SFG1511 V2

**AZERBAIJAN REPUBLIC**

**MINISTRY OF TRANSPORT**

**"AZERROADSERVICE" OPEN JOINT STOCK COMPANY**

# AZERBAIJAN MOTORWAY IMPROVEMENT AND DEVELOPMENT

## Baku – Shamakhi Road Widening

## Supplemental ENVIRONMENTAL ASSESSMENT (EA) REPORT FOR BAKU-SHAMAKHI (KM 15-45)

**August 2015**

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# Abbreviations

| | | |
|---|---|---|
| ARS | | Azer Road Service |
| CSC | - | Construction Supervision Consultant |
| EA | - | Environmental Assessment |
| EA&MF | - | Environmental Assessment And Management Framework |
| EIA | - | Environmental Impact Assessment |
| EHS | - | Environment, Health and Safety |
| EMP | - | Environmental Management Plan |
| EP | - | Environmental Protection |
| ESS | - | Ecology and Safety Sector |
| HIV/AIDS | - | Human Immuno-Deficiency Virus/Acquired Immune Deficiency Syndrome |
| IBA | - | Important Bird Areas |
| IBRD | - | International Bank for Reconstruction and Development |
| IUCN | - | International Union For Conservation of Nature And Natural Resources |
| LACMA | - | Law on Administrative Control on Municipality Activity |
| MAC | - | Maximum Allowable Concentrations |
| MDG | - | Millennium Development Goal |
| MENR | - | Ministry of Ecology and Natural Resources |
| MOH | - | Ministry of Health |
| MOT | - | Ministry of Transport |
| NGO | - | Non-Government Organization |
| OP | - | Operational Policy |
| PIU | - | Project Implementation Unit |
| RER | - | Regional Environmental Review |
| ROW | - | Right-of- Way |
| RPF | - | Resettlement Policy Framework |
| ARS | - | Road Transport Service Department |
| SFF | - | State Forest Fund |
| STD | - | Sexually Transmitted Disease |
| UNDP | - | United Nations Development Programme |
| WB | - | World Bank |

# Units of Measurement

| | | |
|---|---|---|
| °C | - | degree Celsius |
| km | - | kilometer |
| km/h | - | km per hour |
| $km^2$ | - | square kilometer |
| m | - | meter |
| $m^3$ | - | cubic meter |
| mm | - | millimeter |

# EXECUTIVE SUMMARY AND CONCLUSION

## Introduction / Project Scope

The Baku-Shamakhi Road (Km 15-45) is to be reconstructed into a four-lane highway following a New Project Design which was different from the design when the Scott-Wilson EA Report was drafted. For this reason a Supplemental Environmental Assessment (EA) Report has been drafted to capture the change in scope. This project will be funded by WB-IBRD and to be implemented by Azer Road Service (ARS) under the Ministry of Transport.

The objective of this supplemental Environmental Assessment (EA) is to present and assess the impacts of the New Project Design (primarily the change in the structural pavement design in 8km spots/sections) which entails reworking on old pavement structure and importing some new materials from previously identified quarries and borrow areas. The preparation of the Supplemental Environmental Assessment (EA) for Baku-Shamakhi Road Km 15-45 takes full cognizance of the Scott-Wilson EA Report as the reference document.

## Description of the Project

The project road of 30km will be supportive of the objectives of the entire Baku-Shamakhi road which are as follow:

- Reduce road transport costs for road users
- Improve access and transit throughout the entire road
- Enhance safety within Azerbaijan's east-west corridor, through the implementation of a number of subprojects
- Better road quality and better safety through new alignments
- Lower travel costs and a shorter travel time.

In addition, as mentioned in the Scott-Wilson EA Report, the other recognized objectives are as follows

- to propel economic growth as a result of returns on investments through the marked growth of the traffic on the subject roads;
- to improve road technical specifications for increase in speed and consequently reduce travel time;
- To improved east-west connections to foster economic integration and growth within the country, in particular non-oil growth, leading to a degree of economic diversification

The four-laning of the entire Baku-Shamakhi road is expected to result to economic growth for Azerbaijan is as a consequence of higher returns on investments through the marked growth of the traffic, increase in speed, and subsequent decrease in travel time with the better road infrastructure. In general, the enhanced east-west connections will foster economic integration and growth within the country, particularly the non-oil growth, leading to a degree of economic diversification.

From the existing two-lane Category II road, the segment km 15-45 of the Baku-Shamakhi highway shall be reconstructed into four-lane and will entail the following options:

(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;
(ii) Widening of the existing carriageway on both sides, either by:
    (a) Widening at both sides with a reduced median and shoulder, total width 22.5m; or

(b) Widening at both sides without median and reduced lane width and shoulder, total width 17.5m.

(iii) Widening in sections with climbing lane, total width 20.5m.

The changes in the original scope includes: (i) improvement of U-turn layouts; (ii) relocation of various utilities; and (iii) Strengthening of additional sections of the existing carriageway, totaling about 8 km. The new lanes in the 8km spots/sections will conform to the new design, which will have relatively thicker Wearing Course by 3 cm (from 5cm to 8 cm), while maintaining the same thickness of Binder Course (9cm), and Bituminous Base Course (10cm). The Granular Base Course will be thicker by 10cm (from 5cm to 8 cm), while the Capping Layer will be thinner by 9cm (from 35cm to 24cm)..

Generally, the construction will be within the designated ROW. Indirect impact can extend even beyond the 60 ROW mainly due to social environmental characteristics of the project area. This has been considered in the Scott-Wilson EA Report.

**Supplementary Environmental Impacts and Mitigation Measures**

In the previous Scott-Wilson EA Report for the four-laning of the road segment, anticipated direct and/or indirect impacts were already sufficiently tackled and adequately addressed in the Outline Monitoring Plan. In this Supplemental EA, the change of scope due to the revision in the pavement design is the only one item being considered. Primarily reconstruction work is only done on the existing pavement and firsthand work is to be done on the additional two lanes as part of the four-laning.

Impacts considered are those associated with scarifying and milling of the existing asphalt layers to be while the subs-structures should be reworked to conform to the new designs. The new two-lanes will conform to the new design.

In the four-laning work, the impacts will be expected along the road corridor as well as the material sources and processing plants. Hence, this Supplemental EA will be mainly be on impacts and mitigation measures in connection with reworking of the existing two lanes and construction of two additional lanes.

**Supplemental Environmental Management during Construction**

The Supplemental Environmental Management Plan (EMP) identifies the mitigation measures, monitoring activities and institutional arrangements to be implemented to prevent, eliminate, or reduce to acceptable levels any adverse environmental and social impacts of the road rehabilitation project. The Scott-Wilson EA Report is considered still relevant and applicable with the four-laning project works and may be used in the environmental management and monitoring works during the construction. In this supplemental EA, a number of additional provisions are being included to improve the management and monitoring aspects of the four-laning construction activities to take into account the change in scope.

**Capacity Building**

The staff training for ESS/district ARS is recommended as part of the construction supervision contract by an international environmental specialist focusing on capability on the proper enforcement of the EMP. A typical ESS/ARS staff training will consist of lecture-type presentation of the general procedure and requirements for effective environmental monitoring followed by more detailed on-the-job and hands-on training at the construction site where the trainees will participate in the activities of the international environmental specialist/construction supervision staff in reviewing the Contractor's reports, periodic monitoring inspections,

deliberation of environmental issues involving the Contractor and the project stakeholders, and finally the accomplishment of environmental reports.

**Public Consultation Summary and Information Disclosure**

In conformance with the Operational Policy (OP)/Bank Procedure (BP) 4.01: Environmental Assessment of the WB-IBRD, In conformity with the Operational Policy (OP)/Bank Procedure (BP) 4.01: Environmental Assessment of the WB-IBRD, public consultation for the Four-laning of the Baku-Shamakhi km 15-45 Section [*additional works for rehabilitation and strengthening of the existing road lanes and relocation of utility and communication lines not envisaged by the original road design]* was scheduled on 23 October 2015 at 3:00 pm at Ashagi Guzdek Settlement Municipal Office, part of Absharon Rayon. The PIU-ARS coordinated the holding of public consultation with the Local Executive Power of Absharon Rayon, wherein local residents, village officials/representatives, local NGOs, and other stakeholders were invited. This was attended by around of 20 participants and in which the Environmental Consultant elaborated the rehabilitation works, project's environmental, social impacts, and land issues along with WB and GoA policies in minimizing and mitigating projected impacts. Comments were later solicited from the participants in an open forum and both by means of written documentation filled out by the participants themselves. Minutes of the Meeting have been separately documented and attached to the Report.

**Conclusions**

This Supplemental EA contains additional provisions in the mitigation and monitoring aspects to be performed during the implementation of the project in conformance with the change of scope (New Project Design). These shall be in addition to what were presented in the Scott-Wilson EA Report documents drafted for the project. These additional provision aims at improving the environmental management and monitoring aspect of the works.

# 1. INTRODUCTION

## 1.1 Project Background and Previous Studies

The project being considered in this is referred to as the Baku-Shamakhi Road (Km 15-45). This project involves the upgrading of a road segment from two-lane Category II to a four-lane Category I Highway which starts at km 15+000 to km 44+600 as the actual chainage. This road segment is part of the upgrading of the entire Baku-Shamakhi Road (M4) starting from km 10 and km 91. Funding for this project is being provided as a load from WB-IBRD and to be implemented by Azer Road Service (ARS) under the Ministry of Transport.

The existing road segment has been rehabilitated into a Category II road as per the Former Soviet Union Standard (SNIP) 2.05.02-85. The construction works produced a road with a two lane carriageway with a paved width of 9.00 m and an unpaved shoulder width of 2 x 3.00 m.

The Baku-Shamakhi road is the shortest way from Baku to Georgia and to western Azerbaijan. The four-laning construction for the Baku-Shamakhi Road has been subdivided into several road segments with their respective EIAs. Previously, an Environmental Assessment Report (EAR) for the four-laning was drafted for km15-45[1] by Scott-Wilsion, referred herewith as SW-EAR. However, certain changes were adopted in the pavement structure n around 8 km plus improvement in some of the U-turn layouts. The four-laning of the section-alignment from km15-45 remained the same aside from these said modifications. This modification is not considered major departure from the former scope as the reconstruction is confined within the defined four-lane strip. Because of this reason, a new EA is not necessary, and a Supplemental EA Report is being drafted to capture the difference of scope, with the perceived impacts and required mitigation measures.

The previous environmental documents for this road segment are as follows:

- Scott Wilson. Azerbaijan Motorway Improvement and Development Baku – Shamakhi Road Widening: Km 15 to Km 45. Environmental Assessment Report, May 2009
- Kocks Consult GmbH Baku – Shamakhi Road Rehabilitation, Environmental Assessment Final, April 2006
- Scott Wilson Ltd - Regional Environmental Review, April 2009

to a four-lane highway between km 15 and km 45.

## 1.2 Brief Description of the Study Area

The Baku-Shamakhi highway is a segment of the Magistral Road, M4 (Baku to Yevlakh). The segment being considered starts at chainage km 15+000 and ends at km km 44+600. The entire starting point of this approximate 29.6 km road segment at km 15 which located west of the trumpet interchange after Mushfiq (part of Garadah Rayon) and Ashagi-Guzdak (part of Abasheron Rayon); through Pirakeshkul (Military Camp) and ends at approximately 1.5 km east of Dzhangi, part of Gobustan Rayon. This particular road segment is linked with km 13.5-15 and km 45-91. Currently, some works were already done, however temporarily stopped due to some issues with the Contractor.

In the S-W EA Report, the road has been described as going through areas of arid, denuded, rolling foothills with deep, water incised gullies, climbing gently towards the Caucasus. The landscape is also characterized as highly eroded, with soils that are friable, alkaline with high

[1]Nov.2013. IRD. Azerbaijan Highway Project II-Additional Financing. IBRD Loan No. 7516 AZ. Upgrading of Baku-Shamakhi Road Section of Baku-Shamakhi-Yevlakh Road, preparation of Environmental Assessment and Environmental Management Plan

clay content. This area is known to be used as winter grazing grounds for sheep, cattle and goats, and donkeys, which reduces the opportunity for shrub development

Along the study corridor, there is only one watercourse that is found – Sumgayitchay River, which flows about two kilometers to the north parallel with the road approximately from km 20 up to km 45; however in some sections (e.g. at km 22 and km 28) the loops of the river come nearer to the road side up to 500 m.

The area between 15km-45km on the Baku-Shamakhi highway crosses dry steppe/semi-desert, in which the flora is mainly characterized by Saltwort (*Salsola dendroides)* and Wormwood (*Artemisia hanseniania*) plant species. The road construction is restricted to 60m (30m either side of the existing road centre point) of the ROW and it is not envisaged that there will be a significant, long term impact on roadside vegetation. During the drafting of the S-W EA Report, there are no known sites of cultural or archaeological importance near the entire stretch of road.

The only Nationally Designated protected area in the immediate highway environs is the Mud Volcano Areas found at km 30.5 and km 31. The closest mud-volcano to the study corridor is Pirikushkul mud volcano located approximately 100 m from the roadside at approximately km 31.

A map of the project road is shown in Figure 1 below.


**Figure 1: Map of the Project Road**

## 1.3 Scope of Supplemental Environmental Assessment

The preparation of the Supplemental Environmental Assessment (EA) Report for Baku-Shamakhi Road Km 45-91 takes full cognizance of the Scott-Wilson EA Report as the reference document. Due to the changes in the original construction contract a Supplemental Environmental Assessment (EA) Report has to be drafted.

The changes to the original scope are as follows:

1) Improvements to the layout of U-turns provision
   - Doubling of three single direction U-turns, at Km21+432, km26+367, km30+362;
   - New single U-turn at Km23+100
   - Improved layout for all 9 U-turns.

2) Relocation of various utilities; and

3) Strengthening of additional sections of the existing carriageway, totaling about 8 km. The carriageway in these sections were to have been overlaid with wearing course, but will now be reconstructed to the same specification as the new carriageway. In these areas, all existing pavement layers, (both asphalt and unbound (subbase) layers) will be removed as well as part of the earthworks, depending on the conditions found. Some of the asphalt layers may be recycled to be used as fill material. Unlike in km 45 – 91, the new carriageway, and the reconstructed existing carriageway, will not have a separate crushed stone layer.

This Supplemental EA Report will focus on impacts that will result in the introduced changes and assess the adequacy of the associated Environmental Management Plan. Previous environmental assessment results will be also be checked vis-à-vis the new design and recommendations shall be presented to conform to WB-IBRD's requirements and Azerbaijan legislations.

# 2. CURRENT EA DOCUMENT

An Environmental Assessment Report for the four-laning construction based on existing design was drafted by Scott-Wilson dated May 2009, the purpose of which was to provide an update of the previous Environmental Assessment (EA)[2] for Baku – Shamahki Road Rehabilitation in relation to the proposed 4-lane highway upgrade between km 15 and km 45.

As mentioned in the Scott-Wilson EA Report, an Environmental Assessment was prepared by Kocks Consult GmbH as part of the initial planning phase for the Rehabilitation stage of this project; and this has been approved by the State Ecological Expertise (SEE) of the Ministry of Environment and Natural Resources (MENR) of Azerbaijan.

The Scott-Wilson EA Report describes any additional, or amplified, impacts due to the proposed 4-lane upgrading along the 30 km stretch from km 15 to km 45. The salient components consist of:

- Discussions on Alternative Alignments;
- Environmental Baseline Conditions Km15 – Km45;
- Socio-Economic Baseline Conditions Km15 – Km45;
- Overall Mitigation and Offsets and Monitoring; and
- Appendix F: Outline Monitoring Plan

[2] Kocks Consult GmbH Baku – Shamakhi Road Rehabilitation, Environmental Assessment Final, April 2006

# 3. PROJECT OBJECTIVES AND PROJECT SCOPE MODIFICATION

## 3.1 Objectives and purpose of the project

The 30km project road of will be supportive of the objectives of the entire Baku-Shamakhi road which are as follow:

- Reduce road transport costs for road users
- Improve access and transit throughout the entire road
- Enhance safety within Azerbaijan's east-west corridor, through the implementation of a number of subprojects
- Better road quality and better safety through new alignments
- Lower travel costs and a shorter travel time.

In addition, as mentioned in the Scott-Wilson EA Report, the widening of the existing Baku to Shamakhi road from a two lane to a four lane road is intended to meet an anticipated growth in demand for road transport services. The other recognized objectives are as follows

- to propel economic growth as a result of returns on investments through the marked growth of the traffic on the subject roads;
- to improve road technical specifications for increase in speed and consequently reduce travel time;
- To improved east-west connections to foster economic integration and growth within the country, in particular non-oil growth, leading to a degree of economic diversification

The four-laning of the entire Baku-Shamakhi road is expected to result to economic growth for Azerbaijan is as a consequence of higher returns on investments through the marked growth of the traffic, increase in speed, and subsequent decrease in travel time with the better road infrastructure. In general, the enhanced east-west connections will foster economic integration and growth within the country, particularly the non-oil growth, leading to a degree of economic diversification.

## 3.2 Main Design Options

In the Scott-Wilson EA Report, four main design options were proposed for the four-laning of the road between Baku and Shamakhi, depending on local topography and land use – to be used alternatively on different sections of the road. These options were as follows:

(iv) Construction of the additional carriageway to one side, either the right hand side (RHS) or left hand side (LHS) of the existing carriageway (see Figure 2) with a total width of 27.5m;
(v) Widening of the existing carriageway on both sides, either by:
  (c) Widening at both sides with a reduced median and shoulder, total width 22.5m (see Figure 3); or
  (d) Widening at both sides without median and reduced lane width and shoulder, total width 17.5m (see Figure 4).
(vi) Widening in sections with climbing lane, total width 20.5m (see Figure 5).

The entire construction roadway from shoulder to shoulder will have a width of 27.00m. With provisions for drainage, the entire road will be around 30-35 m. The cross-sectional profile of the road is shown in the next Figures.

The road construction will also include drainage, cross-pipes and culverts along with relocation of underground and above ground utility lines.

Generally, the construction will be within the designated ROW. Indirect impact can extend even beyond the 60 ROW mainly due to social environmental characteristics of the project area. This has been considered in the Scott-Wilson EA Report. These options were further deliberated by the PIU and the concerned consultants.

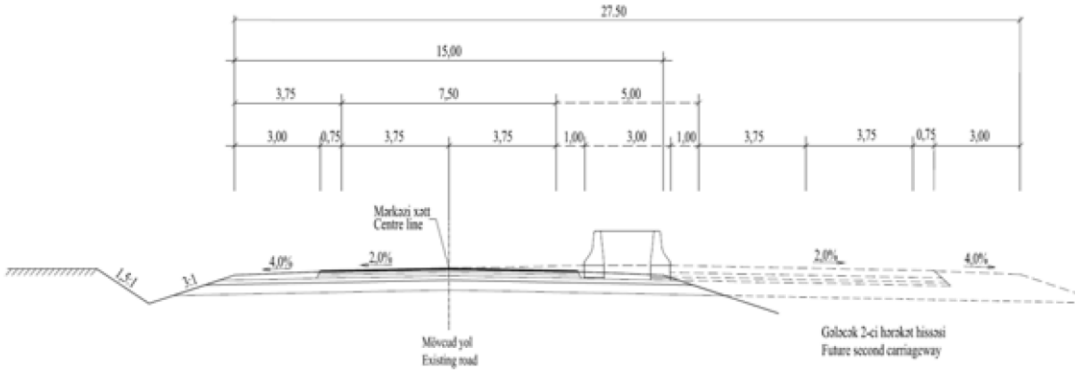



**Figure 2: Option (i) Typical Cross Section for Widening to One Side**

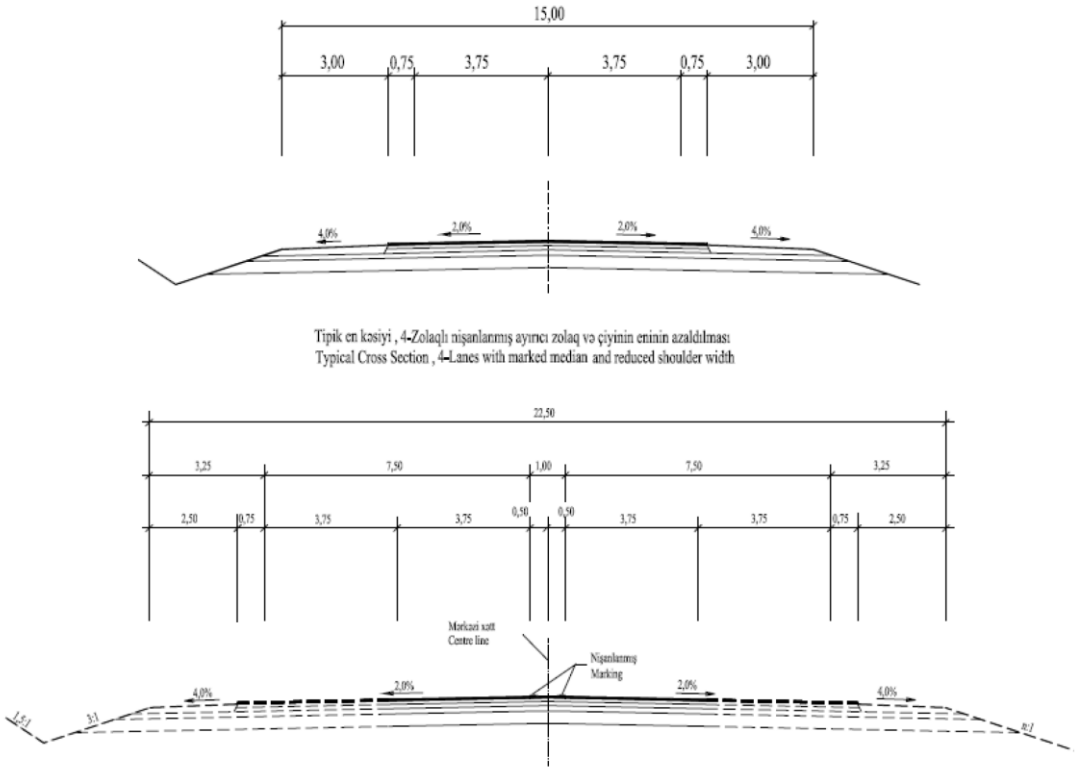
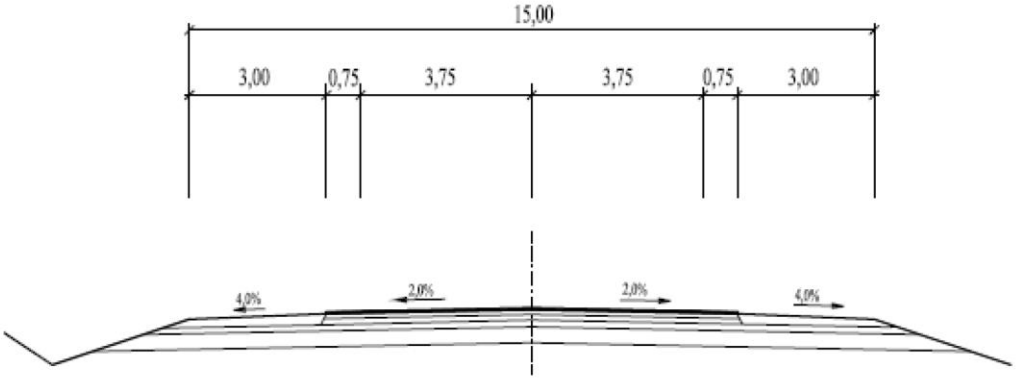



**Figure 3: Option (iia) Typical Cross Section for Widening at Both Sides with Reduced Median and Shoulder**




Tipik en kəsiyi , 4-zolaqlı,ayırıcı zolaq olmadan
Typical Cross Section , 4-Lanes, without median

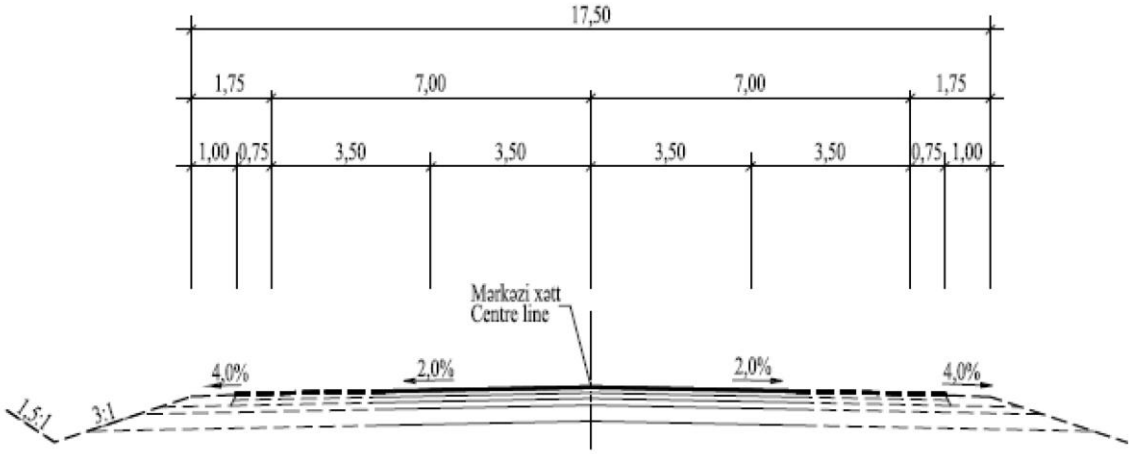



**Figure 4: Option (iib) Typical Cross Section for Widening at Both Sides Without Median and Reduced Lane Width and Shoulder**

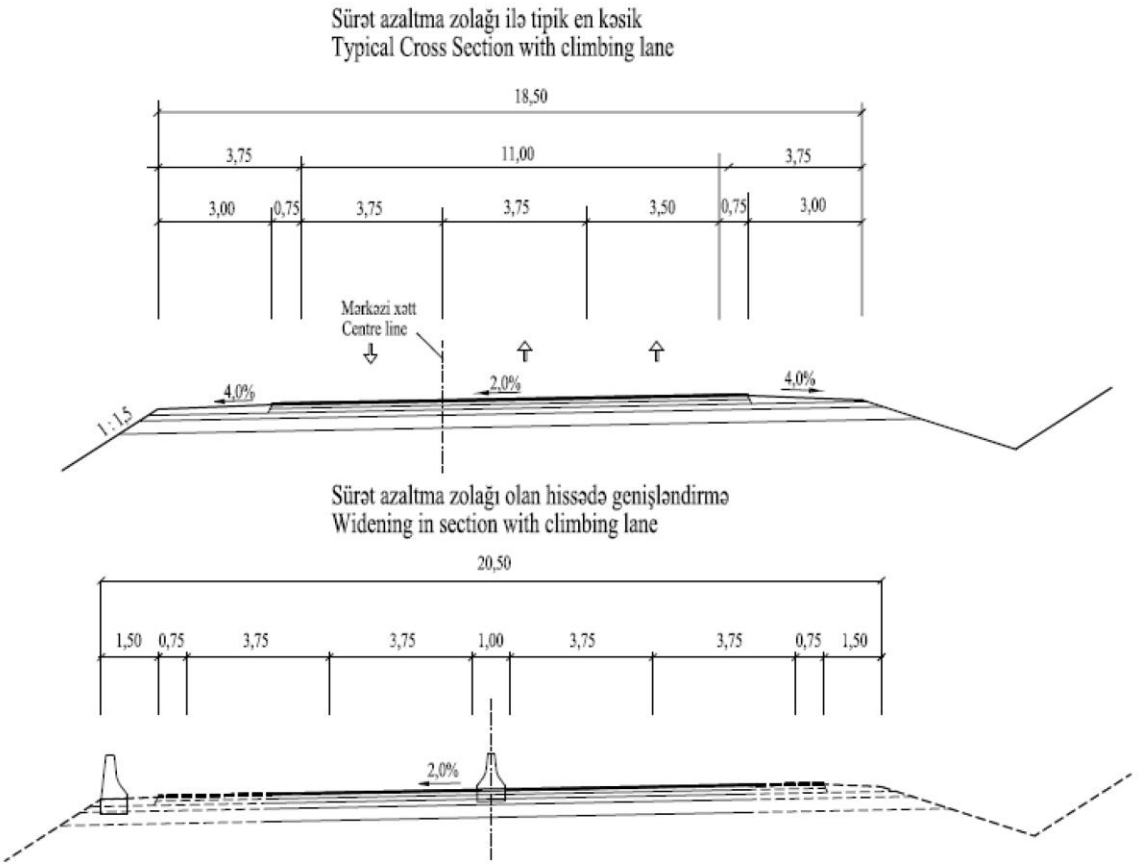



**Figure 5: Option (iii) Typical Cross Section for Widening in Sections with Climbing Lane**

## 3.3 Description of Project Modification

As mentioned, the changes in the original scope includes: (i) improvement of U-turn layouts; (ii) relocation of various utilities; and (iii) Strengthening of additional sections of the existing carriageway, totaling about 8 km. The strengthening portions entails a new structural pavement design based on new parameters adopted to strengthen the road pavement in anticipation of heavier loadings. Because of this, the road pavement of said 8km sections has also to be rebuilt to conform to the new design parameters. Changes in thicknesses in the New Project Design were introduced. In the construction, this will be implemented by scarifying the pavement structure up to embankment layer and onto which the new design project design. The design modification is shown on the table below and depicted on the subsequent schematics.

**Table 1: Road Design Modification**

| No. | Pavement Component | Existing Road Design | New Project Design |
|---|---|---|---|
| 1 | Wearing Course | 5 cm | 8 cm |
| 2 | Binder Course | 9 cm | 9 cm |
| 3 | Bituminous Base Course | 10 cm | 10 cm |
| 4 | Granular Subbase | 15 cm, CBR>15% | 25 cm, CBR>30% |
| 5 | Capping Layer | 35 cm, CBR>15% | 24 cm, CBR>15% |
| | **Total Thickness** | **74 cm** | **76 cm** |

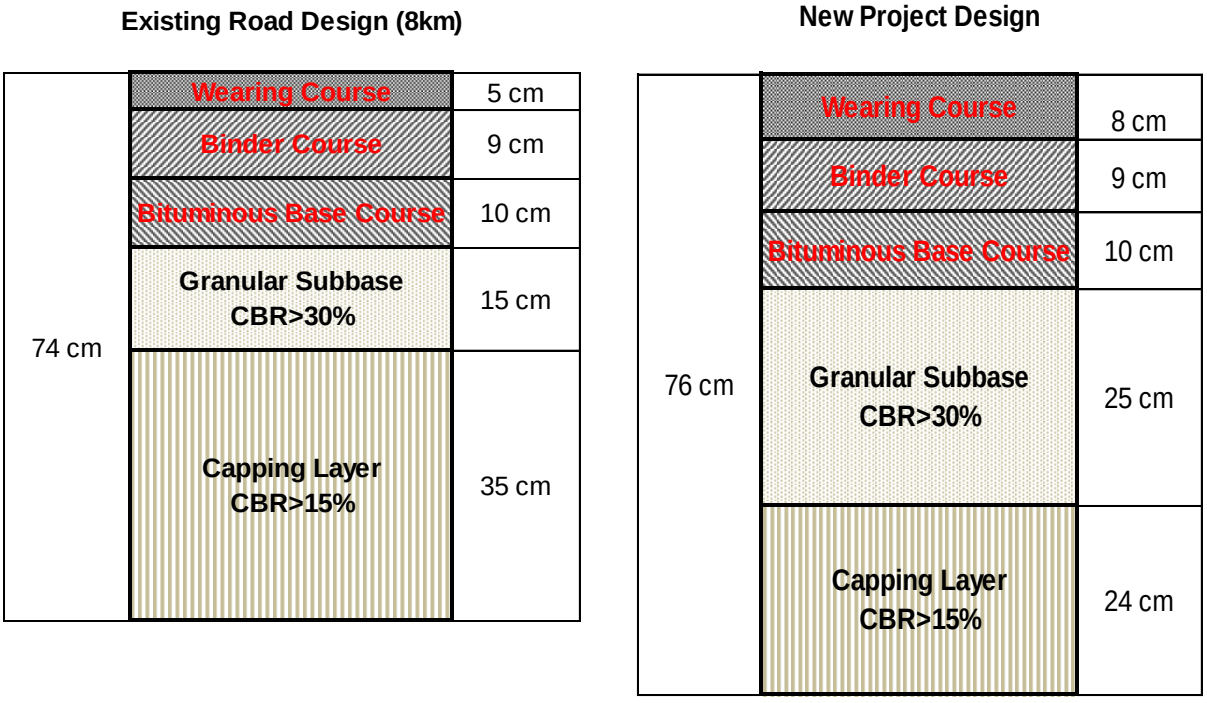



**Figure 6: Road Design Modification Schematics**

# 4. SUPPLEMENTAL ENVIRONMENT IMPACTS AND MITIGATION MEASURES

In the previous Scott-Wilson EA Report for the four-laning of the road segment, anticipated direct and/or indirect impacts were already sufficiently tackled and adequately addressed in the Outline Monitoring Plan. In this Supplemental EA Report, the change of scope due to the revision in the pavement design for the 8km spots or sections is the only one item being considered. Primarily reconstruction work is only done on the existing pavement and firsthand work is to be done on the additional two lanes as part of the four-laning.

For the existing pavement in the 8km spots or sections, the asphalt layers are to be scarified, milled and to be mixed with new asphalt mix at the plant, while the subs-structures should be reworked to conform to the new designs. The new lanes will conform to the new design, which will have relatively thicker Wearing Course by 3 cm (from 5cm to 8 cm), while maintaining the same thickness of Binder Course (9cm), and Bituminous Base Course (10cm). The Granular Base Course will be thicker by 10cm (from 5cm to 8 cm), while the Capping Layer will be thinner by 9cm (from 35cm to 24cm).

In the four-laning work, the impacts will be expected along the road corridor as well as the material sources and processing plants. What will be emphasized in this Supplemental EA Report are impacts and mitigation measures in connection with reworking of the 8km spots/sections lanes. In general, the previous Outline Monitoring Plan in the Scott-Wilson EA Report can be supplemented according to this change of scope.

## 4.1 Roadway Earthworks for the 8km Change in Scope

Since the 8km spots/sections of the road will be constructed on existing road and shoulder, impacts on major cut or fill have already been considered in the Scott-Wilson EA Report and previous documents. The rework on the existing pavement (if already completed) will entail the following to conform to the new design:

(i) Scarifying and milling of the existing asphalt layers: Wearing Course, Binder Course and Bituminous Base Course
(ii) Excavation, removal and temporary stockpiling of the existing Granular Subbase
(iii) Excavation trimming of the Capping Layer from 35cm to 24cm
(iv) Re-laying of thicker Granular Subbase from 15cm to 22cm, using stockpiled portion (excess Capping Layer and possibly from milled materials in conformance with the specified gradation;
(v) Re-laying of thicker Bituminous Base Course of the same thickness (10cm)
(vi) Re-laying of thinner Binder Course of the same thickness (9cm)
(vii) Re-laying of thicker Wearing Course from 5 cm to 8 cm

In case where new two-lane portion shall be constructed along new strips, these will require the following scope of the New Project Design:

(i) Preparation of the road embankment layer
(ii) Installing 24 cm Capping Layer
(iii) Laying of 25 cm Granular Subbase
(iv) Laying of 10 cm Bituminous Base Course
(v) Laying of 9 cm Binder Course
(vi) Laying of 8 cm Wearing Course

The reconstruction of the new pavement will entail short term disturbance at the site consisting of noise, dust, equipment emission, impairment of local community access. Noise can be

mitigated by proper scheduling the usage of equipment, installation of mufflers and regular equipment maintenance and provision of noise barriers when needed. Dust can be routinely minimized by watering of certain exposed areas and covering materials being hauled in trucks. Location for temporary material stockpile can pose some localized issues which the Contractor can resolve by proper planning.

In some areas, cut and fill for the new lanes to conform to the New Project Design may have to be done along with the construction of side ditches for drainage. Roadway cuts shall entail excavation, removal and reusing, when proved to be suitable, for embankment/filling work. Unsuitable soil materials shall be disposed in areas where it would be proven to be non-detrimental to adjacent community and the environment. The work scope also includes all excavation necessary for side ditches and relocation of underground utilities. Some excavation and filling will be done at the extension of water way crossings. The impacts of the cut and fill works will be minimized by proper planning and determining sites to obtain materials or deposit them when they are in excess. Re-cultivation of borrow areas should be done after their usage and deposited materials should be stabilized by proper grading to allow natural re-vegetation.

## 4.2 Borrow and Quarry Areas

The four-laning will entail usage of materials in the existing road and additional volumes for the new two lanes. After comparing the New Project Design with the Existing Road Design for 8km spots/sections, it is likely that for the reconstruction of existing pavement, new materials would have to be imported from quarries. The volume of materials that will be used for the road substructure can be estimated by simplified computations base on the road geometry as shown below:

**Table 2: Computation Table for Road Material Requirements**

| Pavement Layer | Designs (cm) | | | |
|---|---|---|---|---|
| | Existing Road | New Project | Difference | In (m) |
| (A) | (B) | (C) | (D)=(C)-(B) | (D)/100 |
| Wearing Course | 5 | 8 | 3 | 0.03 |
| Binder Course | 9 | 9 | 0 | 0 |
| Bituminous Base Course | 10 | 10 | 0 | 0 |
| Crushed Base Course CBR>80% | 0 | 0 | 0 | 0 |
| Granular Subbase CBR>30% | 15 | 25 | 10 | 0.1 |
| Capping Layer CBR>15% | 35 | 24 | -11 | -0.11 |

| | | | |
|---|---|---|---|
| Assumed Ave Width of Pavement | | 30 | meters |
| Assumed Ave Length of Pavement | 8 km | 8,000 | meters |

| Pavement Layer | Volume (m3) | Est. 15m3 Truckloads |
|---|---|---|
| Wearing Course | 7,200 | 480 |
| Binder Course | 0 | 0 |
| Bituminous Base Course | 0 | 0 |
| Crushed Base Course CBR>80% | 0 | 0 |
| Granular Subbase CBR>30% | 24,000 | 1,600 |
| Capping Layer CBR>15% | (26,400) | -1,760 |
| **Total** | **4,800** | **320** |

The excess milled materials from the asphalt layers of the Existing Road can be used in the New Project Pavement layers, after verification in accordance with specified parameters. From the environmental point of view the recycling of old asphalt as raw materials in new asphalt mix

proves to be beneficial. Savings in the bitumen can likewise be realized with the reuse of old asphalt pavement.

In the Scott-Wilson EA Report, sources of aggregate for road pavement were mentioned and these are primarily the rivers near the project road. The following were among the potential: (i) Qozluchay I; (ii) Qozluchay II; and (iii) Pirsaatchay. As mentioned in the report, these were identified as the potential borrow areas by the Environmental Assessment for Baku – Shamakhi Road rehabilitation[3] and the impacts were discussed by the mentioned Kocks EA Report.

As shown, minimal requirements may be needed. However, to assure of the quality, the Wearing Course may be constructed of new crushed aggregate from the material sources.

What needs to be given more consideration is the manner of quarrying. Proper planning should be done to minimize effect on the topography as well as the natural hydrology of the river. Mitigation measures to minimize or avoid bank erosion and/or localized scouring should be undertaken. When all materials are obtained, the quarries used should be reinstated to better or improved conditions.

[3] KOCKS (2006) Environmental Assessment for Baku-Shamakhi Road Rehabilitation, Final Report

# 5. SUPPLEMENTAL ENVIRONMENTAL MANAGEMENT PLAN

The Supplemental Environmental Management Plan (EMP) in this report identifies the mitigation measures, monitoring activities and institutional arrangements to be implemented to prevent, eliminate, or reduce to acceptable levels any adverse environmental and social impacts of the road rehabilitation project. The Scott-Wilson EA Report also takes cognizance of the previous fore-running EMP drafted by Kocks Consult[4].

In this Supplemental EA Report, a number of additional provisions are being included to improve the management and monitoring aspects of the four-laning construction activities to take into account the change in scope. These additional items are found in the Annexes of this Supplementary EA Report.

## 5.1 Environmental Mitigation and Monitoring Program

The Supplemental environmental mitigation and monitoring programs summarized in Annexes A and B have been devised to ensure proper response with the identified project impacts, which may arise during the construction phase of the project road. Prior to the construction, the ESS with the assistance of the Construction Supervision Consultant will do the following for the Baku-Shamakhi Road (Km 15-45):

- Establish baseline information on the existing environmental conditions and parameters for the specific road project;
- Develop an environmental auditing protocol for the construction period as well as a detailed monitoring and management plan;
- Provide guidance and formulate a report outline that will be used by the contractor as a guide in the preparation of monthly environmental progress reports; and
- Undertake regular and periodic monitoring of contractor's implementation of the mitigation measures during the construction stage, consistent with the monitoring program, and submit to PIU-ARS quarterly monitoring reports. Special separate reports should be prepared in the event a significant environment related incident will arise.
- The PIU will provide the WB a summary of the monitoring results on a quarterly basis.

In addition, environmental management activities should form part of the Internal Monitoring System. The purpose of such system is to track progress of as well as changes in civil work activities as well as monitor effects and impact of the road construction and rehabilitation on the households and communities along the road. The ARS OJSC will be responsible for the establishment of the monitoring system with the assistance of the Supervision Consultant and the Civil Works Contractor, whose scope will be specified in the terms of reference for the work contract.

## 5.2 Institutional Arrangements and Reporting

To ensure that the proposed mitigation measures will be implemented by the Contractor/s during the construction stage, the detailed engineering consultant will undertake the following:

[4] Kocks Consult GmbH Baku – Shamakhi Road Rehabilitation, Environmental Assessment Final, April 2006

- Clearly define in the tender and contract documents the Contractor's obligation to undertake and implement environmental mitigation measures as specified in Scott-Wilson EA Report and Supplemental Environmental Mitigation Measures outlined in **Annex A.** The same shall be appended in Contract Specifications;

- The cost for the recommended environmental mitigation measures will, where possible, be itemized as cost items in the Bill of Quantities. Such allocation of a cost item to specific environmental mitigation measure will be crucial to assure their actual implementation. During procurement or bidding, the bidders will be specifically instructed to include these cost items as line items in the Bill of Quantities to form part of their financial bids; and

- Explicitly require the Contractor to recruit an environmental, health and safety (EHS) personnel who will be specifically responsible in handling environmental issues of the project.

The Contractor will be responsible for the implementation of environmental mitigation measures during construction and shall employ EHS personnel who will supervise implementation of the Contractor's environmental responsibilities as stipulated in the contract and liaise with the ESS and the district ARS on such matters. Likewise, the EHS personnel will also be responsible for health and safety aspects of work sites and shall submit monthly reports to ESS on the status of implementation of mitigation measures, including complaints received and actions taken as well as other environmental issues relating to the project. The Contractor, in coordination with the construction supervision consultant, shall set-up a grievance redress committee that will deal with any complaints during project implementation.

Also, during project implementation, the ESS with the assistance of the CSC shall monitor the compliance of the Contractor in accordance with the EMP provisions. The ESS shall submit quarterly reports to ARS and the MENR describing the status of implementation of environmental mitigation measures by the contractors. Included in the reports are additional mitigation measures that may need to be implemented, incidents of non-compliance with applicable environmental permits, complaints received from local residents, NGOs, etc. and ways and means by which, they were addressed or settled.

It is advisable that the CSC shall employ an expatriate environment specialist (with civil engineering/environmental management background) to assist the ESS in the monitoring the progress of the construction on its environmental aspect. The CSC, through its environment specialist, shall provide hands-on training to the ESS throughout various stages of the construction. The CSC shall also assist the ESS in preparing monitoring reports regarding the performance of the contractors in terms of compliance with the relevant national environmental regulations, quality standards and the implementation of environmental specifications in accordance with the contract provisions. The Terms of Reference (ToR) for the environmental specialist shall be drawn-up by the detailed engineering consultants for the road project. During project implementation, the ARS (through the PIU) will report to the World Bank-IBRD every three (3) months on the progress of the project based on the monitoring reports submitted by the ESS/CSC and the Contractor.

Upon project completion and subsequent acceptance by the ARS, the same will be responsible on the operation and maintenance of the Project Road. Routine and random environmental monitoring will be undertaken by ARS district offices as scheduled in the monitoring plan (**Annex B**). Parallel to this the MENR will conduct random monitoring of the project to assess compliance with the required mitigation measures and applicable environmental laws and regulations. Should the ARS plan for full public participation activities, a detailed action plan should be devised with adequate funding from Azerbaijan government.

The following Table summarizes the various institutional responsibilities for the implementation of the environmental management plan at various stages of the Project Road rehabilitation.

**Table 3: Responsibilities for Implementing the Supplemental EMP**

| Project Stage | Responsible Organization | Responsibilities |
|---|---|---|
| Detailed Design | ARS with the detailed engineering consultant | Incorporate mitigation measures into engineering design and technical specification |
| | ARS and MENR | Review and approve environmental mitigation and management measures |
| | Investment Department of ARS | Allocate appropriate budget to undertake environmental monitoring and capacity building for ESS |
| Construction | Contractor (with the through its EHS Manager) | Implement required environmental measures and submit monthly reports to ESS regarding status of such implementation.<br><br>Set-up a grievance redress committee in coordination with the CSC. |
| | ESS with the assistance of CSC | Supervise contractor's implementation of environmental measures on a daily basis. Enforce contractual requirements |
| | ESS and CSC | Audit construction phase through environmental inspections and collect monitoring data. Submit quarterly reports to ARS and MENR. |
| | CSC | Assist the Contractor in the formulation of a grievance redress committee.<br><br>Provide awareness/training to workers and technology transfer to the Contractor. |
| | ESS and CSC | Ensure compliance with Government legal requirements during construction.<br>Review complicated issues arising from the Project. |
| | ARS | Submit quarterly progress reports to WB |
| | MENR and MOH | Undertake periodic monitoring of the project |
| Operation | ESS / District Maintenance Unit | Undertake routine environmental monitoring and prepare corresponding reports. |

## 5.3 Cost Estimate

The estimated cost for a period assumed as four (4) months (equivalent to 0.33 years of construction) in implementing the mitigation measures and monitoring plan necessary in the Baku-Shamakhi Road (Km 45-91) change in scope for the four-laning project is provided in the Table below. The costs during construction shall be part of Contractor's civil works package, while the costs associated in assisting the ESS in the implementation of the EMP and conducting relevant environmental training shall be included in the construction supervision cost.

**Table 4: Estimated Environmental Monitoring and Mitigation Cost**

| | Item | Unit | Qty | Unit Cost | Total |
|---|---|---|---|---|---|
| *Environmental Costs - Civil Works (included in contractor's civil work package)*[a] | | | | | |
| | Dust suppression measures | day | 60 | 125 | 7,500 |

| | Item | Unit | Qty | Unit Cost | Total |
|---|---|---|---|---|---|
| | Planting of trees[b] | km | 0.5 | 4,000 | 2,000 |
| | Grass revegetation | $m^2$ | 1,000 | 2 | 2,000 |
| | Provision of biodiversity crossings | units | 0 | 5,000 | 0 |
| | Land management measures at dumping sites for excess material | $m^3$ | 1,000 | 1 | 1,000 |
| | Stripping of top soil (0-200 mm) and storage for reuse[c] | $m^3$ | 1,000 | 3 | 3,000 |
| | Rehabilitation (Landscaping) of borrow areas | No | 1 | 25,000 | 25,000 |
| | Provision of EHS Manager | MM | 4 | 3,000 | 12,000 |
| | Conduct of seminar/orientation on HIV, AIDS and STD awareness among workers and nearby communities, condom supply, coordination with HIV monitoring centers and basic supply provision | lump sum | 1 | 5,000 | 5,000 |
| | | | | **Total** | **57,500** |
| *Environmental Management, Monitoring and Training Costs during Construction (Included in construction supervision cost)* | | | | | |
| | Remuneration and per diems | | | | |
| | International Environment Specialist | MM | 1 | 20,000 | 20,000 |
| | Local Environmental Specialist | MM | 4 | 6,000 | 24,000 |
| | Travel | | | | |
| | Intl. Travel | trip | 2 | 2,500 | 5,000 |
| | Domestic Travel | lump sum | 1 | 10,000 | 10,000 |
| | Training materials and logistics | lump sum | 1 | 5,000 | 5,000 |
| | Periodic construction site water quality, air quality and noise monitoring | M | 4 | 1,500 | 6,000 |
| | | | | **Total** | **70,000** |
| *Environmental Mitigation during Operation - ARS Budget* | | | | | |
| | Purchase of water truck for maintenance of roadside vegetation | unit | 1 | 35,000 | 35,000 |

[a]estimated cost during the construction period ( 4 months)
[b]total length of tree/shrub plantations to be provided in some designated places by ARS.
[c]including seeding or other means of protection during stockpiling to preserve fertility

## 5.4 Implementation Schedule

The environmental measures are determined during the detailed design phase when the environmental assessment is undertaken. These measures will then form part of work items for the project. In addition, the other environmental activities related to road rehabilitation are presented in the succeeding Table below:

**Table 5: Implementation Schedule**

| Project Phase | Issue | Schedule |
|---|---|---|
| Prior to commencement of construction activities | ESS (with assistance from CSC) to review and approve Contractor's method statements | once |
| Upon mobilization | Training for ARS'S ESS and district offices (hands-on | once |

| Project Phase | Issue | Schedule |
|---|---|---|
| of the CSC | training will also be provided by the CSC during monitoring of the performance of Contractors) | |
| During construction | Monitoring | Refer to Annex B |
| During construction | Reporting:<br>• Contractor to ESS<br>• ESS to ARS/MENR<br>• ARS (through PIU) to WB | monthly<br>quarterly<br>quarterly |
| During Operation | Monitoring | Refer to Annex B |

## 5.5 Institutional Strengthening

In the implementation of projects, often one major issue is the incorporation of the requirements for environmental mitigation and monitoring in the contract documents even though the EMP was adequately prepared. Accordingly, it becomes difficult to enforce the needed environmental mitigating measures in projects, particularly due to lack of reference of these items in the project contract. It is important that this item be adequately emphasized on the part of ESS for compliance by the Contractor. Furthermore, the level of expertise of ESS to undertake environmental management and monitoring should also be upgraded.

In the past some training had been formulated and implemented in line with institutional building and capacity building of staff from various agencies dealing with environmental regulations and control, especially the ESS-ARS OJSC. The topics elaborated in the training covered a range of environmental management and related issues relevant to the road construction sector in Azerbaijan such as Introduction to Construction Noise, Ecology, Environmental Good Practice, Waste Management; Good Practice on site – Dust, Ecology, Noise, Smoke & Odours, Trees, Water Management, Map Reading, Borrow Pit/Quarry, Oils & Chemicals; and Traffic Impacts on Air Quality.

To respond to the requirements of the environmental monitoring activities, the gaps in the previous training should be assessed. Accordingly, based on these identified gaps, it is proposed that additional measures be provided to address these gaps, as guide to good practices in ensuring compliance by Contractors to the environmental regulatory measures.
On this note the assistance of an international environmental specialist will be useful. The matter of capability and capacity building on the part of the ESS should form part of the proposed Terms of Reference of the international environment specialist who will conduct the ESS/district ARS training and orientation for contractors. The following are the basic scope of the international environment specialist among others:

- Assess the capacity of the ESS and district ARS and determine the specific additional training needs to respond to the requirements in conducting environmental monitoring and implementation of mitigation measures of road projects;

- Prepare a short-term staff training prospectus and associated materials to meet immediate needs;

- Undertake training workshops that will include the following topics:

- Establishment of baseline data at the start of the project for reckoning project environmental impacts.

- Preparation of EMPs and incorporation of the mitigating measures in contract documents and specifications for Consulting Services and Works contracts;

- Procedures for monitoring the implementation of mitigating measures including target parameters, frequency, responsibilities and means of monitoring;

- Health and safety procedures in project implementation.

- Conduct orientation/workshop for contractors on construction-related environmental issues on road projects, implementation of mitigation measures and monitoring, and preparation of monitoring reports;

- Evaluate the effectiveness of the training measuring improvements in attitudes and skills achieved through a combination of feedback questionnaires and performance evaluation; and

- Prepare outline proposals for the longer-term organizational and capability development of ESS and district ARS.

A typical ESS/ARS staff training will consist of lecture-type presentation of the general procedure and requirements for effective environmental monitoring. This will be followed by a more detailed on-the-job and hands-on training at the construction site where the trainees will participate in the activities of the international environmental specialist/construction supervision staff in reviewing the contractor's reports, periodic monitoring inspections, and deliberation of environmental issues involving the contractor and the project stakeholders, and finally the accomplishment of environmental reports. The field trainings should coincide with peak work activity at the site to provide a first-hand observation of the following environmental issues:

- Erosion and slope stability issues;
- Discharges to water bodies;
- Disturbance on biodiversity;
- Dust suppression;
- Exhaust emissions;
- Noise abatement measures;
- Protection against oil spillage;
- Quarry, borrow pits and asphalt plant operations;
- Site health and safety, sanitary facilities, etc.;
- Public safety, traffic management, child safety, etc.
- Documentation in dealing with public complaints and conflict resolution.

# 6. PUBLIC CONSULTATIONS

## 6.1 Stakeholder Consultations

In conformity with the Operational Policy (OP)/Bank Procedure (BP) 4.01: Environmental Assessment of the WB-IBRD, public consultation for the Four-laning of the Baku-Shamakhi km 91-107 Section *additional works for rehabilitation and strengthening of the existing road lanes*

*and relocation of utility and communication lines not envisaged by the original road design]* was scheduled on 23 October 2015 at at 3:00 pm at Ashagi Guzdek Settlement Municipal Office, part of Absharon Rayon. The PIU-ARS coordinated the holding of public consultation with the Local Executive Power of Absheron Rayon, wherein local residents, village officials/representatives, local NGOs, and other stakeholders were invited.

20 participants attended the public consultation in Ashagi Guzdek village. The Consultant elaborated the rehabilitation/construction works, project's environmental, social impacts, and land issues along with WB and GoA policies in minimizing and mitigating projected impacts in a slide presentation (PowerPoint), maps, graphics, and handouts. Comments were later solicited from the participants in an open forum and both by means of written documentation filled out by the participants themselves. Comments, responses and recommendations, photos and list of participants have been separately documented.

# Annex A:

| Annex A. SUPPLEMENTAL MITIGATION MEASURES DURING DESIGN, CONSTRUCTION/REHABILITATION AND OPERATION | | | | |
|---|---|---|---|---|
| **Activity** | **Potential Impact** | **Mitigation measures** | **Institutional Responsibility** | |
| | | | Implement | Monitor |
| **CONSTRUCTION PHASE** | | | | |
| Operation of borrow areas | Disfigurement of landscape and damage to access roads | Secure MENR's approval for the operation of the borrow areas.<br><br>Prior to operation of borrow areas, submit a plan to ESS indicating the location of the proposed extraction site as well as rehabilitation measures and implementation schedule for the borrow areas and access roads.<br><br>Undertake rehabilitation of borrow areas and access roads upon project completion. | Contractor | ESS/CSC |
| | Increased dust emission | Prior to operation of borrow areas, submit a dust management plan which shall include schedule for spraying on access road and details of the equipment to be used.<br><br>Spray water on all unpaved access roads particularly in sections where critical receptors, such as settlements, schools and the like, are located. | | |
| | Siltation and obstruction of watercourses | Wet aggregates and/or provide cover on haul trucks to minimize dust emission and material spillage.<br><br>Locate stockpiles away from watercourses. | | |
| Operation of asphalt plant | Odor emission and safety risks | Asphalt plants shall be 500 m downwind from settlements.<br><br>Provide spill and fire protection equipment and submit an Emergency Response Plan (in case of spills, accidents, fires and the like) to the ESS prior to operation of the plant.<br><br>Secure approval from the MENR for installation and operation of asphalt plants. | Contractor | ESS/CSC |
| | Water pollution due to spilled bitumen | Bitumen will not be allowed to enter either running or dry streambeds and nor can be disposed of in ditches or small waste disposal sites prepared by the contractor.<br><br>Bitumen storage and mixing areas must be protected against spills and all contaminated soil must be properly handled according to MENR requirements. Such storage areas must be contained so that any spills can be immediately contained and cleaned up. | | |
| Earthworks and various construction activities | Loss of topsoil | Topsoil shall be stripped and reused to cover areas where excess materials will be dumped and along road sections where roadside vegetation will be provided. Long-term stockpiles of topsoil will be immediately provided with a grass cover and protected to prevent erosion or loss of fertility. | Contractor | ESS/CSC |

| Annex A. SUPPLEMENTAL MITIGATION MEASURES DURING DESIGN, CONSTRUCTION/REHABILITATION AND OPERATION | | | | |
|---|---|---|---|---|
| **Activity** | **Potential Impact** | **Mitigation measures** | **Institutional Responsibility** | |
| | | | Implement | Monitor |
| | | Submit to ESS a soil management plan detailing measures to be undertaken to minimize effects of wind and water erosion on stockpiles, measures to minimize loss of fertility of top soil, timeframes, haul routes, and disposal sites. | | |
| | Dust emission along routes to and from final disposal sites | Regularly spray water on haul roads to suppress dust, especially along sections that will pass close to settlements and sensitive receptors. | Contractor | ESS/CSC |
| | Air pollution due to exhaust emission from the operation of construction machinery | Maintain construction equipment to good running condition and avoidance, as much as possible, idling of engines.<br><br>Banning of the use of machinery or equipment that cause excessive pollution (e.g., visible smoke). | Contractor | ESS/CSC |
| Earthworks and various construction activities | Disturbance of adjacent settlements due to elevated noise levels | Restrict work between 0600 to 2100 hours within 500m of the settlements. In addition, a limit of 70 dBA will be set in the vicinity of the construction site and strictly followed.<br><br>Machinery to be used for the construction should be equipped with mufflers to minimize the generation of noise;<br><br>Whenever possible the local population should be advised of occurrence of elevated noise levels to enable them to take the necessary preparatory measures. | Contractor | ESS/CSC |
| | Social grievance | Formulation of a grievance redress committee in association with affected population before starting the civil works. | Contractor | ESS/CSC |
| **OPERATION PHASE** | | | | |
| Increased traffic flow | Elevated levels of gaseous and noise emissions due to increased traffic | Along sections of the road with sensitive receptors such as settlements, school, hospitals, etc., provision of roadside vegetation using densely leafed shrubs and trees should provide some attenuation. The ESS of ARS recommended planting of local and indigenous species such as Pine, Cypress, Loester, Tamarisk, and Olive which are suitable for the area, particularly near settlements along km 15-45. The Detailed plans should be produced by Contractor and CSC (the Engineer), in consultation with the local people/officials | | |

**Prior to construction works, the following method statements/plans shall be submitted by the Contractor to the ESS for approval:**

- A plan indicating the location of the proposed extraction site as well as rehabilitation measures to be implemented for the borrow areas and access roads upon project completion

A plan (Grievance Redress Mechanism) detailing the means by which local people can raise grievances arising from the construction process and how these will be addressed (e.g., through dialogues, consultations, etc.).

# Annex B:

| Annex B. SUPPLEMENTAL ENVIRONMENTAL MONITORING PLAN | | | | | |
|---|---|---|---|---|---|
| **Aspect** | **Parameters to be monitored** | **Location** | **Methodology** | **Timing and Frequency** | **Institutional Responsibility for Monitoring** |
| Borrow areas and access roads | Watercourses in the vicinity (obstruction, siltation, etc.)<br>Dust emission along access roads, particularly near settlements. | At site and access roads | Inspections, observations, consultation with nearby communities | Unannounced inspections during construction and after complaint. At least twice a week | ESS/CSC |
| Asphalt plant | Exhaust fumes | At asphalt plant site | Inspections, observations, consultation with nearby communities | Unannounced inspections during construction and after complaint. At least twice a week | ESS/CSC |
| Worker's Safety | Provision and use of appropriate personnel safety equipment | Job site | Inspections; observations and interviews | Unannounced inspections during construction. At least once a week | ESS/CSC |
| Air Quality | The following parameters shall be measured by the Contractor: TSP, Sulphur Dioxide (SO2), Nitrogen Dioxide (NO2) and Carbon Monoxide (CO). Other parameters maybe warranted as and when requested by the Engineer. | Vicinity of populated settlements of project road.<br>Asphalt plant | Obtain air samples from the field and analysis in laboratory for air quality measurement | Monitoring to be undertaken monthly | ESS/CSC |
| Noise | The Contractor shall ensure that routine noise monitoring is undertaken throughout the construction period. Parameters to be monitored to establish a baseline include:<br>Laeq 1h (dBA)<br>Average Daily Noise level | Vicinity of populated settlements of project road.<br>Asphalt plant | Noise meter gadget | Monthly throughout construction. | ESS/CSC |

# ANNEX D: PUBLIC CONSULTATION PHOTOS