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ESHIA for 2D Seismic Survey Block 4 with extension into Blocks 2 and 3

Non-Technical Summary

Shell B.V.
Project number 60568938
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1. Overview

Shell Upstream Albania B.V. (hereafter referred to as SUA) is planning to conduct a seismic survey (hereinafter "the Project") during 2019 in Block 4 with extended lines to Blocks 2 and 3 in Southern Albania. In order to manage the impacts from the project and to meet the permitting requirements, the Environmental, Social and Health Impact Assessment (ESHIA) has been undertaken which outlines the regulatory requirements and establishes the physical, biological and social baseline of the study area. The ESHIA identifies potential receptors that may be affected by the proposed project activities, assesses the impacts and describes the mitigation measures to help manage the impacts of the proposed seismic survey activities. This Non-technical Summary (NTS) provides a synopsis of the ESHIA report and outlines key points from its chapters. The reader is advised to refer to the final draft ESHIA report for detailed understanding of the activities, sensitivities, potential impacts, their significance and the mitigation and management measures.

The proposed seismic survey will use standard seismic survey methods and comprise of approximately 212 km of seismic data acquisition through the use of explosives or specialised (vibroseis) trucks. The survey will be undertaken in an ecologically and socially rich habitat including biodiversity features, designated areas, cultural heritage, water resources and local communities. Designated sites are protected by Albanian legislation or may be internationally recognised with no formal national designation. They comprise both natural monuments (biological and geological features) and cultural heritage monuments.

The impact assessment has considered the sensitivity (importance/vulnerability) of the receptors against the potential magnitude of change as a result of the project activities to determine the overall consequences of the impact. Using this approach the significance of residual impacts with regard to each identified receptor has been assessed. This takes into account the sensitivity of the receptor, the magnitude of change and the mitigation that will be implemented, leaving the residual impact.

The use of explosives is sub-surface (at a depth of up to 12m), spread over three months under highly controlled operational regime and will be delivered through an experienced contractor. The survey will be carried out sequentially; where survey activities will take place at one location and when completed will move to a new location, thus limiting the time of activities in an area.

The flexibility of setting the seismic line alignment within 500m corridor will help avoid and/or minimize clearance of vegetation thus reducing impacts on ecology. The actual foot print within the corridor will be no more than 5m wide. In addition, a buffer area of 200m will be adopted to further avoid sensitive receptors such as designated cultural monuments. Use of heavy machinery and vehicles is proposed along existing roads and under robust Health and Safety protocols. Project water will be sourced through carefully selected local suppliers and will be used under a monitoring regime. Seismic energy sources have the potential to cause damage in this sensitive karst landscape. The risk is recognized and mitigation measures are proposed. Additional measures will be deployed to improve the existing controls to minimize potential for residual risks.

Key social and health impacts associated with spatially spread project activities, particularly involving workforce from outside the project area, relate to the access and use of the land, the potential development of or use of worker accommodation in villages and potential damage to buildings from seismic survey. Additionally, the potential for excessive use of community water sources and medical facilities and the risk of disturbance created by project workers or traffic are also considered. Good International Industry Practices (GIIP) and locally tested approaches including avoidance techniques, compensation, effective engagement & consultation and implementation of good behavioral code of practice are proposed. The project is anticipated to deliver positive impacts through employment during the project duration and procurement of goods and services from local/regional markets.

A key strategy for implementing the mitigation measures and controls to minimize impacts is through the implementation of a structured management and monitoring framework. SUA and its seismic contractor will develop and implement scope-specific management plans (e.g. Land Transport Safety Plan) to achieve compliance and manage impacts.

With the successful implementation of mitigation/control measures through well-defined and coordinated management plans, the residual impacts from the proposed seismic survey activities are mostly likely to be low and insignificant overall.

2. Introduction

Shell Upstream Albania B.V. (hereafter referred to as SUA) is the Operator of a Production Sharing Contract (PSC) for Exploration, Development and Production of Petroleum in Blocks 2 and 3, onshore Albania, where it is currently performing appraisal activities. SUA has signed a Production Sharing Contract (PSC) for Exploration, Development and Production of Petroleum in Block 4, approved with the Decision of Council of Ministers of the Republic of Albania no. 350 dated 12.06.2018. SUA proposes to conduct a seismic survey (hereinafter "the Project") during 2019 in Block 4 with extended lines to Blocks 2 and 3. The proposed survey will enable SUA to evaluate the hydrocarbon potential of Block 4 and help to identify possible locations of future potential drilling activities.

The Environmental, Social and Health Impact Assessment (ESHIA) has been prepared in accordance with the Albanian legislation, the International Finance Corporation (IFC) and Shell standards, which requires that projects with the potential to have an impact on the environment to undertake an Environmental Social and Health Impact Assessment (ESHIA). The ESHIA is undertaken in advance of the activities (also referred as Environmental Impact Assessment (EIA) in the Albania legislation). The ESHIA is in accordance with the Albanian regulatory requirements and responds to the feedback provided during the first round of stakeholder engagements.

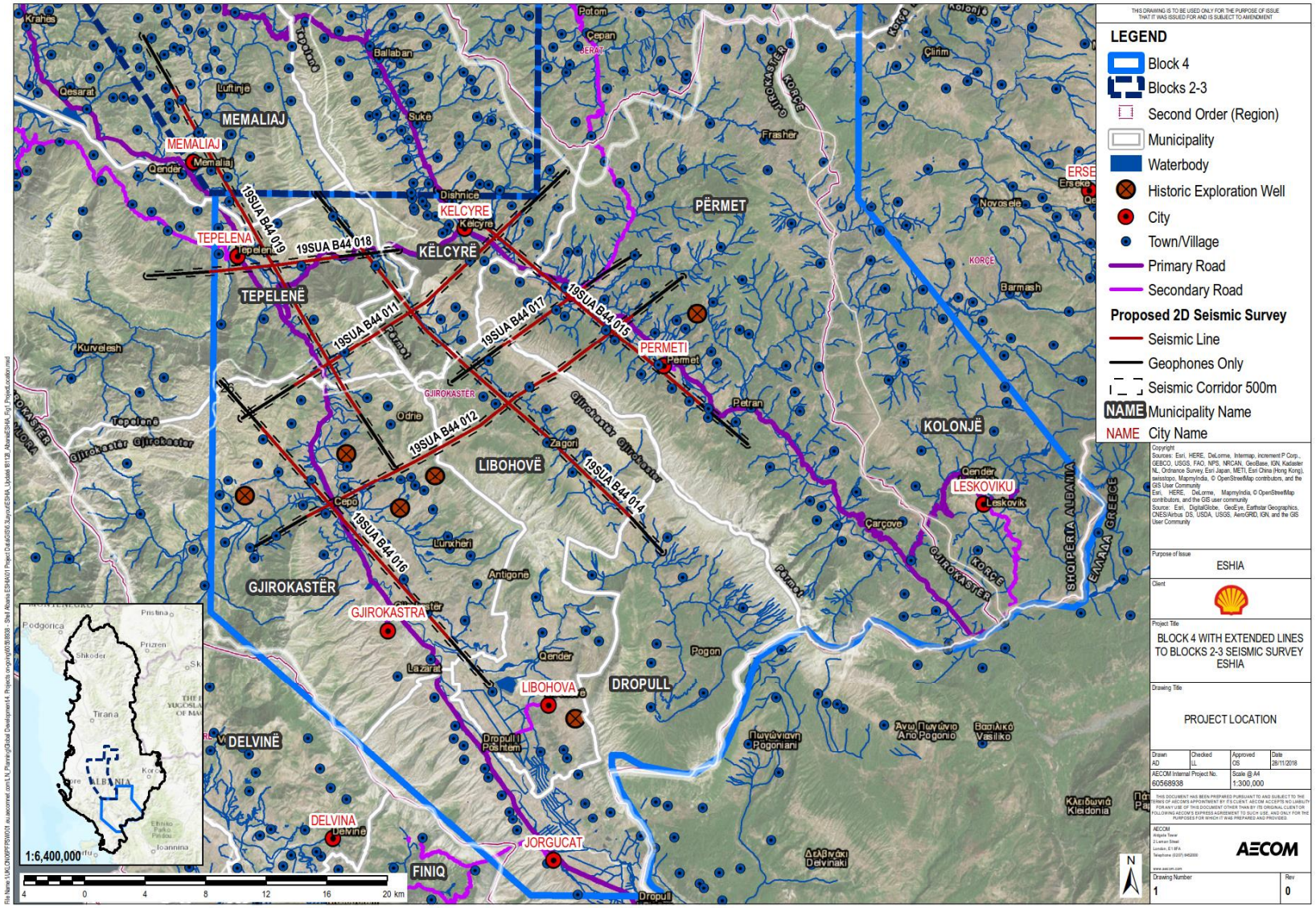
The ESHIA has been prepared by a team of specialists led by AECOM, a global leading engineering and environmental consultancy operating in more than 150 counties, supported by EMA, an environmental consultancy based in Albania. EMA have extensive national ESHIA and stakeholder consultation experience in various sectors including oil and gas.

Block 4 is located in southern Albania adjacent to the border with Greece, approximately 100 to 200km south of Tirana and south to Blocks 2 and 3. The Block 4 covers four regions - Berati, Korca, Gjirokastra and Vlora, though the majority of the seismic survey will be located in the Gjirokastra region. Figure 1 illustrates the location of the Project and the indicative seismic survey corridors/passages within which the survey will take place.

The project area includes designated natural and cultural heritage monuments. Designated areas are protected by Albanian legisaltion or may be internationally recognised with no formal national designation or protection. Some nationally designated areas also have an international recognition. The designated or protected areas receive this status because of their recognized natural, ecological or cultural values.

The final alignment of the seismic lines within the seismic corridors will be based on the terrain, accessiblity and proximitly to sensitive receptors such as villages, cultural monuments, natural monuments and sensitive ecological habitats.

Figure 1: Location of the Seismic Survey

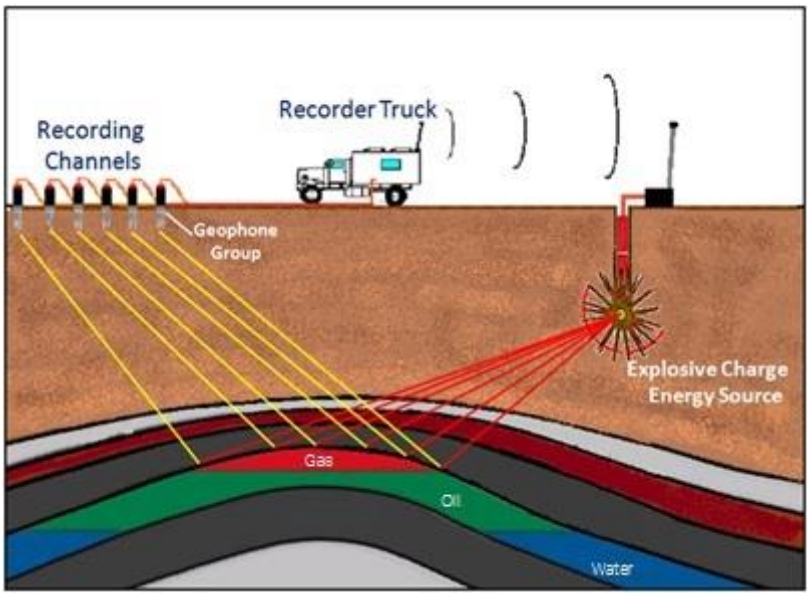


3. Project Description

A seismic survey is a method of investigating geological structures and their potential for exploration of petroleum, natural gas and mineral deposits. The seismic campaign proposed by SUA will comprise of approximately 212km of seismic survey corridors (spatial, not physical) and is expected to commence in the second quarter (Q2) of 2019 and could last for up to six months subject to obtaining all relevant approvals.

Seismic surveys use explosives or specialised (vibroseis) trucks. The sound waves are reflected by the underground rock formations and picked up on the surface by recording sensors. The sensors are connected to a central recording truck by wires (see Figure 2).

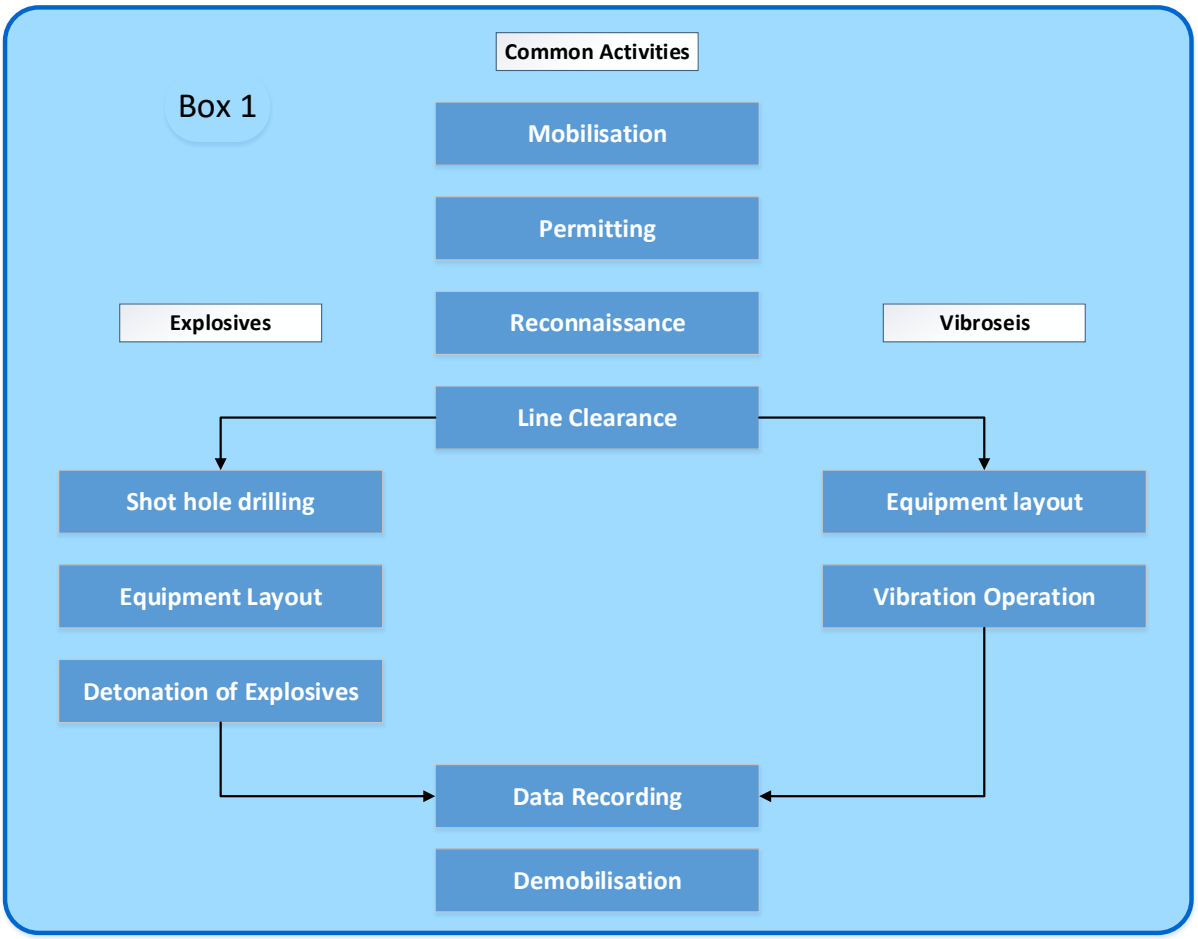
Figure 2 Schematic of a seismic survey



The choice of the energy source (explosives or vibroseis trucks) will depend on the terrain, land access, shallow geology and other operational parameters.

The seismic survey activities will be within the 500m corridor along the seismic line length. This will provide enough flexibility to avoid sensitive environmental and social receptors whilst allowing for reliable seismic data acquisition. Buffer zones, where either limited survey activity or no survey activity will take place have been established and adopted. These buffer zones consider Albanian legislation and guidance. The actual footprint of the seismic line within the 500m corridor where seismic activities will take place will be approximately 5m. This width will be wide enough to accommodate vehicles and enable avoidance of features (e.g. structures, trees, ponds or rock outcroppings). In some locations, survey activities will be limited to the placement of geophones only; these locations are at each end of the seismic lines. A 200 m buffer zone has been adopted to consider Albanian legislation that stipulates that a protection zone be establish specifically for designated areas, specifically cultural monuments. SUA has adopted this protection for other sensitive receptors, where appropriate. Activities within these buffer zones will vary based on the sensitivities.

Box 1 below summarises different activities associated with both seismic methods. Some activities are specific to the survey method whist other activities will take place irrespective of the survey method.



Mobilization will start upon the receipt of environmental approvals and other relevant permits. Mobilisation activities include moving staff and equipment to the project area and the establishment of the support facilities (base, 'fly camps', helicopter base and explosive storage facilities). The term "permitting" associated with the seismic survey is used to describe the process of arranging permissions and agreements to access land and compensation to land/property owners for providing access to the land or any damage to the property (e.g. structures, crops etc.). In advance of the survey, a team will scout the area to identify key features along the seismic corridors which are sensitive from a natural (ecological, geological, hydrological) or cultural perspective. The team will be working with specialists who will identify such sensitive locations. The team will also document the proximity of seismic lines to inhabited areas and infrastructure (e.g. bridges, roads and trails) and establish the logistics plans for the movement of crew and equipment within the survey area.

For both survey methods, some areas may need to be cleared to allow the survey crew to have a clear line-of-sight and create sufficient access for vehicles and personnel for the deployment and retrieval of seismic survey equipment. Access to the survey corridors and for the placement of receivers may occasionally require trimming the vegetation (e.g. thick bushes). Vegetation clearance within the seismic corridor will depend on the type of vegetation and the type of vehicles used for the access. An absolute minimum width just wide enough to walk through and set up the survey equipment will be used.

Approximately 3,000 shot holes will be drilled to place small (1 to 4kg) non-toxic degradable explosive charges. Shot holes with a diameter of 9cm will be drilled to a depth of 10-20m below surface and if required these holes will be cased with a casing to ensure borehole stability. The drilling phase will start as soon as one or more lines have been surveyed and will last for approximately 3 months. The drilling crews are expected to consist of approximately 4 persons each. It is expected that there will be 10 to 20 drilling crews operating simultaneously (depending on the level vibroseis acquisition which may replace the use of buried charges). Each drilling crew will have its drill rig and a transport vehicle.

Use of truck mounted drilling rigs and vibroseis will be limited due to mountainous terrain. These areas will be accessed for shot hole drilling by portable (hand carried) drill rigs or by helicopter (Heli- portable rigs). Examples of truck mounted rig and a heli-portable rig are shown Figure 3 and Figure 4 respectively.

Figure 3 Truck mounted rig

Figure 4 Heli-portable rig

The vibroseis method of recording seismic data uses a vibroseis machine to generate vibration by deploying a pad onto the ground which will then vibrate. The method may be used in areas where explosives are difficult to use and/or environmental or safety concerns discourage the use of explosives. However, vibrating trucks can be very large and good access is required for their operation. An example of a vibration truck is shown in Figure 5

Figure 5 Vibroseis machine

Before recording activities commence along each seismic line, the surveyors will determine minimum safe offset distance for the project area to avoid impacts particularly at locations where there is existing infrastructure or protected areas (e.g. buildings, natural monuments, cultural heritage, sensitive habitats and water sources). If a seismic survey point falls within the confines of the safe operating distances then the surveyor offsets the seismic survey point.

After the geophones are in place, the seismic energy is released to generate a vibration either through the use of buried explosives or using the vibroseis truck. After the release of the seismic energy, the geophones will be recovered and the site conditions assessed, and if required, restored to their pre-survey conditions.

The seismic survey programme is anticipated to commence in the second quarter of 2019. However the programme may extend into 2020 due to operational constraints. It is anticipated that the programme will last for 6 months, with key operations running in parallel. Operations will progress sequentially, moving from one area to another, and will not be spread across the 212km of seismic survey corridors concurrently. The indicative project schedule is provided in Table 1.

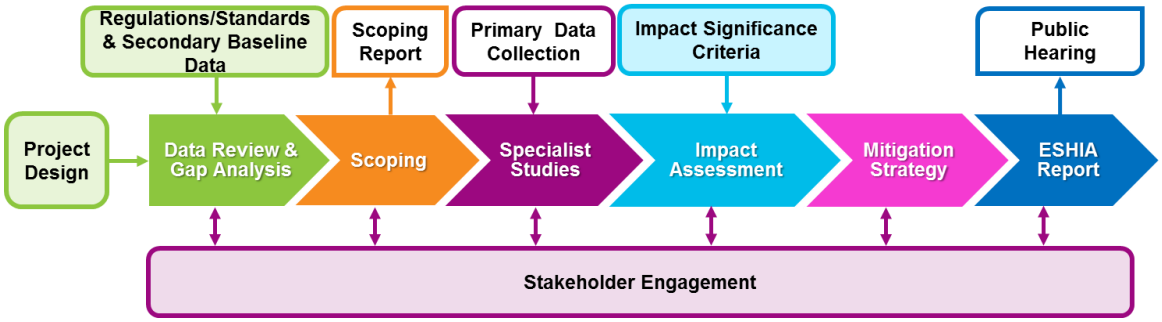
Table 1 Indicative Project Schedule

Key Operations	Estimated time
Mobilisation, Scouting, Planning & Permitting	3-4 weeks
Shot Hole Drilling	3 months
Layout of cables/geophones & Recording	3 months
Line Equipment and Crew Pickup	1 month
Post Survey Clean-up and Restoration	2 months

4. The ESHIA Process

The ESHIA process is a systematic approach to predict and assess the potential environmental, social and health impacts of a proposed project, evaluating alternatives and designing appropriate mitigation, management and monitoring measures. The results of this ESHIA, apart from enabling the project proponent to manage its project impacts, will allow MTE, the National Environment Agency (NEA) and other leading government agencies to make informed decisions about development proposals and allow potentially affected stakeholders to participate in the process. The step by step process is outlined in Figure 6.

Figure 6 The ESHIA Process



Baseline conditions are studied and documented so that potential changes or impacts from the project can be measured against them. Baseline conditions are the physical, biological, socio-economic, and cultural heritage characteristics that currently exist in the project area of activities prior to the start of the project. Impacts are identified and assessed according to the different project activities (mobilisation, support facilities set up and operation, seismic survey, and demobilisation and restoration).

The potential impact is assessed to determine the impact significance which is a measure of how important or consequential an impact is. Impact significance considers the magnitude of the impact and the sensitivity of the affected receptors (i.e. a body of water, air, parcel of land, community, habitat or individual creature, human being

or property that may be subject to an impact). The magnitude of an impact is a measure of the degree of change from the baseline conditions. A particular receptor may be more or less susceptible to a given impact. Some receptors may experience a greater degree of change, or have less ability to manage the change as compared to other receptors that may be more resilient or adaptable to a change.

Impact significance is assessed taking into account existing (built into the project design) control measures (called embedded mitigation measures). Off sets or avoidance measures included in the project design help avoid and protect sensitive environmental and social receptors while containment measures e.g. spill trays underneath leaking equipment help control contamination from spreading.

A combination of the magnitude of the effect and the sensitivity of the receptor determines the level of the impact. Impacts assessed as *high* or *moderate* are considered to be *Significant,* requiring mitigation measures to be developed**.** An impact predicted to be *low or negligible* is considered to be manageable or *insignificant,* where mitigation measures are not necessarily required.

Impact Significance Matrix

		Receptor Sensitivity (vulnerability and value)			
		Negligible	***Low***	***Moderate***	***High***
Impact Magnitude (extent, frequency, reversibility, duration)	***Negligible***	Insignificant	Insignificant	Insignificant	Insignificant / Low*
	Low	Insignificant	Low	Low / Moderate*	Moderate
	Moderate	Insignificant	Low / Moderate*	Moderate	High
	High	Insignificant / Low*	Moderate	High	High

After the identification of potential impacts a preliminary assessment of the significance of the impact is conducted. Strategies to avoid or mitigate the impacts are then developed. Next, the significance of the impacts is re-evaluated considering the implementation of these mitigation measures. The resulting impact is known as the 'residual' impact and represents the impact that will remain, following the application of mitigation and management measures, and thus the ultimate level of impact associated with the project.

5. Stakeholder Engagement

An important part of the ESHIA process is to solicit views, opinions and concerns on the proposed activities from various stakeholders, including representatives of local communities, interest groups, non-governmental organisations and government agencies regarding the proposed seismic operations and activities. Stakeholder engagement happens throughout the ESHIA process and during the execution of the project. AECOM developed a Stakeholder Engagement Plan (SEP) which set out the process for undertaking engagement and consultation with stakeholders. A summary of the main stakeholders consulted during this ESHIA is presented in Box 2 below.

Box 2 **Summary of Stakeholders**

National Authorities

- Ministry of Tourism and Environment (MTE)
- National Environmental Agency (NEA)
- National Agency of Protected Areas (NAPA)

Representatives of Prefecture of Gjirokaster

- Prefect
- Regional Agency of Environment
- Regional Directory of Cultural Heritage

Municipality Authorities

- Dropulli
- Gjirokaster
- Kelcyra
- Libohova
- Memaliaj
- Permeti
- Tepelena

Sub-municipality and village representatives

- Antigone
- Cepo
- Dishnica
- Kelcyra
- Luftinja
- Lunxheri
- Memaliaj Fshat
- Përmet
- Petran
- Picar
- Qender Piskove
- QenderTepelene
- Zagorie

Regional Authorities

- Directory of Environment
- Directory of Protected Areas
- Inspectorate of Environment and Forests in Gjirokastra
- Directory of Cultural Heritage in Gjirokastra
- Directory of Roads
- Directory of Transport

Municipality Drinking Water Departments or Enterprises

- Dropulli
- Gjirokastra
- Kelcyra
- Libohova
- Permeti
- Tepelena

National NGOs

- Institute for Nature Conservation in Albania (INCA)
- Preservation and Protection of Natural Environment in Albania (PPNEA)

Regional NGOs

- Association for Environment, Water and Forest
- “Çajupi” Association
- Cooperazione e Sviluppo (CESVI)
- Cultural Heritage without Borders
- Gjirokastra Foundation
- Seksioni Ndërkombëtar Shqiptar (CIOF)

6. Existing Baseline Conditions

The environmental and social settings of the project area is characterised based on a combination of desk based research, targeted baseline studies (specialist studies) and stakeholder engagement. The desktop study was supplemented by field surveys (baseline studies) undertaken between May and September 2018 at selected locations along the seismic lines and through interviews with stakeholders. The baseline surveys focused on the areas of sensitivity identified during the initial phase of the ESHIA process (i.e. Scoping Phase) which included ecology, cultural heritage, water resources, land use, tourism,. An overview of the environmental and social baseline particularly relevant to the project is provided in the following sections.

Environmental Baseline

Ambient air quality and noise

The seismic survey area is primarily located in rural areas with the exception of Gjirokaster town. There is limited industrial development in the project area therefore the air quality is expected to be predominantly good. The main source of noise is from road traffic and the most exposed areas and settlements to noise are those along the main road network, connecting the towns from Memaliaj to Tepelena, Gjirokastra and Libohova and Kelcyre to Permet. The data recorded in Gjirokastër town during 2017 indicates the noise levels exceed the World Health Organization (WHO) standards during the night (50.11 dB (A) in comparison to the WHO standard of 45dB (A)). The level of noise during the day was 58.35 dB (A), exceeding the WHO limits by 6.9%. There is no noise monitoring data for rural areas; however, the noise levels are expected to be predominantly within the limits due to limited road traffic and other noise generating activities.

Geology and Soils

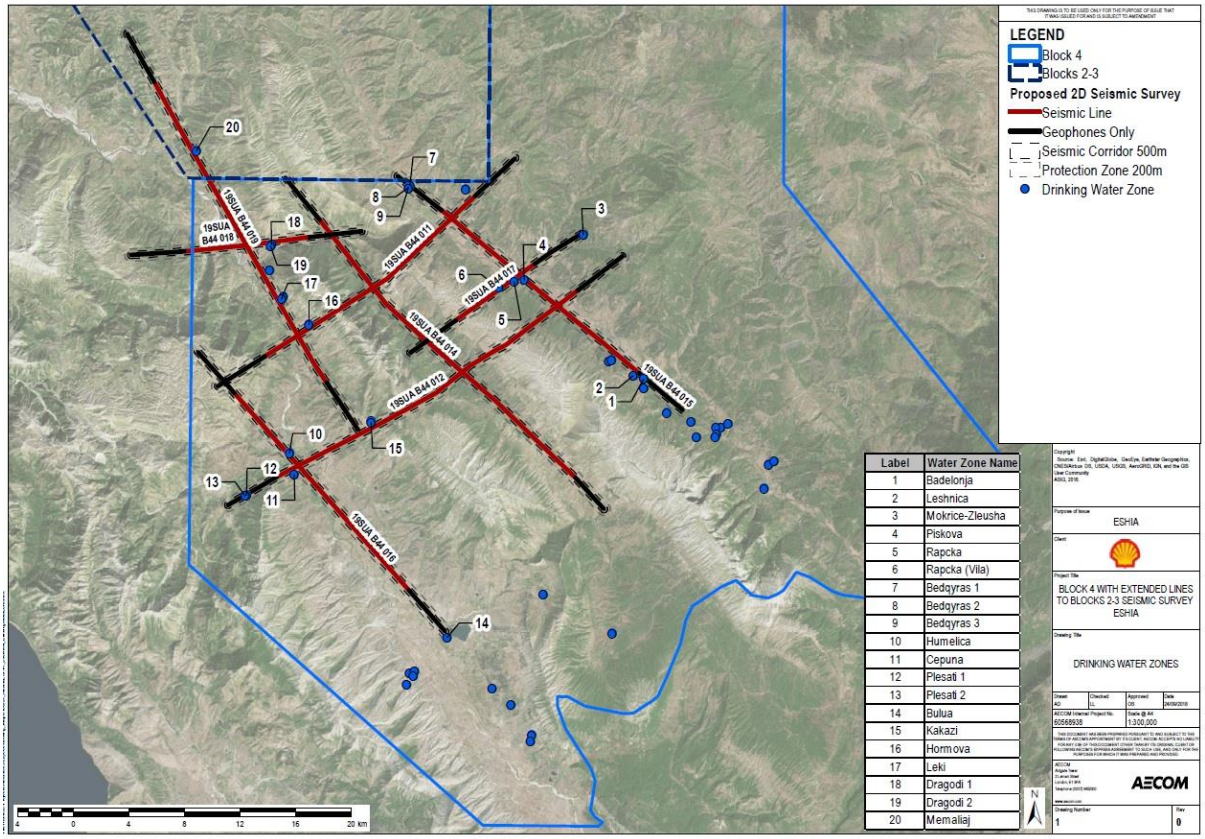
The project area lies in the Southern region of Albania characterized by the presence of limestone mountain ranges of Trebeshinë - Dhëmbel – Nemërçkë, Shëndëlli - Lunxhëri – Bureto and Mali i Gjerë-Stugarë, and valleys. The characteristic features of the geomorphology in the project area are steep slopes and flat mountain ridges. Unique rock formations of karst limestone are present in the Project area, especially in the eastern slopes of mountains. Karst geology is also characterized by underground drainage systems with caves area which are also present in the project area. Based on site surveys, the most erosion prone areas include exposed slopes areas along the Luftinja Sub/Municipality, especially the hill system at Zhapokika village. Other areas prone to erosion include the abandoned agricultural land along the Drinosi river valley. Designated natural monuments based on their geological significance or value includes the Lisat e Manastirit at Nivan, Pylli i Gurte at Nderan and Mezhgorani Cave are within the project area (see Figure 8). The available data on seismicity highlight that the western part of the project area is characterized mostly by micro earthquake activity, concentrated to the upper 10 km depth, excluding the events in depth shallower than 1 km. According to the historical data, the project area falls under Zone VII (zonation based on the earthquake intensity) where earthquakes with expected magnitude M_{max} between 6.0 and 6.9 may occur from natural causes.

Water Resources

The project area is situated in the Vjosa River watershed basin. The main rivers crossing the seismic corridors include Vjosa River and its tributaries Drinos, Suha, Zagoria, Bënça, as well as the Luftinja stream. The rivers are characterized by fluctuating seasonal flow which peaks in autumn or winter and reduces in summer. The upland rivers and feeding streams are known for their large flows and periodic flooding. The flooding is caused by substantial variations in rainfall, particularly during the winter months, when precipitation is the highest. In the summer months, the small rivers and upland streams can dry out completely. Water quality data in the project area is limited to four monitoring stations; three along the main River Vjosa, and one on its tributary, Drino River. According to the results of perennial monitoring published by NEA, the water quality of Vjosa river basin is classified good (second category).

The karst and porous aquifers are the main groundwater resources in the project area, supplying drinking and irrigation water to the local communities. The karst aquifers discharge to the many springs which occur within the project area. These springs are the main source of drinking water for the towns and villages in the project area. The groundwater table in the Vjosa basin ranges between 2m and 16m. The main recharge of aquifers occurs through infiltration of surface water. Detailed groundwater quality data is not available however the literature indicates that the water is of good quality. There are known water sources in the vicinity of some of the proposed seismic survey corridors as shown in Figure 7.

Figure 7 Drinking Water Supply Zones



Label	Water Zone Name
1	Badelonja
2	Leshnica
3	Mokrice-Zleusha
4	Piskova
5	Rapcka
6	Rapcka (Vila)
7	Bedqyras 1
8	Bedqyras 2
9	Bedqyras 3
10	Humelica
11	Cepuna
12	Plesati 1
13	Plesati 2
14	Bulua
15	Kakazi
16	Hormova
17	Leki
18	Dragodi 1
19	Dragodi 2
20	Memaliaj

Biodiversity

The project area includes a diverse range of terrain comprising of river valleys, agriculture areas, mountains, especially along Drinosi river valley and steep rocky slopes. In addition, there are vast areas of forests (shrubs, oaks, coniferous and alpine meadow). Within the project area are parks; specifically, Hotova Fir National Park and Zagoria Natural Park. Both parks comprise of diverse terrain with distinguished natural features and limited human activity, providing diverse and undisturbed habitats for many fauna species. The Vjosa and Drinosi rivers are important ecological corridors characterized by wetlands and riparian areas.

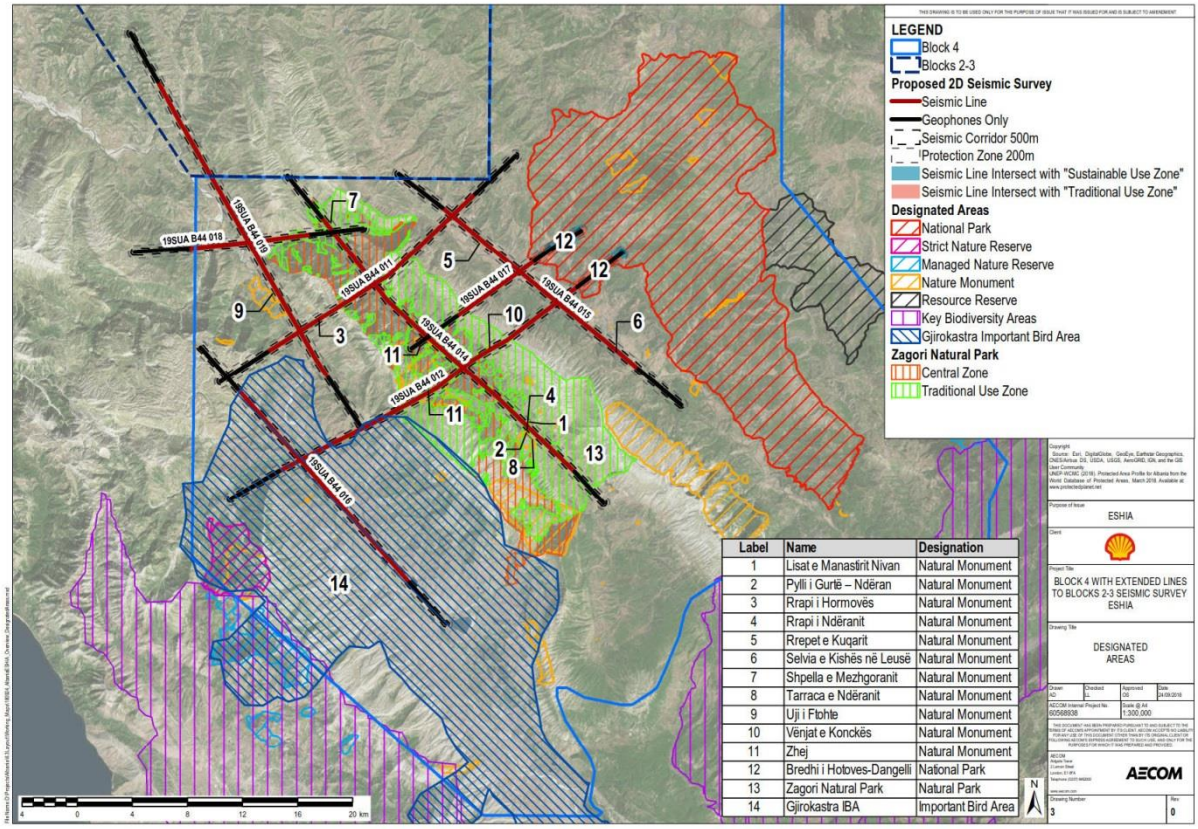
Within the project area are forest/ habitats which are listed in Annex I of the EU Habitats Directive. The Annex I Habitats are those habitats which are of European interest (i.e. worthy of conservation) which maintain and restore, at favourable conservation status, natural habitats and species of wild fauna and flora of Community interest. These species-rich habitats contribute to the biodiversity of the project area. There are nationally threatened species of mammals, herptofauna and birds.

Designated Areas

Designated areas within the project area inlcude national parks, natural parks, and nature monuments. Natural monuments comprise several distinguished features of the nature such as geological (caves), geomorphological land formations such as terraces, water wells, and canyons as well as ecological features (trees and forests). Fourteen designated areas are intersected by the 500m seismic corridors and 200m buffer zones as shown in Figure 8. Designated areas include:

- Bredhi i Hotoves-Dangelli National Park comprising a large and diverse area supporting a range of game species and mature woodlands (proposed Special Area for Conservation);
- Zagoria Natural Park representing a natural habitat with biological diversity and species of conservation interest; and
- 11 Nature Monument areas protected under Albanian legislation for their biological, geological or hydrogeological features

Figure 8 Designated Areas in the Project Area



Label	Name	Designation
1	Lisat e Manastirit Nivan	Natural Monument
2	Pylli i Gurtë – Ndëran	Natural Monument
3	Rrapi i Hormovës	Natural Monument
4	Rrapi i Ndëranit	Natural Monument
5	Rrepet e Kuqarit	Natural Monument
6	Selvia e Kishës në Leusë	Natural Monument
7	Shpella e Mezhgoranit	Natural Monument
8	Tarraca e Ndëranit	Natural Monument
9	Uji i Fbhte	Natural Monument
10	Vënjat e Konckës	Natural Monument
11	Zhej	Natural Monument
12	Bredhi i Hotoves-Dangelli	National Park
13	Zagori Natural Park	Natural Park
14	Gjirokastra IBA	Important Bird Area

Social baseline

Municipalities in the Project area

The proposed seismic corridors are within seven municipalities of Gjirokastër County: Gjirokastër, Tepelenë, Përmet, Këlcyrë, Libohovë, Memaliaj and Dropull. Within the seven intersected municipalities there are five cities: Gjirokastër, Tepelenë, Përmet, Këlcyrë, Memeliaj, and Libohovë. There are settlements within the seismic corridors and a 200 meters buffer zone around its boundary.

Land use and land ownership

Families often own several plots of land spread over a wide area. Land tenure and land rights can be complex and contentious in some areas.

Tourism

Tourism is an important part of the economy in the project area, providing diversification from the traditional agricultural economy. Tourism activities and attractions are predominately in the Gjirokastra town due to its architectural and historical significance. The most frequent tourism period in Gjirokastra is from May until October. The preferred time for visiting Vjosa river valley and Permeti area is April-May and September – October.

Road infrastructure and safety

Road infrastructure is not well maintained and gives rise to road safety concerns. The main national road from Memailaj – Gjirokaster – Jorgucat is in good condition with four lanes. The national road from Memaliaj town to Permeti is old asphalted road with two lanes and its road worthiness is poor. Other roads in the project area, in the rural settings, are unpaved (gravel) and with access problems especially in wet season (landslides, floods).

Local employment

The project area has limited local opportunities for employment. The main source of employment is domestic farming which includes the rearing of livestock. Employment in towns is mainly in government institutions and services industry.

Waste and sewage disposal

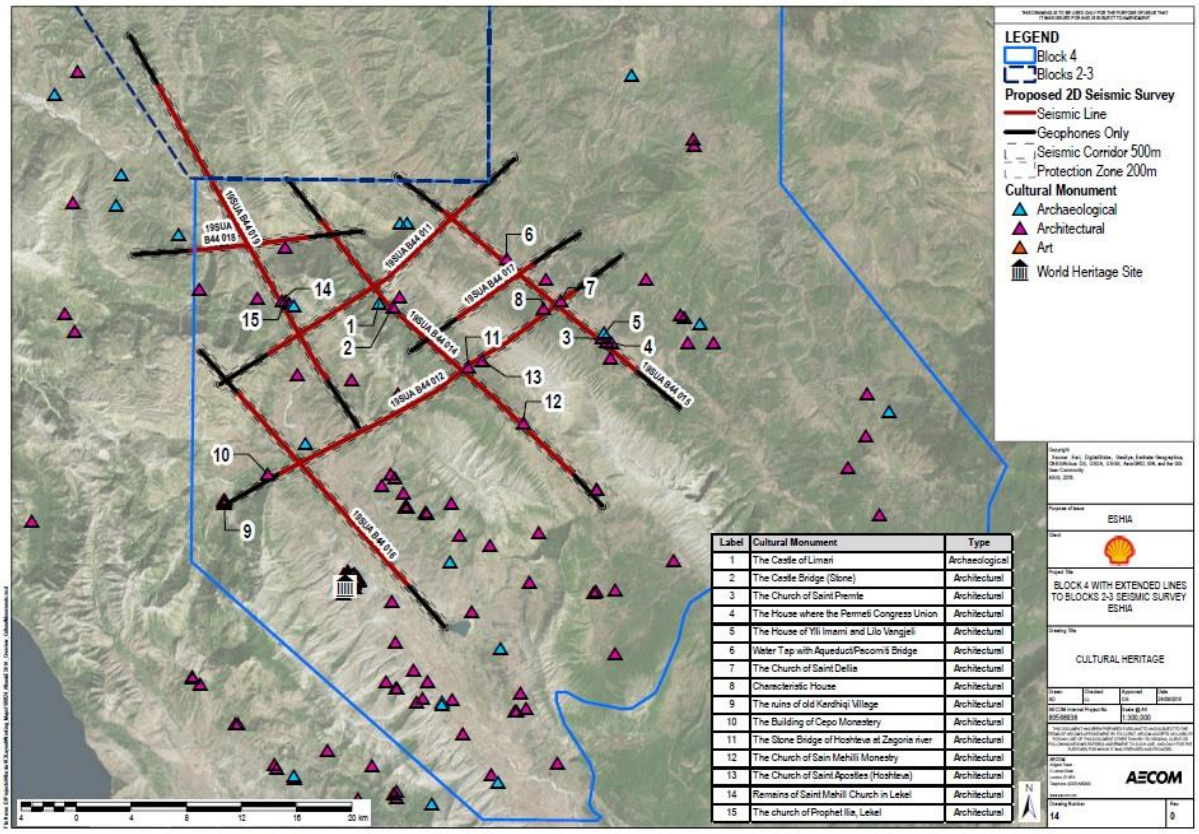
Solid waste management is not adequate and waste is being dumped in open pits and left to be degraded, releasing contaminants into the environment. The project area does not have sufficient waste disposal infrastructure and the closest landfill, with adequate disposal standards, is Bajkaj located in Delvina Municipality.

There is no wastewater treatment plant (WTP) in the project area. Untreated wastewater is discharged directly into rivers. The closest WTP is located in Saranda Town.

Cultural Heritage

The project area is a rich in cultural heritage. Cultural heritage of the project area included designated protected sites and intangible heritage. Apart from designated sites (mainly monuments) in the project area, there are local burial places (communal cemeteries) and places of worship. Cultural events, such as the Gjirokastër Folk Festival, take place within the project area. The locations of designated cultural heritage site are shown in Figure 9. Non-classified cultural heritage that could be identified in the project area have also been mapped and are presented in the full Draft ESHIA report.

Figure 9 Cultural Monuments in the Project Area



Label	Cultural Monument	Type
1	The Castle of Limari	Archaeological
2	The Castle Bridge (Stone)	Architectural
3	The Church of Saint Premte	Architectural
4	The House where the Permeti Congress Union	Architectural
5	The House of Yll Imami and Lilo Vangjeli	Architectural
6	Water Tap with Aqueduct/Pacomi's Bridge	Architectural
7	The Church of Saint Dellia	Architectural
8	Characteristic House	Architectural
9	The ruins of old Kardhiqi Village	Architectural
10	The Building of Cepo Monastery	Architectural
11	The Stone Bridge of Hoshteve at Zagoria river	Architectural
12	The Church of Sain Mehilli Monastry	Architectural
13	The Church of Saint Apostles (Hoshteve)	Architectural
14	Remains of Saint Mehill Church in Lekel	Architectural
15	The church of Prophet Ilia, Lekel	Architectural

7. Impact Assessment and Mitigation Measures

The impact assessment from the project activities is undertaken in two steps. The first step is to conduct the assessment of impacts based on the basis of existing project design (with embedded mitigation measures). The second step is to reassess the impacts considering the implementation of the additional measures. The residual impacts are those impacts that are left after the embedded and additional mitigation measures are implemented.

The key embedded mitigations are highlight in Box 3 below.

Box 3

Key Embedded Mitigation Measures

- Seismic survey activities will be limited to within the 500m corridor along the line length to provide flexibility in order to avoid sensitive receptors whilst allowing for reliable data acquisition
- Buffer zones of up to 200m will be provided to protect cultural heritage monuments where no explosive or vibroseis activities will be undertaken
- A 50m buffer zone where no explosive or vibroseis activities are to be taken will be adopted for natural monuments with the exception of Zheij and Zagori
- Chance find procedure will be implemented to ensure that any archaeological artefacts encountered are properly recorded and left in situ A stop work policy will be implemented
- During the early stage of data acquisition the international guidelines for setback distances from structures, using Peak Particle Velocity (PPV) measurements, will be tested and verified against the buffer zones. The buffer zones will be tested against different recording options. Buffer zones may be extended, if necessary, and according to the results of the startup tests
- The cutting of trees, greater than 10 cm diameter at breast height (DBH), will be avoided. Where clearance is necessary, vegetation will be cut approximately 10 cm above the ground level to preserve rootstock and promote sprouting
- The permit crew will visit with the landowner during the seismic campaign stage (prior and after the line has been shot). After the seismic line has been shot the permit crew will verify with the landholder any damage that may have occurred and negotiate compensation and address any complaints
- Implement SUA Land Acquisition & Resettlement Framework and Community Feedback and Compensation Procedure
- Contractors encouraged to recruit locally where feasible and expectations incorporated into contract tendering documents (although recognizing opportunities for local employment will be limited due to the short-term nature of the work and specialist skills required)
- Crew will hand carry the cables and geophones into position to protect sensitive receptors potentially susceptible to environmental, social or health impacts
- Project will use non-toxic degradable explosives
- All fuels and chemicals will be stored in contained bunded areas and refueling will be carried out in dedicated areas with hard standing/impermeable layer. Lubricants will also be stored in bunded areas to contain potential spills or leaks
- No waste will be disposed on-site or in the surrounding area. All waste will be removed from the base by a licensed waste management contractor and disposed of at an appropriately licensed waste facility

A summary of assessment of impacts for “seismic survey” phase of the project is provided in Table 2. The assessment for mobilization, support facilities and demobilisation phases is in the full Draft ESHIA report.

Table 2: Summary of Assessment of impacts for the Seismic Survey phase of the project (please refer to full Draft ESHIA for the other project phases)

Element and Potential Impact (*)	Impact Significance	
	Impact	Residual impact
5.1 Soils (Soil erosion, Soil compaction, Soil contamination)	Low	negligible
5.2 Geology (Damage to Geological Monuments and Features, Karst collapse)	High	Moderate
5.3 Groundwater (Degradation of water quality)	Low/Moderate	negligible
5.4 Surface Water (Degradation of water quality, Alterations in stream bank morphology and integrity	Low/Moderate	negligible
5.5 Biodiversity (Loss/disturbance to habitats, Loss/disturbance to species of conservation concern, Contamination of terrestrial and aquatic habitats)	Low/Moderate	Low/negligible
5. 6 Air quality (Degradation of air quality, Climate change (GHG emissions))	None/negligible	None/negligible
5.7 Noise and vibration ** (Nuisance to communities, Disturbance to religious ceremonies and cultural events)	Moderate	negligible
8.8 Light emissions (Disturbance to communities, Loss of visual amenity)	None	None
8.9 Waste (Environmental degradation resulting from litter, Environmental contamination from hazardous, non-hazardous, operational and domestic waste)	Low	negligible
5.10 Socio-economics (Land use within camps and seismic lines, Accommodation of project workers in hotels and guest houses, Accommodation of project workers in Base and fly camps, Presence of non-local workers in or near communities, Use of Water, Movement of project equipment and vehicles, Introduction or spread of communicable disease within communities, Provision of Security, Access restrictions to land and agricultural areas, Disturbance to livestock, Damage to structures by vibrations, Decreased tourist appeal, Handling, transportation and use of explosives)	Moderate	Low
5.11 Cultural Heritage (Damage to cultural heritage cultural monuments, Damage to archaeological sites, Noise and visual intrusion to cultural heritage monuments, Noise and visual intrusion to cultural and religious festivals or ceremonies)	Moderate	Negligible
5.12 Landscape and visual amenity (Deterioration of roads and unpaved tracks, Vegetation clearance, Presence of fly camps, vehicles, machinery and equipment, Littering, Light emissions)	Moderate	Low

(*) potential impacts of the project have been grouped by element for the purpose of this summary table and the impact of highest significance has been reported out of the grouped impacts. For the full detail of the impacts assessment, please refer to the full Draft ESHIA report. (**) vibrational impacts to designated areas and community infrastructure are addressed under the relevant topics.

The main additional mitigations are summarized at the end of each of the following sections.

Impacts to biophysical features

Soils

Potential impacts on soils include soil contamination, erosion and compaction. Soils can be contaminated from accidental spills during fuel use, transportation, refueling operations, releases of chemicals and waste management storage areas. Soils can be also contaminated by residual explosive/detonation products.

Erosion can occur where vegetation is stripped, exposing bare soils. Activities on steep slopes and unstable soils can also lead to soil erosion. Damage to unpaved tracks by heavy equipment and the increased usage could result in rutting of the surface leading to the potential for gullying and soil erosion. The use of heavy machinery or equipment (i.e. vibroseis tracks), particularly on wet soils, can compact soils. Soil compaction can also occur where heavy loads are placed for an extended period of time (e.g. camp facilities) and at high traffic locations (people and equipment).

Through the adoption of design controls and the implementation of additional mitigation measures, all residual impacts on soil during all phases of the project have been assessed as negligible or *Insignificant*

Geology

The main impacts to geology are damage to geological monuments and karst features. Damage to geological monuments and features can occur during fly camp set up and during seismic data acquisition (i.e. shot hole drilling and the use of vibroseis machines). The sensitivity of geological monuments and features is considered to be high. There may be undesignated geological features such as karst outcroppings, unique to the landscape that has not been designated. These features are considered to have a moderate sensitivity. Cave ceilings may be close to the surface, there is potential during drilling of shot holes and ca result in damage to the cave structure which gives it a high sensitivity. The project team, in advance of the seismic activity, reviews the site conditions to identify and avoid unique fragile geological features of the landscape.

All residual impacts on undesignated geological features during all phases of the project have been assessed as negligible or *Insignificant*. The residual impacts to designated geological monuments are to low/negligible or *Insignificant*. The residual impact of karst collapse is moderate or *Significant*. To further reduce the geological risk to karst formation and to lower the significance of residual impact, additional work is ongoing to refine the existing controls.

Groundwater

Groundwater can be degraded as a result of spills of fuel or chemicals and residual explosive products migrating to the underlying aquifer. If soak-ways or septic tank systems are utilized, biological contamination has potential to migrate to the aquifer.

Water demands from the project will be met by local water supplies which may utilize groundwater sources.The requirement for water for camp and operational needs may strain existing water resources during dry season. Groundwater is considered to have a high sensitivity as it is the main source for providing drinking water supply locally. It is provided by local wells and from natural springs fed by groundwater. Control measures are proposed to mitigate the risk of contamination of groundwater from project activities including Spill Prevention a Response Plan and Land Transport Safety Plan (to avoid spillages from accidents).

All residual impacts on groundwater during all phases of the project have been assessed as negligible or *Insignificant*.

Surface Water

The potential impacts of the project activities on surface water include the degradation of water quality and alterations of stream back morphology and integrity. Water quality has potential to be degraded by the accidental release of fuels during storage, transportation and refuelling operations of vehicles and equipment, uncontained drilling fluids and cuttings, leaks from drill rigs and vehicles including vibrosis trucks. These released can be carried to surface water in runoff during heavy rain events. The clearance of vegetation for the installation of the fly camps may expose bare soils that may be prone to erosion also resulting in sediment laden runoff into the nearby streams and rivers.

Alterations in stream bank morphology and integrity can result from vehicle crossings of streams and the construction temporary bridges. The stability of the valley stream banks is uncertain therefore they are considered to have a moderate sensitivity. Areas with rock outcroppings are considered to have a low sensitivity as they could be more resilient to change.

Various control measures are proposed to mitigate the risk of contamination or degradation of surface water from project activities including erosion control measures, maintain safe distances, Waste Management Plan, Spill Prevention and Response Plan and Land Transport Safety Plan (to avoid spillages from accidents). Through the adoption of design controls and the implementation of the mitigation measures, all residual impacts on surface water quality during all phases of the project have been assessed as negligible or *Insignificant*. The residual impacts to stream back morphology are considered to be of low or *insignificant*.

Biodiversity

Potential impacts on biodiversity could be associated with loss or damage to habitats, in particular habitats which are listed in Annex I of the EU Habitats Directive and natural monument areas, loss or disturbance to species of conservation concern associated with or dependent on those habitats and environmental contamination.

Vegetation loss may impact species through loss of their habitat or damage to species that support or depend on these habitats for foraging, nesting or breeding (including ground dwelling and breeding birds). Many faunal species within these habitats will move away temporarily from areas that are being disturbed so therefore will not be directly impacted through vehicle movements, cutting of vegetation, etc.

Vegetation clearance has potential to impact on fauna through loss of breeding grounds, interruption of lifecycles and feeding patterns, particularly for ground dwelling species. Amphibians and wetland species could, be affected through activities that degrade wetlands and any open water.

General on-site human activities, including noise and vibration from helicopters, vehicles, vibroseis tracks as well as detonation of explosives, may result in direct effects on animal species in the area, particularly if operations coincide with breeding seasons. Noise and vibration can result in disturbance of faunal communities and potentially mortality of small species in close proximity to noise/vibration sources. Disturbance at camps may also cause the abandonment of nests and breeding opportunities and if there is intense and repeated noise they will become subject to stress and displacement. In addition, the presence of the non-local work force can result in illegal fishing or hunting.

Vibration and noise can potentially disturb, injure or kill small burrowing mammals, reptile species or ground breeding birds in its vicinity and to affect breeding behaviour of amphibians and wetland species. Such disturbance may also disturb bird species and displace them from their foraging habitats.

The use of equipment sources from outside the project area or within the project area, where invasive or alien invasive species may be present, has the potential to introduce these species into new areas.

There are risks associated with potential release of pollutants (such as hydrocarbons) into, or increased sediment loads in, watercourses that could affect fish or other species dependent in the water environment, such as otters. Wetland and river habitat may therefore be impacted by upstream pollution incidents or deterioration in water quality and quantity associated with several crossing of rivers by the seismic lines.

Mitigation and control measures including avoidance, buffer zones, protection of habitats, erosion control measures, Waste Management Plan, Spill Prevention and Response Plan and Land Transport Safety Plan (use of existing roads and speed limits to avoid animal mortality). However, once the mitigation is taken into account all residual impacts for all receptors and for all stages are defined as either negligible or no impact and therefore all impacts are *Insignificant*.

Box 4 **Additional Mitigation Measures**

Soils and Groundwater

- Implement controls on vehicle movements within the seismic corridor.
- Minimise the extent of removal of vegetation and soil cover
- Development and implementation of Soil Erosion Prevention procedures
- De-compaction of compressed soils will be undertaken by using a mechanical rake or mechanical harrow as a primary measure and manual raking as a secondary measure at fly camp sites; when appropriate
- Where required, equipment will have containments measures deployed
- In the event of leakages or spillages of fuel or oil, a Spill Prevention and Response Plan will be implemented

Geology

- Undertake a desktop study to identify the extent of the subterranean geology at Shepella e Magazorat; undertake a site visit to understand topography and geological beds and thus avoid areas of increased risk of cave systems
- Where possible, use vibroseis as an energy source so as to preclude drilling into a cave ceiling (shot hole method)
- Place vibration sensors on fragile geological features, natural monuments and designated/undesignated cultural heritage structures, during the Pre-shooting testing to determine site conditions prior to seismic data acquisition

Surface Water

- Avoid placement of seismic lines within wetlands and watercourses; A 100 meter off-set is recommended
- A shallow bund will be formed around the base of each stockpile to intercept run-off
- Cross streams at right angles with straight approaches and gentle grades
- Contain drilling fluids during shot hole drilling; use fit for purpose containment to receive drilling cuttings No unlined pits will be used

Biodiversity

- A biodiversity specialist will accompany the line clearance crew to ensure that habitat degradation is minimized
- A biodiversity specialist will check the vegetation for nesting birds and faunal presence in advance of clearance and propose appropriate mitigation
- Avoidance of most sensitive habitats and features such as protected areas, Annex 1 habitats and critical habitat identified by the biodiversity specialist
- Any stripped soil and vegetation will be retained in the area for subsequent restoration of the land
- Ensure that any topsoil stored is covered to prevent erosion and growth of invasive species
- Implement and enforce hunting and fishing ban for workforce
- To avoid clearance of vegetation lines will be off-set and/or wavy line technique will be used
- Natural breaks in vegetation will be used as preferred routes
- Ensure vehicles used during the project are thoroughly washed of soil before entering the area to prevent dispersion of seeds or plant fragments

Impacts from Project emissions

Air quality

The primary source of atmospheric emissions will be from vehicle exhausts and operation of diesel generators at the fly camps. Dust and particulate matter will occur during transport operations and from exposed soils surfaces including unpaved roads. Dust emissions could also be expected during vegetation clearing. Air quality is considered to have a high sensitivity. Mitigation measures related to control of dust emissions, efficient use of equipment and transport and appropriate selection of technology and machinery will help reduce the impacts. All residual impacts on air quality from normal operations during all phases of the Project have been assessed, including emission of greenhouse gases and the impact on global warming, as negligible or *Insignificant*.

Noise and vibration

Vehicles (including helicopters) will cross the municipalities of Gjirokastër, Tepelene, Kelcyre, Libohove, Permet and Memaliaj. The primary receptors located in the surroundings of the project area comprise villages and agricultural areas (e.g. animal rearing and grazing) which have medium sensitivity to noise. Industrial areas will have a low sensitivity to noise. To be conservative and as most of the survey activities will take place in the rural areas, the receptor sensitivity is considered to be medium in all cases. Religious ceremonies and cultural events may occur within or close to villages. The rural ambient noise and vibration environment is considered to be of high sensitivity.

With the help of mitigation measures related to maintaining safe distances from sensitive receptors, maintenance of noise generating equipment and implementation of Stakeholder Engagement Plan (understanding community

concerns on nuisance from noise and other project activities), residual noise and vibration impacts are considered to be negligible or *Insignificant*.

The effects of vibration on natural features (e.g. natural monuments) are discussed under the geology section and impacts to cultural monuments are discussed in the Cultural Heritage section of this report.

Light emissions

Local residents may be disturbed from light emissions resulting from Project activities at the support facilities. Different human receptors have different sensitivity to light; people in rural areas, residential areas and health establishments are generally more sensitive to light than those in commercial and industrial areas. Although industrial areas such as Gjirokastër may be less sensitive to light emissions, the project lighting scheme may be inconsistent with the existing night lighting. In both cases, the sensitivity of the human receptors is considered to be medium. Use of essential and wildlife friendly lighting and implementation of Stakeholder Engagement Plan (understanding community concerns on nuisance from Lighting and other project activities) will help manage the impacts. The residual impacts have been assessed as negligible or *Insignificant*.

Waste

The main sensitivities associated with waste generation and management impacts identified with respect to waste. Nuisance litter is diminishes the character of an area to a resident or tourist and hence is the sensitivity is considered to be medium (human receptors). Environmental contamination can result in the absence of the appropriate management of hazardous waste, non-hazardous, operational and domestic waste. The seismic survey is primarily located in rural areas therefore considered to represent a receptor of moderate sensitivity (resources). Development and implementation of Waste Management Plan and Duty of Care Procedures will help mitigate impacts from project waste. All residual impacts on have been assessed as negligible or *Insignificant*.

Box 5 Additional Mitigation Measures

Air Quality

- Avoid dust generating activities within close proximity to settlements
- Keep vehicle movements to a minimum and turn off engines and equipment when not in use

Noise and Vibration

- Implement a Journey Management Plan to control traffic routing and minimize traffic movements, limiting the hours of noisy activities associated with camps near human receptors, and minimize noise generation at night
- Equipment and machinery to be adequately maintained and operated
- Planning flight routes, timing and altitude for helicopter flights over community areas to reduce disturbance

Light

- Lighting will be kept to a minimum and designed in a wildlife friendly manner

Waste

- Prepare and implement a Waste Management Plan and Duty of Care Procedures
- Bins with covers to reduce windblown litter will be provided
- Enforce good housekeeping practices to keep the base, fly camp and survey site clean and free of litter
- Identify materials that can be recycled at a licensed recycling facility

Impacts for socio-economics and cultural heritage

Social and Health

Key social and health impacts relate to the access and use of the land by project activities in areas used for cultivation or grazing, the potential development of or use of worker accommodation within villages, potential damage to buildings and disturbance from seismic survey activities, the potential for excessive use of community water sources and medical facilities, and the risk of disturbance created by project workers or traffic.

Access to land may require removal of vegetation from cultivated land or grazing areas. Given the subsistence use of land for these activities, this could noticeably impact food availability and livelihoods for impacted households.

For worker housing, the development or use of accommodation within villages will have an impact on the way-of-life for those villages for the short duration while the accommodation is used. This could be exacerbated by the use

of water, sanitation systems and roads affecting availability of those systems for the community. The potential use of tourist accommodation by project workers could create impacts on tourism within the project area.

Without adequate siting, the use of explosives and vibroseis could create physical impacts to nearby buildings and infrastructure. Livestock may be disturbed by helicopter movements, seismic energy release and the movement of workers and traffic. Vibration from seismic acquisition and the movement of project equipment has the potential to create damage to structures, including buildings, sheds and fences. Structures that are old or in poor state of repair, underground infrastructure, such as wells and septic tanks, could be susceptible to vibration impacts. The movement of project equipment and vehicles could lead to accidental damage of structures such as fences.

Water supply is limited in many areas and excessive use by the project could impact availability to other users. Medical facilities and availability of medical staff is limited in rural areas and excessive use by the project could impact availability to local residents.

The presence of workers and traffic in local communities could impact local residents due to noise, increased traffic on local roads, and disrespectful behavior such as littering.

Good International Industry Practices (GIIP) and locally tested approaches including avoidance techniques, compensation, field level consultation and implementation of good behavioral code of practice are proposed to mitigate the impacts. With mitigation measures in place, all social and health residual impacts are expected to be managed to a low or negligible level and *Insignificant*.

Cultural heritage

Project activities that have the potential to impact cultural heritage and archaeology are mainly from site clearance and levelling activities, the movement and use of vehicles and machinery and seismic data acquisition. Access to land, ground levelling and potential removal of vegetation will be required for the base and fly camps and along the seismic acquisition lines. These activities have the potential to physically impact cultural heritage monuments and as yet unknown archaeological sites. The use of explosives and vibroseis could create physical impacts to nearby cultural heritage monuments and sites. Noise and visual intrusion generated by movement of project vehicles could disrupt the quiet appreciation of cultural heritage monuments by tourists and local people. This could also affect cultural and religious ceremonies and festivals that coincide with the project timeline.

Use of buffer zones/offsets, pre-evaluation of sensitive structures, guidance and consultation with cultural heritage specialists/authorities to appreciate sensitivities will help mitigate the impacts. The cultural heritage residual impacts are expected to be managed to a low or negligible level and Insignificant.

Box 6 **Additional Mitigation Measure**

- Notification of landowners of the schedule for seismic survey activities in the area
- If livestock are present in close proximity to the planned seismic data acquisition activity the livestock keeper will be contacted to arrange for the movement of the livestock
- Implementation of a Worker Accommodation Plan to help ensure that impacts from workers accommodation are minimized. If worker accommodation is provided in villages then consultation will be undertaken with the villages and agreements will be made on the use of buildings and community water, roads and sanitation systems
- Identification of the locations of buildings and other sensitive infrastructure; the seismic survey lines will be offset with consideration to the location of these assets
- Provision of medical facilities and personnel for Project workers to maintain a healthy workforce and reduce any burden on local medical facilities
- Project workers will be trained on a code of conduct for respectful behaviour in communities
- Implementation of a Water Management Plan to reduce impacts to local water supplies
- Implementation of a Transport Management Plan and Traffic Management Plan

Box 7 **Additional Mitigation Measures**

- Demarcate known cultural heritage sites/cemeteries around the fly camps and seismic lines to avoid any destruction or disturbance
- A suitable offset from the known extent of cultural heritage sites and cemeteries should be agreed with community leaders, religious representatives and key stakeholders
- Evaluation of the integrity of the structures should be undertaken during the Pre-acquisition phase and final design discussed with affected parties and key stakeholders
- An appropriately qualified and experienced cultural heritage specialist should be available to provide guidance
- Liaise with Municipalities, the Ministry of Tourism and Cultural Heritage authorities with regard to festival dates in order to minimize disruption that may be caused by project operations

8. Unplanned Events

An unplanned event is defined as 'a reasonably foreseeable event' that is not planned to occur as part of the project, but which may conceivably occur as a result of project activities (e.g. accidents), even with a low probability. Unplanned events can occur at any phase of the project. The consideration of unplanned events has focused primarily on the risks of the rupture or damage of fuel and oil storage; vehicle collisions and accidents; and uncontrolled explosions and fire.

Mitigation for non-routine events will include many of the mitigation measures already presented. By implementing the Emergency Response Plan, damage can be minimized and contained. The provision of training on immediate response to fire, spillages among other non-routine events (e.g. explosions) and the prevention of accidents by adhering to good industry practices will mitigate the potential impacts. No significant impacts are anticipated.

9. Cumulative Impacts

Cumulative impacts result from the incremental effects of the proposed project when added to other past, present and reasonably foreseeable future projects/actions, regardless of who undertakes them. Cumulative impacts can result from individually minor, but collectively significant, actions taking place over time. No significant cumulative impacts have been identified as a result of the project.

10. Positive Impacts

The project is expected to create positive impacts through the employment of Albanian labour and through the procurement of accommodation, goods and services.

The project will require 190-200 crew members. It is anticipated that 50-60 of these will require specific skills and therefore most are likely to be non-Albanians. For the remaining crew requirement, local work force will be preferred. Accommodation for the project workforce will be either in camps, local hotels and guesthouses, in-community living or a combination of the three options. Positive impacts include:

- Rental fees paid to land owners for the use of land for camps
- Increased revenues for hotels and guesthouses for use of rooms by Project workers
- Rental fees paid to private owners of local authorities for the use of houses or local facilities for in-community living
- Local procurement for goods (such as food supply) and services and other material which can be found in-country

Decisions related to the procurement of goods and services will be made by the Contractor, and the sources and volumes cannot be confirmed in this ESHIA. The Contractor will endeavour to obtain as much equipment locally as is reasonably possible, though all locally contracted equipment must meet Albanian and Shell standards. Many of the goods and services (including some non-specialized equipment, vehicles, materials, and catering) will be procured regionally (i.e. within Gjirokastër county) or nationally as much as possible. Specialized seismic equipment and materials will need to be brought into Albania. During their time off and while traveling to and from the work sites, the project workforce will also make use of services such as local restaurants, bars, stores and transportation, creating increased revenue for these businesses.

11. Environmental Management and Monitoring

SUA will ensure that the Seismic contractor is contractually and operationally bound to implement the mitigation measures identified in the ESHIA. SUA will also ensure that project personnel are adequately trained in identifying sensitivities and applying operational management procedures, so that all levels of staff effectively contribute to impact prevention and mitigation at all times. SUA will ensure the contractor is able to fulfil the requirements of the Environmental Declaration and employ best environmental practices recommended in the ESHIA throughout project activities. SUA will closely monitor and supervise the seismic contractor to ensure the mitigation measures are implemented and effective.

Implementation of the project social and environmental monitoring plan (EMP) and associated management plans will ensure compliance with the relevant national (and international) standards. Furthermore, the implementation of the EMP will ensure that design controls and mitigation measures are employed and potential impacts to the environment will remain within the predictions of this ESHIA. The management plans provide topic specific guidance, processes and actions to achieve the goal of mitigating the potential impacts that could occur during project execution. SUA will commit resources and management time to ensure that EMP and management plans are implemented. A list of management plans that will be developed by SUA and the Seismic Contractor before the implementation of the project is provided in the Box 8 below.

Box 8

Management Plans

- Land Acquisition & Resettlement Framework Compensation Plan
- Worker Accommodation Plan
- Journey Management Plan
- Traffic Management Plan
- Land Transport Safety Plan
- Water Management Plan
- Waste Management Plan
- Emergency Response Plan (ERP), including Spill Prevention and Response Plan
- Stakeholder Engagement Plan

12. Conclusions

The assessment of potential environmental and social impacts from the proposed seismic survey has been carried out using a conservative precautionary approach, based on publicly available literature, primary data collected through field studies, and inputs from stakeholder consultation; combined with the expert opinion of AECOM and EMA. On the basis of this assessment, mitigation measures are proposed and agreed with SUA.

It is expected that with the successful implementation of mitigation/control measures through well-defined and coordinated management plans, the residual impacts from the proposed seismic survey activities, – which are mobile and transient operations over a six months period, are mostly likely to be low and insignificant overall.

However, in the unlikely event of fire, explosion or major fuel spill, the impacts on the environment and communities may remain significant. SUA's preparedness to deliver the emergency response to respond to such unlikely events (fire, explosion, spills) will ensure that impacts are prevented and minimized.

There are no cumulative impacts from the proposed seismic survey activities given the short term nature of the survey and the low level of industrial activities within the project area.