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AZERBAIJAN MOTORWAY IMPROVEMENT AND DEVELOPMENT

Regional Environmental Review Executive Summary

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Regional Environmental Review Executive Summary

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LIST OF ABBREVIATIONS

| Abbreviation | Meaning |
|--------------|---|
| AA | Alternative Alignment |
| ARS | Azerroadservice |
| asl | above sea level |
| AZN | Azeri Manat |
| BP | Bank Procedure |
| CEMP | Construction Environmental Management Plan |
| EA | Environmental Assessment |
| EA&MF | Environmental Assessment and Management Framework |
| EIA | Environmental Impact Assessment |
| EMP | Environmental Management Plan |
| EP | Environmental Protection |
| ESIA | Environmental & Social Impact Assessment |
| ESS | Ecology & Safety Sector (Department in ARS) |
| ha | Hectare |
| IBA | Important Bird Area |
| km | Kilometre |
| LAD | Land Acquisition Department |
| LAP | Land Acquisition Plan |
| LHS | Left Hand Side |
| m | Metre |
| mm | Millimetre |
| MDG | Millennium Development Goal |
| MENR | Ministry of Ecology and Natural Resources |
| MoT | Ministry of Transport |
| NGO | Non Government Organisation |
| OD | Operational Directive |
| OJSC | Open Type Joint Stock Company |
| OP | Operational Policy |
| PAP | Project Affected People |
| PIU | Project Implementation Unit |
| RAP | Resettlement Action Plan |
| RER | Regional Environmental Review |
| RHS | Right Hand Side |
| ROW | Right Of Way |
| RPF | Resettlement Policy Framework |
| SEE | State Ecological Expertise |

| Abbreviation | Meaning |
|--------------|---|
| SFF | State Forest Fund |
| SNIP | Construction Norms and Rules |
| SPPRED | State Programme on Poverty Reduction and Economic Development |
| ToR | Terms of Reference |
| UN | United Nations |
| UNECE | United National Economic Commission for Europe |
| World Bank | World Bank (i.e. IBRD and IDA) |

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EXECUTIVE SUMMARY

This Executive Summary provides an outline of the main regional environmental and social findings comprising the Regional Environmental Review (RER) of the proposed Highway III Project in Azerbaijan.

1 INTRODUCTION

1.1 Background to the Project

The Government of Azerbaijan requested the World Bank's support for the widening of a segment of road along the two-lane road between Baku and Shamakhi in Azerbaijan. It is proposed that the Azerbaijan Motorway Improvement and Development or 'Highway III' Project ('the Project') will include the widening of a 90 kilometre (km) section of the existing two-lane road to a four-lane road between Baku to Shamakhi, a 120 km section of the east-west transport corridor between Baku and Tbilisi.

The proposed Project will take place in addition to the existing Highway II Project, which covers the rehabilitation of the two lane Category II road.

1.2 Purpose of the Regional Environmental Review

The RER is part of a set of practical guidance documents¹ designed to facilitate Project implementation and to ensure compliance with Azerbaijan's legislation and procedures, with international Conventions and the World Bank safeguard policies, particularly in regards to environment, resettlement and land acquisition.

The purpose of the RER is to provide information on key environmental and socio-economic issues in the Project area, needed to ensure informed decision-making regarding investment strategies, and to ensure that programmes and projects are environmentally and socially sustainable for the region as a whole.

In order to provide an overview of regional environmental and social opportunities and limitations, the RER contains an overview of:

- The project, including consideration of alternatives to the project;
- The policy, legal and administrative framework which applies to the Project;
- An overview of the environmental and socio-economic conditions in the Project area and wider regional environment; and
- A discussion of environmental and social impacts likely to derive from the implementation of the Project as well as mitigation measures necessary at the Project implementation level.

¹ The Environmental Assessment and Management Framework (EA&MF) and the Resettlement Policy Framework (RPF) will be used at a later stage to manage environmental and socio-economic studies, to guide the public consultation and disclosure process, to guide the land and property acquisition process as well as any resettlement of Project Affected Persons (PAPs)

2 PROJECT DESCRIPTION AND ALTERNATIVES

2.1 Project Objectives and Need

The main Project objective is to reduce road transport costs and improve access, transit and safety within Azerbaijan's east-west corridor through the widening of the Baku-Shamakhi road. It is intended that the implementation of the Project will lead to improved road quality and road safety through the selection of improved alignments, shorter travel times and lower travel costs.

This in turn is expected to promote economic growth along the study corridor and nationwide as improved an east-west connection, increased speed and consequent shorter travel times will foster economic integration and growth within the country and lead to diversification of the economy in particular by generating non-oil economic growth and revenue.

The widening of the existing road is also intended to meet a growing demand for road transport services. Although detailed traffic surveys indicate that traffic growth along the study road has not been significant in recent years, it is expected that the refurbishment of the existing road will lead to a marked increase in road traffic with consequent economic development along the road route.

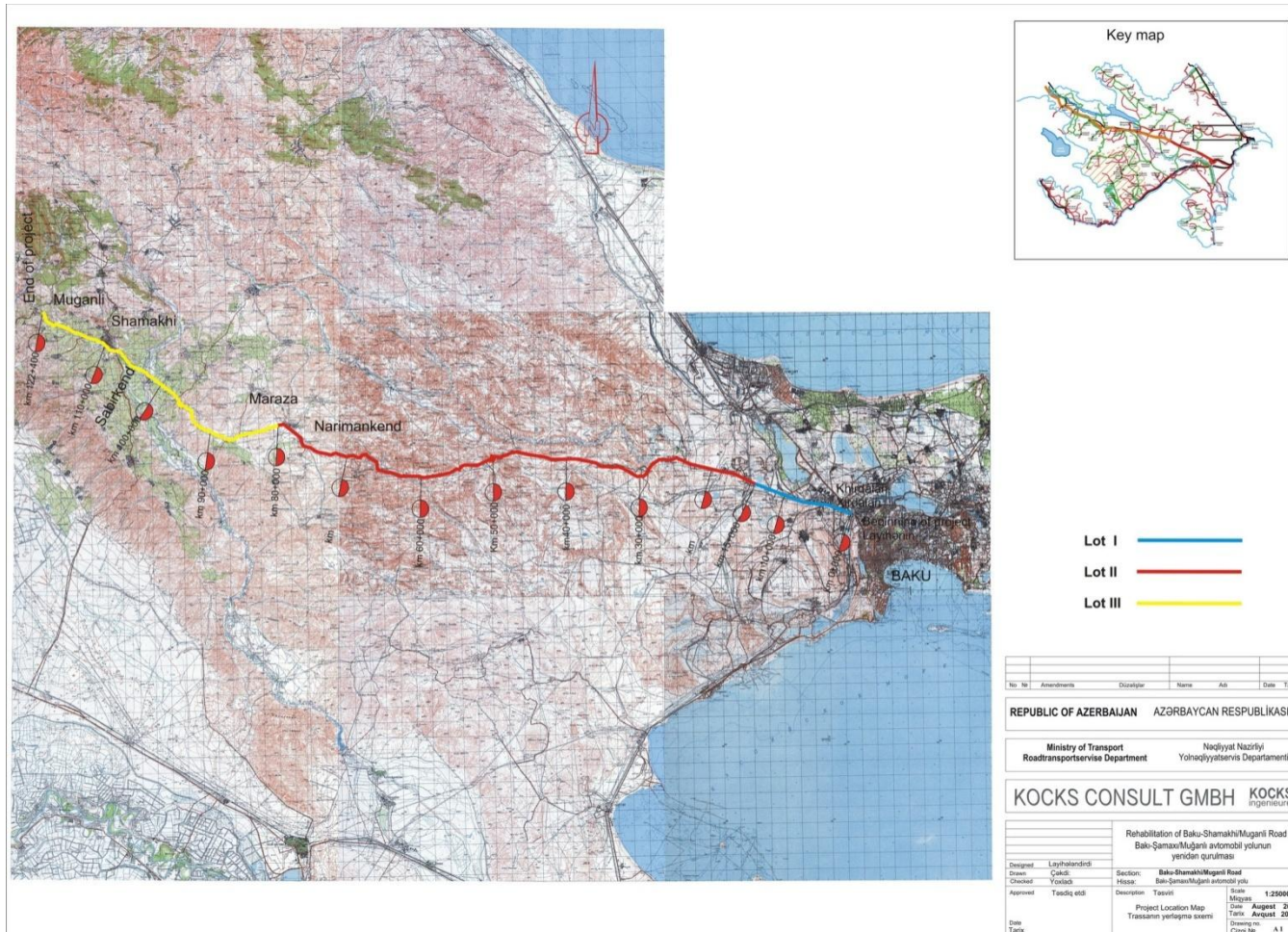
2.2 Project Description

2.2.1 Scope of Works

The proposed Project will focus on the widening from a two-lane road to a four-lane road between km 15 to km 105 of the existing Baku to Shamakhi Category II road (see Figure 1). This road has a Right-of-Way (ROW) of 60 metres (m); i.e., 30 m on each side of the road from the existing road centre-line. Generally, this provides sufficient room to widen the road to a four-lane road without the need for land outside the ROW.

However, in certain sections of the road the ROW is significantly reduced and implementation of the Project in these areas will require land acquisition to widen the ROW to the required length. Additional land acquisition will also be needed at certain points to allow for road design features such embankments, interchanges, local connector roads and potential route realignments.

Figure 2: Baku-Shamakhi Road Location Map



2.2.1.1 Main Design Options

Extension of the road from a two-lane road to a four lane road will take place according to the following design alternatives:

- Construction of the additional two lanes to one side of the road, either the right hand side (RHS) or the left hand side (LHS), resulting in a total road width of 27.5m²;
- Widening of the existing carriageway on both sides, either by:
 - Widening at both sides with a reduced median and shoulder, total width 22.5m; or
 - Widening at both sides without median and reduced lane width and shoulder, total width 17.5m.
- Widening in sections with climbing lane, total width 20.5m.

The project will also include traffic safety features, such as road lighting, road signs, guardrails, interchanges, facilities for pedestrian and domestic animal crossing and ecoducts. These will be considered at the detailed design and site specific ESIA phase.

2.2.1.2 Alternative Alignments

In addition to the main design options, the following alternative alignments (AA) were proposed for four stretches of road:

- AA1 - Between km 26 and km 34: re-alignment of the existing road through an area of irregular topography featuring flat areas as well as a number of hills, ridges and gulleys.
- AA2 - Between km 43 and km 53: this AA will go north from the road and through or behind a hill and will re-join the road by potentially cutting through the village of Jangi, then diverting again from the existing road in a south-western direction cutting across a very hilly area with a number of steep slopes and ridges, sloping upwards to rejoin the road.
- AA3 - Between km 59 and km 61: this AA will provide a slightly straighter route joining km 59 to km 61, through a straight line parallel to the existing route.
- AA4 - Between km 79 and km 86: this AA will provide a straight route between km 79 (i.e. on the edge of the village of Narimankand) and km 85. It cuts across a flat expanse of sown cropland.

“Without Project” Scenario

Assuming that the existing Highway II Project will have been finalised before commencement of the Project, the “without project” scenario will mean that the widening of the refurbished road from a two-lane to a four-lane road will not take place. Under this scenario it is likely that as a result of the Highway II Project traffic and traffic speed will increase significantly (soon after refurbishment and in the long-

² This will be the preferred option as it is the only one which complies with the Construction Norms and Rules (SNIP); the remaining options will be considered where there will not be sufficient space for this option to be implemented.

term) on the two lane road following its refurbishment , potentially giving rise to increased numbers of traffic accidents and road accidents involving pedestrians and animals (wildlife and cattle) crossing the road.

2.2.2 Implementation Arrangements

The proposed highway widening programme is to take place over a period of several years. The first year's implementation programme will widen the first section of the Baku-Shamakhi road, for approximately 30 km. The works on the remaining section will be advanced in year two.

The overall engineering feasibility study for the Azerroadservice's (ARS) preferred option is still to be undertaken. The Environmental Assessment and Management Framework (EA&MF) and Resettlement Policy Framework (RPF) have been developed in parallel to this RER. Detailed designs will be produced for each sub-project, with the design phase for each section including studies to develop appropriate section-specific Environmental and Social Impact Assessment (ESIA), Environmental Management Plans (EMPs) and Land Acquisition Plans (LAPs) and /or Resettlement Action Plans (RAPs).

3 POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK

The proposed Project will need to be in line with national legislation and policies, international conventions which Azerbaijan is a signatory to and the World Bank policies and standards.

3.1 Institutional Framework

Environment

The key environmental institution in Azerbaijan is the Ministry of Ecology and Natural Resources (MENR). The MENR performs functions related to:

- Environmental policy development.
- Environmental protection.
- Water monitoring and management.
- Protection of marine (Caspian Sea) bio-resources.
- Forest management.
- Bio-resources and protected areas management.

The MENR's State Ecological Expertise (SEE) department is responsible for the review and approval of EIAs submitted by developers.

The ARS, the Highway II Project Implementation Unit and the ARS's Ecology and Safety Sector (ESS), have the responsibility for ensuring the implementation of the recommendations contained in the EA&MF and for ensuring compliance with national environmental standards.

Resettlement

Table 1 specifies which Governmental authority will be involved in coordinating resettlement issues which are likely to arise as a result of project implementation.

Table 1: Institutional Framework with Responsibilities in Resettlement

| Institution | Responsibilities |
|---|--|
| Azerroadservice OJSC (ARS) | The execution of the compensation and valuation process. The implementation of the RAPs through its LAD. Consultation with the PAPs. Provide relocation assistance. Cover the costs of building new houses and business units. Provide income restoration measures. Distribute funds for land acquisition. |
| Land Acquisition Department (LAD) | Carrying out resettlement procedures. Co-ordinating the public consultation and information disclosure process. |
| Local Executive Powers and Municipalities | Responsible for documenting the grievances of the PAPs and send it to the appropriate agency/office for action. |
| Local Commission | Will pay the compensation. The Local Commission is responsible for monitoring the progress and effectiveness of the land acquisition process. |
| Cabinet of Ministers | Assesses the process and determines the normative prices for land and property. |

3.2 Legal, Regulatory and Policy Framework

National Policies on Environment, Poverty Reduction & Economic Growth

The National Millennium Development Goals (MDGs) relevant to the proposed Project are listed in Table 2.

Table 2: Relevant Azerbaijan Millennium Development Goals

| Goal | Target |
|---|--|
| Goal 1: Reduction of poverty | Target 1: Reduce, between 2002 and 2015, the proportion of people whose per capita monthly income is below the country's absolute poverty line. |
| | Target 2: Reduce, between 2002 and 2015, the proportion of people in extreme poverty. Halve the share of the population living below the relative poverty line of the country. |
| Goal 7: Ensure environmental sustainability | Target 9: Integrate the principles of sustainable development into country policies and programmes and reverse the loss of environmental resources. |
| | Indicator 27: Proportion of land covered by forest. |
| | Indicator 28: Land area protected to maintain biological diversity. |

Source: www.economy.gov.az/PRSP/

The Government designed a State Programme on Poverty Reduction and Economic Development (SPPRED). This includes policy measures and actions to help Azerbaijan achieve its MDGs of poverty reduction and environmental sustainability.

3.3 National Laws and Regulations on Environmental Protection

The Constitution of the Republic of Azerbaijan defines principles for environmental protection, ownership of natural resources and regulations for their use. Key laws pertaining to the environment include:

- The *Law on Environmental Protection* (EP) of 1999 governing environmental protection in Azerbaijan.
- The Land Code is the key piece of legislation governing land use and development.
- Laws on the protection and sustainable use of natural resources, including: *Law on Plant Protection* (1996), *Forestry Code* (1997), *Water Code* (1997), *Law on Fisheries* (1998), *Law on Fauna* (1999) and *Law on Protected Areas* (2000).
- A range of laws regulating environmental pollutants³.

3.3.1 National EIA Policy, Legal and Regulatory Framework

The EIA system follows the procedure of SEE which consists mainly of the formal verification by state authorities of all submitted developments for their possible environmental impacts, regardless of their scale, sector type or nature.

The legal acts and documents that form the basis for Azerbaijan's current EIA system are listed in the following table.

Table 3: Legislative Basis of EIA System in Azerbaijan

| Legislative Document | Year of Adoption | System Implied |
|--|------------------|----------------|
| EIA Handbook | 1999 | EIA |
| Law on Environmental Protection, Clause VIII: State Ecological Expertise (SEE) | 1999 | SEE |
| Decree on the Ratification of the Espoo Convention ⁴ | 1999 | EIA |
| Decree Accession to the Aarhus Convention ⁵ | 2000 | EIA |

EIA Procedures

The procedures for the conduct of EIA are laid down in the *Handbook for the EIA Process in Azerbaijan* of 1996. Although these provisions are not technically legally binding, compliance with them is to all intents and purposes regarded as mandatory. The EIA Handbook establishes the main principles and elements the EIA process:

- The sequence of events, roles and responsibilities of developers and Government institutions, charges;
- The purpose and scope of the EIA report;
- Public participation in the process;
- The environmental review and decision;

³ Anon (2004) *Country Study on Biodiversity and First National Report*, Republic of Azerbaijan, June 2004

⁴ UNECE *Convention on EIA in a Trans-boundary Context*

⁵ UNECE *Convention on Access to Information, Public Participation and Decision Making and Access to Justice in Environmental Matters*

- The process involves various stakeholders, considers public opinion and aims at environmentally conscious decision making.

The EIA process in Azerbaijan includes:

- (i) The Submission of Application and Initial Examination: the developer submits to the MENR a formal application, the format and content of which must comply with the indications given in section 7.2 of the Handbook. The MENR will notify the developer on the required scope and depth of the investigation and public consultation during the EIA study.
- (ii) Review of EIA Report through the MENR/the Environment Expert Review Group: the second stage of the EIA process lasts three months, during which the EIA documentation submitted by the developer is investigated by the MENR.
- (iii) Decision by the MENR: the MENR decides on whether to approve or refuse the application with or without conditions. Conditions for the approval that might typically be considered in the present context mainly relate to the construction phase and may include site management, noise, dust, discharges to the air land, subsurface or water, solid waste management, fire risk, emergency contingency plans. If the application is accepted, the developer must provide a report to the MENR on progress within 12 months of the MENR decision.

3.4 National Laws and Regulations on Land Acquisition and Resettlement

Current legislation related to the status and control of the road reserves includes:

- *1976 Road Decree* - gives legal standing to the width requirements for road reserves given in the construction standard.
- *1989 Road Decree No. 461* - prohibits activities and constructions in the road reserve and assigns rights for the roads authority to evict illegal occupants on 15 days notice, at the conclusion of which, the roads authority may demolish the constructions without compensation and use the resultant materials in the construction of the road.
- *2000 Decree on Application of the Road Law* - One of the main purposes of this decree was to update the 1989 decree, especially in regard to the designation of responsible agencies. Article 14 outlined that the width of road reserves will be confirmed by the Cabinet of Ministers.
- *2004 Decree on Additional Activities Aimed at Regulating the Usage of Road Reserves in the Republic of Azerbaijan* - designates responsible agencies for various issues relating to the road reserve and adjacent land use, including the preparation of an inventory of national road reserves to identify illegal and legal occupiers and properties, and for ongoing maintenance and protection of the road reserve.

Legal instruments governing land, land acquisition and compensation for other property losses include:

- Land Code dated 25 June 1999 – regulates valuations of land for, and compensation purposes.
- Civil Code dated 1 December 1998 - states that any rights to immovable properties must be registered with the State, and that land may be recalled from owners for state or municipal needs as approved by the relevant courts.
- Cabinet of Ministers Resolution No. 42 - On Some Normative and Legal Acts Relating to the Land Code of the Azerbaijan Republic dated 15 March 2000. This resolution outlines procedures for the compulsory acquisition of land for state or municipal needs.
- Cabinet of Ministers Resolution No 110 – On Approval of Regulations for an Inventory Cost estimation of Buildings Owned by Natural Persons dated June 1999. This resolution outlines procedures for acquisition and compensation valuation for affected buildings and immovable properties.

According to the above-mentioned the legislation, there are three possible scenarios of land acquisition:

- Land owner is provided with the equal size and quality of land.
- Land owner is compensated by proponents of the land acquisition on the basis of current markets prices.
- Dispute is the subject of court consideration.

The Government of Azerbaijan is represented in the regions by the local offices of line ministries which in some cases may cover more than one district. In this Project, the Ministry of Transport represented by the ARS is the main stakeholder due to their responsibilities in road construction.

3.5 World Bank Safeguard Policies

The World Bank environmental and social safeguard policies are regarded as a cornerstone of its support to sustainable poverty reduction. The objective of these policies is to prevent and mitigate undue harm to people and their environment in the development process. These policies provide guidelines for the World Bank and borrowers in the identification, preparation and implementation of programmes and projects.

EIA is one of 10 environmental, social and legal safeguard policies of the World Bank. An EIA is used in the World Bank to identify, avoid and/or mitigate the potential negative environmental impacts associated with lending operations. The purpose of an EIA is to improve and provide ensured decision-making, to ensure that project options under consideration are sound and sustainable, and that potentially affected people have been adequately consulted. The World Bank's EA policy and recommended processing are described in Operational Policy (OP)/Bank Procedure (BP) 4.01: Environmental Assessment. This policy is considered to be the 'umbrella' policy for World Bank environmental 'safeguard policies'. For the Highway III Project the relevant safeguard policies to be considered at all stages of preparation and planning are:

- Involuntary Resettlement (World Bank OP/BP 4.12);
- Natural Habitats (World Bank OP/BP 4.04: Natural Habitats 2001);
- Forestry (World Bank OB/BP 4.36);

- Management of Cultural Property (World Bank OP 11.03).

The World Bank's requirements on Information Disclosure are detailed in The Disclosure Handbook 2002.

EIA reports would be presented to both the Government of Azerbaijan and World Bank Management and serve as a background document for approval by the competent authority. In accordance with OP/BP 4.01, the Borrower (i.e. the Government of Azerbaijan) would have to make the draft EIA Report and LAP available in Azerbaijan at a public place accessible to project-affected groups and local NGOs. The Borrower must also officially transmit the EIA report and LAP to the World Bank. Once the EIA report and LAP have been locally disclosed and officially received by the World Bank, the World Bank would also make them available to the public through its Infoshop⁶.

At the time of preparation of the RER, the proposed widening of the Baku–Shamakhi road had already been classified a Category A project under the provisions of World Bank's OP 4.01. Hence, EIAs for the sub projects for a Category A project will examine a project's potential negative and positive environmental impacts, will compare them with those of feasible alternatives (including the 'without project' situation), and will recommend any measures needed to prevent, minimize, mitigate or compensate for adverse impacts and improve environmental performance.

An EMP needs to be established in accordance with the World Bank's OP 4.0, which identifies the EMPs as an essential feature of category A projects. The specific requirements relating to EMPs are set out in Annex C to World Bank's procedure 4.01 (BP 4.01) – these are mandatory.

3.6 International Conventions

Azerbaijan is a signatory to most international agreements and conventions relating to the environment, including, *inter alia*:

- The UN Economic Commission for Europe (UNECE) Convention on EIA in a Trans-boundary Context (or Espoo Convention⁷), regulating the EIA process.
- The Convention on Wetlands of International Importance as Waterfowl Habitat ('Ramsar Convention') to stem the progressive encroachment on and loss of wetlands now and in the future.
- The Convention on Biological Diversity which seeks to ensure conservation of biological diversity and sustainable use of its components.
- The UNECE Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters (also 'Aarhus Convention'⁸), which establishes a number of rights of the public (citizens and their associations), including the right of everyone to receive environmental information that is held by public authorities ('access to environmental information'), the right to participate from an early stage in environmental decision-making, and the right to challenge, in a court of law, public decisions that have been made without respecting the two aforementioned rights or environmental law in general ('access to justice').

⁶ The World Bank (2002): The Disclosure Handbook. Operations Policy and Country Services. 2002.

⁷ ratification 01.02.1999

⁸ ratification 09.11.1999

Based on Article 151 of the Azerbaijan Constitution, international Conventions override national laws if there is any conflict. With regard to the context of the present 'Motorway Improvement and Development Project', the Law on Environmental Protection (EP) specifically states that SEE is guided, *inter alia*, by international legal obligations.

3.7 The Role of RER, EA&MF and RPF in ensuring Compliance

The RER identifies and provides a broad overview of the policy, environmental and socio-economic implications of the entire Project scope. The EA&MF and RPF outline the procedures for the management and monitoring of environmental and social issues of sub-projects in relation to Azerbaijan's legislation, procedures and policies, international Conventions as well as World Bank safeguard policies, in particular in terms of environment, land acquisition and resettlement.

4 PROJECT AREA AND SURROUNDING ENVIRONMENT

4.1 Geology, Topography and Soils

The **topography** along this road is characterized by undulating arid hills and mountains. The relief gradually transforms from plains in the east over to foothills and lower mountain areas of the Greater Caucasus in the western part of the study corridor. Altitudes vary between 0m above sea level (asl) at the starting point of the road in the east to about 1,000m around Shamakhi in the west. This area is characterized by a network of smaller streams which are also used for drinking water purposes. The road corridor to Shamakhi crosses a series of wide river terraces and ancient river canyons which all represent erosion types of landscape⁹.

Chestnut soils occur between altitudes of 300m to 500m asl with average precipitations of 300-450 mm. This type of soil is plain dry steppe, which has loamy structure, medium degree of salinity, low coefficient of erodibility and low bio-climate potential.

4.2 Climatic conditions

The study corridor is mainly semi-desert and dry steppe or steppe, with hot summers and mild winters.

4.3 Ambient air quality

There are no stationary sources in the study area, which can seriously impact ambient air quality. Therefore, vehicular traffic is assumed as being the major source of emissions and ambient air pollution, although details regarding traffic emissions are not known.

4.4 Surface and Groundwater

Surface water resources of the study corridor are made up of a few rivers, springs and small lakes. Within the first 20 km of the road they generally carry little water. The eastern-most river of the study corridor is Sumgayit Chay, which flows eastward, entering the Caspian Sea at Sumgayit city. Travelling westwards, the road also

⁹ Budagov B.A. (1998) *Modern Natural Landscapes of Azerbaijan SSR*; Geography Institute of Az AoS, Baku, 1988

crosses the rivers Jeyrankechmez and Pirsaat Chay, the biggest river in the study corridor.

Drinking water in the study corridor is either spring water or water taken from the rivers, Villages also tend to have artesian wells.

Wastewater collection and treatment facilities are provided at the Shahriyar settlement and Shamakhi only. Wastewater is piped to a wastewater treatment works located some 7-8 km away from town where the water is processed and the sludge is used as fertilizer.

4.5 Noise

Noise studies have not been undertaken in the project area. Given the current low level of road traffic and low level of industrial activity along the Baku-Shamakhi road, at present it is unlikely that noise is a key environmental issue in the area.

4.6 Natural Hazards

Drought is characteristic of the Absheron-Gobustan zone. In the light of global warming, evaporation rates that exceed precipitation rates and greater tendencies for dry summers have increased the risk of desertification in this region.

A number of landslide prone areas were identified along Baku Shamakhi Road. In particular, areas around kms 60, 81.5, 96 – 99, 109-110 and 132.6 are of great concern. The western part of the study corridor is characterized by very high seismic activity, with a number of villages, including Shamakhi, having been seriously damaged several times by strong earthquakes. Therefore, the landslides along the road may be further exacerbated due to the high seismicity of the area.

4.7 Biological Environment of the Study Corridor

4.7.1 Flora

The area to the west of Baku is characterized by saltwort and ephemeral deserts and wormwood-saltwort semi-deserts. Overall along the study corridor flora biodiversity is high featuring between 600-729 plant species. Travelling westwards along the Baku-to-Shamakhi road, the saltwort-ephemeral desert landscape is gradually replaced by wormwood-saltwort semi deserts and arid steppe. Beyond km 70, the natural vegetation is mountain-steppe landscape with mixed-grass vegetation and agricultural fields are gradually replaced by dry steppe vegetation. The species composition on the foothills in this area shows evidence of strong pressure of overgrazing on the existing ecosystem.

In the wet season species of ephemeral grasses, tulips (*Tulipa sp.*), iris (*Iris sp.*), feather grass (*Stipa sp.*), some cereals (*Andropogon sp.*) and bushes (*Pirus sp.*, *Amigdalus fenzliana*, *Crataegus orientalis* etc) can be observed. In the spring season numerous flower species can be found (*Euphorbia helioscopia*, *Veronica chamaedrys*, *Leontodon hispidus*, *Cirsium arvensis*, *Erodium cicutarium*, *Arnebia linearifolia*, *Sisymbrium officinadale*, *Ammi visnaga*, *Cicorium intibus*, *Calendula sp.* and *Papaver sp.*). In the dry summer season the most common species are *Salsola sp.*, *Eryngium planum* and *Echinops ritro*.

Thirteen species of plants, which are in the Red Data Book of Azerbaijan, can be found in the Baku-Shamakhi area. The species are *Ferula persica*, *Cladocheta candissima*, *Anabasis brachiata*, *Astragalus bakuensis*, *Iris acutiloba*, *I. reticulata*, *Muscari elegantulum*, *Tulipa biebersteniana*, *Acantholimon schemachense*, *Avena ventricosa*, *Stipa pellita*, *Calligonum bakuense* and *Pyracanta coccinea*. These species occur in the desert and semi-desert landscape.

The ARS planted narrow strips of trees in various sections alongside the road, mainly in the area to the west of Narimankand. In accordance with the provisions of the Construction Norms and Regulations (SNIP 2.05.02.85), the main purpose of these plantations is to reduce noise and air pollution and to protect the road from strong winds and snow. The most common planted tree under this scheme is the pine tree. However, a number of trees along the study route were infected by what appears to be a fungal infection and have perished (the first affected trees were observed near Maraza in 2002 and since that time approximately 200 trees have perished and continue to perish). Only pines planted in 1973 are affected by the disease. The responsibility of preventing the fungal infection from spreading lies with the Jangi Forest Fund. Other trees found along the roadside are Acacia (*Acacia* sp.), Oleaster (*Elaeagnus* sp.), Willow (*Salix* sp.), Almond (*Amygdalus* sp.), Apricot (*Armeniaca* sp.), Poplar (*Populus* sp.), Oak (*Quercus* sp.) and Ash (*Sorbus* sp.). Young trees planted since 2003 include Oleaster (*Elaeagnus* sp.), Acacia (*Acacia* sp.), Almond (*Amygdalus* sp.), Elm (*Ulmus* sp.), Gleditschia sp., Maclura sp., Indigo (*Amorpha* sp.) and Fustic (*Cotinus* sp.).

Six tree species have been identified for future plantation by the Jangi Forestry Department. These include: Oleaster, Elm, Gleditschia, Maclura, Poplar, and Fustic (Smoke tree). Not all of these species are native to Azerbaijan or to the local area. However, these tree species are widespread in the country and can coexist with the local flora.

The eastern part of the study corridor is mainly used for winter pasture. Vine-growing, animal husbandry, grain cultivation and fruit growing dominate in the western zone, where 35% of the land is used for pasture; 25% is arable lands and vineyards; 5% is forest and 35% is urban or unused lands.

4.7.2 Fauna

The area harbours a number of faunal species, including threatened species of national and international importance. The following comments on the fauna along the study corridor are mainly based on the Red Data Book of Azerbaijan, IUCN Red Data List and publications of BirdLife International.

According to the above-named sources, the common mammals of the area are the Jackal (*Canis aureus*) and the Wolf (*Canis lupus*) which follow the sheep flocks to the winter pastures in the lowlands and the Red Fox (*Vulpes vulpes*), Badger (*Meles meles*) - its big entrances to the burrows are usually locate in the slopes of river canyons – the Wildcat (*Felis libyca*) and the hare (*Lepus europaeus*) which are the resident species of this area. Characteristic mammals are the bat Western Barbastelle (*Barbastella barbastella*) and Blasius's Horseshoe Bat (*Rhinolophus blasii*^B). *Barbastella barbastella*^B categorised as a Vulnerable Species under the 2008 IUCN Red List Category, can be found in the study area throughout the year, except summers. These night active animals have shelters in surrounding structures during daytime. *Rhinolophus blasii*^B is a Near Threatened Species under the 2008 IUCN Red List Category. It is found only in vicinity of Shamakhi in the forests in

subterranean shelter¹⁰. Further characteristic mammals are *R. ferrumequinum*, *Pipstrellus pipistrellus*, *P. kuhlii*, *Myotis blythii*. These bat species are resident animals, breeding in numerous caves in vicinity hills and under the roofs of houses within the settlements and wintering mainly in subterranean shelters. Colonies of numerous rodents – House Mouse (*Mus musculus*), the Water Vole (*Arvicola terrestris*), the Red-tailed Sanderling (*Meriones lybicus*), *Allactaga williamsi* and the Social Vole (*Microtus socialis*) can be observed even at the embankments of the road but also at surrounded landscape predominately at the area with soft soils, in particular, on agricultural fields. Insectivore species are presented by Long-tailed White-toothed Shrew (*Crocidura guldenstaedti*) and hedgehogs - *Erinaceus concolor* – usually occurring in the gardens and parks with grass vegetation and *Hemiechinus auritus*, mainly occurring in open semi-desert and active during twilight and night time. These species hibernate from November to early April.

The avifauna is characterized by: Short-toed Eagle (*Circaetus gallicusa*) - nesting, Imperial Eagle (*Aquila heliaca*), Pallid Harrier (*Circus macrourus*) - migratory, Saker (*Falco cherruga*) – wintering, Common Kestrel (*Falco tinnunculus*) – resident.

The wider area includes breeding areas for two species of falcons. Gargabazar rock (IUCN Important Bird Area), located approximately 10km from the study road is the only place within the country where nesting of the Lanner (*Falco biarmicus*, breeding) has been registered .

The Lesser Kestrel (*Falco naumannii*) – is an internationally protected species and a Vulnerable Species under the 2008 IUCN Red List Category. It is a common breeding bird in the study area. Small breeding colonies and even separate pairs usually nest on the piers under Bridges No. 2 and 3 and also under the roofs of abandoned houses and cowsheds. The biggest concentration of this species had been noted in the vicinity of the River and village Jeyrankechmez.

Large flocks of Little Bustard (*Tetrax tetrax*) can be found during both migration and wintering seasons. Chukar (*Alectoris chukar*), Black-bellied Sandgrouse (*Pterocles orientalis*), Rock Dove (*Columba livia*), Crested Lark (*Galerida cristata*), Isabelline Wheatear (*Oenanthe isabellina*) and Chough (*Pyrrhocorax pyrrhocorax*) are typical resident species. Rooks (*Corvus frugilegus*), Jackdaws (*Corvus monedula*) Common Starlings (*Sturnus vulgaris*) and Tree Sparrows (*Passer montanus*) are densely occupied numerous agricultural fields. A large breeding colony (of about 600 pairs) of Rose-colored Starlings (*Sturnus roseus*) can be observed approximately 20 m - 50 m from the roadside at Jeyrankechmez village from April until the end of July. Mixed breeding colonies of Common Bee-Eaters (*Merops apiaster*) and Rock Sparrows (*Petronia petronia*) are commonly observed on the slopes of the surrounding hills.

Study area is characterized by very dry climate, especially in the eastern part of the corridor, thus amphibians are not very common animals in the area. Characteristic amphibian species are the Green Toad (*Bufo viridis*) and the Common Frog (*Rana ridibunda*), which are found in vicinity of rivers and ponds and even temporary puddles. A much rarer Spade-footed Toad (*Pelobates syriacus*), which is in Red Data Book of Azerbaijan, can be observed only along the banks of springs and fresh water streams. Common Toad (*Bufo bufo*) usually occurs in overgrows of bushes, gardens and parks of western part of the corridor in warm seasons of the year.

¹⁰ *World of Animals of Azerbaijan*, Senior Editor M A Musayev, Azerbaijan Academy of Sciences, Baku, 2000

The reptile fauna of the area is composed of a number of species which include the Viper Lebetina (*Vipera lebetina*), the Caucasian Agama (*Agama caucasica*), the Greek Tortoise (*Testudo graeca*), the European Pond Turtle (*Emys Orbicularis*) and the Caspian Turtle (*Mauremys caspica*).

The Greek Tortoise is one of the most typical reptile species in the area and characteristic of semi-desert dry lands. Although this is both locally and internationally protected animal, the species has quite a big number (up to 16 individuals for 1 km of route), but usually has bigger concentration at the sites with extensive vegetation. Therefore, Greek Tortoises roam in search of forage. In dry summers they can be observed along the rivers.

The European Pond Turtle (Near Threatened Species under the IUCN 2008 Red List¹¹) as well as the Caspian Turtle can be found only in vicinity of permanent water bodies and in particular along the banks of the rivers.

Many other species occur in this landscape type – lizards (*Stellio caucasicus*, *Ablepharus pannonicus*, *Eremias arguta*, *Eumeces scheideri*, *Cyrtopodion caspius*, etc) and snakes (*Elaphe quatourlineata*, *Eirenis collaris*, *Malpolon monspessulanus*, *Vipera lebetina*).

Most reptile species from the order Sauria and Criptodira occur from beginning of March up to October-November (depending on temperature conditions). Species from the order Serpentes usually occur from end of March/April up to October. The exception is *Vipera lebetina*, which may not reach hibernation (this species can be observed throughout the year). Representatives of Amphibia may also be found during the whole year (in suitable weather conditions), but their period of activity is mostly continuous from March up to November. Common fish species that occur in the area are Caucasian Chub (*Leuciscus cephalus orientalis*), Kura's Barbel (*Barbus curi*), Caucasian Bleak (*Alburnus charusini*), Bitterling (*Rhodeus sricous*), Sazan (*Cyprinus carpa*), Kura's Loach (*Nemachilus brandti*). No threatened fish species are found in the rivers and streams of this region.

Characteristic and rare insects that may be encountered include beetles – *Carabus scabrosus* and *Calosoma sycophanta*^A; and butterflies Apollo (*Parnassius apollo*^C), *Colias aurorina*^A and *Manduca atropos*^A.

Tarantula (*Lycosa*), Phalanges (*Galeodes araneoides*), Scorpions (*Buthus eupeus*) and tick (*Ornithodoros*) are the most common arthropods in the study area. Insects present include Darkling Beetles (Blaps), locust species (*Dociostaurus maroccanus* is especially common), mantis, small mosquito (Phlebotomus) occurs in the burrows of sanderlings in dry areas and many different gnats occurs on wetlands. Some rare species from the Azerbaijan Red Data Book can be observed in the vicinity of the study corridor. These include beetles – *Carabus scabrosus*^A, *Calosoma sycophanta*^A, *Megacephalus euphraticus*^A, and the Alpine Swift (*Apus melba*)¹²

4.8 Protected Areas and Other Significant Natural Sites

4.8.1 State Forest Fund Tree Plantations

¹¹ IUCN/SSC (2008) Tortoise and Freshwater Turtle Specialist Group. 2008 IUCN Red List for Testudines. [www.iucn-tftsg.org/red-list/]

¹² As above

Within the Gobustan Rayon there are sections of land along the study road which are protected by the State Forest Fund (SFF). These are artificial tree plantations of both native and introduced plant species. The plantations belong to Jangi SFF.

Table 4 details the location and tree composition of the different tree plantations along the study road.

Table 4: Location and Tree Composition of the Tree Plantations Along the Study Route

| Road sections | | Length, km | Tree type ¹³ | Tree age |
|---------------|--------|------------|---|----------------------------------|
| from km | to km | | | |
| 45+000 | 46+900 | 1.9 | Cypress, Pine, Oleaster, Willow, Acacia, Almond, Elm, Fustic etc. | young (planted in 2003 or later) |
| 51+200 | 54+800 | 3.6 | Cypress, Pine, Oleaster, Willow, Acacia, Almond, Elm, Fustic etc. | young (planted in 2003 or later) |
| 56+400 | 59+200 | 2.8 | Cypress, Pine, Oleaster, Willow, Acacia, Almond, Elm, Fustic etc. | young (planted in 2003 or later) |
| 57+700 | 64+400 | 4.7 | Cypress, Pine, Oleaster, Willow, Acacia, Almond, Elm, Fustic etc. | young (planted in 2003 or later) |
| 79+500 | 88+600 | 9.1 | Acacia, Willow (35%) Poplar (13.7%) Pine (10.3%) Almond, Apple (7.1%) Oak, Ash (0.6%) | mature (planted in 1973) |
| 89+500 | 95+700 | 6.2 | Pine (70%) Acacia, Willow (14.3%) Oak, Ash 4.8%) Almond, Apple 3.8%) Poplar (3.3%) | mature (planted in 1973) |

Source: Consultant's Site Visit (March 2009)

The protected area status of the tree plantations was declared by the Forestry Code of the Azerbaijan Republic (No 424-IQ) and the Presidential Decree on the Application of Forest Fund (No. 693, 30th March 1998), and includes all forests within Azerbaijan as well as land lots of SFF not covered with plants (forest and non forest land areas). Any land of the SFF is considered state land and not privatised, however it can be used for governmental or social purposes. State organisations which intend to use, purchase or somehow affect the lands owned by SFF have to abide by the following procedures:

- Preparation of a document detailing the potential damage to the SFF land in order to apply for permission to the central office of the Ministry of Ecology and Natural Resources.
- The MENR sets up a commission that includes representatives of both the MENR's central office and the local SFF. This commission studies the situation and prepares detailed documentation on its assessment, land acquisition issues and compensation mechanisms.

¹³ The percentages correspond to the percentage cover of that particular tree type within that length of road section.

- The document must be approved by the head of local Executive Power
- The document must obtain final approval from the Cabinet of Ministers of the Azerbaijan Republic.

4.8.2 Nationally Protected Mud Volcanoes

In accordance with the Presidential Decree of 15 August 2007 "Creation of Nature Reserve for group of mud-volcanoes of Baku and Absheron peninsula", there are a number of nationally protected areas along the study corridor. These include (from east to west) the following mud-volcanoes: Damlamaja, , Uchtepe, Pirikushkul, Buransiz-Julga, Saridash-Boyanata, Shorsulu and Ayazakhtarma. The new protected areas are usually separate detached mountains with some attached surrounding areas. These are strictly protected areas and no construction or agricultural activity is allowed within these areas. The closest mud-volcano to the study corridor is Pirikushkul mud volcano that is located directly at the roadside (to the North side of it) between km 30.5 and km 31.

4.8.3 Other Areas of Importance for Nature Conservation

In the study corridor there are a number of sites which are breeding sites for the Lesser Kestrel, a species noted as Vulnerable under the IUCN Red List. In addition, the area is also likely to be a habitat for the European Pond Turtle, a Near Threatened species under the IUCN 2008 Red List.

In the wider surroundings of the study corridor there are two sites of international conservation importance. These are so called 'Important Bird Areas'¹⁴ and are located around Gargabazar and Gushgaya mountains some 8-10 km directly south of Jangi village. These areas are important habitats for the IUCN Vulnerable Species threatened Lesser Kestrel (*Falco naumanni*) as well as for the Lanner (*Falco biarmicus*) and the Alpine Swift (*Apus melba*)¹⁵. Gargabazar is the only place in the country where nesting of the Lanner has been observed.

4.9 Socio –Economic and Cultural Environment of the Study Corridor

4.9.1 Introduction

The Baku-Shamakhi road passes through four administrative districts namely, from east to west, Garadagh (which is under the jurisdiction of Baku municipality), Absheron, Gobustan, and Shamakhi¹⁶. There are five main centres of population along the Baku-Shamakhi road: Baku itself, Gobustan Village of Absheron district, Jangi Village and Gobustan Town¹⁷ of Gobustan district and Shamakhi.

Absheron: The area of the district is 1546 sq.km and the population is 105806 persons, most living in rural areas (83.01%). 44 large and medium sized enterprises

¹⁴ Heath, M.F. and Evans, M.I., (2000) *Important Bird Areas in Europe: priority sites for conservation*, 2 vol., Cambridge, UK: BirdLife International (BirdLife Conservation series No 8), eds., 2000.

¹⁵ As above.

¹⁶ The road widening under the Highway III Project will cover Absheron, Gobustan and Shamakhi districts

¹⁷ The villages of Narimankand and Maraza were merged to form the town of Gobustan

are in operation in Absheron. Absheron comprises 1 city, 8 settlements and 6 villages. The Absheron region was formed in 1963 and over the past years has established a high-level control over collective and state farms of Baku and Sumgait and their provinces. Absheron has an agricultural and poultry industry, as well as industrial centres which supply agricultural products. Scientific-research institutes and laboratories are also present.

Gobustan: The area of the district is 1370 sq.km. The population is 39964 persons. The urban population is 44.2% and the rural population 55.8%. Gobustan contains a number of infrastructure and commercial developments, including 30 secondary schools, 3 hospitals, 6 infant schools, 6 large and medium-sized enterprises and 23 cultural centres. On the 25th April 2008, by Presidential Decree, the Maraza and Narimankand settlements were combined to create a Town of Gobustan.

Shamakhi: The area of the district is 1610 sq.km. The population is 89638 persons. Shamakhi comprises 1 city, 3 settlements and 57 villages. The ethnic composition is mostly made up of Azerbaijanis (approximately 88%), and the remainder of the population includes a number of ethnic minorities - Turkish, Russian, Lezgi, Ukrainian, Tatar, Armenian, Jewish and Georgian. There are 1075 IDPs and 3850 refugees living in Shamakhi. Sabir, a settlement adjacent to the road, comprises 582 households and 3018 persons. The main source of income in Sabir is cultivation and cattle breeding.

Property assets commonly found adjacent to or in close vicinity of the study route include several houses, farms, shops, cafes, butchers and restaurants. In addition, the study corridor includes schools in Sabir and Gobustan, cultural monuments and sacred places, including one mosque in Gobustan and one sacred place in Sabir, tree plantation areas, and graveyards.

4.9.2 Land Use and Sources of Income

Gobustan: The economic basis of the Gobustan district is agriculture: mainly grain production, cattle breeding and vine growing. Every year Gobustan produces more than 1 ton grain per person. The average monthly income in Gobustan is 167 AZN.

Table 5: Land use information of Gobustan

| N | Information on land use | Total area (sq.km) |
|---|-------------------------|--------------------|
| 1 | productive lands | 324.8 |
| 2 | unimproved pasture | 510.5 |
| 3 | sown pasture | 494.80 |
| 4 | planted lands | 219.90 |
| 5 | fruit gardens | 2 |
| 6 | saline lands | 510.50 |
| | Total: | 1369.4 |

Source: <http://azerbaijan.az/>

Absheron: The Absheron district's economy is based on food processing, irrigated agriculture (vegetable production, vine growing) and livestock breeding for milk and meat production. In the south, pistachio nuts, almonds and olives are grown as well as the very valuable saffron (*Crocus sativus*), natural food flavouring and colouring agent with pharmaceutical properties. Olive gardens comprise 69.8% of all garden

areas. The average annual amount of olive processing is 1800-2000 tons. In addition the District has deposits of oil and natural gas. Along the roadside, butchers slaughter and sell meat

Table 6: Land use information of Absheron

| N | Information on land use | Total area (sq.km) |
|---|-------------------------|--------------------|
| 1 | productive lands | 808.0 |
| 2 | unimproved pasture | 689.0 |
| 3 | sown pasture | 613.0 |
| 4 | planted lands | 106.0 |
| 5 | fruit gardens | 32 |
| 6 | saline lands | 0.4 |
| | Total: | 1546 |

Source: <http://azerbaijan.az/>

Shamakhi: The basis of the economy of the district is agriculture: grain production, cattle breeding and vine growing. Main agricultural products include wheat, grapes, fruits, potato, vegetables (cabbage, tomato, aubergine etc), melons and pepper. For centuries, it was famed for its carpet production. There is no oil in the district. There are some industrial facilities, including several factories producing electrical goods.

Tourism is viewed as a potential growth industry in Shamakhi, with a focus on nature and winter sports. The district contains a great number of natural places known for their unique scenic value and biodiversity. Areas which attract attention from a scientific, historical and natural point of view include Ulu Duzu, Bulovdash, Sheredli, Dedegunesh, Gonagkend forests, characterized by cool and full water springs, natural beauty and rich flora and fauna diversity. Pirgulu zone, located 1400-1500 m asl is used as an area of tourism and relaxation.

The villages along the proposed routes have small shops for every day goods and services. In addition to serving the local population they also serve passing traffic on the existing road.

Table 7: Land use information of Shamakhi

| N | Information on land use | Total area (sq.km) |
|---|-------------------------|--------------------|
| 1 | productive lands | 334.84 |
| 2 | unimproved pasture | 318.04 |
| 3 | sown pasture | 0.51 |
| 4 | planted lands | 171.12 |
| 5 | fruit gardens | 1.45 |
| 6 | saline lands | 20.81 |
| | Total: | 1611 |

Source: <http://azerbaijan.az/>

4.9.3 Land Ownership

Land along the study road belongs either to the State (State Land Fund and State Forest Fund), the Municipalities or private persons. The existing ROW is 60m according to the law. However, at present the ROW has been significantly reduced in places, either through privatisation or passing the land to the ownership of the municipalities. As a result some private, municipal and forest land plots will be affected as a result of the widening of the road to a four lane road.

4.9.4 Cultural Heritage

In addition to the property assets described in Chapter 4.9.1, there are the following cultural heritage assets along the study corridor:

Gobustan: The Diri Baba Mausoleum, dating from the 15th century, is built into a cliff 1.1 km from the main road.

Sabir Village: At Pirsaat Pir, east of the bridge over the major Pirsaat River at Sabir, there is a place where local people come to drink the reputedly holy water and leave a donation.

Shamakhi: Shamakhi is an ancient city and possibly one of the oldest cities in Azerbaijan. A number of sources indicate that it may be the Khamkhia described in Ptolemy's *Geography* (written 2nd century AD). The city was established on a major regional trading route. Archaeological excavations elsewhere in the District of Shamakhi have found evidence of features dating back to the 11th and 13th centuries¹⁸.

For most of its history, Shamakhi was the capital of Shirvan/¹⁹western Azerbaijan, until the centre of power was moved to Baku in the 15th-16th centuries. The city contains several mosques, including the Juma (Friday) Mosque with two minarets (established 743) and the Grand Mosque (built 1902).

Other historical buildings within the area include the Gulustan Fortress dating from 1043 west of the city and the Yeddi Gumbaz tombs of the khans of Shamakhi which date from the 18th-early 19th century. There is also a caravanserai complex dating back to the 14th century. There is a large graveyard between the road and the water supply reservoir, west of the road between Shamakhi and Muganli.

4.9.5 Community Structure

Every district has its own administrative centre where Local Executive Power is situated. The Head of Executive Power is appointed by the President. The Local Executive Power receives funding from the Central Government. The Local Executive Power has a Land Department that has relevant detailed information and maps about land use and land ownership. The appropriate Local Executive Power prepares documents about land use and land ownership for the municipalities (groups of villages).

Each village has its own municipality and large villages with the small villages around them form administrative units. Although municipalities are independent bodies, according to the *Law on Administrative Control on Municipality Activity* (LACMA), the

¹⁸ Socio-Economic and Heritage Desk-Based Study and Survey undertaken by Socio-Economist, February - March 2009

¹⁹ The Shirvanshahs ruled from the 7th to the 16th century over parts of the Shamakha-Derbent-Baku region (Elliott, 2004)

Local Executive Power has authority to control their activity. The purpose of this control is to coordinate municipality activity with legislation, but it mustn't limit their activation (LACMA Article 4). Usually, administrative units and local municipalities work together to solve local problems.

5 ENVIRONMENTAL ASSESSMENT OF THE BAKU-TO-SHAMAKHI ROAD

A regional environmental assessment (EA) was undertaken within the RER framework to identify the specific characteristics of the project and of the environmental and social features likely to be affected by it. It is based on the current knowledge of the project and visual assessments of the project specific sites completed in February and March 2009.

This regional EA comprised:

- Desktop identification of any sensitive receptors, such as residential areas and ecologically sensitive areas; and,
- A route drive-through of the project area and AAs was conducted by environmental and social specialists in February and March 2009, in order to identify sensitive areas, existing activities or evidence of historic activities of potential concern.
- Public consultations and interviews in the settlements along the study corridor

The Baku-Shamakhi road is a section of the shortest way from Baku to Georgia and to western Azerbaijan. As well as many long, straight sections through unpopulated semi-desert areas, the road includes a number of steep, winding sections through the mountains with tight, blind corners. The road surface, which was constructed around "40 years ago" (Head, Local Executive Power, Shamakhi) is uneven in many places due to structural problems, damage from overloaded heavy vehicles and repeated 'patching' of the surface during road maintenance. It is at present being refurbished as part of the Highway II Project and it is assumed that the refurbishment of the road under the Highway II Project will have been finalised before commencement of the road widening.

The potential investment strategies considered for this project are as follows:

1. 'Without Project' scenario

The "without project" scenario will mean that the widening of the refurbished road from a two-lane to a four-lane road will not take place. Under this scenario it is likely that traffic and traffic speed will increase significantly on the two lane road following its refurbishment²⁰, potentially giving rise to increased numbers of traffic accidents and road accidents involving pedestrians and animals (wildlife and cattle) crossing the road.

From an environmental and ecological perspective, no significant positive or negative permanent or direct impacts are expected to result from this scenario. In the long term, however, the refurbishment of the road is likely to lead to a gradual increase in traffic and traffic speed with consequent gradual deterioration of air quality and

²⁰ *Pers. Comm.*

increase in noise, with some negative impacts on wildlife, local economic activities, and the quality of life of the local communities.

2. Widening Scenario

The widening of the Baku-Shamakhi road from a two-lane road to a four-lane road.

In the context of the existing environmental setting, some potential impacts have been identified by the RER and they need to be considered in the site specific EIAs:

- Destabilisation of slopes in sensitive areas;
- Loss of tree plantations and shrubs planted by the ARS and the MENR in various sections alongside the existing road;
- Disturbance to drainage systems;
- Disturbance to mud volcanoes' areas
- Loss/disturbance of breeding sites, including those of the globally threatened Lesser Kestrel under the bridges over the river Jeyrankechmez;
- Habitat fragmentation;
- Extraction of road construction materials;
- Increased dust production which can negatively impact on road safety;
- Increased air and noise pollution during construction and operation;
- Impacts to the surface water quality of rivers crossing the study area;
- Damage to or loss of archaeological and/or cultural heritage;
- Increased waste production and increased littering;
- Contamination of land through oil and chemical spills during construction works; and
- Impacts on resident and worker health and safety

5.1 Impact Mitigation – Environmental Considerations

In the following paragraphs, a few strategic recommendations are provided that should be considered at the stage of project preparation to enhance environmental performance of each individual sub-project.

Slope destabilisation: As was mentioned during a meeting held with officials at Gobustan, some studies have been conducted in the mid 1970s on possible technical solutions for road improvement in sections with unstable ground and landslide hazards. The preparation of the detailed design should review the scope and contents of these earlier documents and verify if they contain reliable information on the geo-technical conditions of the sections in question and also if this information is representative of the present situation. Otherwise, the comprehensive landslide hazard studies, including geotechnical investigations, and the landslide hazard risk assessments for the road need to be undertaken and appropriate mitigation measures – temporary and permanent) need to be recommended. The data will contribute to the multicriteria assessment of road widening options

Roadside plantations: To minimise any loss of plantations alongside the road, it is recommended that the regional branch of the State Topography and Lands Committee and the Jangi Forestry Department are contacted. These organisations will have records of all plantations and their exact location. Based on this information, the potential impact of the road widening works in the relevant sections

can be assessed and ways by which the impact may be minimised will be identified. Owing to the fact that significant portions of the land immediately adjacent to the road are under the ownership of the State Forest Fund (Jangi Forestry), any potential vegetation losses resulting from the individual sub-projects will require approval from that department and the MENR. Where the loss of such plantations cannot be avoided, their replacement should be considered at detailed design and budget. In accordance with international best practice it is recommended that native species be used, such as tamarisk, juniper, oleaster, fig and pomegranate, which will be suitable for plantation along the road within semi-desert and arid landscapes. This will be dealt with within the EIA stage and within the EMP (which should include a Restoration Plan). The use of wood cut from live trees whether from roadside plantations or other sources by the workforce for fuelwood or construction purposes should be prohibited.

Drainage: To eliminate the flooding that is reported to regularly affect Gobustan town and Sabir Village it is recommended to envisage the improvement of drainage in the sections in question (between km 90 and 93, and km 103-105). When preparing the TORs for the detailed design, this issue should be recommended for detailed analysis.

Disturbance to mud volcanoes' areas: These are strictly protected areas and no construction or agricultural activity is allowed within these areas. The exact locations of mud volcanoes that are in the study corridor should be established by site specific EIAs. The detailed design should ensure that the protected areas are intact by the proposed road widening. Furthermore, it should be ensured that borrows pit sites and access roads to borrow pit sites are not in vicinity to these protected areas. No stockpiling of material will be allowed in reserve area either.

Protected species: The impairment of the local breeding colony of the globally threatened Lesser Kestrel (*Falco naumanni*) on the bridges over the Jeyrankechmez may be avoided through the definition of seasonal restrictions for the execution of any construction works in this area. The restrictions for the execution of any construction works will be required throughout the nesting season, i.e. April to July²¹. Hunting and/or trading in any protected species by the workforce should be prohibited. The impairment of the *Barbastella barbastella*,^B and *Rhinolophus blasii*^p may be avoided through inspections of the relevant structures by the appropriate national specialists prior to dismantle works of structures, if these species were observed and recorded during the site specific EIA surveys. The specific mitigation measures, if necessary, will be detailed in the site specific EIAs. The impairment of the of the Greek Tortoise (*Testudo graeca*,^C) and the European Pond Turtle (*Emys Orbicularis*^B) may be minimised if in winter the wildlife specialists will check all earth moving activities, and all found tortoises and turtles will be moved to a safe location.

Acquisition of construction materials: Materials acquisition could be a problem for the project as the strata identified in the study area may not have the required structural properties for providing aggregates for concrete or road building materials. Materials would probably be obtained through the construction of borrow pits. These should be located as close as possible to the construction site in order to minimise transport distances, and it should be ensured that any borrow pits do not impact, directly or indirectly, on any protected mud-volcano nature reserve or IBA.

²¹The nesting season varies depending on atmospheric temperatures of a given year. Therefore the nesting season will have to be confirmed in the site specific EIA.

Impacts associated with the construction and use of borrow pits are varied and should be given consideration within any EIAs, EMPs and Construction Management Plans undertaken in subsequent phases of the project. In particular, (i) impacts associated with the borrow pit construction and material extraction activities: air emissions, noise and vibration from equipment, impacts to any archaeology present on site, visual impacts, impacts to the water table and groundwater (from interceptions to the water table through excavation as well as from leakages and spillages of fuel and oils) , changes to surface water flows and drainage and issues associated with the disposal of waste material; and (ii) Impacts associated with the construction of temporary access roads and transport of materials to the construction site: these can include waste arisings and disposal, increased traffic, and consequent increase in air and noise emissions.

Impacts associated with the existence of the borrow pits following construction activities should also be considered: if not rehabilitated, the borrow pit area could be a source of visual impacts as well as leaching and runoff of metals/minerals/soil/contaminants to the soil, nearby surface waters and groundwater thus contributing to soil erosion and water pollution. Borrow pits should only be used to supply the construction project in question, following which their licence should be terminated and the area rehabilitated.

Surface water quality of rivers crossing the study area - impacts to water quality would be likely to arise mainly from discharge of runoff containing suspended sediments (soil) or contaminated materials into the water course, or from accidental spillages of oils/chemicals and fuels into the water course. In order to prevent such events, appropriate procedures should be implemented for the handling, storing and using of hazardous chemicals on site (during construction), in particular in the vicinity of watercourses and groundwater zones. Emergency response plans should be put in place and appropriate equipment (e.g. spill containment kits) provided, as well as relevant staff training. In addition, any runoff from the road into the water course during the operational phase should be prevented through the use of mechanisms such as oil and silt interceptors.

Disposal of materials/waste: This issue will be dealt with at project level with the development of project-specific EMPs. Only approved disposal sites should be used.

Contaminated land: the issue will be dealt with in the site-specific EIAs and EMPs, if contaminated land is found to be an issue in any area likely to be directly affected by a project. The areas that are more likely to show a certain level of contamination are garages, car repair shops, scrap yards, gas works, chemical works and landfills/dump sites, etc along the road. Furthermore, the road is used to transport oil-derived products, therefore, spillages are likely to have occurred and some ground contamination may also be present alongside the road. However, no data is available to make conclusions about the levels of contamination or how widespread it is or how likely it is to have reached any sensitive receptors at this stage.

Worker health and safety: This issue will have to be addressed in the ESIA and EMP.

5.2 Impact Mitigation – Social Considerations

The widening of the existing two-lane road to a four-lane road may extend beyond the existing right-of-way (ROW), so the potential impacts on the local population

need to be studied in compliance with the World Bank Safeguard Policies and national legislation in Azerbaijan, such as the Land Code.

In the context of the existing socio-economic setting the following potential impacts could be relevant:

- Impacts on local residents from increases in air emissions and noise and consequent health effects and loss of quality of life;
- Impacts on road safety and the safety of residents / pedestrians and schoolchildren crossing a four-lane road;
- Impacts on local economic activities, such as animal husbandry (cattle, water buffaloes, sheep and goats);
- Impacts to road-side businesses which depend on drivers “stopping by”, such as restaurants, sellers of fresh herbs and butchers;
- Impacts to archaeological and cultural heritage during construction and excavation works;
- Impacts to the community and cultural infrastructure, such as accessibility to local mosques or other sites of spiritual significance, sports areas or any community centres.

Cultural Heritage and Archaeology: an archaeological and heritage survey should be undertaken in order to identify any areas of potential significance. If the area is found to be of potential significance, this should be dealt with in the project specific EIA and EMP.

Access to villages, farms, and major commercial premises must be provided with suitable access routes and pedestrian crossings, to ensure road safety and accessibility. This will need to be addressed within detailed design.

Access to agricultural fields and pasture land must be safeguarded and included into the design phase of the project. Access routes which allow for a safe movement of people, wildlife and domestic animals will have to be addressed during the design phase.

Access to small road-side businesses such as butchers and coffee shops, and road-side sellers will have to be catered for by means of providing them with safe exit route from the main road onto their business premises. Currently, no mitigation measures are envisaged which could minimise or cancel the potential detrimental impacts of the project on the small road-side businesses which contribute towards the local economy.

Issues relating to loss of or damage to property or other assets must be subject to a full Resettlement Action Plan (RAP). Full and adequate resettlement and compensation will have to be provided in line with the World Bank OP 4.12 and Resettlement Policy Framework (RFP).

Table 8: Summary of Environmental and Social Impact Mitigation Measures

| Environmental & Social | Potential Impact | Mitigation |
|--|---|--|
| Land-use and Settlement - Construction | Local severance of routes between settlements and increased journey times. Disruptions and deterioration of local roads due to use by construction traffic. | Use of local roads restricted to routes specified by the local authority. On-going maintenance of local roads during construction to standards agreed by the local authorities. |
| Land-use and Settlement - Operation | Local severance of routes between settlements and increased journey times. | Provision of local pedestrian and cattle crossings at intervals along the alternative alignments where residents and domesticated animals are known to cross, and the creation on new earth roads parallel to the alignment. |
| Water Quality - construction | Ground and surface water. | The CEMP should specify detailed measures to reduce the risk of groundwater contamination during construction. |
| Water Quality - operation | Accidental spillage of chemicals polluting local ground- and surface water. | <i>Pollution Incident Plan and Emergency response procedures</i> |
| | Run-off from routine operation affecting ground- and surface water. | <i>Oil Interceptors</i> |
| <i>Air Quality - construction</i> | Potential minor impact in the vicinity of the asphalt and cement plants. | Licences will have to be obtained from the relevant authority prior to operation. |
| | Dust nuisance during construction in vicinity of construction compounds, haul roads and the right of way | Water sprinklers and wheel washing. |
| Air Quality - Operation | No adverse air quality impact on beyond the 50m buffer is expected. | None required. |
| Noise and Vibration - Construction | Potential noise impact in the vicinity of the construction compounds, haul roads and right of way. | The CEMP will set out measures to reduce noise impacts during construction. Monitoring will also be carried out to ensure the levels remain below |

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| | | the Noise Standards for construction. |
| Noise and Vibration - Operation | Significant adverse noise impact on residential houses and small farms outside the 50m noise buffer. | Noise barriers should be provided at locations selected during the ESIA and EMP. |
| Natural Environment and Ecology - construction | Destruction or disturbance of nesting sites for protected species. | The CEMP specifies that the nest of protected species will not be disturbed during construction. The National Park will also monitor the construction works to ensure no disturbance occurs. Screening and timing of works. |
| Ecology - operation | Severance of fauna and amphibian populations | Fauna and amphibian passes and amphibian fencing to channel them near the entrance to the pass. |
| | Loss of protected plant species | Translocation of protected species will be employed, if necessary |
| Cultural Heritage – construction | Archaeological artefacts damaged through construction | Establish dedicated archaeological watching brief |
| Social – construction | Deterioration of local access routes due to use by construction traffic | The Contractor has negotiated agreements with the local town councils to use specified local roads and ensure they remain in a good condition |
| | Potential impact on physical health of construction workers | Occupational Health and Safety Management System: Occupational health and safety policy |
| | | Organizational framework, competence requirements, operating procedures, training programs, system documentation, communication OHS objectives (quantified) Hazard prevention - - Risk assessment - prevention and control measures: management of changes, emergency preparedness and response , procurement (tools, equipment, plants, services, contractors) - Performance monitoring and measurements - hazard prevention measures, work related |

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| | | injuries, ill health, diseases and incidents -Evaluation - feed back - corrective measures |
| | Under-18s employed on construction site | Age check on all construction workers, including sub-contractor employees Verify legal and tax status of sub-contractors |
| | 'Gang' labour | |
| | Local severance from market, mosque, other services | Reparation of local roads used by construction traffic. Reporting mechanisms for PAPs. |
| Social - operation | Local severance from market, mosque, other services | Overpasses will be constructed to allow access across the road |
| | Traffic safety | The game fencing will reduce the likelihood of people attempting to cross the project. Local crossings will also be provided. |
| | Loss of livelihood and other social and economic impacts experienced by affected households | Ensure expropriation procedures outlined in the RPF are followed. Grievance procedure observed |
| | Social and economic losses to elderly or other vulnerable households | Stakeholder analysis of affected households, on basis of demographic data to inform appropriate steps |
| | Inconvenience and disruption to local households | Reporting mechanism for affected communities and PAPs. |
| | Local severance from market, church, other services | Overpasses. Improvement of existing dirt roads |
| | Death or injury | Road safety campaign in local schools |
| Borrow Pits - construction | Potential unforeseen damage to environmental assets due to the use of illegal borrow pits. | Only licensed borrow pits will be used to source construction material. Furthermore, the PIU will have to monitor borrow pit locations and operations. |

6 ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT AND MITIGATION MEASURES

6.1 Introduction

The RER provides an overview of the Environmental and Social considerations that need to be taken into account throughout all stages of a project.

A detailed ESIA must be compiled for every project sub-section at the detailed design stage.

An ESIA will lead to a documented demonstration that environmental impacts and risks have been reduced to a level that is as low as is reasonably practicable (ALARP). It is also a demonstration of the client's commitment towards sustainable development. The ESIA requires a systematic process for analysing and proposing measures to address the positive and negative environmental consequences of a project. The ESIA includes the need for stakeholder engagement throughout the process, based on a well thought-out stakeholder identification and engagement plan like a Public Consultation and Disclosure Plan (PCDP). Other key themes in undertaking an ESIA include, *inter alia*, the collection of baseline data, scoping exercise, iterative interaction with project design, prediction and evaluation of the significance of effects and the clear setting out of commitments made during the EIA as well as monitoring, implementation, and audit programmes.

6.2 Project ESIA Scope

The ESIA for the Project will assess Project activities in terms of their impact on:

- Air quality
- Traffic studies
- Water quality
- Physical environment
- Ecology, nature conservation and protected areas
- Cultural heritage and archaeology
- Resources
- Land use and socio-economics
- Community well-being

The impacts emanating from the activities will likely include:

- Emissions – chemical, dust, air
- Discharges – sewage, dirty water
- Noise and vibration
- Water quality (surface and ground water), water use and management
- Resource use
- Waste production
- Traffic increase
- Visual impacts
- Socio-economic impact
- Resettlement
- Property and land acquisition

Resettlement, land and property acquisition, and compensation issues will be addressed in the Resettlement Action Plans (RAPs) in accordance with the RPF.

6.3 Project EMP Scope

The Outline Environmental Management Plan (EMP) will be presented to the Contractor for further development. The Contractor will take ownership of the EMP at contract award; develop content and ensure implementation throughout the project construction period.

The purpose of the EMP is to identify and set out the minimum requirements the Contractor and his sub-contractors, must take to control and mitigate for any environmental and social issues relating to road construction along the Baku to Shamakhi route. All the main Contractor's sub-contractors will abide by the procedures laid out in the EMP and supporting documentation. The EMP is a live document and will be reviewed and updated on a regular basis throughout construction such that it accurately reflects the realities of the project. It is a controlled document which will be distributed and maintained by the Contractor's Project Manager, who is responsible for making the EMP available to all personnel employed on the Project and incorporating amendments following approval by the ARS.

The Contractor shall develop project specific documentation relating to the management of environmental and social issues. Activity specific mitigation measures shall be included in the relevant Method Statement. Procedures can form separate documents or be discrete sections of the EMP; they shall include, but not be limited to:

- Sub Contractor Management
- Traffic Management
- Wildlife Protection
- Pollution Control and Mitigation
- Waste Minimisation and Management
- Emergency Response and Contingency
- Reinstatement and Aftercare – including Borrow Pits and Access roads
- Monitoring and Measuring
- Training and Awareness
- Incident Management and Reporting
- Audit and Inspection schedule
- Impact Register
- Sensitive Location Register
- Project specific KPIs
- Community Liaison
- Worker HSE Management
- Cultural Heritage and Archaeology Management
- Grievance Procedure

7 PUBLIC CONSULTATION

Given a degree of uncertainty on route selection, the timing of project implementation and thus the communities, which might be affected by the Project, consultation took the form of an initial round of discussions with local officials and relevant village representatives in February and March 2009.

The February - March 2009 consultations provided continuity to the public consultations held along the Baku – Shamakhi Road in August – September 2005. The purpose of the discussions was to:

- introduce and disseminate basic information about the project,
- promote discussion about the potential positive and negative impacts of the proposed project;
- to collect statistical and anecdotal information about the environment, social and economic characteristics of each of the concerned districts.

All comments were thoroughly recorded in order to bring them to the attention of decision-makers within the ARS, the World Bank and other organisations interested in the planning and implementation of the proposed road improvement programme.

The public consultations will continue throughout the project implementation, i.e. during the detailed design and environmental impact assessment preparation for the specific sections of the road, and throughout the construction activities. The relevant national, regional and local stakeholders will be invited to partake in the consultations.

8 RECOMMENDATIONS

The results of the RER indicate that Baku to Shamakhi road widening including the construction of the proposed by-passes and bridges will have potential adverse impacts entailing permanent land-take of agricultural land, resumption of residential and other properties and businesses, reduced access to agricultural land and services, impacts on natural environment as well as temporary construction phase nuisance.

However, improved infrastructure links may reduce traffic accidents within built-up areas and help stimulate economic development in the region. Whatever route is chosen for whatever section it should be designed to minimise land acquisition and resettlement requirements, and avoid any socio-cultural impacts on common property resources, e.g. graveyards, cultural monuments and water points, and to minimise impacts on the natural environment. In particular, some of the key findings of the RER are summarised in Table 9 below:

Table 9: Some key finding of the RER

| | Nature of Issue | Findings | Considerations |
|---|------------------------|--|--|
| A | DESIGN OPTIONS | Main design options proposed by Kocks Consult GmbH for the widening of the road between Baku and Shamakhi, are dependent on local topography and land use – with these factors | A right-of-way (ROW) of the existing two lane Baku – Shamakhi Road is 60 metres; i.e., 30 m on each side from the existing road centre-line. Generally, this provides enough room for road |

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| | | <p>underpinning the alternatives on different sections of the road. The options are:</p> <p>(i) Construction of the additional carriageway to one side, either the right hand side (RHS) or left hand side (LHS) of the existing carriageway with a total width of 27.5m;</p> <p>(ii) Widening of the existing carriageway on both sides, either by:</p> <p>(a) Widening at both sides with a reduced median and shoulder, total width 22.5m; or</p> <p>(b) Widening at both sides without median and reduced lane width and shoulder, total width 17.5m.</p> <p>(iii) Widening in sections with climbing lane, total width 20.5m.</p> | <p>widening for the four main design alternatives.</p> <p>However, at certain sections of the road, the ROW is significantly reduced. Therefore, the implementation of these alternatives will involve land acquisition as well as additional land acquisition to allow for embankments, the construction of interchanges, local connector roads, and possible bypasses and realignments.</p> |
| B | <p>DESIGN OPTIONS</p> | <p>In addition to the main design options, alternative alignments (AA) were proposed by the Kocks Consult GmbH and are as follows:</p> <p>AA1: Between km 26 and km 34</p> <p>This proposed realignment to the south of the existing route is approximately 13km in length and will cross an area of irregular topography which features a number of hills, ridges and deep gullies. The road will first run south through a flat plain for approximately 2km; then turn north-west and rise and up a hill to cross a succession of very deep gullies, before running alongside the hillside above the gully incisions. The</p> | <p>These routes were drafted onto existing topographical maps only and have not been the subject of field assessment and detailed investigations by the Engineering Consultant. Therefore, field assessment and detailed investigations need to be conducted at the detailed design stage</p> <p>It is not clear why such an extensive re-route was selected; it is approximately twice the distance of the existing route and the fairly wide hairpin bend in the existing road could be opened out within the proposed RoW. The AA would have significant environmental implications due to its larger footprint and will actually create geohazards by excessive excavation in this very friable clay soil. The construction</p> |

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| | | <p>route continues across a plateau with occasional broad, deep gullies before joining the existing road</p> <p>AA2: Between km 43 and km 46 This proposed realignment turns north from the road across flat terrain to cross a ridge (approx 30-40m high) which runs parallel to the road. The AA then takes a course for approximately 3km parallel to the existing road but the other side of the ridge; it then turns south-west to cross the ridge again to emerge behind the village of Jangi. The AA bisects the village to join the road to the south of the village.</p> <p>AA2x: Between Km 46 and Km 53 AA2 continues on the south side of the existing road, heading southwest. This route cuts across a hilly area of a very irregular terrain of steep slopes, ridges and gullies. (see Figure B – the route crosses the saddle in the background). Once the route has made a steep ascent to cross a high saddle on the ridge, it traverses a relatively high plateau. However, to join the road at km 53 there are two very deep, broad gullies to cross.</p> <p>AA3: Between km 59 and km 61 This realignment proposes to provide a slightly straighter route joining km 59 to 61. It will provide a straight line running parallel to the existing route on its northern</p> | <p>implications are significant as many gullies will have to be traversed and benching techniques will have to be implemented as the route traverses the cross steep slope of the hillside. This AA is not recommended.</p> <p>As the existing road on this stretch is straight, more or less level and with plenty of level ground on each side, it is not clear why an alternative was deemed necessary. The AA is longer, would require technical challenges to cut through a ridge; would potentially create erosion and land stability problems and would pose social issues (resettlement) as it bisects the village of Jangi (at present the village is intact and lies just to the north of the existing road). This AA is not recommended.</p> <p>It is clear why an AA was considered for this stretch of road: to achieve the elevation the road takes two steep hairpin bends which pose a significant safety hazard for fast traffic. Nevertheless, the selected AA poses potentially extreme environmental, geohazard and construction concerns and is significantly longer. Furthermore, the elevation is achieved over a short distance, the engineering feasibility of which would require rigorous analysis. This route is not recommended.</p> <p>The AA is only a slight modification of the existing route but will have a larger footprint as it will require the construction of four new lanes rather than the addition of two to the existing road. In addition assuming that the existing road will not be reinstated, the overall footprint</p> |
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| | | <p>side. This section of the road and suggested re-alignment are located on an expanse of flat land.</p> <p>AA4: Between km 79 and km 86 This proposed re-alignment provides a straight route between km 79 (i.e. on the edge of the village of Narimankand) and km 85. It cuts across a flat expanse of sown cropland.</p> | <p>will be the cumulation of the four new lanes as well as the existing two. The widening of the existing route is recommended as the preferred option.</p> <p>The AA will increase the distance between the road and the village of Maraza and will, therefore, avoid the need for relocation and compensation of existing businesses. It will also minimise noise and air quality impacts on Maraza. In addition the AA will allow for the preservation of the existing mature trees alongside the existing road. The AA is therefore the recommended alternative.</p> |
| C | ENVIRONMENTAL | <p>According to the Presidential Decree of 15 August 2007 "Creation of Nature Reserve for Groups of Mud-volcanoes of Baku and Absheron Peninsula", there are a number of nationally protected areas along the study corridor.</p> | <p>These are strictly protected areas and no construction or agricultural activity is allowed within these areas. The detailed design should ensure that the protected areas are intact by the proposed road widening. It should be ensured that borrows pit sites and access roads to borrow pit sites are not in vicinity to these protected areas. No stockpiling of material will be allowed in the protected areas.</p> |
| D | ENVIRONMENTAL | <p>There are two sites of international conservation importance in the wider surroundings of the study corridor. These are 'Important Bird Areas' and are located around Gargabazar and Gushgaya mountains some 8-10 km directly south of Jangi village.</p> | <p>As these sites are 8 -10 km away from the study area, it is not envisaged that the construction activities will cause any particular disturbance to the IBAs. However, it should be assured that no borrow pits are placed in vicinity to these sites as no access roads should be allowed either.</p> |
| E | ENVIRONMENTAL | <p>The Lesser Kestrel (<i>Falco naumanni</i>^b) – an internationally protected species and a Vulnerable Species under the 2008 IUCN Red List Category - is a common breeding bird in the study area. Small breeding colonies and even separate pairs usually nest on the piers</p> | <p>The bridges No 2 and 3 should remain intact during the nesting season. No dismantle works can be performed without the prior field investigations and approval by the appropriate national specialists (see recommendations for RER Finding F).</p> |

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| | | under Bridges No. 2 and.3 and also under the roofs of abandoned houses and cowsheds. The biggest concentration of this species had been noted in the vicinity of the River and village of Jeyrankechmez. | The nesting season lasts 4 months from April to July. However, due to an earlier start of warm season, the nesting season can shift slightly. |
| F | ENVIRONMENTAL | The study area harbours a number of faunal species, including threatened species of national and international importance. | The most effective mitigation measure for the protection of wildlife is to have a permanent on-site specialist for the duration of the construction phase of the project. |
| G | ENVIRONMENTAL | Within the Gobustan Rayon there are sections along the study road which are protected by the State Forest Fund . | The following procedures have be abide prior to the start of the construction works: <ul style="list-style-type: none"> • Preparation of a document detailing the potential damage to the SFF land in order to apply for permission to the central office of the Ministry of Ecology and Natural Resources. • The MENR sets up a commission that includes representatives of both the MENR's central office and the local SFF. This commission studies the situation and prepares detailed documentation on its assessment, land acquisition issues and compensation mechanisms. • The document must be approved by the head of local Executive Power • The document must obtain final approval from the Cabinet of Ministers of the Azerbaijan Republic. |
| H | ENVIRONMENTAL | Mammals: <i>Barbastella barbastella</i> , ^B categorised as a Vulnerable Species under the 2008 IUCN Red List Category, and <i>Rhinolophus blasii</i> ^P a Near Threatened Species under the 2008 IUCN Red List Category, can | These animals may have shelters in surrounding structures during daytime. This will have to be confirmed by the site specific EIAs, which will detail relevant mitigation measures, if necessary. |

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| | | be found in the study area throughout the year, except summer. The latter is found only in vicinity of Shamakhi in the forests in subterranean shelter. | Furthermore, no dismantle works of structures can be performed without the prior field investigations and approval by the appropriate national specialists. See recommendations for the RER Finding F |
| H | ENVIRONMENTAL | The reptile fauna of the area includes that protected the Greek Tortoise (<i>Testudo graeca</i> , ^C) and the European Pond Turtle (<i>Emys Orbicularis</i> ^B) | The species of most concern is the Greek Tortoise; in summer this animal could stray onto the site, in winter they could be hibernating in undisturbed soil. See recommendations for the RER Finding F. In winter the wildlife officer will check all earth moving activities. All found tortoises will be moved to a safe location. |
| I | ENVIRONMENTAL | Mammal, amphibian and reptile fauna | Underpasses to be designed for wildlife. The locations of underpasses to be confirmed at the detailed design stage by appropriate national specialists. |
| J | ENVIRONMENTAL | Baseline Data | Baseline data on noise, air quality and water quality for the study area is scarce. The site specific EIAs should provide this data, if required. Adequate traffic forecasts are needed for assessment of air quality, noise and vibration impacts. |
| K | ENVIRONMENTAL | There are several landside prone areas along the study road | The comprehensive landslide hazard studies, including geotechnical investigations, and the landslide hazard risk assessments for the road need to be undertaken and appropriate mitigation measures – temporary and permanent need to be recommended |
| L | SOCIO - ECONOMIC | Property assets commonly found adjacent to or in close vicinity of the study route include several houses, farms, shops, cafes, butchers and restaurants. In addition, the study corridor also includes schools (Sabir and Gobustan), cultural monuments and sacred places (including one mosque in Gobustan and one sacred place in Sabir), and graveyards | The design should ensure that land acquisition and resettlement requirements are minimised, and any socio-cultural impacts on common property resources are avoided. |

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| M | SOCIO-ECONOMIC | Drainage facilities along the road should be provided | The detailed design should ensure property drainage capacity along an entire road route. |
| N | SOCIO-ECONOMIC | Extensive domestic animal husbandry in the study area | Underpasses to be designed for domestic animals. The locations of underpasses to be confirmed at the detailed design stage through consultations with the stakeholders comprising the farmers, villages' authorities, relevant municipalities and relevant rayon executive powers. |

Based on the findings comprising the Regional Environmental Review, the following recommendations are provided:

1. We recommend the completion of Environmental and Social Impact Assessments (ESIAs) for the sub-projects in order to collect, assess and use information and data about environmental and social impacts to inform decision-making.
2. In order to reduce any environmental risks, we recommend that the following issues are addressed prior to commencement of construction works:

| ENVIRONMENTAL ASPECT | ISSUE | RESPONSIBILITY | AUTHORITY |
|-----------------------------|--|---|--|
| Permits and Licences | | | |
| Environmental Permit | Need to be obtained before construction | Contractor on behalf of the Client, i.e. ARS of the MoT | National Environmental Inspectorate (MENR) |
| Water Permits | Need to be obtained before construction | Contractor on behalf of the Client, i.e. ARS of the MoT | Relevant Water Administration, including AzerSuu |
| Borrow Pit Licences | In order to avoid any delay to the time schedule, ensure licences have been obtained. Applications may take a long time. | The owners of the borrow pits have to apply for permits. This is overseen by the Contractor on behalf of the Client | Relevant Inspectorate in Azerbaijan |
| Archaeology | Ensure all certificates are in place prior to works in order to avoid causing a delay to the schedule | Relevant authority in Azerbaijan | Relevant authority in Azerbaijan |

| ENVIRONMENTAL ASPECT | ISSUE | RESPONSIBILITY | AUTHORITY |
|--|--|---|--|
| Final Detailed Design of Environmental Protection Facilities | Environmental Permit Required. All relevant authorities to grant consent | Contractor on behalf of the Client, i.e. ARS of the MoT | National Environmental Inspectorate (MENR) |
| EIA Procedures for sub- projects | | | |
| Surface Water | Ensure adequate assessment of impacts is provided and adequate treatment of impacts is provided in design. In so doing, objection by Sanitary and Epidemiology Service and the MENR and potential litigation is avoided. | Environmental and social consultancy firm (to be appointed) | National Environmental Inspectorate (MENR) |
| Groundwater | Ensure adequate assessment of impacts is provided and adequate treatment of impacts is provided in design. In so doing, objection by MENR and potential litigation is avoided. | Environmental and social consultancy firm (to be appointed) | National Environmental Inspectorate (MENR) |
| Ecology | Ensure adequate assessment of impacts is provided and adequate treatment of impacts is provided in design. In so doing, objection by MENR and potential litigation is avoided. | Environmental and social consultancy firm (to be appointed) | National Environmental Inspectorate (MENR) |
| Noise | Ensure traffic studies are up-to-date and that background data is provided. In so doing, compliance with EIA procedures is ensured. | Environmental and social consultancy firm (to be appointed) | National Environmental Inspectorate (MENR) |

| ENVIRONMENTAL ASPECT | ISSUE | RESPONSIBILITY | AUTHORITY |
|--|---|---|---|
| Air Quality | Ensure traffic studies are up-to-date and that background data is provided. In so doing, compliance with EIA procedures is ensured. | Environmental and social consultancy firm (to be appointed) | National Environmental Inspectorate (MENR) |
| Construction Environmental Management Plan | Ensure CEMP is in place prior to construction works. Compliance is mandatory to ensure satisfaction of national and international standards of best practice. | Contractor on behalf of the Client, i.e. ARS of the MoT | National Environmental Inspectorate (MENR) |
| Monitoring Plan | Ensure the Monitoring Plan is in place prior to works. Compliance is mandatory to ensure adherence to national and international standards of best practice. | Environmental and social consultancy firm (to be appointed) | National Environmental Inspectorate (MENR) |
| Management Plan | Ensure costs are correct and up-to-date. | Environmental and social consultancy firm (to be appointed) | ARS |
| Emergency Response Procedures | Ensure procedures are adequate and complied with to obtain environmental permit. | ARS | National Environmental Inspectorate (MENR) and Ministry of Emergency Situations |
| Road Maintenance | Ensure procedures are adequate and complied with to obtain environmental permit. | ARS | National Environmental Inspectorate (MENR) |

3. Adequate traffic forecasts are needed for assessment of air quality, noise and vibration impacts.
4. Comprehensive accident data should be made available in order to identify specific accident data cluster sites and other accident factors, such as accident areas, driver age and time of accident. This will contribute towards effective decision-making on the preferred alternative alignments comprising the widening of the road.

5. A Pollution Incident Plan and Emergency Response Plan should be prepared at the Detailed Design Stage to deal with emergency response situations in the events of accident spillages on the road.
6. In order to ensure that mitigation measures are incorporated within construction and operational phases of the project, the ESIs shall outline the Construction Environmental Management Plans (CEMP) and Operational Environmental Management Plans (OEMP).
7. The potential for impacts should be reduced by adoption of the following measures in the CEMP:
 - Water quality:
 - Areas of bare soil should be kept to a minimum;
 - In order to prevent water pollution resulting from worker-generated sewage effluents, portable toilets should be provided or alternatively existing toilet facilities located on the site would be identified for construction worker use;
 - Where water would need to be removed from excavations, it should be transferred the minimum practical distance to discharge;
 - Storage compounds for the storage of construction materials or temporary stockpiling of excavated soils should be located away from surface watercourses and drains;
 - Drums and barrel should be stored in a designated bunded safe area within the site compound;
 - All drums and barrels should be fitted with flow control taps;
 - All drums and barrels should be properly labelled;
 - The placing of any wet concrete in or close to any watercourse should be controlled to minimise the risk of leakage of wet cement into the watercourse;
 - The washing of any concrete mixing plant or ready mix lorries should be carried out so as to prevent effluent from cleaning from being allowed to flow into any watercourse or drain;
 - Haul roads on the site and the approaches to the watercourse should be regularly cleaned to prevent the build-up of mud;
 - Before any discharge of water is made from the site, adequate provisions should be made to ensure that it is not

polluting (for example by incorporating silt settlement techniques). The techniques to be employed should be suitable for the particular site. Techniques may include settlement lagoons, use of straw bales for silt trapping and use of flocculants;

- All pumped drainage from the construction works including areas used for temporary storage of construction materials or excavated soils, should be passed through silt settlement treatment prior to discharge to surface watercourses or drains. Silt settlement treatments may, for example, include straw bales, grassland soak away, silt settlement lagoons;
- All roads and hard-standing should be kept clean and tidy to prevent the build-up of oil and dirt that may be washed into a watercourse or drain during heavy rainfall;
- Where appropriate, watercourses should be bunded to prevent contamination from surface water runoff;
- The use of water sprays to reduce dust or to wash down construction areas should be carefully regulated to avoid washing substantial quantities of silt into surface water drains. Where large quantities of gravel, mud or other such material require clearing, the area should be swept clean prior to any subsequent hosing down;
- Manholes and catchpits should be covered to prevent concrete/cement ingress;
- Concreting at watercourse culvert sites should be closely supervised to prevent concrete contamination of the watercourses;
- The washing of any concrete mixing plant or ready mix lorries should be carried out so as to prevent effluent from cleaning from being allowed to flow into any watercourse or drain;
- Storage compounds for fuels, oils or other liquid chemicals should be sited away from surface water drains. They should have an impermeable base and bund with a capacity of 110%, and should not drain directly into the surface water drains. Where practicable, drainage from storage compounds should be passed through oil interceptors prior to discharge;
- Small plants, such as pumps, should be equipped with drip trays;

- Emergency response procedures should be included to handle any leakages or spillages of potentially contaminating substances;
 - Spill kits should be located on sites near to watercourses and within the works compounds;
 - Staff should be trained in the use of spill kits;
 - Groundwater should be pumped from excavations into lagoons/settlement tanks to enable sediment to drop out and, if necessary, aided by addition of flocculants;
 - Subsoil should be exposed for a minimum length of time after topsoil strip. Cut-off trenches, where necessary, should be excavated to prevent massive surface water run-off into watercourses. Cut-off trenches should discharge into sediment lagoons; and
 - Topsoil/vegetation along watercourses should be retained to aid attenuation and sediment infiltration.
- Landscape:
 - Particularly intrusive measures should be sited away from any sensitive areas, such as the mud volcanoes, Important Bird Areas and residential properties. Hoarding and other screens should be erected between sensitive receptors and construction sites;
 - The remediation of areas affected by construction sites and activities should be carried out as early as possible;
 - Where possible, existing trees and vegetation groups should be retained and protected; and
 - The relevant authorities should be asked to approve the species used in any of the proposed planting.
- Noise and Vibration:
 - At night, construction vehicles will be required to operate at 15 mph and the use of horns will be banned;
 - The operation of noisy equipment will be prohibited from 22:00 hours – 06.00 hours each day;
 - Transportation of construction materials on the exiting roads will be carefully scheduled to avoid any disturbance to the local traffic;

- Noisy elements, such as compressors, haul roads, should be located in less sensitive areas making use of any existing natural or artificial features that can shield the construction noise;
 - The noise emission of construction equipment should be reduced through the use of mufflers and continued good maintenance on all equipment; and
 - A complaint mechanism should be established for the duration of the project.
- Natural Environment and Ecology:
 - The Greek Turquoise and European Pond Turtle and other protected fauna will be removed and excluded from working areas;
 - The relevant authorities, like the MENR, will be allowed on site during construction to survey protected fauna, including avifauna;
 - The relevant authorities, like the MENR, should be invited to attend any relevant health and safety training for site workers;
 - Measures identified by the relevant authorities, like the MENR, to reduce impacts on protected fauna, such as the Lesser Kestrel, during construction should be carried out;
 - Where construction compounds or working areas are in close proximity to sensitive bird habitats, hoarding of a minimum of 1.8m in height should be used to screen working areas;
 - The disturbance of the protected floral, faunal and avifaunal species during construction should be minimised through screening of working areas and/or seasonal timing of works;
 - Construction should be confined to designated areas to minimise temporary land-take;
 - Where protected plant species occur adjacent to the construction compounds or working areas, these areas should be clearly marked to avoid disturbance by machinery associated with construction;
 - Where cattle, sheep, goats and water buffaloes cross roads, these areas will be clearly marked and measures

will be taken to reduce impacts and disturbance to these domestic animals; and

- Measures should be taken to ensure that there is no pollution of sensitive areas during construction (see Water Quality).
- Archaeology
 - The relevant authorities should have permission to access the working areas to undertake a watching brief, providing the report to the site supervisor on arrival and follow the appropriate health and safety procedures;
 - The relevant authorities should be invited to attend any relevant health and safety training for site workers; and
 - The arrangement with the relevant authorities for the watching brief, and actions to be taken in the event of an archaeological find should be formalised through contractual agreements.

8. An option assessment is required to support the alternative route selection process from a spatial planning, geotechnical, environmental, social, safety, economic and construction deliverability perspective, and to identify a preferred option from the various route options developed to date.

9. International practice should be applied for Health and Safety Management for the construction activities, and should be addressed separately by the Contractors.

10. The social impact assessment (SIA) comprising the ESIA should provide key baseline socio-economic data, including demographic, income, employment, health data as well as more qualitative data such as indicators of community cohesion, feelings of security, lifestyle. The identification of such baseline data is essential to enable comparisons over time, in order to monitor actual socio-economic impacts. Data has to be collected on current connectivity, such as local connectivity for small farms. Without such baseline data, it will be difficult to prove or disprove claims of harmful impacts by Project Affected Persons (PAPs). The SIA must give attention to predicted changes of behaviour of the PAPs, particularly of small farm communities affected by expropriation, severance of land and impacts on connections to local markets and for communities. The SIA must include a critical analysis of possible contradictions between masterplans and impacts of the planned motorway construction. The SIA must identify vulnerable groups and analyse the significance of relevant effects for these groups respectively. For example, this should include an assessment of air and noise pollution impacts on particularly vulnerable groups, such as young children. The SIA should provide a description and analysis of the social structure of affected communities, including local norms and values, social activities – for rural and for urban communities

separately. The SIA should also predict increases in certain types of employment opportunities for some communities and should provide an analysis of the project's impact on existing employment opportunities, including agricultural opportunities. The SIA should include predictions of changing coping strategies of affected communities, particularly for small farm networks. The SIA should therefore provide an indication of who is likely to benefit and who is likely to suffer, in terms of affected communities and other stakeholders. A stakeholder analysis of winners and losers is recommended in order to ensure that appropriate mitigation measures are targeted at relevant groups. The SIA must include evidence of public consultation via direct and indirect means during the different stages of the ESIA process. The public consultation process should include direct engagement with community members in addition to engagement with elected representatives or officials. This should be planned in the monitoring of indicators of social impact.

11. We recommend the preparation of the Public Consultation and Disclosure Plan (PCDP) to describe the Project Affected Persons (PAPs) and public who may be affected by the Project and sub-projects.
12. Resettlement Action Plans (RAPs) will have to be prepared if resettlement is required and unavoidable. The RAPs will be prepared in accordance with the laws and regulations on land acquisition and resettlement in Azerbaijan as well as the Resettlement Policy Framework (RPF) which was prepared as part of the Project in line with the Involuntary Resettlement Policy (OP 4.12) of the World Bank.
13. We recommend the preparation of a monitoring plan. This plan will include the following:
 - Water Quality:
 - Surface Water and groundwater quality measurement should be taken in all the watercourses crossed by the project, including alternative alignments, prior to the commencement of construction to enable comparison with later monitoring results. This will allow the identification of whether any changes in water quality are attributed to the construction of the project.
 - Air quality:
 - Whilst levels of oxides of nitrogen might become more significant at phase one sites as traffic volumes increase, it is unlikely that levels of lead or carbon monoxide will rise sufficiently to place limit values at risk. It is therefore recommended that monitoring of carbon monoxide and lead is excluded from the monitoring programme and resources reassigned to enable additional dust monitoring at sensitive receptors close to the perimeter of the project and alternative alignments.

- A number of small farms, schools and houses are located very close to the perimeter to the new alignments. It is recommended that the dust monitoring is extended to include these receptors during construction and during the first couple of years of operation.
- In regard to construction compounds that will include concrete mixer and asphalt mixer sites, the impact of fugitive dust emissions should be minimised in the first instance by maximising the distance between the sources and the nearest receptors. In so far as monitoring is concerned, the use of a deposition gauge as proposed at other sites would be an acceptable minimum.
- Noise and Vibration:
 - Care must be taken to ensure a selection of the closest receptors to the alternative alignments and along the existing roads where a benefit is expected are included. Noise monitoring should also be carried out at the nearest properties to the project, alternative alignments and construction compounds.
- Landscape:
 - Visual inspection of the works areas should be undertaken on a weekly basis to ensure there are no large areas of base soil.
- Natural Environment and Ecology:
 - Monitoring locations for fauna and flora should be identified and should encompass all of the most sensitive areas along the route (e.g. locally designated sites, avifauna nesting sites). Monitoring should be continual. Further detail on the frequency on monitoring visits and the duration for which monitoring will continue after construction should be provided.
- Social and Socio-economic:

| Impacts | Monitoring | Responsibilities | Time frame |
|---|--|-------------------------|---|
| Potential impact on physical health of construction workers | Occupational Health and Safety Management System monitoring of hazard prevention measures, work related injuries, ill health, diseases and incidents | Contractor | Pre-construction to end of construction |
| Under-18s employed on construction site | Monitor age of employees, including sub contractor employees | Main contractor | From start of construction to end |

| | | | |
|---|--|--|---|
| Forced 'Gang' labour | Monitor contracts of employees, legal and tax status of sub-contractors | Main contractor | Duration of construction activity |
| Loss of livelihood and other social and economic impacts experienced by affected households | Monitor income of expropriated households and households within 60m proximity of route | Relevant Ministry in Azerbaijan (e.g. the Ministry of Transport) | Pre-construction make available existing data Gather on annual basis |
| Social and economic losses to elderly or other vulnerable households | Monitor income and reported hardships of households with elderly members and children | Ministry of Transport in Azerbaijan and relevant local administrative office | Pre-construction make available existing demographic data Survey on annual basis |
| Inconvenience and disruption to local households | Monitor complaints received by affected households | Relevant local administrative office | Duration of construction |
| Local severance from market, church, other services | Interview of households identified as affected by severance | Main contractor | Agricultural harvest time |
| Traffic accidents | Record of accidents | Ministry of Transport in Azerbaijan | Annual check |
| Employment opportunities | Survey of employment of working age members of affected households | Ministry of Transport in Azerbaijan | Pre-construction – make available existing employment data Survey on annual basis |
| Involuntary resettlement | Ex-post evaluation | Ministry of Transport in Azerbaijan | Pre-construction: make available data on expropriation proceedings followed Post-construction: evaluation of social and economic impacts |