. The impact on the Skhalta River

OHL's new route, like the old one, crosses Skhalta River on the section of Tower #175-176. The distance from both towers to riverbed is 370m. Next, the new route goes along Skhalta River and Chirukhistkali River dividing ridge crest and does not cross Skhalta River tributaries, unlike a rejected, alternative route that crosses up to 15 right tributaries of the Skhalta River, majority of these tributaries are characterized by mudflow. None of the towers of the new route are located near the Skhalta River.

We can conclude that the Project will have no impact on the Skhalta River.



Fig. OHL's Vernebi section – crossing the Potskhovi River.

5. Impact on the Adjaristkali River

As for the impact on Adjaristkali, it should be noted that the old (approved earlier, alternative) route as well as the new route's last section goes along the near-floodplain upper terrace of the Adjaristkali River, while 5 towers are at the level of the floodplain.

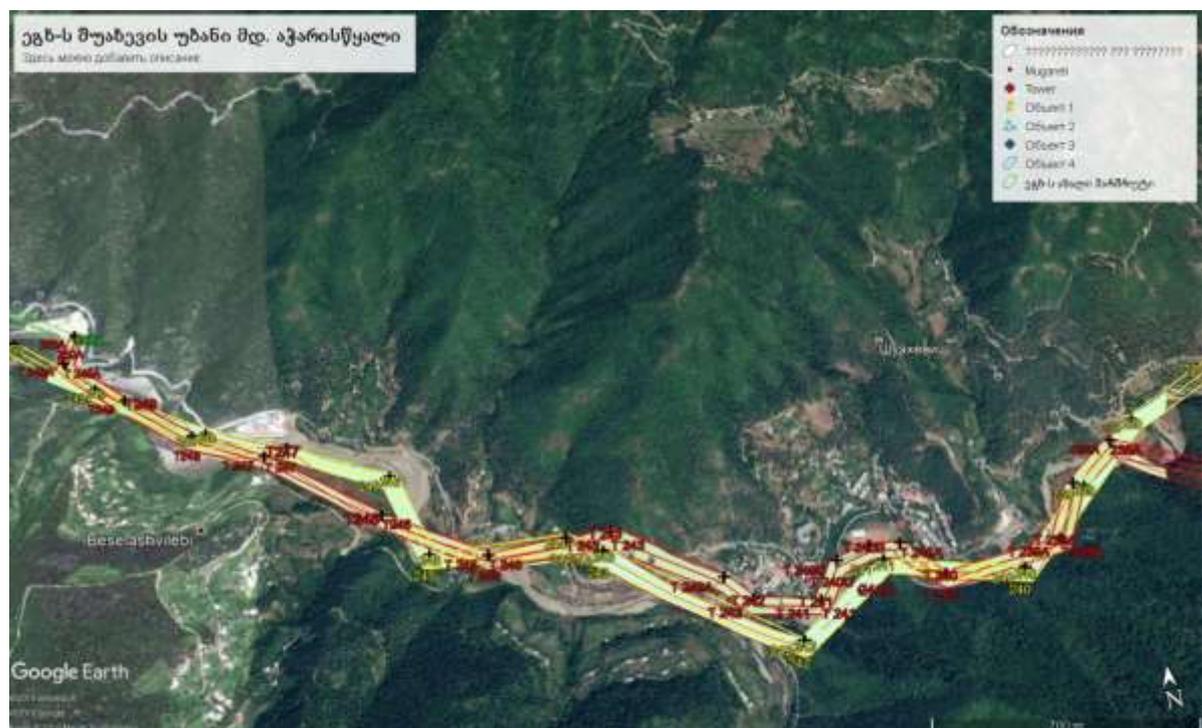


Fig. OHL's Shuakhevi section – River Adjaristkali

Tower number	Altitude from the river level	Distance from the riverbank	Intensity of impact during the construction stage
238A	10m	115m	No impact
239	4m	55m	Low; temporary
239A	13	130	No impact
240	0	10m	High; temporary
240A	0	10m	High; temporary
240B	0	10m	High; temporary
240C	3m	47m	Medium; temporary
241	1m	14m	High; temporary
242	1m	68m	Low; temporary
242A	2m	88m	Low; temporary
243	93m	226m	No impact
244	33m	189m	No impact
245	0	10m	High; temporary
246	28m	66m	Low; temporary
247	23m	71m	Low; temporary
248	5m	20m	High; temporary
249	8m	39m	medium; temporary
249A	0	10m	High; temporary
250A	8m	42m	Medium; temporary

As can be seen, 15 towers are located at closer than 100 m to the riverbank. Of these, works performed on 7 towers can have high intensity, although short-term impact on Adjaristskali River, since these towers are located within 10-20 m distance from River Adjaristskali banks and out of these 7 towers 5 towers will effectively be in the river floodplain.

The impact is mainly related to the mixing of erosive or loose materials outwash during earthworks with the river water, the infiltration of spilled concrete into the river and possible pollution of the river with infiltrated fuel. Additional stirrup or pollution of the water may have impact on ichthyofauna.

The varieties of fish found in the Adjaristskali River are provided in the table below.

Taxonomic group	Adjaristskali River
*Salmo trutta	-

Gobio gobio lepidolaemus n.	+
Luciobarbus escherichii	+
Capoeta tinca	-
Alburnoides fasciatus	+
Phoxinus colchicus	+
Rhodeus colchicus Bitterling	+
Rutilus rutilus	+
Nemacheilus angorae	+

The following preventative and mitigation activities are necessary:

- On Towers #240; 240A; 240B; 241; 245; 248; 249A; It is recommended to perform construction works during the summer period, when the water level in the river is lowest. Construction sections of these towers should be isolated from the riverbed with protective barriers (Stone and rubble and geotextile material) that will contain the runoff and spilled concrete from the earthworks section.
- On Towers #240C; 249 and 250A, expected impact is of medium intensity, since these sections are quite distanced from the riverbed (up to 40m). Mitigation activities comprise setting up light barriers (straw; geotextile; berms), that will contain the runoff from earthworks section and spilled concrete.
- On this section of Adjaristkali River works should be restricted during the spawning period. Trout and other sensitive varieties are not found in the Adjaristkali River, still, it is advisable to not implement construction works during the spawning period in order to minimize the impact.
- The Construction company should have the means (adsorbents; straw/geotextile barriers; etc.) for the prevention of the spread of pollution in case of the leak of fuel
- Rigorous control of good working order of equipment and the leakage of fuel.

4. The disposal of spoil (tailings)

Issue 2. The EIA report does not include the following information, which should be specified: detailed projects for disposing tailings (dumpsite), location coordinates, as well as engineering hydrogeological conditions of the sections under the examination at the site of the placement of waste rock by riverbanks and the impact of the river on the area of the location of dumpsites

Issue 8. Given the geologically complex and sensitive characteristics of the Adjara High Mountainous region, approximate volume of the removed ground --180,000 m³, has powerful impact on geological environment, hence, the EIA report should provide detailed information about mitigation and re-cultivation activities.

Answer: In the EIA report submitted for evaluation contains a mechanical error and 180,000m³ is indicated as estimated volume of tailings, which is incorrect. The error is twofold: on the one hand, the brought figures are for the entire length of Batumi-Akhalsikhe OHL (146km; 398 towers) and not for this OHL project (to be updated) part, while, on the other, the volume of full excavation (earthworks) is provided, rather than the volume of tailings, since most of excavated soil is returned to the ditches and is used for organizing access roads and construction sites.

Let us remind you that the total length of Batumi-Akhalsikhe double-circuit OHL is 146km. 220kV OHL will start from Akhalsikhe existing 500/400/220kV substation and will be connected to the existing Batumi 220kV substation. For obtaining the permit for building the above-mentioned line, in 2014-2015 technical project and EIA was prepared; as a result of environmental expert examination, on August 3, 2015 a positive conclusion was issued for the project as well as a building permit based on such conclusion. In 2015 works were launched on Batumi Shuakhevi and Akhalsikhe Goderzi sections according to the construction permit. Considering the changes in the project, a new EIA document became necessary for **Shuakhevi-Akhalsikhe 94km section** to which the mentioned change applied. Respectively, the present EIA is the Environment Impact Assessment (EIA) of the Amendment and the Acceptance into Service of the Construction and Operation of Akhalsikhe-Batumi double-circuit 220kV transmission line Project (**Shuakhevi-Akhalsikhe 94 km section**). A total of **270 tower installation** is planned on this section.

The volume of earthworks for the project will not be major. As has been mentioned several times, the implementation of earthworks will be primarily necessary on towers sections, for making foundations for the towers. Considering total number of towers (270 towers) and total ground area of their foundation (average 300m²), in case of the removal of on average 10cm muck (humus) layer, the removed muck layer is about 8,100m³. For minimizing impact on the soil cover, the topsoil will be removed separately (on average 10cm will be removed and respectively) the muck layer of soil will be stored at the location while after the completion of works these soils will be used for the re-cultivation of the territory.

The depth of the foundations for each tower is 3m. on average 150m² area, i.e., as has been mentioned in the EIA, at each tower 450m³ soil will be excavated (of this, 15m³ is muck layer). Thus, as a result of excavation 435m³ soil will be excavated at each tower. For a total of 270 towers areas -- total 117,450m³ soil. According to the preliminary geological assessment, rocks are primarily hard rock, and the excavated material will be fit as a filling inert material. 80% of soil excavated by towers will be used for backfilling and setting up tower sites. Excess 20% is 23,500m³ and this material will be primarily used for setting up access roads.

Specifics of access roads will be determined, and projects will be produced during the construction stage. Existing roads will be used predominantly. They will need to be leveled; earth roads will need to be restored using the inert materials. According to rough estimation, a total of 26km access road will have to be organized (60 sections: 9 long and 51 short sections). The towers are primarily located on crests, hence, the necessity to cut the slopes is minimized and low (average 02m height) fillings (earth roads that are leveled and filled using inert materials) will mainly be used. 31,200m³ ground material will be needed for setting up roads. In the section, according to rough estimations, 15,000m³ dump ground will be produced, which will also be used for setting up fillings. Hence, out of 23,500m³ excess soil remaining from the construction of towers 16,200m³ will be used for setting up the fillings on the roads. The volume of soil to be disposed is 7,300m³.

To reiterate, these estimations are rough and will be specified after the contractor prepares projects for access roads and the completion of geotechnical study at towers. The construction contractor, according to these estimations, will determine final volumes of dump ground and specific projects for their placement. At this stage, we can only provide recommendation for potential sections for placing dump ground.

Key criteria:

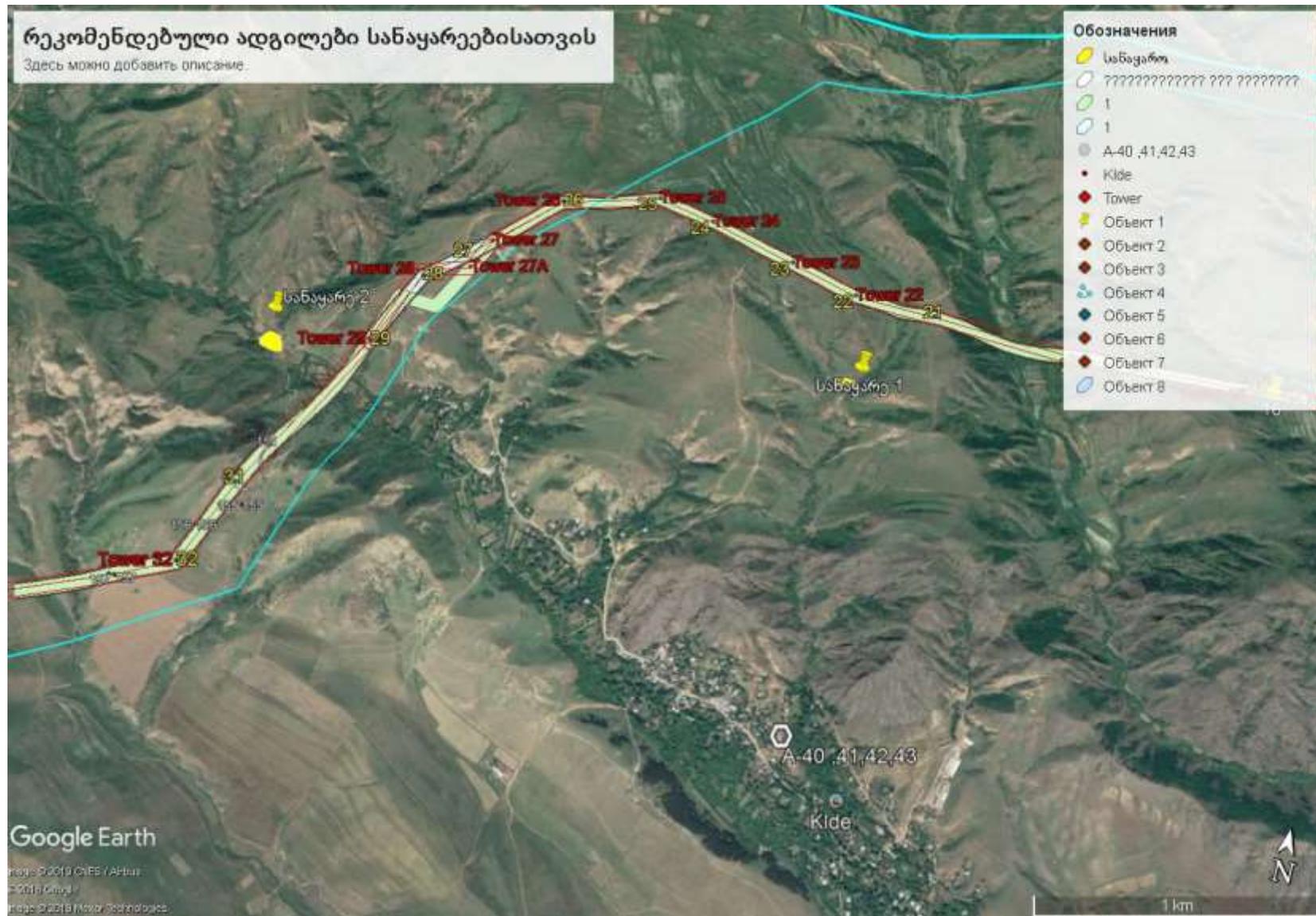
- proximity with the OHL corridor and access roads
- distance from surface water bodies (not less than 100m)
- environmentally less sensitive areas
- distanced from settlements
- will not be disposed on arable lands and private land plots

4 potential areas for placing dump soil have been selected. The entire 7,300m³ dump ground can be disposed on each of these areas. Building contractor can select one or several from these areas, or identify a better option considering the mentioned criteria.

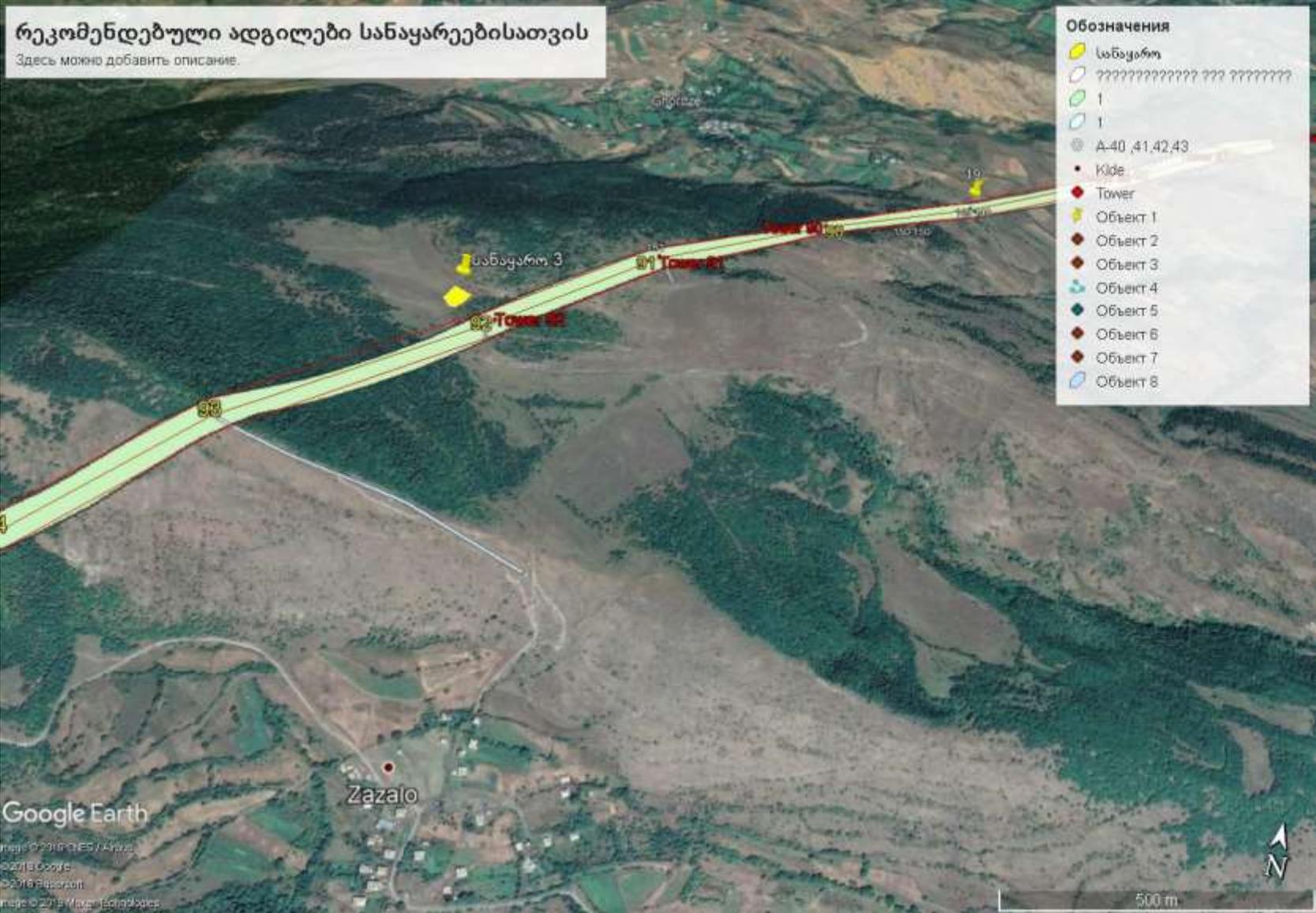
Dumpsite #	Coordinates	Comments
1	336218 4617232	Local, recessed plateau at 300 m distance from the OHL, adjacent to the existing access road; degraded pasture; no surface water bodies present, or private lands are located nearby. North of the Village Kide
2	333828 4616903	Local, recessed plateau at 300 m distance from the OHL, adjacent to the existing access road; degraded pastureland; no surface water bodies are present or private lands are located nearby. North-west of Village Kide
3	312412 4611563	Local, recessed plateau at 38 m distance from the OHL, adjacent to the existing access road; degraded pastureland; within immediate vicinity of Tower # 92's

		construction site. No surface water bodies or private lands are in the vicinity. North of the village Zazalo
4	291215 4604370	Local plateau between the OHL corridor and access road loop. The pastureland between Towers # 162 and 163. Within immediate vicinity of the construction site (the section between construction sites of two towers and access roads). No surface water bodies or private lands are found in the nearby. South-east of Village Rakvta

The locations for suggested potential dump sites are shown on the maps below.



Dump sites 1 and 2 (yellow spots) - north of Village Kide



Dump site 3 (Yellow spots) - north of Village Zazalo



Dump site 4 (Yellow spots) - South-east of Village Rakvta

5. Environmental and Social Management Plan and detailed Environmental and Social Monitoring plan to be implemented during the Construction and operation of OHL

4. According to the Scoping Conclusion #17 (11.02.2019), the matters of observation over the impact on specific components of biodiversity should have been included in the EIA report's Monitoring Plan. This matter should be specified in the EIA Report.

5. Since the Environmental and Social Mitigation Plan and Environmental and Social Monitoring Plan included in the EIA report for are general, the specified information submitted to the Ministry shall be accompanied by the detailed Environmental and Social Monitoring Plan to be implemented during the construction and operation of the OHL, along with detailed measures and activities for preventing, minimizing or mitigating negative impact on environment. Furthermore, a detailed environmental monitoring plan for the period of the OHL Construction and Operation stages should be submitted.

Answer: Environmental mitigation and monitoring plans are provided below, in **Annex 1** and **Annex 2**; Comments # 4 and # 5 are incorporated in these plans to the extent possible. We would like to additionally clarify, that mitigation activities are specific where there is distinctly specific impact on a determined receptor: e.g., surface water protection activities are specific on Adjaristskali section where towers are located near the riverbed, and we have included non-specific measures in other remaining sections where the distance from water bodies is great and the impact – less likely. Activities for protecting against noise and dust are non-specific, since construction sites are distanced from villages and the impact is temporary. The EIA does not include (and cannot include) specific activities for protecting geological environment and soil, since no current landslides or erosion sites have been identified in the corridor. Hence, planned activities are general and effectively represent the listing of those protective activities that may become necessary if such need is identified during the monitoring.

6. Other issues

13. Information about existing and new access roads, by indicating relevant parameters should be specified in the EIA Report. The works of constructing new access roads should be described. Detailed description of possible impact on environment as a result of the construction of access roads and as necessary, relevant mitigation/preventive activities should be included.

Answer: Access roads will be specified, and projects will be prepared during the construction stage. Existing roads will be used predominantly; they will need to be leveled; earth roads will have to be restored with inert materials. Roughly, a total of 26km access road will have to be organized [60 sections: 9 long sections (total length 16.5km) and 51 short sections (total 9.5km)].

14. Sub-Chapter 3.8.4 of the EIA report indicates that main objective of the project is to minimize impact on sensitive sections in the course of the construction of the transmission line. Relevant requirements and procedures are described in the present Report's Chapter 7 -- about the analysis of potential impact of the project. The above-mentioned does not correspond with the content of Chapter 7 of the EIA, since EIA's Chapter 7 addresses current socio-economic context.

Answer: Impact on sensitive receptors is described in Chapter 8, while mitigation activities are described in Chapter 9.

Information about Adigeni-Beshumi 110 kV OHL indicated in the submitted EIA report should be specified (detailed information about the proximity with the project corridor, crossing the project corridor, overlapping of OHL corridors, etc.).

Answer: The existing Adigeni-Beshumi 110kV OHL and the projected Batumi-Akhalsikhe 220kV OHL go parallel for a 11.2km length section in one corridor, starting from Tower # 1 (4.3 km west of Vill. Zazalo) up to the Tower # 60 at the outskirts of Beshumi town.

The overview of possible cumulative impact:

In the mentioned common 11.2 km length corridor there is no increased impact on forests or other sensitive habitats due to the increase of the total width of the corridor from 62m to 110m, since common corridor of the two OHLs is fully located in ecologically low sensitivity zone – on the section of degraded pastures (see the map below). Trees are not being cut here; moreover, there are no such Here the trees are not cut at all and there are no nonwoody plant varieties found here that would be entered in the Red Book of Georgia or that would represent any value from conservation standpoint.

The area is not sensitive from zoological standpoint either and parallel location of two OHLs will not cause considerable increase of the risk of collision of birds or bats with the lines.

There is no cumulative impact on social environment either, since common corridor of the lines is distanced from settlements and crosses primarily degraded pastures. The common corridor does not pass through private (arable or homestead) lands. At the initial section (Section from Tower # 5 to # 7) existing 110 kV OHL crosses several agricultural plots, but on this section the projected 220 kV OHL is distanced from the 110 kV OHL by 100 meters and does not affect private land plots.

ANNEX 1. Environmental and Social Management Matrix

Environmental and Social Management Matrix provides a framework for managing, mitigating and monitoring environmental and social impacts of the Project at construction and operation/maintenance phases, and can be used to demonstrate that sound practices (environmental and social) will be followed throughout.

Environmental and Social Management Plan is presented in the form of a Table and provides measures required to prevent or reduce the negative impact identified in the ESIA process.

Environmental and Social Monitoring Plan is provided for the evaluation of the efficiency of mitigation measures carried out during project construction and operation phases and to assess the residual impact. ESIA report also contains employer's (GSE's) generic plans for managing waste and emergency situations, which are to be updated and adjusted by contractor:

- Waste Management Plan, which provides the measures for the management of waste at the construction and operation phases of the power transmission line;
- Emergency Response Plan, which is necessary for the prevention of expected emergency situations, to minimize their risk and to eliminate the results

The Mitigation Matrix will be provided to prospective bidders for the construction contracts, to ensure that detailed environmental mitigation measures and costs are included into their technical and financial proposals

GSE will ultimately be responsible for ensuring that the Mitigation Plan is implemented. To achieve this goal, GSE will follow the project-specific **Monitoring Plan** and its own Environmental and Social Management System (ESMS), which includes environmental and social supervision capacities/resources (both in-house and contracted) for the monitoring over the implementation of the Project.

6.1 Environmental and Social Mitigation

The Environmental and Social Mitigation Plan provides a logical framework within which the negative environmental and social impacts identified during the ESIA study can be mitigated and any beneficial environment effects can be enhanced.

Environmental and social impact mitigation measures have to be further elaborated upon Pre- Construction Survey undertaken by selected/awarded Contractor before proceeding with initial stages of construction (i.e., RoW clearance, topsoil stripping for foundations, arrangement of access roads, etc.), to ensure that they consider and carefully plan the implementation of each mitigation measure under their responsibility. Contractors will be required to prepare their own specific ESMPs based on ESMP provided as part of this ESIA, describing in detail the actions they will take to provide each measure. The contractor's specific ESMPs should include (but not limited to) the following documents: Waste Management Plan, Traffic Management Plan, Pollution Prevention Plan, Biodiversity Management Plan, Community Engagement Plan, Local Recruitment Plan, Reinstatement Management Plan, Health & Safety Management Plan (including working on heights and prevent electrocution, etc.), Emergency Response Plan, Cultural Heritage Management Plan (including Chance Finding Procedure), Community Liaison and Local Recruitment Plan, other documents as necessary, that have to be prepared and submitted by the Contractor to the Client (GSE) (or its Construction Supervision Consultant) for approval, prior to initiation of construction works. GSE, as Project Developer, is also responsible for auditing Contractor's Environmental and Social Management System (ESMS) to ensure that there are institutional and human capacities in place (environmental and social managers, field officers, coordination mechanisms with construction managers, etc.) to ensure proper and timely implementation of the approved specific ESMPs requirements.

The above-mentioned set of Contractor's ESMPs should contain all site-specific mitigation measures specified in ESIA and additional measures included in ESMP by the Contractor to address any new details related to construction (final location of access roads, construction camps etc.). The ESMPs should oblige Contractor to: clearly demarcate necessary construction zone and avoid excavations, storage of spoil or waste and other type invasion on adjacent territories; prepare and implement site specific reinstatement and landscaping plan upon completion of construction to restore the original conditions of landscape to the extent possible; enhance landscape by introducing anti-erosion measures and revegetating areas with the native floral species, as well as local floral species most appropriate as anti-erosion protection; provide mitigation by biosurveys immediately before construction to micro-locate towers and other project elements, also use of restricted construction timing if needed to avoid impacts on breeding birds/animals or migrating birds; for sensitive species, restrict construction season if needed; conduct permanent supervision over the construction works to prevent any unsanctioned invasions on private land plots not acquired for the project; compensate any losses related to damages to the private property, business interruption; restore any infrastructure elements damaged during the construction works.

Table 10.1 comprises the environmental and social mitigation measures and management practices for the 220kV Akhaltzikhe-Batumi Power Transmission Line Project, to be used by Contractors and included in their set of ESMPs.

Chance Finds Procedure should be developed by the Contractors as a part of Cultural Heritage Management Plan, to ensure that any important archaeological material is properly recognized, recorded and preserved if necessary. The Chance finding procedure prepared by Contractor, should be based on principles described in section 8.3.4, (subsection – Chance finding procedure) and should describe in details contractors set up, permitting for excavation works, decision making and responsibilities for implementation, reporting and monitoring.

Should any archeological deposits be found during the construction of tower foundations, a full measured, drawn and photographic survey should take place prior to any further works. Additional mitigation measures should be agreed with the Department of Historical Monuments under the Ministry of Education, Science, Culture and Sport of Georgia. If, as a result of the work method statement developed by the Contractor, there is a possible impact on any cultural monument, this impact should be avoided and the method statement revised. In the unlikely event that impact is genuinely unavoidable, further mitigation measures should be agreed with the Ministry of Education, Science, Culture and Sport of Georgia.

Table 0-1 ESMP - Mitigation Measures to Prevent or Reduce Potential Impacts

N	Activities or Aspects	Potential Impacts/Issues of concern	Significance of Impact ²	Mitigation /Enhancement Measures or Best Management Practice	Responsibility	Further Information
1. DESIGN PHASE						
1.1	Compliance with the permit and legislative requirements: Compliance of high-voltage power transmission lines construction projects with Georgian and International requirements (World Bank Group);	Issues to be considered: Compliance with Georgian and International requirements (World Bank Group) regarding the Environmental Protection and EIA Procedure for Transmission Line Construction Projects; Implementation of the Environmental and Social Impact Management Plan	Required for project implementation	Implementation of the requirements and procedures of the Georgian Legislation and financial institutions regarding the EIA. Compliance with these requirements should be checked prior to the construction works. In particular, it should be checked: <ul style="list-style-type: none"> - If the permits required for construction and operation of the project (construction permit, permit for cutting timber for the purpose of arrangement of Row on forested areas, etc.) are obtained; - If all issues related to the private property or acquisition of land for Row are settled in accordance with the requirements of the Georgian legislation and the World Bank Group (implementation of Resettlement Action Plan) or if the negotiations on this issue are underway. - If the environmental and social impact mitigation measures and monitoring plans are developed and if they meet the standards of the Georgian Legislation, the World Bank and International Finance Corporation. - The GSE and its main contractor shall appoint persons who will be responsible for environmental issues and control the implementation of planned mitigation measures on the construction and operation 	GSE (Project Implementing Agency) with support of Design Consultant and ESIA Consultant	These issues are reflected in Paragraphs 1 and 2 of the ESIA report

N	Activities or Aspects	Potential Impacts/Issues of concern	Significance of Impact ²	Mitigation /Enhancement Measures or Best Management Practice	Responsibility	Further Information
				phases of the project.		
2. PLANNING (KEY ISSUES)						
2.1	Power transmission line, ROW planning	Adverse impacts on land use and visual impacts Adverse impacts on environmental and socio-economic conditions Occupational and Public Health and Safety	Negligible to Moderate adverse	<ul style="list-style-type: none"> - Alternatives analysis to estimate relevant impacts of each alternative proposed for power transmission line routes. - Considering landscape characteristics, important elements of the environment and local population in layoutting the power transmission line; - Existing transmission / distribution lines should be utilized, and existing transport infrastructure for transportation of equipment/machinery - Development of specific measures to prevent or minimize crossing of settlements / residential areas as well as agricultural lands; - Accurate assessment of the value of private property due to proximity to the transmission line (social and economic issues - see detailed information in the Social Management Plan and Resettlement Action Plan) - If it is impossible to avoid sensitive areas (such as forests), - take and implement all necessary mitigation measures to minimize/mitigate the adverse impacts on environmental and social conditions during construction and operation phases of the Project. - Provide at least 30 meters' buffer / sanitary zone on both sides from the middle of the 	GSE (Project Implementing Agency) with support of the Design Consultant and the ESIA Consultant	ESIA Section 3, 4, 7, 8.

N	Activities or Aspects	Potential Impacts/Issues of concern	Significance of Impact ²	Mitigation /Enhancement Measures or Best Management Practice	Responsibility	Further Information
				<p>corridor of power transmission line.</p> <ul style="list-style-type: none"> - Carry out extensive public consultations during the Project Planning phase, e.g. siting of power line, ROW (social and economic issue – for details refer to Annex 6 - Stakeholders Engagement and Public Consultation Plan (SEP) 		
		Landslide hazards	Low or medium negative impact	<ul style="list-style-type: none"> - Consider landslide risks when selecting the OHL corridor and reviewing alternative routes; - Avoiding towers installation and forest cutting on areas with particularly high landslide hazard; - In case of installation of towers on areas with high and medium landslide hazard, planning of appropriate geo- and bio-engineering measures to reduce the risks to the acceptable level; - Reduction of the need for forest cutting to a minimum on areas with high and medium landslide hazard, and elaboration of appropriate geo- and bio-engineering measures for ground stabilization; - Development of measures for controlling surface runoff on landslide hazard areas, as well as planning of recultivation works, including vegetation cover restoration works, and development of other geo- and bio-engineering activities, if necessary. 	GSE (Project Implementing Agency) through the Design Consultant	ESIA Sections 6, 7 and 8

N	Activities or Aspects	Potential Impacts/Issues of concern	Significance of Impact ²	Mitigation /Enhancement Measures or Best Management Practice	Responsibility	Further Information
		<p>Negative impact on habitats, flora and fauna</p> <p>Including:</p> <p>Risks of birds' collision with electric wires and damages caused by electric shock</p> <p>Impact on aquatic habitats</p> <p>Impact on habitats and species of high conservation value</p>	<p>Low or medium negative impact</p>	<ul style="list-style-type: none"> - Avoid project corridor from crossing critical habitats. For this purpose, existing transmission / distribution lines should be used for power transmission, and existing transport infrastructure for transportation of equipment/machinery; - Avoid project corridor from crossing protected areas; - Develop specific measures to reduce the number of river crossings, as well as consider the requirements of Technical Regulation on Water Protection Zones, approved by the order №440 of the Government of Georgia (31.12.2014) and the provisions established by the Law of Georgia on Water; - If crossing of sensitive areas (e.g. forests) cannot be avoided, relevant mitigation measures should be developed and implemented for the construction and operation phases of the project. - At the stage of designing high voltage transmission line, reduce or eliminate the risk of electric shock of bird species - Consider the birds' migration corridors at the stage of selection and design of OHL route; - Consider the line marking at the stage of design, which is required to reduce the risk of collision; - Plan the power transmission line route so as not to cross significant water habitats (wOHLand areas, floodplain forests, water 	<p>GSE (Project Implementing Agency) through the Design Consultant</p>	<p>ESIA Sections 6, 7 and 8</p>

N	Activities or Aspects	Potential Impacts/Issues of concern	Significance of Impact ²	Mitigation /Enhancement Measures or Best Management Practice	Responsibility	Further Information
				<p>bodies, etc.) that may be the places where the migratory birds might be gathering;</p> <ul style="list-style-type: none"> - Planning of pre-construction study of biodiversity and implementation throughout the OHL corridor in order to prepare appropriate biodiversity management plan, including the proper planning of mitigation measures for biodiversity impacts. - Development of biodiversity management plan, which should be carried out during construction and operation of the power transmission line. 		
2.2	Planning of access roads	Impact on soil, vegetation-cleared areas, surface and underground water bodies, land use (loss of hay-pastures), modification of habitats, landslide hazard.	Low, medium or high negative impact	<ul style="list-style-type: none"> - Precise mapping of access roads on large scale topographical maps prior to construction; - In order to reduce the need for construction of new access roads, determine the areas from where the construction brigades will be able to access the towers' sites through the power transmission line corridor; - Avoid the construction of new access roads in landslide hazard areas as far as possible. When this is not possible, developed appropriate geo-/bio-engineering measures to minimize landslide risks; - The measures developed for the planning of the power transmission line corridor (see above). 	GSE (Project Implementing Agency) through the Design Consultant	ESIA Sections 3, 7 and 8

N	Activities or Aspects	Potential Impacts/Issues of concern	Significance of Impact ²	Mitigation /Enhancement Measures or Best Management Practice	Responsibility	Further Information
3. CONSTRUCTION PHASE						
3.1	Construction of the base camp, transmission line, access roads, temporary camps along the line.					
3.1.1	Construction of the base camp (if planned) and staging areas	Damage to topsoil/subsoil, vegetation clearings and loss of grassland/habitat. Soil erosion	Minor adverse	<ul style="list-style-type: none"> - Clearly demarcate access roads to the camps and staging areas along the segments of access roads, where construction equipment will be moved and stored. - Clearly demarcate construction, other equipment storage areas and temporary tank farm areas, - Confine vehicles to demarcated roadways. - Provide erosion control measures at the base camp. - Establish native grasses around the base camp after the construction works are completed. 	Contractor	ESIA Sections 7 and 8
		Domestic and construction waste generation. Oily and chemical waste generation on-site. Contamination of soil and surroundings with litter and construction debris	Negligible adverse or no impact if mitigation measures applied	<ul style="list-style-type: none"> - Develop a waste management and handling plan for construction base camp and secondary construction camps - Properly store and dispose construction, sanitary and oily waste. - Reduce amount of waste to maximum extent possible. - Collect solid, oily and chemical waste and store until transported to a designated waste disposal places. - Collect sanitary waste in septic. - Transport sanitary waste to designated 	Contractor	

N	Activities or Aspects	Potential Impacts/Issues of concern	Significance of Impact ²	Mitigation /Enhancement Measures or Best Management Practice	Responsibility	Further Information
				<ul style="list-style-type: none"> off-site disposal facilities. - Provide adequate facilities for disposal of garbage (bins, litter trays) - Train workforce in waste management - Organize clean-ups of existing garbage around each temporary construction camp. 		
3.1.2	<p>Preparation of the Row, arrangement of access roads and towers, including:</p> <ul style="list-style-type: none"> - Earth works; - Removal of vegetation cover from access roads and RoW; - Arrangement of foundations for towers; - Installation of tower structures; - Cable-stretching / installation; - Blasting works required for the construction of tower foundation - Transportation and equipment operation 	<p>Impact on soil - cutting of trees / shrubs, which may cause soil erosion and dust generation, since the soil is protected from the impact of wind and sediments by the vegetation cover.</p>	<p>Minor or low negative impacts</p>	<ul style="list-style-type: none"> - Implementation of earth works in compliance with the Technical Regulations on Topsoil Removal, Storage, Use and Recultivation approved by the Decree of the Government of Georgia N24 of December 31, 2013; - Avoid damage to the area outside of the construction site boundaries; - Provide erosion control measures (e.g. drainage, sludge containment barriers) on spoil grounds; - In areas where it is necessary to cut shrubs and trees, the local species of the grass shall be sown immediately after completion of construction works; - Implementation of erosion control measures. Reduce the works to a minimum when the surface of the land is wet. When it is necessary to implement the works in rainy weather, provide control of surface runoff with special tissues, straw barriers or other means that will reduce the velocity of surface runoff and erosion caused by construction 	<p>Contracto,</p>	<p>ESIA Sections 7 and 8</p>

N	Activities or Aspects	Potential Impacts/Issues of concern	Significance of Impact ²	Mitigation /Enhancement Measures or Best Management Practice	Responsibility	Further Information
				works; - Use of anti-erosion coatings (plastic "mattresses") on the carriageways in order to prevent destruction of habitats.		
		Flora; Red List species of Georgia; Emerald list of species; Other sensitive species;		Pre-entry survey: verification of existence of the sensitive endemic and endangered species within the impact zone; density of population and borders; Need of route refinement; Prevention or minimization of tree cuts in compliance with environmental and OHL safety regulations; Plant conservation programs for separate sections of the OHL; Monitoring and assessment of efficiency of the implemented program; Planning of corrective measures, if needed.		
		Forest habitats; Emerald list of habitats; Other sensitive habitats;		Pre-entry survey: verification of existence of the sensitive habitats within the impact zone; Need of route refinement; Monitoring of efficiency of implemented preventive and mitigation measures; Planning of corrective measures, if needed. Reports to be shared with IFIs;		
		Alpine meadows habitats; Emerald list of habitats; Other sensitive habitats;		Minimize the work of heavy machinery on the steep slopes; Monitor erosion processes and implement anti-erosion measures; - Monitoring of efficiency of implemented preventive and mitigation measures;		

N	Activities or Aspects	Potential Impacts/Issues of concern	Significance of Impact ²	Mitigation /Enhancement Measures or Best Management Practice	Responsibility	Further Information
				<p>Planning of corrective measures, if needed. Reports to be shared with IFIs;</p>		
		<p>Fauna, including mammals: brown bear, otter etc. Red data species of Georgia; Emerald list of species; Other sensitive species of birds and bats;</p>		<p>Pre-entry survey: verification of existence of the bird nests and bat shelters within the impact zone; Asses the need of route refinement;</p> <ul style="list-style-type: none"> - Monitoring of efficiency of implemented preventive and mitigation measures; - Planning of corrective measures, if needed. <p>Reports to be shared with IFIs;</p>		
		<p>Towers#240; 240A; 240B; 241; 245; 248; 249A; High impact areas on surface water;</p> <p>Towers #240C; 249 და 250A Medium impact areas on surface water;</p>		<ul style="list-style-type: none"> - Towers #240; 240A; 240B; 241; 245; 248; 249A; Conduct the cical works in summer, when the water discharge rate is lowest; - Construction sites should be isolated from the river water by barriers (stones and gravel; geotextile etc. to contain the sediments or concrete slurries from the construction sites; - Towers #240C; 249 და 250A These receptors are of medium sensitivity as they are located at a distance from the tower erection sites (400-m distance). Mitigation measures include arrangement of berms or other light barriers to contain the sediments from construction sites; - At the mentioned sections of the r.Adjaristksali the works should be stopped during the spawning period (despite the 		

N	Activities or Aspects	Potential Impacts/Issues of concern	Significance of Impact ²	Mitigation /Enhancement Measures or Best Management Practice	Responsibility	Further Information
				<p>fact that there are no sensitive species of fish, like the trout found in Adjaristskali).</p> <ul style="list-style-type: none"> - The construction company should have all equipment and gears for preventing contamination in case of local oil spills. The vehicle maintenance and leakage control should be conducted according to standards' 		
		<p>Increase sediment in surface water bodies within RoW due to loosened ground from scattered surfaces as a result of cuts on access roads</p>	<p>Minor or low negative impacts</p>	<ul style="list-style-type: none"> - Recultivation of territories with local species of grass after completion of the vegetation clearance works from forested areas and shrublands. - Arrangement of anti-sludge barriers along the areas cleared from vegetation cover within the RoW, which ensures the retention of ground washed down by surface runoff 	<p>Contractor</p>	
		<p>Pollution caused by mud-stained tires of transport driving from construction sites</p>	<p>Minor negative impact</p>	<ul style="list-style-type: none"> - Arrangement of buffer mound between the earth access roads and paved roads in order to prevent the pollution of paved roads with ground / mud; - Washing the engine and tires of the construction equipment before leaving the construction site. 	<p>Contractor</p>	
		<p>Soil compaction, creation of gullies and dust generation within the RoW and on access roads</p>	<p>Minor negative impact</p>	<ul style="list-style-type: none"> - Covering wet / loamy soil with appropriate material, for the purpose of weight distribution of construction machinery and prevention of creation of gullies; - Regular watering of temporary access roads passing near the populated areas in dry and 	<p>Contractor</p>	

N	Activities or Aspects	Potential Impacts/Issues of concern	Significance of Impact ²	Mitigation /Enhancement Measures or Best Management Practice	Responsibility	Further Information
				windy weather; - Recultivation of bare soil after completion of construction works, including restoration of grass cover.		
		Geohazards: landslides and mudflows	Minor or low negative impacts	<ul style="list-style-type: none"> - Implementation of geo-/bio-engineering measures developed for landslide hazard areas at the design phase; - To avoid blasting on geologically unstable areas, and to use small charges for blasting on geologically stable areas. - Implementation of planned measures to minimize impact on soil and vegetation cover, including demarcation of construction area, minimization of tree felling and implementation of other above-mentioned measures; - Implementation of measures to control surface runoff; - Recultivation of damaged territories upon completion of construction works; - Inform the GSE if the landslide risk turns out to be higher than it was considered at the design stage and if the mitigation measures planned at the design stage may not be sufficient. Works on such territories shall be suspended until the Customer does not provide adequate management measures for landslide risk; 	Contractor	

N	Activities or Aspects	Potential Impacts/Issues of concern	Significance of Impact ²	Mitigation /Enhancement Measures or Best Management Practice	Responsibility	Further Information
		Generation of fugitive dust	Negligible adverse	<ul style="list-style-type: none"> - Confine vehicles to demarcated roadways. - Use gravel for the access roads into the base camps. - Restrict unnecessary traffic - Establish speed limit for vehicles moving on earth roads; - Supply workforce with dust masks. - Water spray the roads during warm (summer) period to suppress dust. - Minimize size of material/spoil storage piles. - Suspension of earth works during windy weather; - Refilling of excavated soil in a timely manner; - Recultivation of the area upon completion of construction works; - Utilize truck bed covers when hauling materials 	Contractor	
		Impact on the runoff of surface water bodies, degradation of water quality in small streams and ravines	Low negative impact	<ul style="list-style-type: none"> - Considering the provisions of Technical Regulation on Water Protection Zones, approved by the order №440 of the Government of Georgia (31.12.2014) and the provisions established by the Law of Georgia on Water; - Avoiding intensive tree cutting within the RoW; 	Contractor	

N	Activities or Aspects	Potential Impacts/Issues of concern	Significance of Impact ²	Mitigation /Enhancement Measures or Best Management Practice	Responsibility	Further Information
				<ul style="list-style-type: none"> - Cultivation of local species of grasses within the project corridor. 		
		Contamination of air from vehicle and other construction equipment emissions (bulldozers etc.)	Negligible adverse	<ul style="list-style-type: none"> - Implement regular vehicle maintenance and repair procedures at designated areas. - Utilize fuel efficient equipment and vehicles. - Restrict unnecessary traffic. - Utilize emission control devices such as catalytic converters. 	Contractor	
		Forest fire danger	Minor negative impact	<ul style="list-style-type: none"> - Timely removal of vegetation cover from the project corridor. 	Contractor	
		Generation of noise	Negligible adverse	<ul style="list-style-type: none"> - Confine construction activities to daylight hours within 500 m of residential areas - Warning of the local population on the planned work and their duration prior to the commencement of works; - Provide workforce with hearing protection as needed. - Ensure technical maintenance of machinery / equipment; - If necessary, carry out additional measures to minimize noise impacts near populated areas or sensitive habitats such as selection of less noisy construction techniques, implementing 	Contractor	

N	Activities or Aspects	Potential Impacts/Issues of concern	Significance of Impact ²	Mitigation /Enhancement Measures or Best Management Practice	Responsibility	Further Information
				works manually, and planning of works so that not to coincide with the periods of animal reproduction and migration, and more.		
		Local contamination of soil and groundwater with oil products and chemicals	Minor negative impact	<ul style="list-style-type: none"> - Allocate special storage areas for fuel, lubricants and chemical substances at construction camps and parking lots for construction equipment. Waterproof layer shall be arranged on the surface of the storage area, and waterproof embankment shall be arranged throughout its perimeter. The territory must be protected from atmospheric waters. The area bounded by the embankment should be sufficient to retain the full volume of the fuel / chemicals spilled on the area. - Fuel, lubricants and chemical substances shall be stored only on a properly protected area; - Regular maintenance of construction equipment to ensure timely detection of fuel / lubricants spills and its removal. - Maintenance / repair of trucks only on areas arranged for these purposes. 	Contractor	
		Impact on ecosystem, flora and fauna	Minor or low negative impact	Implementation of mitigation measures developed within the ESIA, which should be taken into account in the Biodiversity Management Plan. Mitigation measures may	Contractor	ESIA Sections 7 and 8

N	Activities or Aspects	Potential Impacts/Issues of concern	Significance of Impact ²	Mitigation /Enhancement Measures or Best Management Practice	Responsibility	Further Information
				<p>include:</p> <ul style="list-style-type: none"> - Arrangement of the towers so as to avoid impact on isolated populations / community; - Planning the schedule of construction and maintenance works so that the works do not coincide with the periods of animal reproduction and migration; - Avoid construction of access roads from high sensitive areas from ecological point of view; - Implementation of monitoring surveys to determine the level of impact on sensitive species; - Arrangement of nests for large birds far away from the power transmission line. - Recording wood species to be cut within the OHL corridor in accordance with the Resolution No.242 of the Government of Georgia of 20 August 2010 “On approval of forest use rules”. - Storage and use of cut woods in accordance with the above-mentioned resolution. 		
		<p>Negative impact on landscape due to contamination with domestic waste (plastic, bottles, etc.).</p>	<p>Minor negative impact</p>	<ul style="list-style-type: none"> - Development of waste management plan; - Provide appropriate equipment (garbage boxes, containers) for waste collection; - Instruction of personnel on waste management issues; - Clean up all temporary construction camps 	<p>Contractor</p>	

N	Activities or Aspects	Potential Impacts/Issues of concern	Significance of Impact ²	Mitigation /Enhancement Measures or Best Management Practice	Responsibility	Further Information
		Worker's injuries / accidents		<p>and their surrounding areas.</p> <ul style="list-style-type: none"> - Development of a labor hygiene and safety management plan; - Provide personnel with personal protective equipment (hand, fingers and legs protective equipment) and control of the use of these means; - Conduct training for personnel on safety issues; - Minimize the height of the materials drop; - Minimize the size of materials and soil storage areas; - Establishment of a medical point where it will be possible to solve small medical problems; - Providing people with knowledge of first aid at all working areas. 	Contractor	
		Employment - impact on economy (temporary employment, total number to be specified)	Minor positive impact	<ul style="list-style-type: none"> - Development of Public Relations and Human Resources Management Plan; - Employment of local workers as far as possible; - Each worker deployed on the basis of a formal contract; - Salary paid for local worker should not be less than the average salary of local population. - Provide construction camps with heating 	Contractor	

N	Activities or Aspects	Potential Impacts/Issues of concern	Significance of Impact ²	Mitigation /Enhancement Measures or Best Management Practice	Responsibility	Further Information
				system, showers and kitchens.		
4. OPERATION AND MAINTENANCE PHASE						
4.1	Operation and Maintenance of the transmission lines and ROW					
4.1.1	Typical activities for transmission line and ROW O&M would include: <ul style="list-style-type: none"> - Energizing the transmission line - Maintenance site visits and inspections - Vegetation control in ROW - Tower repairs - Foundation repairs - Repair of damaged/downed wires. 	Fugitive dust and vehicles' emissions from maintenance visits.	Minor adverse	<ul style="list-style-type: none"> - Restrict unnecessary traffic and ensure that exposed ground is reseeded or otherwise stabilized - Implement regular vehicle maintenance and repair procedures. - Utilize fuel efficient equipment and vehicles. - Utilize emission control devices such as catalytic converters 	GSE (with support of maintenance contractor)	ESIA Sections 7 and 8
		Disruption to overhead power lines and towers due to irregular maintenance of vegetation within the ROW.	Negligible adverse	<ul style="list-style-type: none"> - Remove invasive plant species, whenever possible, and cultivate native plant species. - Implement Vegetation Management Plan: the selective removal of tall- growing tree species and the encouragement of low-growing grasses and shrubs. 	GSE (with support of maintenance contractor)	ESIA Sections 7 and 8
		Soil erosion and water quality impacts:	Negligible to Minor adverse	<ul style="list-style-type: none"> - Place silt fence down gradient of all areas of exposed soil within ROW to capture sediment in runoff. - Where clearing in shrubland and forested areas, the ground should be tilled and seeded with native grass species immediately after clearing activities are complete. 	GSE a (with support of maintenance contractor)	ESIA Sections 7 and 8
		Landslide hazard	Low or medium	<ul style="list-style-type: none"> - Monitoring of revegetation and erosion 	GSE a (with support of	ESIA Sections 7

N	Activities or Aspects	Potential Impacts/Issues of concern	Significance of Impact ²	Mitigation /Enhancement Measures or Best Management Practice	Responsibility	Further Information
			negative impact	<p>processes across the entire corridor during the first 2-3 years after completion of works to identify problematic areas where additional measures will be taken to restore vegetation and prevent erosion.</p> <ul style="list-style-type: none"> - Regular monitoring of high and medium risk landslide hazardous and erosive areas throughout the operation phase to assess the adequacy of the measures taken, to timely identify potential problems and, if necessary, to timely plan and implement additional Measures. 	maintenance contractor)	and 8
		Forest fires due to accumulation of underlying growth or slash from routine maintenance along the ROW	Negligible adverse	<ul style="list-style-type: none"> - Thorough monitoring of ROW vegetation and periodic clearings. - Proper disposal of maintenance slash by trucks - Planting and managing fire resistant species (e.g. hardwoods) within the ROW 	GSE a(with support of maintenance contractor)	ESIA Sections 7 and 8
		Soil contamination along the route with herbicides.	Negligible to Minor adverse	<ul style="list-style-type: none"> - Control vegetation using manual techniques which do not require the use of herbicides. 	GSE (with support of maintenance contractor)	ESIA Sections 7 and 8
		Impacts on surface water quality due to increased soil erosion rates and sediment loads into the streams.	Minor adverse	<ul style="list-style-type: none"> - Considering the provisions of Technical Regulation on Water Protection Zones, approved by the order №440 of the Government of Georgia (31.12.2014) and the provisions established by the Law of Georgia on Water; - Avoid excessive vegetation clearings (trees and shrubs) around the power transmission lines. This is especially true for the towers located on 	GSE (with support of maintenance contractor)	ESIA Sections 7 and 8

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N	Activities or Aspects	Potential Impacts/Issues of concern	Significance of Impact ²	Mitigation /Enhancement Measures or Best Management Practice	Responsibility	Further Information
		Impact on flora	Minor to major adverse	<ul style="list-style-type: none"> - Implement mitigation required by Flora Conservation Plan. - Recording wood species to be cut within the OHL corridor in accordance with the Resolution No.242 of the Government of Georgia of 20 August 2010 “On approval of forest use rules”. - Storage and use of cut woods in accordance with the above-mentioned resolution. 	GSE a(with support of maintenance contractor)	ESIA Sections 7 and 8
		Impact on wildlife and habitat	Minor to major adverse	<ul style="list-style-type: none"> - Scheduling ROW maintenance activities to avoid breeding and nesting seasons for any critically endangered or protected wildlife species. - Implement mitigation required by Fauna Conservation Plan. 	GSE a(with support of maintenance contractor)	ESIA Sections 7 and 8
		Avian collisions and electrocutions	Negligible to Minor adverse	<ul style="list-style-type: none"> - Monitoring of birds collision with power transmission line and implementation of additional mitigation measures, if necessary (e.g. installation of power line markers); - Implementation of measures considered by the Biodiversity Plan 	GSE (with support of maintenance contractor)	ESIA Sections 7 and 8
4.1.2	Occupational and public health and safety for transmission line and ROW operation and	Health and Safety issues for maintenance workers and local residents include: - EMF impacts on health	Negligible to Minor adverse	<ul style="list-style-type: none"> - Measure EMF levels in all buildings within 100 meters of the line. - Allow only trained and certified workers to 	GSE (with support of maintenance contractor, Technical Consultant and a certified monitoring	ESIA Sections 7 and 8

N	Activities or Aspects	Potential Impacts/Issues of concern	Significance of Impact ²	Mitigation /Enhancement Measures or Best Management Practice	Responsibility	Further Information
	maintenance activities	<ul style="list-style-type: none"> - Working at heights on poles and structures - Risks of electrocution - Electromagnetic interference - Exposure to chemicals and PCBs 		<p>install, maintain or repair electrical equipment. Allow only trained workers to work at heights</p> <ul style="list-style-type: none"> - Ensure that live-wire work is conducted by trained personnel with strict adherence to specific safety and insulation standards. 	agency)	
4.1.3	Public health and safety at the operation and maintenance phases of the power transmission line	<p>Radiation of the electromagnetic field of the OHL;</p> <p>Electrical shock when touching power wires</p>	Negligible to Minor adverse	<ul style="list-style-type: none"> - Prevent hazards of electrocution, use signs, barriers (locks, doors, gates, steel posts surrounding transmission towers) at all towers. - Prevent shocks, ground conducting objects (e.g. metal fences and other metal structures) installed near power lines. 	GSE (with support of maintenance contractor, Technical Consultant) and a certified monitoring agency	

ANNEX 2. Environmental and Social Monitoring Plan

Environmental and social monitoring is one of the important components of the Environmental Management System that ensures environmental and social protection at the construction and operation phases of the project. Georgian legislation on environmental impact assessment requires self-monitoring of environmental impacts during the full cycle of project. The monitoring plan shall include the monitoring of both environmental and social impacts. The monitoring plan shall ensure the implementation of responsibilities defined by the EIA or other similar reports, as well as by the licenses and permits.

Present Environmental and Social Monitoring Plan was prepared with consideration of impacts identified in the ESIA process and is part of the Environmental Impact Assessment report. It is presented in Table 10-2 and Table 10-4. Environmental and social monitoring aims to determine the effectiveness of proposed mitigation measures and to update / specify impact mitigation measures by taking into consideration the actual level of impact.

More specifically, the objective of the monitoring plan is:

- To identify the changes in the environment at the construction and operation phases of the project and to determine the actual impact level;
- To monitor the implementation of mitigation measures and to determine the effectiveness of these measures;
- To timely identify potential problems and shortcomings, to timely implement appropriate corrective actions, and improve mitigation measures;
- To meet legislative requirements and corporate or public liabilities;
- To develop mitigation measures for such type of impact that has not been identified during the ESIA process or is caused by design changes made in the project implementation process;
- To provide the Georgian State Electro system and International Financial Institutions (World Bank) with the possibility of evaluating the fulfillment of the requirements set out in the Loan Agreement.

The Environmental and Social Monitoring Plan describes monitoring parameters, actions to be performed, positioning of monitoring points, frequency and duration of monitoring, data to be collected during the monitoring and reporting method. Monitoring may include:

- Monitoring of the current situation of the environment that may be carried out in certain seasons or within a few years to accumulate statistical information on the nature, trend and quality of changes of environmental characteristics that are required to assess and mitigate the impacts on natural and social environment;
- Compliance monitoring, which aims to assess compliance with the legislative requirements and requirements of licenses / permits (e.g. assessment of the level of atmospheric emissions);
- Monitoring of environmental impacts and mitigation measures, which aims to compare the estimated and actual (residual) levels of impacts and to determine the efficiency of mitigation measures based on this.

Monitoring may provide environmental and social monitoring with potential impact sources or impact receptors. Social impact monitoring is particularly important, since the impact on social receptors is often caused by a number of impact factors.

The GSE shall ensure that the agreement reflects full spectrum of compulsory mitigation measures and the schedule of monitoring the implementation of these activities. The Environmental and Social Management Plan should be included in the tender / contractual documentation to ensure that the bidder holds full information on what activities should be taken to minimize environmental impacts and to consider appropriate expenditures in

estimate. Monitoring carried out by the customer shall consider the supervision of works under the contract concluded with the contractor.

Environmental and social supervision and monitoring by GSE is carried out on all phases of the project. Monitoring is an integral part of the environmental impact management system of the Company and it aims to:

- Ensure implementation of appropriate mitigation measures;
- Ensure effectiveness of mitigation measures and proper protection of the environment;
- Evaluate the level of actual impact on natural and social environment after implementation of mitigation measures to determine whether there is a residual or unforeseen impact that needs to be addressed.

The Environmental and Social Monitoring Plan includes pre-construction (preparation stage), construction and operation phases of Akhalsikhe-Batumi 220 KV Power Transmission Line Project. The GSE will be responsible for project monitoring through its qualified environmental staff and consulting company. Monitoring reports will be submitted to the Ministry of Economy and Sustainable Development, Ministry of Environment Protection and Agriculture, and the World Bank.

Table 0-2 Environmental and Social Monitoring Program for 220kV Akhaltzikhe-Batumi OHL Project, Construction Phase (Responsibility of Construction contractor)

Environmental and Social Monitoring Program for 220kV Akhaltzikhe-Batumi OHL Project Construction Phase (Responsibility of Construction contractor)					
Receptor/ Media	Parameters/Activities	Standard	Location	Frequency	Duration and deliverables
Ambient air quality	Opacity (visibility through dust) Excessive emissions from improperly maintained machinery	Minimum impairment of visibility for >1 minute Best practices	Construction and vehicle operation locations	Daily	Supervision reports. Daily
Ambient air quality	Watering of Access roads used	As required to meet the opacity requirements Best practices	Construction and vehicle operation locations, unpaved roads located within settlements	Daily	Supervision reports. Daily
Ambient noise	Noise levels (subjective)	Audibly loud noises	Vehicle and equipment operation locations. Access roads through the settlements used by construction machinery	Daily	Supervision reports. monthly
Groundwater and surface water resources	pH, BOD5, TSS, TDS TPH	Georgia Standards and Best practices Georgian national surface and drinking water quality standards	At construction base camps Downstream from river crossings Any other natural waters used as potable water (none known at this time)	Monthly After any chemical, oil and hazardous materials spills	1 sample per location, report to GSE

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Environmental and Social Monitoring Program for 220kV Akhaltzikhe-Batumi OHL Project Construction Phase (Responsibility of Construction contractor)					
Receptor/ Media	Parameters/Activities	Standard	Location	Frequency	Duration and deliverables
Soil quality and erosion	Assessment of soil disturbance and erosion. Assessment of erosion rate and slope stability in hilly areas.	Best practices	Along all access roads and ROW At construction base camp	Once before construction at each area	Photographic and narrative record at each location.
			All areas disturbed by construction equipment and workers All access and auxiliary roads	Continuous during construction,	Checklist observation Photographic and narrative record at each location where the change is noticeable
Landslides	Earth movement, excavation or blasting for tower foundations.	Best practices	200-500 m within all blasting locations and nearest steep rocky surface	Before and after every blasting sessions, if any.	Records of seismic conditions
Birds	Evidence of nesting by raptors, other large birds, or sensitive species within 0.5 km of corridor. Includes active and old nests	International best practices	Along the access roads and the line with special attention to places of high sensitivity.	Once before construction start on each section	Birds breeding survey results, report to liaison officer
Flora	Protected or endemic species and habitat - assessment for relocation or other action needs.	Best practices	Along entire line, with special attention to ESIA-identified sensitive areas	At each particular site, before the clearance activity start.	Flora conservation plan for each section. Performed activity monitoring report to verify success. Summary to lenders in accordance to lender's requests.

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Environmental and Social Monitoring Program for 220kV Akhaltsikhe-Batumi OHL Project Construction Phase (Responsibility of Construction contractor)					
Receptor/ Media	Parameters/Activities	Standard	Location	Frequency	Duration and deliverables
Flora, including Georgian Red List species; proposed Emerald site species – yellow azalea; other sensitive species;	Assess the need for transplantation of protected or endemic species or other measures (such as, for example, assessment sites covered by these species in high densities, also assessment of the need for an alternative to this particular section of the route). Prevention of cutting and/or other damage to plants, which is not specified in the pre-agreement document	Best practices	Along entire line, with special attention to ESIA-identified sensitive areas	At each particular site, before the clearance activity starts	Flora conservation plan for each section. Performed activity monitoring report to verify success. Additional mitigation measures if needed. Summary to lenders in accordance to lender's requests.
Forest habitats, including proposed Emerald site habitats, other sensitive habitats	Vegetation removal of the right-of-way and other works in forested areas. Assess the need for an alternative to the particular section of the route in the case of sensitive habitats.	Terms of the permit for cutting timber; best practices	Power lines sections crossing the forest	Daily during implementing construction works, at all forested sections.	Daily monitoring reports, Monitoring report after the completion of construction works and mitigation measures. Reports on the effectiveness of mitigation measures, if necessary, evolve additional mitigation measures. A summary of the report will be submitted to the lender.
Alpine Meadows Habitats	Minimize tracking over steep alpine terrains during the RoW clearance, transportation of	Best practices	Along OHL sections in alpine areas	Daily during construction works	Daily supervision reports Monitoring report after construction in each section

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Environmental and Social Monitoring Program for 220kV Akhaltshikhe-Batumi OHL Project Construction Phase (Responsibility of Construction contractor)					
Receptor/ Media	Parameters/Activities	Standard	Location	Frequency	Duration and deliverables
	materials. Assessment of soil disturbance and erosion. Clear demarcation of RoW				and completion of mitigation to verify success
Fauna	Protected species and habitat	Best practices, EMP, Contractor's Biodiversity Management Plan	Sensitive areas identified in ESIA	Once before construction, once more at specific location if construction to take place during breeding season (spring/early summer)	Report results of survey, mitigation measures needed. Monitoring report after construction and completion of mitigation to verify success.
Occupational and Public Health and Safety	Noise, fire safety, hazardous materials, waste management. Workplace inspections for presence and use of PPE, noise, fire safety, hazardous materials registrar, solid and sanitary waste registrar, traffic safety, blasting, etc. Records of safety training.	Georgia and GSE occupational and community HS standards, Best practices	At tower sites, construction base camp, temporary camps, residential areas in close proximity to construction/ transportation sites	Monthly	Designated safety officers (not part of work crews) report to GSE as Project Execution Agency.
Community involvement/public consultation	Foreman training on local issues (including for minority communities) Staff training on same Briefings/notifications of community leaders of activities	WB and IFC Requirements	All work locations	Before every mobilization	Throughout construction period, report to lenders

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Environmental and Social Monitoring Program for 220kV Akhaltzikhe-Batumi OHL Project Construction Phase (Responsibility of Construction contractor)					
Receptor/ Media	Parameters/Activities	Standard	Location	Frequency	Duration and deliverables
	Foreman training sessions Safety training sessions Consultations/briefings of local communities. Accidents and safety incidents Complaints by citizens or stakeholders	WB and IFC Requirements	All work locations	Training: As workers begin jobs and refresher training thereafter Safety reports annually Complaints: monthly	Throughout project life, reports to Ministry of Energy and lenders

Figure 0-3 Environmental and Social Impact Monitoring Program for Akhaltzikhe-Batumi 220 kV power transmission line project Construction Phase (GSE Responsibility)

Environmental and Social Impact Monitoring Program for Akhaltzikhe-Batumi 220 kV power transmission line project Construction Phase (GSE Responsibility)					
Receptor / Environmental component Project phase	Parameters / activities	Standard	Location	Frequency	Duration and documentation
Entire corridor of OHL	Implementation of planned mitigation measures by the construction contractor	The best practice, environmental impact management plans of the construction contractor, the Georgian legislation and the requirements of the World Bank	The OHL corridor, according to the works monitoring plan	Based on the planned construction works schedule, according to the works monitoring plan	Monitoring reports reflecting the quality of implementation of mitigation measures and defining the need for corrective measures. Relevant photo material depicting the current situation

ცხრილი 0-4 Environmental and Social Monitoring Program for 220kV Akhaltsikhe-Batumi OHL Project Operation Phase (Responsibility of GSE)

Environmental and Social Monitoring Program for 220kV Akhaltsikhe-Batumi OHL Project Operation Phase (Responsibility of GSE)					
Receptor/Media	Parameters/Activities	Standard	Location	Frequency	Duration and deliverables
Soil quality and erosion	Assessment of soil disturbance and erosion. Assessment of erosion rate and slope stability in hilly areas.	Best practices	All access roads and in areas with high potential for erosion	Every maintenance visit	Checklist observation Annual photographic record
Birds	Bird injury/mortality.	Best practices	Along the power line route	Survey of Batumi bottleneck section sections once during each migration season. Annual survey for large bird mortality due to electrocution	Throughout project life: annual bird survey report, report to liaison report, summary to lenders
Flora	All locations	Flora Conservation plan	Entire RoW with maximum attention to areas where mitigation was implemented	Annually and every visit to location for maintenance	Annual Environmental monitoring report Standard maintenance report
Forest Habitats	Vegetation control during maintenance, fire protection measures	Best practices	Along OHL sections in forested areas	Routine maintenance visits/walkovers	Standard Maintenance report
Alpine Meadows Habitats	Minimize tracking over steep alpine terrains during the RoW clearance, transportation of materials. Assessment of soil disturbance	Best practices	Along OHL sections in alpine areas	Routine maintenance visits/walkovers	Standard Maintenance report

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Environmental and Social Monitoring Program for 220kV Akhaltshikhe-Batumi OHL Project Operation Phase (Responsibility of GSE)					
Receptor/Media	Parameters/Activities	Standard	Location	Frequency	Duration and deliverables
	and erosion.				
Soil quality (integrity) and erosion	Assessment of soil disturbance and erosion. Assessment of erosion rate and slope stability in hilly areas.	Best practices	All access roads and in areas with high potential for erosion	During each maintenance work	Monitoring questionnaire; Annual photo material
Birds Chiroptera	Birds/chiropterans injury/mortality due to collision with the power line or electrocutions	Best practices	Entire OHL corridor	1. Monitoring of Rakvta-Shuakhevi section during each migration season; 2. Annual monitoring of large bird mortality due to electrocutions	During the existence of the OHL: annual bird monitoring reports, reports on the effectiveness of mitigation measures, if necessary, evolve additional mitigation, impact preventive and other measures in order to develop and implement them; submitting a summary of the report to creditors
Flora	Monitoring the restoration of vegetation in damaged areas; Identify and implement the need for special compensation and recovery actions	Flora Conservation plan	Entire right-of-way corridor; attention should be paid as much as it is possible to the areas where mitigation measures have been taken.	Annually and during maintenance works	Annual environmental impact monitoring reports; observation reports, if necessary, in order to evolve and set additional measures; Standard maintenance report.
Forest habitats	Monitoring the restoration of damaged areas; vegetation control during maintenance, fire	Best practices	At forested areas of OHL	Ongoing maintenance works/inspection of OHL	Observation reports on the effectiveness of rehabilitation measures, if

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Environmental and Social Monitoring Program for 220kV Akhaltsikhe-Batumi OHL Project Operation Phase (Responsibility of GSE)					
Receptor/Media	Parameters/Activities	Standard	Location	Frequency	Duration and deliverables
	protection measures				necessary, in order to evolve and set additional measures; Standard maintenance report.
Alpine meadows habitats	Monitoring the restoration of damaged areas; minimize tracking over steep alpine terrains during the RoW clearance, transportation of materials. Assessment of soil disturbance and erosion.	Best practices	Along OHL sections in forested and other areas	Ongoing maintenance works/inspection of OHL	Observation reports on the effectiveness of rehabilitation measures, if necessary, in order to evolve and set additional measures; Standard maintenance report.
Fauna: listed in the Georgian Red List and spread on the territory of Emerald site, as well as other sensitive species, including otters, viperas, insects, etc.	Discovery of animal species confirmed by the EIA, and the species that can be found there. Observing/assessing their condition. Monitoring the residual impact after the completion of construction works and taking appropriate mitigation measures	The best practice, environmental impact management plan	OHL corridor and sensitive areas identified in ESIA	According to the environmental impact management plan	Carrying out the measures defined by the environmental impact management plan and the mitigation measures identified in ESIA; if necessary, evolve and set additional measures
Fauna	Presence of protected species, injured or dead animals	Best practices	All inspected area	Ongoing maintenance works/inspection of OHL	Standard maintenance report; if necessary, evolve and set additional measures
Fauna	Presence of protected species, injured or dead animals	Best practices	Each area visited	During routine maintenance	Standard maintenance report

*Akhaltzikhe - Batumi 220kv Double Circuit Power Transmission Line
Environmental Impact Assessment of the Change and Commissioning*

Environmental and Social Monitoring Program for 220kV Akhaltzikhe-Batumi OHL Project Operation Phase (Responsibility of GSE)					
Receptor/Media	Parameters/Activities	Standard	Location	Frequency	Duration and deliverables
				activities/inspection s	
Occupational and Public Health and Safety	Vehicle safety, PPE, training records	Georgia and GSE occupational and community HS standards, Best practices	Staging area for line inspectors	Weekly by inspection supervisor and inspector	Reports compiled for annual summaries to Ministry of Energy
	Presence of fences, warning signs and placards	Best practices Georgia standards	All towers	At every inspection or visit	Monthly reports on status of signs and actions
	EMF	International and Georgia standards (most stringent)	All buildings within 100 meters of line and other buildings as requested by owner/resident	Every two years, or as requested	Annual report on monitoring and results to Ministry of Energy and lenders
Community involvement/public consultation	Consultations/briefings of local communities. Accidents	WB and IFC Requirements	Along entire line	Safety reports annually Complaints: monthly	Annual reports on safety issues, complaints registration log and annual reports.
Effectiveness of implemented mitigation measures	Analysis of effectiveness of mitigation measures implemented on design and construction phases, determination of need for additional measures	Best practice, requirements of Georgian Legislation and the World Bank	OHL corridor and surrounding area	Once a year, based on the results of the monitoring carried out during the year, or when a significant problem is revealed	Current and annual reports of monitoring, plans for additional mitigation / corrective measures and their implementation reports (if necessary)