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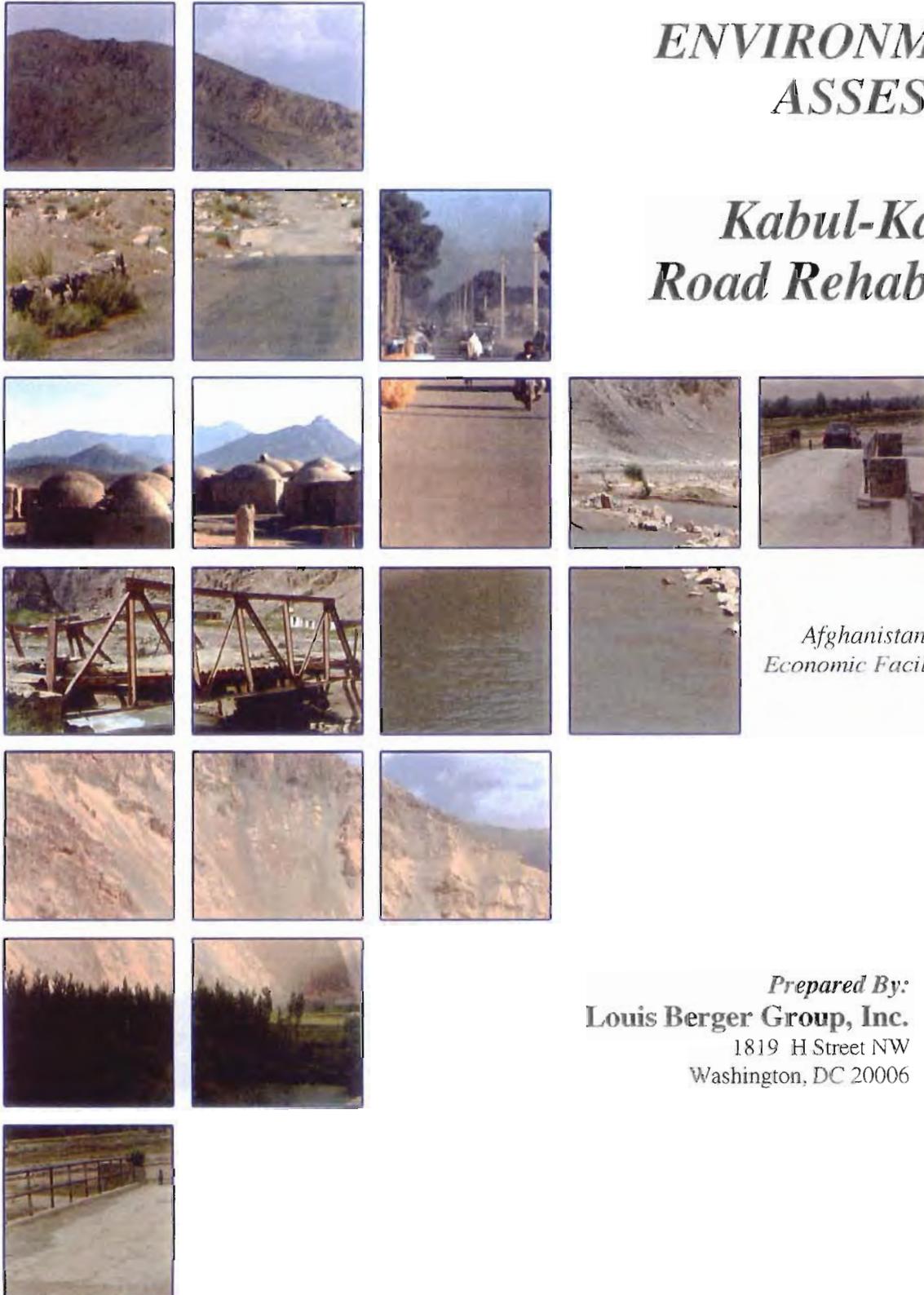


United States
Agency for International Development
Contract 306-C-00-02-00500-00

ENVIRONMENTAL ASSESSMENT

Of the:
**Kabul-Kandahar
Road Rehabilitation
Project**

A part of the
*Afghanistan Rehabilitation of
Economic Facilities and Services
(REFS) Program*



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December 2002

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KABUL-KANDAHAR ROAD REHABILITATION PROJECT
 Proposed As Part Of The
REHABILITATION OF ECONOMIC FACILITIES AND SERVICES
(REFS) Program
 With Funding Provided By
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ACRONYMS/GLOSSARY

LIST OF ACRONYMS/GLOSSARY

A

AASHTO American Association of State Highway and Transportation Officials
 ACCA Afghan Assistance Coordination Authority
 ADB Asian Development Bank
 ADT Average Daily Traffic
 AIA Afghanistan Interim Administration

B

BPM Bituminous Pavement Material
 BOD Biological Oxygen Demand

C

CAWSS Central Authority for Water Supply and Sewage
 CFR Code of Federal Regulations
 CO Carbon Monoxide
 COD Chemical Oxygen Demand
 CODA Conditions of Particular Application
 CSC Construction Supervision Consultant

D

DACAAR Da Afghanistan Breshma Moassesa (Afghanistan Electrical Utility)
 dB Decibel
 DO Dissolved Oxygen

E

EA Environmental Assessment
 EIRR Economic Internal Rate of Return
 EU European Union

F

FIDIC *Federation International Des Ingenieurs Conseils* (International Federation of Consulting Engineers)

G

GC General Contractor
 GCOC General Conditions of Contract
 Gozar Neighborhood

GPD Gross Domestic Product

H

HDM Highway Design and Maintenance (Model)

I

ICB International Competitive Bidding
 IDA International Development Association
 IDB Islamic Development Bank
 IEE Initial Environmental Examination
 IFC International Finance Corporation
 IMF International Monetary Fund
 ISAF International Security Assistance Forces

J

K

KM Kilometer

L

LCB Local Competitive Bidding

M

MHBTP Ministry of Housing, Building and Town Planning
 MIC Ministry of Information and Culture
 MMI Ministry of Mines and Industry
 MOC Ministry of Communications
 MOI Ministry of Interior
 MOIC Ministry of Information and Culture
 MOP Ministry of Power
 MPW Ministry of Public Works
 MSL Mean Sea Level

N

NGO Non-Governmental Organization
 NMT Non-Motorized Traffic
 NO Nitrogen Oxide

P

PAP Project-Affected Person
 Pb Lead

PCF Post Conflict Fund

R

REFS Rehabilitation of Economic
Facilities and Services

ROW Right-of-Way

S

SE Supervising Engineer
Shura District (typically 15-20 *gozars*)

SPM Suspended Particulate Matter

SS Suspended Solids

T

TOR Terms of Reference

TSP Total Suspended Particulate

U

UN United Nations

UNDP United Nations Development
Fund

USAID United States Agency for
International Development

USAID/GC USAID General Contractor

V

VOC Vehicle Operating Cost

W X

Y Z

1.0 SUMMARY OF FINDINGS

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INTRODUCTION

The United States Agency for International Development (USAID) proposes to fund the Kabul-Kandahar Road Rehabilitation Project, possibly in conjunction with other international agencies, as a part of its Afghanistan Rehabilitation of Economic Facilities (REFS) Program.

Projects identified for such funding are subject to the Environmental Procedures established by Title 22 of the U.S. Code of Federal Regulations, Part 216 (22 CFR 216). Pursuant to those Procedures, actions that have a potential for significant impact within a country require the preparation of an Environmental Assessment (EA) and subsequent approval of the EA and its recommendations to avoid or otherwise mitigate potential adverse impacts. The Procedures identify 11 classes of actions as having an inherent potential for significant environmental effect, including "*road building or road improvement projects.*"¹

In response to this requirement, this document, together with its attachments and incorporations by reference, constitutes the EA required for the Kabul-Kandahar Road Rehabilitation Project (the Project). The EA identifies the potential environmental impacts and issues related to the Project following a process and in conformance with requirements as outlined below. A description of the Project as it is currently conceived is provided by **Section 2.0** in accordance with the EA format provided by 22 CFR 216. Details of the potentially affected area, environmental consequences and additional data are provided in the subsequent sections of the EA in accordance with the EA format provided by 22 CFR 216.

Also in accordance with the recommended EA format, the initial section of the EA (Section 1.0, the section in hand) presents a Summary of Findings pursuant to 22 CFR 216.6 (c) (1) 22 which states (in its entirety) that the initial section of the EA shall be a summary and that "*the summary shall stress the major conclusions, areas of controversy, if any, and the issues to be resolved*". Accordingly, the Summary of Findings is organized to present:

- **Major Conclusions** (Item 1.1);
- **Areas of Controversy** (Item 1.2); and
- **Issues to be Resolved** (Item 1.3).

1.1 MAJOR CONCLUSIONS

The Environmental Assessment finds that:

- No significant adverse impacts are likely to result from the proposed Project, provided that the actions to avoid or otherwise mitigate potential adverse impacts are incorporated in the Project as specified herein. Specific environmental provisions for the Project's contractual Conditions of Particular Application (COPA) are provided by **Appendix A**.
- Less-than-significant adverse impacts may occur during the road rehabilitation activities such as temporary impacts to air quality, noise levels due to construction and

inconveniences due to traffic diversions and detours. These impacts will be mitigated by the contract provisions as specified herein, including actions such as water spraying to control dust and the restriction of noise-generating activities to daylight hours and the avoidance of such activities in sensitive areas such as the vicinity of hospitals, etc.

- Two issues having to do with the road's shoulder characteristics and Guidelines for the compensation of project-affected persons (PAPs) require resolution as described in **Item 1.3** below.
- Special note should be taken in regard to drainage structures accommodating all the Ghazni River and water courses feeding the Ab-I-Estada Waterfowl Sanctuary (*Istadeh-ye Mogor*) as discussed in detail in **Sections 4.2.3 and 5.2.3**. Design standards for drainage structures incorporate sufficient provisions for the accommodation of waters flowing into *Istadeh-ye Mogor* and particular care should be taken in the application of those provisions in the *Istadeh-ye Mogor* watershed.
- Consideration of additional actions beyond the scope of the Project, but within the scope of REFS, are warranted as detailed by **Section 6.2**.

1.2 AREAS OF CONTROVERSY

The phrase "Areas of Controversy" in this context is taken to mean areas of disagreement emerging from public comment and participation in the definition of the Project and the Proposed Action. No such areas of controversy have emerged.

1.3 ISSUES TO BE RESOLVED

The two issues alluded to above and requiring resolution within the scope of the project are:

- **Finalization of Shoulder Characteristics.** Current plans provide for shoulder widths of 1.25 meters on either side of the roadway. Recommendations have been forward, however, for shoulder widths of 2.25 meters so as to provide adequate space for emergency pull-offs and to accommodate non-motorized traffic (NMT). It is recognized that the issue is one with significant budget implications. From a public safety point of view, the provision of wider shoulders is recommended to mitigate the impact of higher speeds made possible by the road improvements and conflicts between through traffic, NMT and pedestrians, particularly in populated areas where increasing levels of NMT are likely.
- **Documented Adoption of Guidelines for Compensation.** Although the Project is not expected to result in impacts to residences, it is likely to impact roadside economic activities and assets, including commercial/bazaar activities and farms in certain areas. Details will be dependent on final design decisions yet to be made (including the selected shoulder characteristics). Recommended Guidelines to mitigate impacts to PAPs, based on the precedents set by related policies in Afghanistan, are provided by **Appendix B**.

As also noted above, additional recommendations for actions related to, but beyond the scope of the Project, are provided in **Section 6.2**.

END NOTES – SECTION 1.0

¹ 22 CFR 216 – Agency Environmental Procedures. Paragraph 216.2(d)(1)

2.0 PURPOSE OF THE PROPOSED ACTION

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22 CFR 216 states that under heading of Purpose "*The Environmental Assessment shall briefly specify the underlying purpose and need to which the Agency is responding in proposing ... the proposed action.*"

The rehabilitation of the Kabul-Kandahar Road is proposed to be undertaken within the context of the Afghanistan Rehabilitation of Economic Facilities and Services (REFS) Program, the purpose of which is "*to promote economic recovery and political stability in Afghanistan by repairing selected infrastructure needed to lower transportation cost, improve the provision of water and sanitation services, increase access to education, health and local government facilities, restore electrical transmission and distribution systems, and repair/reconstruct irrigation systems, dams/diversions and canals critical to the reactivation of the agricultural sector, the dominant means of livelihood in the country.*"¹

The REFS Program was developed on the basis of an Afghanistan Civil Infrastructure Assessment for which field investigations were undertaken in mid-2002 and documented by a Final Report to USAID/Afghanistan dated 20 August 2002. The Civil Assessment identified priorities for Afghanistan's civil infrastructure and its reconstruction, repair and rehabilitation needs and the need for agricultural market centers and recommended a prioritized program for:

- Labor-intensive inter-provincial road rehabilitation projects;
- Development of rural market centers;
- Major roads and bridge projects;
- A National Secondary Roads Program; and
- A National Primary Roads Program.

To achieve these goals, the REFS Program was devised to consist of three components:

- Rehabilitation of selected medium to large infrastructure (Component 1)
- Institutional strengthening of selected public services (Component 2); and
- Purchase, importation and distribution of construction materials and supplies not otherwise available in Afghanistan (Component 3).

The Kabul-Kandahar Road Rehabilitation Project (the Project) is part of REFS Component 1. Its specific purposes are to substantially improve the linkage between Afghanistan's two largest cities and to contribute to the economic recovery of the Project Area and the country as a whole. It is anticipated that the travel time between Kabul and Kandahar, which currently requires approximately 14 hours of driving time, will reduce to approximately six hours.

END NOTES – SECTION 2.0

¹ REFS Contract, page C-2.

**3.0 DESCRIPTION OF THE PROPOSED ACTION
AND ITS ALTERNATIVES**

3.0 DESCRIPTION OF THE PROPOSED ACTION AND ITS ALTERNATIVES

INTRODUCTION

The requirements of 22 CFR 216.6 state that the section of the EA providing a Description of the Proposed Action and its Alternatives should:

- *"Present the ... (the Proposed Action) and its alternatives in comparative form, thereby sharpening the issues and providing a clear basis for choice among the options by the decision-makers."*
- *"Explore and evaluate reasonable alternatives and briefly discuss the reasons for eliminating those alternatives which were not included in the detailed study:*
- *Devote substantial treatment for each alternative considered in detail including the proposed action so that the reviewers may evaluate their comparative merits:*
- *Include the alternative of no action:*
- *Identify the Agency's preferred alternative or alternatives, if more than one exists.*
- *Include appropriate mitigation measures not already included in the proposed action or alternatives."*

Accordingly, this section of the EA presents the brief description of the Project's geographic setting, strategic context and implementation framework, with the remainder of the section organized to address the issues identified by 22 CFR 216 item-by-item as follows:

- **The Proposed Action** (Item 3.1).
- **Alternatives Considered** (Item 3.2). These include:
 - The "No Action" Alternative (Item 3.2.1)
 - Alternatives Eliminated From Detailed Study (Item 3.2.2);
 - Alternatives Considered in Detail (Item 3.2.3); and
 - Comparative Analysis (Item 3.2.4)
- **Recommended Mitigation Not Included in the Proposed Action** (Item 3.3)

Environmental Setting. The Kabul-Kandahar corridor is located in southeastern Afghanistan - a country of 647,500 square kilometers making it slightly smaller than the state Texas and slightly larger than France. The country is landlocked and bounded on the west by Iran, to the south and the east by Pakistan and to the north by Turkmenistan, Uzbekistan and Tajikistan. It also has small border with Peoples' Republic of China in the far northeast (**Exhibit 3.0 A**). Its geography is dominated by Hindu Kush Mountains which run northeast to southwest through the central region dividing the northern provinces from the remainder of the country. The southwest is occupied by desert plateau. The lowest point in the country is at Amu Darya at 258 meters above mean sea level (msl). The highest point is at Nowshak 7,485 meters above msl.

The Kabul-Kandahar Road is southeastern arc of what is often described as a ring of circular road around the base of the mountains in the central part of the country. It traverses the relatively flat to rolling corridor linking Kabul, Afghanistan's capital and largest city in the east-central part of the country, and Kandahar, its second largest city located in the south-central portion – and (using Kabul as the zero kilometer) several intervening small communities including Ghazni (KM 134); Mukur (KM 238); and Qalat (KM 314) (Exhibit 3.0 B). Rehabilitation of the Kabul-Kandahar Road is expected to consist of the repair and in some instances reconstruction of approximately 482 kilometers (including the repair and/or replacement of bridges and drainage structures). The entire length of the road is in extremely poor conditions, but field investigations indicate that the conditions of the road can be characterized in three sections

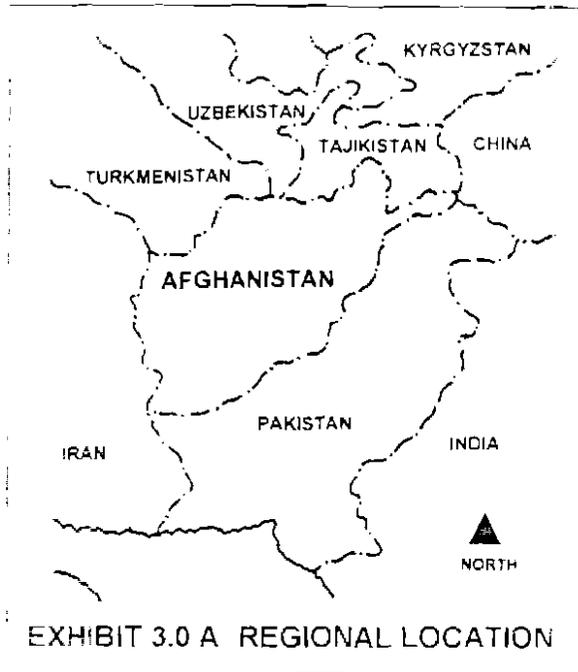


EXHIBIT 3.0 A REGIONAL LOCATION

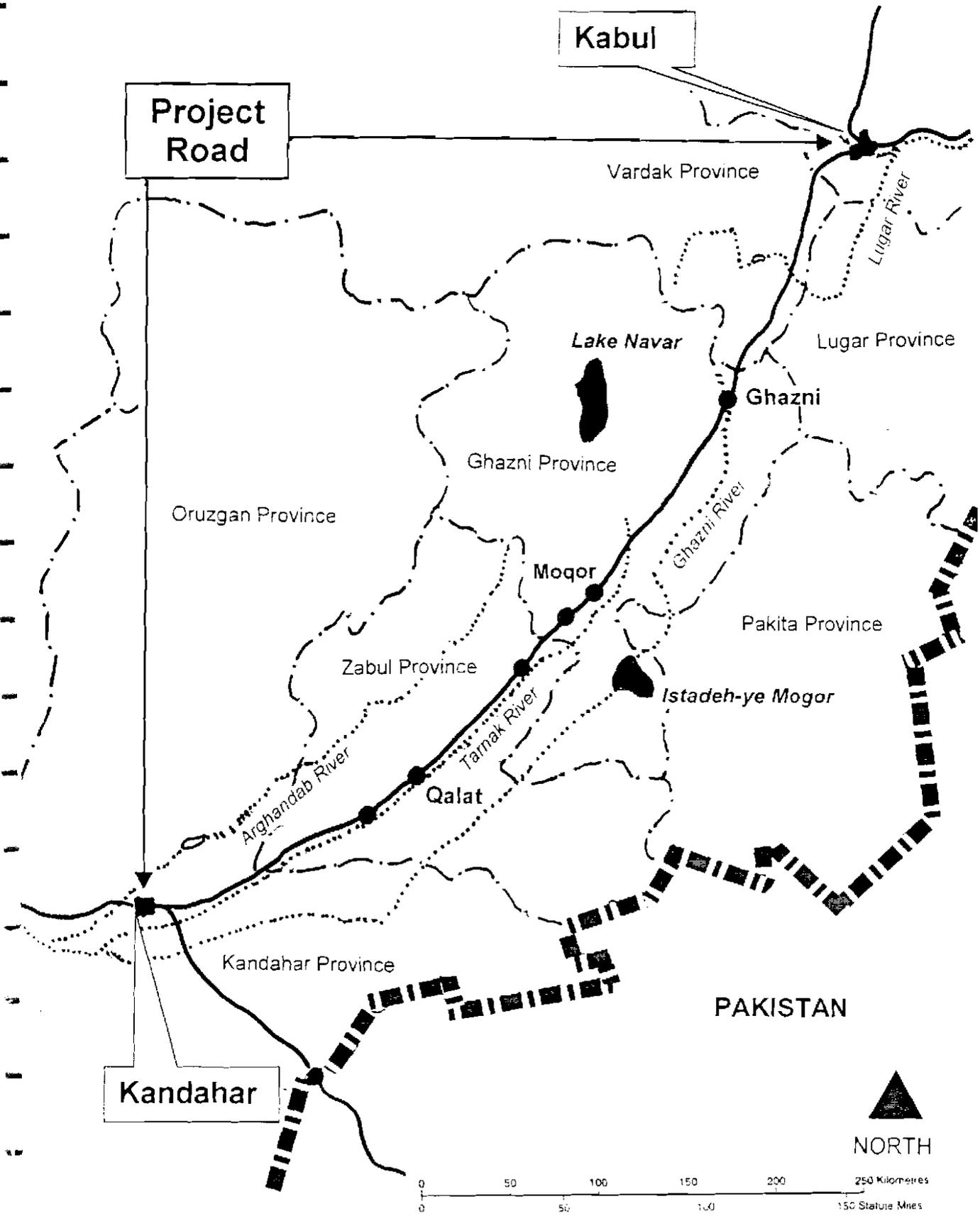
- KM 0 to KM 43 - paved, but in extremely poor condition.
- KM 43 to approximately KM 432 – Most of the road between KM 43 KM 482 has *deteriorated to a very rough, potholed gravel and dirt road. In some cases the potholes are over a meter deep and the size of a car.*² Portions of the pavement have survived within this section, however, in the populated areas (Ghazni, Mukur, Qalat and elsewhere).
- KM 432 to KM 482 (Kandahar) – paved, but in extremely poor condition.

Details of the administrative and strategic context and the proposed actions are provided below. Details of the existing conditions in the potentially affected area are provided item-by-item under the headings of the relevant environmental criteria in **Section 4.0**.

Strategic Context & Implementation Framework. As described in the foregoing statement of Purpose (**Section 2.0**), rehabilitation of the Kabul-Kandahar Road is part of the larger REFS Program devised to assist Afghanistan's economic recovery. Rehabilitation of the road will occur in a series of construction packages which are not yet fully finalized. It is anticipated that the construction will be in the range of 40-50 kilometers and that other international organizations may fund certain packages. Initial assessments indicate that the road segment from KM 0 to KM 43 (i.e., the existing, paved, dual lane section south of Kabul) will require predominantly maintenance activities and constitute a construction package to funded with the assistance of the Japanese Government. The first construction contract to be funded by USAID will address the segment from KM 43 to KM 92. The remainder of the highway will be addressed in a series of construction packages in the 40-50 kilometer range and may also involve funding by organizations in addition to USAID. The entire segment from Kabul to Kandahar is considered to constitute the Project for environmental assessment purposes so that the cumulative impacts of the actions are taken into account.

EXHIBIT 3.0 B

KABUL-KANDAHAR ROAD



Within those portions funded by USAID, rehabilitation and the replacement and/or repair of bridges and drainage structures will be conducted under the supervision of a USAID General Contractor (USAID/GC). Sub-Contractors will be responsible for various portions of the work on a Design-Build basis within the parameters established by the USAID/GC. It is also important to note that arrangements for the work will use the Conditions of Contract following the model established by FIDIC, *Federation International Des Ingenieurs Conseils* (International Federation of Consulting Engineers). FIDIC is the most widely adopted format for road construction projects and its construction management system is established primarily by three major components:

- **FIDIC General Conditions of Contract (GCOC).** The contents of the General Conditions of Contract (GCOC) are generally adopted verbatim.
- **Conditions of Particular Application (COPA).** GCOC are supplemented by Conditions of Particular Application (COPA) to render the contract specifications project-specific. COPA provisions have been drafted for use in the Project. The COPA environmental provisions are reproduced herewith as **Appendix A**.
- **Technical Specifications.** Technical Specifications for the highway will be prepared by the Sub-Contractors following the Design-Build approach adopted for the Project. The Technical Specifications must consistent with the GCOC and COPA.

3.1 THE PROPOSED ACTION

In accordance with the requirements of 22 CFR 216, the Proposed Action is identified as the Agency's Preferred Alternative. Key aspects of the rehabilitation activities proposed to apply to all portions of the highway included in the Project are anticipated as follows:

- **Rehabilitation Activities Confined to Existing ROWs.** Recommended maintenance activities are expected to be limited to work within the existing rights-of-way (ROWs), including minor widening, removing deteriorated or otherwise unsatisfactory layers of road structures and replacing them with new materials (aggregate and new pavement), straightening of some tight curves and improvement of drainage structures (as detailed below). Rehabilitation is expected to consist mainly of scarifying, leveling, reshaping and compacting the existing roadway as necessary to meet acceptable standards.
- **Existing Number of Lanes To Be Maintained.**
- **Shoulder Widths Not Yet Finalized.** A typical two-lane cross section will consist of a 7.5-meter carriageway plus shoulders. Two shoulder width options are under consideration:
 - 1.25-meter shoulders on either side; or
 - 2.25-meter shoulders on either side thus providing sufficient area for accommodation of non-motorized traffic (NMT) as well as emergency pull-off area
- **Replacement of Six Major Bridges.** The bridges, their locations, lengths and widths are as follows:

-	KM 46.1	7 meters long	8 meters wide
-	KM 262.2	18 meters long	8 meters wide
-	KM 294.8	12 meters long	8 meters wide

- KM 297.7 32 meters long 8 meters wide
 - KM 300.8 40 meters long 8 meters wide
 - KM 387 42 meters long 8 meters wide
- **Repair of 43 Additional Bridges** - totaling 1,357 meters (for an overall total of 1,513 meters) will require rehabilitation.
 - **Repairs and Replacements Of Culverts** – It is estimated that 28 large and medium box culverts will require only minor repairs to the parapet walls. 77 small box culverts will require replacement of some of their headwalls and repairs to others. A large number of pipe culverts (currently estimated as approximately 4,800) ranging in size from 46 cm to over 200 cm, many with head walls missing, will be rehabilitated.
 - **Bus/Truck Bays and Stops To Be Provided.** Sub-Contractors will be required to consult and coordinate with the Ministry of Public Works (MPW) in regard to the necessity and locations of bus bays and stops and truck bays and stops. Acceptable areas shall be agreed upon with MPW staff and the necessary design and construction undertaken to the same engineering standard as used for the highway.²
 - **Actions as Determined Necessary at the Sites of “Mexican Bridges”.** Mexican Bridges (also known as “Irish Crossings”) are road sections intentionally depressed to allow floodwaters to overflow the road unimpeded. It is anticipated that 33 sections totaling 9,363 meters will require corrective actions.
 - **Use of Local Labor.** It is anticipated that contract specifications will include provisions to “maximize the use of (locally hired) manual labor to the extent possible... and to use Afghan professional staff to the greatest extent possible and to mentor them, and give them greater management and implementation responsibility...” in accordance with stated REFS objectives.⁴
 - **Contract Specifications to Ensure Control of Ancillary Construction Activities.** Ancillary activities include, for example, the development of base camps, labor camps and asphalt plants necessary for the implementation of the proposed rehabilitation activities. The environmental portion of the specifications is presented in their entirety in Appendix A.
 - **Little or No Residential Resettlement.** Given the rehabilitation nature of the Project, little or no resettlement and relocation actions are anticipated. Field investigations did not reveal any residential structures subject to impact.
 - **Compensation of Project-Affected Persons (PAPs).** Commercial activities line portions of the road within the village bazaar areas through which it passes and will result in a number of project-affected persons (PAPs). Recommended guidelines for compensation requirements are provided by Appendix B and incorporated by reference in the COPA provisions.

3.2 ALTERNATIVES CONSIDERED

3.2.1 The “No Action” Alternative

The Agency Procedures specifically mandate documented consideration of the “No Action” Alternative. The “No Action” Alternative in this instance is defined as a decision not to

undertake the proposed rehabilitation of the Kabul-Kandahar Road through use of USAID funds. In the absence of adequate local funds and/or other international funding sources to undertake the required rehabilitation efforts, the "No Action" Alternative would result in the continued deterioration of the road, bridges and drainage structures along the ROW, thereby severely impeding the economic recovery of the Project Area and the country as a whole. All positive benefits would be foregone. The relatively minor, less than significant environmental impacts (such as noise and short-term air quality impacts due to maintenance activities) and inconveniences (such as traffic diversions) would be avoided in the short-run. In the long-run, however, the steadily declining state of the roadway would severely cripple Afghanistan's recovery efforts. In light of these considerations, the "No Action" Alternative is deemed to be neither prudent nor in the best interest of Afghanistan or those with an interest in, and attempting to assist restoration of, Afghanistan's well being.

3.2.2 Alternatives Considered & Eliminated From Detailed Study

Alternative approaches to road improvements may be discussed in terms of

- Site Alternatives. Site alternatives generally include alternative routes, re-alignments, by-passes and similar actions. In this instance, no alternative alignments, by-passes or similar categories of alternatives altering the site of the Proposed Action actions have been determined to warrant consideration.
- Design Alternatives. The circumstances of the Kabul-Kandahar Road are such that it offers few design alternatives with meaningful differences in their environmental implications – with one exception, the widths of shoulders and their safety implications for accommodation of non-motorized traffic (NMT) and emergency pull-off areas
- Technological Alternatives. All projects conducted as part of the REFS Program are required to "maximize the use of (locally hired) manual labor to the extent possible... and to use Afghan professional staff to the greatest extent possible and to mentor them, and give them greater management and implementation responsibility..." in accordance with stated REFS objectives.⁵ Consideration of technologically advanced and capital intensive approaches to road rehabilitation in these circumstances was, therefore, eliminated from detailed consideration.

3.2.3 Alternatives Warranting Consideration In Detail

Of the three categories of alternatives noted above, only one design alternative is considered to warrant consideration in detail from an environmental (Public Health & Safety) perspective. That issue is the provision or lack of shoulders capable of accommodating NMT and emergency pull-off areas.

3.2.4 Comparative Analysis

Incorporation of 2.25-meter shoulders (rather than the currently proposed 1.25 meters) is recommended to provide adequate space for emergency pull-offs and to accommodate non-motorized traffic (NMT). It is recognized that the issue is one with significant budget implications. It is, nonetheless, identified as a Recommended Mitigation Measure Not Included in the Proposed Action (Item 3.3 below) in accordance with the EA Content and Format provided by 22 CFR 216.

3.3 RECOMMENDED MITIGATION NOT INCLUDED IN THE PROPOSED ACTION

The assessment indicates that mitigation actions have been incorporated as warranted within the design of the proposed rehabilitation activities and the procedures for implementation, specifically the contract provisions and construction supervision activities as will be documented item-by-item in **Section 4.0**, with the exceptions of:

- **Finalization of shoulder width characteristics.** The provision of 2.25-meter shoulders on both sides of the roadway is recommended, particularly in areas of high NMT and pedestrian activity. And
- **Adoption of guidelines for compensation of PAPs.** Recommended Guidelines are provided by **Appendix B**.

In addition to these recommendations certain mitigation actions beyond the scope of the Project have been found to warrant consideration to ensure good environmental management once the road becomes operational, however. These include:

- **Traffic Safety Programs.** Initiatives in this areas are recommended for consideration as part of REFS Component 2. The recommendation is further explained hereinafter as part of **Section 6.0** (Compliance Procedures and Other Recommendations)
- **Enhancement of Roadside Economic Activities.** Consideration of market development activities in the vicinity of the Kabul-Kandahar Road is recommended as companion REFS Component 1 activities.
- **Coordination with Other Financing Organizations.** Rehabilitation of portions of the Kabul-Kandahar Road may be supported by organizations other than USAID including other bilateral organizations and the multi-lateral development banks. The establishment of a reasonably consistent technical/engineering standards for the rehabilitation activities (e.g., the widths of the shoulders in areas with significant levels of NMT) is highly recommended. A reasonable consistency in procedural standards and requirements is also highly recommended. Other very closely aligned projects such as the World Bank's Emergency Infrastructure Reconstruction (EIRP) will require Afghanistan's ministries to establish reporting procedures and will provide the ministries with institutional strengthening mainly to ensure conformance with procedures established by the Bank. Coordination of the technical reporting and procedures expected by the ministries by USAID, the World Bank, the Asian Development Bank and others is highly recommended so that the burden on local organizations to supply essentially the same information in different formats is minimized.
- **Coordination of Future Land Use & Transport Plans.** The long-term land use and urban development impacts of the Kabul-Kandahar Road Rehabilitation Project could be more significant than the short-term impacts of the construction period and are largely beyond the scope of the Project. REFS Component 2 can assist in the inter-governmental action necessary to monitor land use and urban development impacts and ensure that they are adequately managed in concert with other concerned agencies

END NOTES – SECTION 3.0

- ¹ 22 CFR 216 – Agency Environmental Procedures, Paragraph 216.6.
- ² Afghanistan Civil Infrastructure Assessment, August 2002, page 411/412.
- ³ Draft Scope of Work, Kabul-Kandahar Highway Design and Rehabilitation, Part VII, Item 2.5, page 4.
- ⁴ REFS Contract, page C-2.
- ⁵ REFS Contract, page C-2.

4.0 AFFECTED ENVIRONMENT

4.0 AFFECTED ENVIRONMENT

INTRODUCTION

Agency Procedures (22 CFR 216) state that the section of the EA addressed to the (potentially) Affected Environment "shall succinctly describe the environment of the area(s) to be affected or created by the alternatives under consideration. The descriptions shall be no longer than necessary to understand the effects of the alternatives. Data and analysis in the Environmental Assessment shall be commensurate with the significance of the impact with less important material summarized, consolidated or simply referenced."

In order to describe the existing conditions in the areas potentially affected, the following introductory material presents:

- Definition of the Project Area;
- Identification of the relevant environmental criteria for EA purposes;

The remainder of the Section presents the details of the potentially affected environment under four headings structured according to the relevant environmental criteria as will be detailed below.

Definition of the Project Area. The potentially Affected Environment for a given project (generally referred to as the Project Area) is defined by the nature of the proposed action and the sensitivity and circumstances of the environment in which it will occur. Both the nature of the project and the sensitivity of the environment must be considered. An environmentally benign project in one location might be detrimental in another.

The potential for both direct and indirect impacts must be considered in the definition of the Project Area. Potential direct impacts of a road project such as the proposed rehabilitation of the Kabul-Kandahar Road will be largely confined to the Project's construction limits and immediately adjacent environs. The conceptual limits of the Project Area must be expanded, however, to include the potential impacts of network improvements and other indirect and cumulative impacts in accordance with the circumstances of the particular environmental characteristic under discussion. A change in drainage patterns, for example, could have an impact on the conditions within the rehabilitation area and the watercourses directly affected, but may also impact hydrological conditions down stream to a degree that can only be determined by circumstances. The increased runoff due to highway development and the additional development that it attracts (referred to as an "induced impact") often warrants investigations in a considerably larger area than the construction limits and the immediately adjacent area. In the case of the Kabul-Kandahar Road Rehabilitation Project indirect and cumulative impacts, particularly socio-economic impacts, are likely to occur in all provinces through which road passes. Many of these impacts will be beneficial. Improvements to the roadway networks generally will, for example, present a potential for significant economic and social impacts along all network connections.

Accordingly, the Project Area for the purpose of the EA is defined as the area immediately adjacent to the 482-kilometer Kabul-Kandahar Road. The scope of the examination has been expanded to ensure that environmental impacts such as the example of potential down-stream hydrological impacts are taken into account.

Identification of the Relevant Environmental Criteria. The scope and significance of environmental issues for the Kabul-Kandahar Road Rehabilitation Project were addressed by a Scoping Process leading to the preparation of a Scoping Statement submitted to and approved by USAID in November 2002. Steps in the Scoping Process included review of the definition of environmental issues as established by the applicable regulations and other considerations. The review provided the framework for the identification and presentation of the relevant environmental criteria as follows.

Paragraph 216.1 (c) (10) of the Agency Environmental Procedures states that the *"term environment, as used in these procedures with respect to effects occurring outside the United States, means the natural and physical environment"*. Accordingly, the initial sections of the description of the potentially affected environment presents:

- **Physical Resources (Item 4.1).** Physical resources are generally defined to include topographic, soil, geological and related attributes. Sub-headings in this section are:
 - Topography (Item 4.1.1)
 - Soils (Item 4.1.2)
 - Seismic & Geological Conditions (Item 4.1.3)
 - Hydrology (Item 4.1.4)
 - Climate and Air Quality (Item 4.1.5)
 - Mines and Unexploded Ordnance (Item 4.1.6).
- **Natural/Biological Resources (Item 4.2).** Natural/biological aspects of the potentially affected environment are discussed under the sub-headings of:
 - Flora (Plant Species) (Item 4.2.2)
 - Fauna (Wildlife) (Item 4.2.1) and
 - Protected Areas (Item 4.2.3).

In addition to these requirements, Paragraph 216.6 of the Procedures states that *"... Environmental Assessment(s) should include discussions of possible conflicts between the proposed action and land use plans policies and controls for the areas concerned; energy requirements and conservation potential of various alternatives and mitigation measures; natural or depletable resource requirements and conservation potential of various requirements and mitigation measures; urban quality; historic and cultural resources; design of the built environment; reuse and conservation potential of various alternatives and mitigation measures; and means to mitigate adverse environmental impacts"*. Accordingly, these issues are addressed under the following heading and subheadings.

- **Other Environmental Concerns Noted by 22 CFR 216 (Item 4.3).** These are identified and discussed under the sub-headings of:
 - Land Use and Development Policies & Controls (4.3.1)
 - Energy Considerations (4.3.2)
 - Use of Natural/Depletable Resources (4.3.3)
 - Urban Quality/Design of the Built Environment (4.3.4)
 - Historic and Cultural Resources (4.3.5)
 - Reuse & Conservation Opportunities (4.3.6)

Additional environmental issues generally associated with road projects are addressed as:

- **Additional Environmental Concerns Noted for Consideration (Item 4.4)** These are discussed under the sub-headings of:
 - Socio-Economic Considerations (Item 4.4.1);
 - Public Health (Item 4.4.2),
 - Safety (Item 4.4.3)
 - Gender & Disabled Person issues (Item 4.4.4)
 - Noise (Item 4.4.5) and
 - Other Infrastructure Networks (Item 4.4.6).

Potential impacts and measures incorporated in the Project to avoid or otherwise mitigate the potential impacts are identified in **Section 5.0**. These include measures incorporated in contracting procedures and the Project design.

4.1 PHYSICAL RESOURCES

4.1.1 Topography

Afghanistan's topography is dominated by Hindu Kush Mountains which run northeast to southwest through the central region dividing the northern provinces from the remainder of the country. The southwest is occupied by desert plateau. The lowest point in the country is at Amu Darya at 258 meters above mean sea level (msl). The highest point is at Nowshak 7,485 meters above msl. The southern and western parts of the country are covered by deserts at elevations ranging from 500 to 1,000 meters above msl.¹

Compared to roads in other parts of the country, the Kabul-Kandahar Road raises few topographic challenges. The Kabul-Kandahar Road follows relatively flat to rolling surface over a fault line between the mountains in the eastern and south-central portions of the country. The portion of the road from Kabul to the Ghazni Provincial Border (approximately KM 125) ascends from an elevation of approximately 1,800 meters above msl at Kabul to approximately 2,200 meters at Ghazni. The provincial boundary is the watershed between Indus Drainage Basin and Lake of Sistan Drainage Basin on the Afghanistan-Iran border. After Ghazni, there is an overall descent to an elevation of approximately 1,000 meters at Kandahar. The ascent and descent are generally gradual, although hilly in parts and bordered by steep hills on either side of the ROW. Thirty-three (33) road sections totaling 9,363 meters are depressed "Mexican Bridges" (also known as "Irish Crossings") – i.e., areas in which the road is intentionally depressed to allow flash flood waters to overflow the road).

4.1.2 Soils

Within the country as a whole, the soils are characterized as high mountains serozems, desert steppe or meadow steppe. Loess is found in the north. The river valley soils are generally alluvial or meadow alluvial. Serozems and brown desert soils cover large portions of the country in the north and southwest.² Overgrazing, deforestation, desertification, degradation of watersheds and erosion have been identified as significant environmental issues significantly contributing to soil degradation and reduced soil productivity throughout Afghanistan. Land degradation has also been caused by land mines, which reduce access to agricultural land and irrigation.

Within the Project Area, soils are generally classified as mountain serozems and high mountain desert steppe soils in the northern portions (Kabul to a point south of Ghazni) and mountain light serozems south to Kandahar. Within the immediate Kandahar area soils are alluvial, meadow-alluvial soils, mostly saline.³ Uncontrolled urbanization in Kabul and to a lesser extent in Kandahar and encroachment on fertile lands are noted as threatening agricultural sustenance to the cities.⁴ (See related discussions as part of Item Land Use/Development Controls, **Item 4.3.1.**) Agricultural crops in the Project Area are reported as fruits (mainly grapes) in irrigated areas the vicinity of Kabul, and some dry land farming and livestock production in pockets along the length of the roadway.

Within the Project Road ROW, field investigations indicate that the soils conform to the A2 soils group, i.e., they exhibit good strength parameters for highways, but must be covered by pavement layers in order to protect them from the elements and moving wheel loads. Because of the absence of clay binders, the finer particles of the soils are prone to wind dispersal and contamination from blowing sand and dust. The coarse materials are then

easily dislodged under moving wheel loads. Rutting occurs when the finer particles containing silt or fine sand become incorporated in the sub-grade and contaminate both the base and sub-base materials. The existing conditions are such that the sub-grade or embankment must be reshaped and re-graded with new base course materials.⁵

4.1.3 Seismic & Geological Characteristics

Afghanistan's geological circumstances are complex and generally described in terms of plate tectonics, i.e., the premise that the earth's crust is made up of continent-sized slabs of rocks or plates which float on a more fluid layer of material known as the mantle. The plates move, collide, break up and reform as a result of currents and upwellings in the mantle. The mountain chains comprised of the Hindu Kush, Pamir, Karakoram and Himalayan Ranges are believed to have been the result of a collision of the Indian Plate and Asia Plate which began approximately 50 million years ago and continues to the present day. Much of the country is known to be seismically active. The Kabul-Kandahar Road is located along a fault line between the mountains. There is a history of damaging earthquakes that are most frequent in the northeast but are also reported in the areas east of Ghazni. Virtually the entire corridor is rated as an area with high potential for earthquake damage.⁶ Geological resources such as coal and gem stones are discussed as part of Item 4.3.3. Use of Natural and Depletable Resources.

4.1.4 Hydrology

The sources of most of Afghanistan's rivers are in the mountains. Water levels in the rivers vary greatly with the highest levels in spring and early summer. In the remaining seasons the rivers may change into small streams or entirely disappear. Three watershed systems can be differentiated in Afghanistan, two of which are traversed by the Project Road. The three systems are:

- The Eastern Basin. The Eastern Basin includes the Kabul and Logor Rivers and their tributaries which drain the eastern part of the country. The rivers within the eastern basin flow generally to the east and eventually join the Indus River and the Arabian Sea. The portion of the Project Road north of Ghazni lies within the Eastern Basin.
- The Southern Basin. The rivers of the Southern Basin flow generally to the southwest to the Lake of Sistan on the Afghanistan-Iran border and include the Helmand, the country's longest river, the Farah and the Khash. The Project Road south of Ghazni lies within the Southern Basin.
- The Northern Basin. The rivers in the northern part of the country flow northward to the Amudarya River on the country's northern boundary (and eventually to the Aral Sea) or disappear in the desert sands. The Project Area does not include the Northern Basin.

In total, watercourse crossed by the ROW require:

- 46 Bridges with a total length of 1,513 meters (Six of the bridges have been totally destroyed and require replacement).
- 28 large and medium box culverts requiring only minor repairs to the parapet walls
- 77 small box culverts requiring replacement of some of their headwalls and repairs to

others.

- Pipe culverts, the number of which was originally estimated as 645 and currently estimated as approximately 4,800 ranging in size from 46 cm to over 200 cm, many with head walls missing.⁷

Major hydrological features along the ROW are as follows:

- **KM 15** - Crossing of the Kabul River.
- **KM 27** - Crossing of the Ligor River, a tributary of the Kabul.
- **KM 134** – Crossing of the Ghazni River. The roadway roughly parallels the path of the Ghazni River from KM 134 on its western bank in south-southwesterly direction until KM 186 at which point the Ghazni turns more directly south to flow into *Istadeh-ye Mogor*, a large lake north of the town of Nawah. The lake is part of the Ab-I-Estada Waterfowl Sanctuary discussed in **Item 4.2.3** below. The ROW crosses virtually of the tributaries of the Ghazni.
- **KM 186 to KM 482** (Kandahar) – between KM 186 and 482 the roadway roughly parallels the Tarnak River on its western bank. Beyond Kandahar the Tarnak joins the Arghandab and flows into the Helmand and the eventually the complex of lakes and wetlands on the Afghanistan-Iran border (well outside the Project Area).

The aftermath of flash flooding is evident in much of the area, particularly at the locations of Mexican Bridges (Irish Crossings). Boulders carried by the floodwaters have damaged many and many more have been undermined causing slabs to collapse. Most will need cutoff walls of sufficient depth to prevent undermining.

In addition to the rivers and watercourses crossed by the Project Road, two additional surface hydrological features warrant consideration (**Exhibit 4.1.4**)

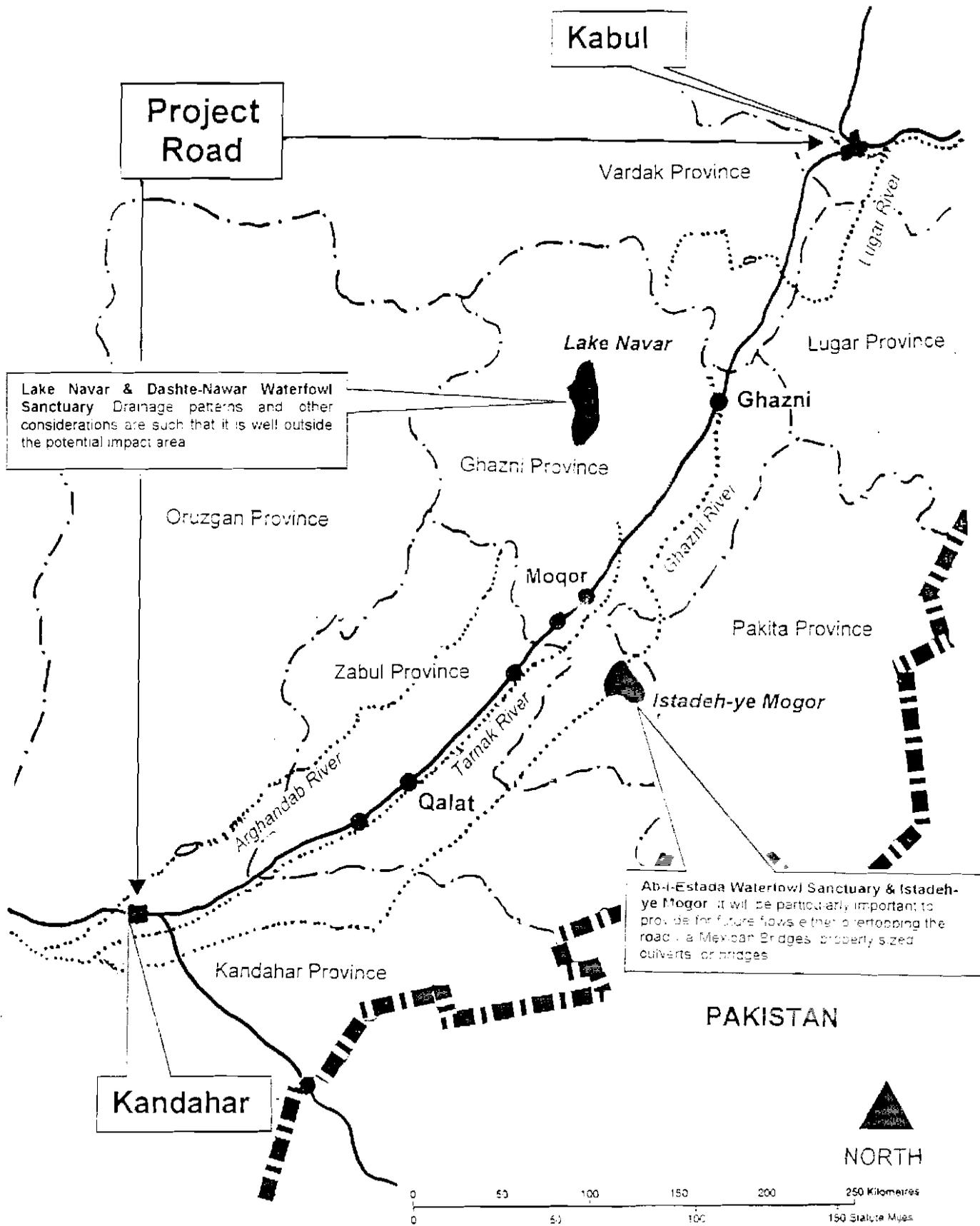
- **Lake Navar**. Lake Navar is a freshwater lake located in the mountains to the west of the Project Road. And is the site of the Daqshte-Nawar Waterfowl Sanctuary as will be discussed in **Section 4.2.3**. The intervening topography and drainage patterns are such that Lake Navar is well outside the area of potential impact.
- **Istadeh-ye Moqor**. Istadeh-ye Moqor is a saltwater lake located to the east of the Project Road. The lake is fed by the Ghazni River and its tributaries, most of which are crossed by the Project Road and are, therefore subject to impact due to the proposed rehabilitation activities. The lake is also the site of the Ab-I-Estada Waterfowl Sanctuary as will be discussed in **Section 4.3.2**. The provision and maintenance of adequately design draining structures will be critical to the

4.1.5 Air Quality

Climate, particularly precipitation and wind patterns, is a major determinant of air quality. Afghanistan's climate is continental, arid to semi-arid, with considerably variations from place to place according to altitude. Its lowland areas have cold winters and hot summers. The mountains are extremely cold in winter and cool in summer. Winter lasts from October to May. Most of the country's fresh water supply is reported to fall as snow in the mountains.⁸ The Project Area in which rehabilitation activities will occur is located in the lowland areas. Climate is not as a significant impediment to traffic within Kabul-Kandahar corridor as it is

Exhibit 4.1.4

SURFACE HYDROLOGY



within the more mountainous portions of the country. No significant micro-climatic conditions (e.g., air inversions) have come to light.

Within the Project Area levels of suspended particulate matter (SPM) are particularly high in areas where the road is not paved. No documentation of air quality in the Project Area is known to be available, but the climatic and soil conditions of the Project Area are such that it is likely to be subject to dust storms, particularly in the summer months, leading to higher levels of SPM. Generally, however, except for the effects of traffic on the unpaved road air pollution levels outside of the urban areas are considered to be relatively low due to the low level of industrialization. The cities are the areas with the poorest air quality due to automotive emissions and concentrations of industries.

4.1.6 Mines and Unexploded Ordnance

Mines and unexploded ordnance (UXO) may be present in portions of the Project Area. As noted in the Scoping Statement, however, special provisions have been made by USAID for the clearance of mines and UXO by the United Nations Mine Action Center (UN MAC).⁹

4.2 NATURAL/BIOLOGICAL RESOURCES

4.2.1 Flora

Afghanistan's vegetation is typical of the semi-deserts and steppes. Ephemeral vegetation grows in the sandy semi-deserts and halophilous vegetation is found in the salt semi-deserts. The most common trees on the more humid soils are oaks, asnes, willows, poplars and fruit trees in orchards. Himalayan forest, including evergreen oak woods grow in the borderland between Afghanistan and Pakistan.¹² The country's mountains are believed to be home to many plants that exist nowhere else on earth. The steppes and intermediary ecosystems are also of biological interest.¹³ Unfortunately, areas supporting natural flora habitat are diminishing. The Asian Development Bank (ADB) reports that one of the most critical environmental problems of Afghanistan is massive deforestation and overgrazing which could be aggravated by the return of the refugees. It is estimated that forest cover declined from 3.4 to 2.6 percent of total land area between 1970 and 1990. Since then, continued timber harvesting and the use of forest resources for fuel have reduced forest cover to less than two percent of the total area.¹⁴

Most of the Kabul-Kandahar Road corridor's natural landscape is uplands dominated by scrub steppe vegetation with juniper scrub and woods occurring along watercourses.¹⁵ No documentation of potential lowland habitat for threatened or endangered plant species has come to light. The Project Area is located in an un-forested lowland area in the southeastern portion of the country. Areas within or adjacent to the ROW have been heavily disturbed by human activities and are highly unlikely to provide habitat for rare or endangered plant species. As indicated by the accompanying photographs (Appendix C), trees and other plant life along the ROW are few except along the river valleys crossing the road corridor.

4.2.2 Fauna (Wildlife)

The fauna of Afghanistan is similar to that of the rest of Central Asia. Beast of prey like the snow leopard, the brown bear, the wolf, the striped hyena, the jackal and the fox live in the mountains. Hoofed animals are represented by Marco Polo sheep, the goitered gazelle and the ibex. Numerous species of birds, rodents, reptiles and amphibians have been reported.¹⁶ The factors that make the Project Road ROW and the adjacent areas an unlikely venue for threatened and endangered plant species also make it an unlikely for special status wildlife species. Field investigations revealed no evidence of existing conditions suggesting possibilities of habitat loss; habitat fragmentation; interruption of wildlife migration patterns or significant patterns of accidents involving wildlife within the vicinity of the Project Road.

Existing conditions have also been assessed vis-a-vis potential indirect wildlife impacts under the following headings:

- Accessibility i.e., the potential for sudden influxes of visitors as a result of increased access. No impacts due to increased accessibility are considered likely.
- Ecological Disequilibrium. Opening of a transport corridor sometimes results in the introduction of new plant and/or animal species along the roadway upsetting the dynamic balance that exists in the ecosystem and altering predator-prey relationships. In this instance, the fact that the corridor is devoted to transport or has been otherwise altered by man minimizes any potential for ecological disequilibrium.

4.2.3 Protected Areas

Three designated and three proposed protected areas have been identified in the country. One (the Ab-I-Estada Waterfowl Sanctuary) is located within the Project's potentially affected area by virtue of the roadways potential impact on area drainage patterns. The six areas, their locations and other relevant data are as follows:¹⁵

- **Ab-I-Estada Waterfowl Sanctuary.** As indicated by the foregoing **Exhibit 4.1.4**, the Ab-I-Estada Waterfowl Sanctuary is located in conjunction with *Istadeh-ye Mogor*, a large lake north of the town of Nawah. The lake is fed by the Ghazni River and its tributaries which are crossed by the Project Road ROW. Although the lake is reported to be dry at present due to drought conditions over the last five years, it will be particularly important to provide for future flows either overtopping the road via Mexican Bridges, properly sized culverts, or bridges.
- **Ajar Valley (Proposed) Wildlife Reserve.** The proposed Ajar Valley Wildlife Reserve is a former royal hunting ground located in Bamian Province in the central part of the country and well outside the Project Area.
- **Bande Amir National Park.** Bande Amir National Park is also located in Bamian Province near the proposed Ajar Valley Wildlife Reserve in the central part of the country and well outside the Project Area.
- **Dashte-Nawar Waterfowl Sanctuary.** The Dashte-Nawar Waterfowl Sanctuary is located in Ghazni Province 40-50 kilometers northwest of the Project Road. Drainage patterns and other considerations are such that it is well outside the potential impact area.
- **Pamir Buzurg (Proposed) Wildlife Sanctuary.** The proposed Pamir Buzurg Wildlife Sanctuary is located in the extreme northeastern part of the country and well outside the Project Area.
- **Kole Hashmat Khan (Proposed) Waterfowl Sanctuary.** The proposed Kole Hashmat Khan Waterfowl Sanctuary is a former royal hunting ground located far south of Kabul and outside the Project Road's potentially affected area.

4.3 OTHER ENVIRONMENTAL CONCERNS NOTED BY 22 CFR 216

As noted in the introductory remarks, issues addressed in this section are discussed under the following headings:

- Land Use and Development Policies & Controls (4.3.1)
- Use of Natural/Depletable Resources (4.3.2)
- Urban Quality/Design of the Built Environment (4.3.3)
- Historic and Cultural Resources (4.3.4)
- Energy & Conservation (4.3.5)
- Reuse & Conservation (4.3.6)

4.3.1 Land Use and Development Policies & Controls

Land Use. The available data indicates that, as of 1988, approximately 12 percent of Afghanistan's land was estimated to be arable, but that none was devoted to permanent crops.¹⁶ Land uses along the Kabul-Kandahar Road are indicated by the accompanying photographs and can be characterized as follows:

- **KM 0** (i.e., at the Project's point of initiation in Kabul). Land uses are predominantly commercial and transport related, including significant bus and taxi stands. There is generally little encroachment of these uses into the ROW. (A brief description of Kabul in a broader context is provided in **Item 4.3.4 Urban Quality**).
- **KM 0-42**: Shortly after KM 0 the urban land uses dissipate. Most of the arid landscape is not occupied or devoted to productive land uses, with the exception of periodic walled enclaves and agricultural and grazing activities in the vicinity of waterways.
- **KM 43**: Small village (Durrani)
- **KM 43-60**: Most of the arid landscape is not occupied or devoted to productive land uses, with the exception of periodic walled enclaves and agricultural and grazing activities in the vicinity of waterways.
- **KM 60**: Small village
- **KM 60-70**: Terraced area with trees. Wheat, maize and apples are reported to be the major crops.
- **KM 70**: Small village (Khwaj Kalah) (**Exhibit 4.3.1**)
- **KM 70-120**: Most of the arid landscape in this area is not occupied or devoted to productive land uses, with the exception of periodic walled enclaves and agricultural and grazing activities in the vicinity of waterways.
- **KM 120**: Small village
- **KM 120-134**: Most of the arid landscape is not occupied or devoted to productive land uses, with the exception of periodic walled enclaves and agricultural and grazing activities in the vicinity of waterways.
- **KM 134**: Ghazni. A brief description of Ghazni is provided in **Item 3.3.5 Urban Quality**

Exhibit 4.3.1

ROADSIDE COMMERCIAL ACTIVITIES (KM 70)



Kabul-Kandahar Road – KM 70. Left (east) side.

Note: Photograph taken shortly after dawn, prior to the initiation of most commercial activities.



Kabul-Kandahar Road – KM 70. Right (west) side.

Note: Photograph taken shortly after dawn, prior to the initiation of most commercial activities.

- **KM 134-210:** Most of this area is desert landscape punctuated by nomadic groups herding camels, goats and sheep.
- **KM 210:** Small village.
- **KM 210-238:** Most of the arid landscape is not occupied or devoted to productive land uses, with the exception of periodic walled enclaves and agricultural and grazing activities in the vicinity of waterways.
- **KM 238: Moqor.** Commercial activities line the roadway in and around Moqor. There is a high likelihood of impacts to economic assets and PAPs in this area.
- **KM 238-250:** Most of the arid landscape is not occupied or devoted to productive land uses, with the exception of periodic walled enclaves and agricultural and grazing activities in the vicinity of waterways.
- **KM 250:** Small village
- **KM 250-285:** Most of the arid landscape is not occupied or devoted to productive land uses, with the exception of periodic walled enclaves and agricultural and grazing activities in the vicinity of waterways.
- **KM 285: Shah Juy.** Commercial activities line the roadway in and around Shah Juy. There is a high likelihood of impacts to economic assets and PAPs in this area.
- **KM 285-352:** This area is punctuated by a number of farming and orchard areas. The road parallels the Tarnak River on its western bank. The ROW crosses several tributaries of the Tarnak. Bridges and culverts in this area heavily damaged or destroyed.
- **KM 352: Qalat.** Commercial activities line the roadway in and around Qalat. There is a high likelihood of impacts to economic assets and PAPs in this area.
- **KM 352-470:** Cultivation continues intermittently after Qalat and yields to urban uses nearing the entrance to Kandahar. A brief description of Kandahar is provided by **Item 4.3.5, Urban Quality.**

The assessment indicates that there is likely to be little if any impact to residences along the ROW as a result of the Proposed Action. As noted above, however, there are, however, several areas in which the Project Road passes through village bazaars and commercial activities oriented to the road and farming areas in which productive agricultural land may be affected. Those who occupy the stalls and commercial areas along the verges of the road and/or infringe on the ROW and those engaged in farming and other roadside economic activities will be impacted and qualify as "project-affected persons" (PAPs) as that term is generally defined by the international assistance community, i.e., persons whose livelihood is directly or indirectly affected by a project. The potential for impact is most evident at, but not necessarily limited to, the roadside bazaars and commercial areas in and around Ghazni, Mogor, Qalat, Shah Juy and Kandahar

Urban Development Controls. The Ministry of the Interior (MOI) is reported to be responsible for municipal governance and oversight. The Ministry of Housing, Building and Town Planning (MHBTP), formerly the Ministry of Urban Development, however, is

responsible for the preparation of master plans and oversight of construction norms and standards. It is reported that MHBTP was at one time subsumed under the Ministry of Public Works (MPW). It has, however, reportedly been re-established as a separate entity, albeit lacking in staff and assets.

MHBTP will be responsible for the allocation of resources made available by urban sector programs such as the World Bank's Emergency Infrastructure Reconstruction Project (EIRP). EIRP has been devised to use existing public participation mechanisms such as the existing system of district *shura* to prioritize development activities. Within the established system, proposals are to be forwarded to MHBTP in July 2002 for determinations of "no objection". Given the recognition of the need for planning and the threat of urban encroachment on scarce farmland, control of such encroachments in the Project Area's Kabul and Kandahar would appear to be a logical part of the MHBTP review process with the technical assistance of the World Bank.

Kabul enjoys a special status, but its functions are reported to be typical of urban local authorities. Prior to 1992, the Kabul Municipality was nominally responsible for the implementation of the city's 1978 master plan – a goal not fully realized due to insufficient funds, lack of management and planning capacity, and the fact that unplanned shelter expansion occurred and other government agencies often undertook construction of facilities without reference to the master plan. The municipality was also responsible for the construction of canals, ditches, flood protection measures, solid waste management, supervision of public parks, construction and paving of urban roads, control of food prices, distribution of land plots for commercial and residential purposes, cultural services and expansions of food markets. In cooperation with the concerned ministries, it was also indirectly involved in the construction of the city sewerage system, water supply, construction of prefabricated apartments, city power, communications, public health, education, public transport (in consultation with the Ministry of Transport, MOT) and traffic management (in consultation with the Ministry of the Interior, MOI).

Reports indicate that residential areas are currently organized administratively by the municipalities in all cities into *gozars* (neighborhoods) with distinct physical boundaries. Each of which has a *wakil-e-gozar* (neighborhood level representative). Typically, 15-20 *gozars* form a single district. Prior to the Mujahideen takeover elections were held for the community representatives at the district level. In connection with current rehabilitation efforts, districts (*shuras*) have been formed and representatives from the *shuras* combine to form an informal council which meets regularly at the municipal level.

4.3.2 Energy Considerations

The World Bank reports that the vast majority of the Afghan population relies on traditional household fuels (wood, bushes, crop residues and animal waste) for its energy needs. There are reports of over-exploitation of forestry resources and non-sustainable production and use of fuel wood leading to deforestation and severe environmental degradation in many areas.¹⁷

Afghanistan's energy situation is reported as follows:

- Electrical Supply & Demand. The year 2000 electrical capacity was estimated as 375 million kWh, most of which (64 percent) was supplied by hydro facilities and the remainder (36 percent) by fossil fuel plants. Demand exceeded supply and the country imported 105 million kWh.¹⁸ Only about four percent of the population is reported to have access to electricity - mainly in the urban areas.¹⁹ In Kabul about half of the consumers

are provided with electricity on alternate days.

- **Energy Resources.** The Soviets estimated Afghanistan's proven and probable natural gas reserves at up to five trillion cubic feet (Tcf) in the 1970s. At its peak in the late 1970s, Afghanistan supplied 70-90 percent of its natural gas output to the Soviet Union's natural gas grid via a link through Uzbekistan. Besides oil and natural gas, Afghanistan is estimated to have 73 million tons of coal reserves, most of which is located in the region between Herat and Badashkan in the northern part of the country. Although Afghanistan produced over 100,000 short tons of coal annually as late as the early 1990s, as of 1999, the country was producing only around 1,000 short tons.²⁰ The World Bank reports that two producing gas fields are continuing to produce in the north. The current gas production is about 550,000 cubic meters per day, which is one-fourth of the production in the 1980s. Seventy percent of current production is reported to be used in a fertilizer factory and power plant. Transmission and distribution pipelines have corroded and about 30 percent of the gas is lost due to leakage. The existing coalmines are hardly operable.²¹ No gas pipelines are known to exist in the Project Area.
- **Petroleum Products.** Afghanistan has significant oil and gas resources. Petroleum products such as diesel, gasoline, and jet fuel are imported, mainly from Pakistan and Turkmenistan. A small storage and distribution facility are reported to exist in Jalalabad on the highway between Kabul and Peshawar, Pakistan. Turkmenistan is also reported to have a petroleum product storage and distribution facility at Tagtabazar near the Afghan border, which supplies northwestern Afghanistan.²² World Bank reports indicate that local officials envision the development of the country's considerable hydrocarbon potential to supply the needs of the domestic market, to export and to generate revenue.²³

4.3.3 Use of Natural/Depletable Resources

Rehabilitation of the Kabul-Kandahar Road will require the use of certain natural resources and will facilitate the transport of others for use elsewhere. The most economically significant of the available resources in Afghanistan are identified as natural gas, petroleum, coal, copper, chromite, talc, barites, sulfur, lead, zinc, iron ore, salt, precious and semiprecious stones.²⁴ The country is also well supplied with rock, sand and other quarried construction materials as required for the proposed road rehabilitation. (Natural gas, coal and other energy-related resources are discussed under the heading of Energy & Conservation as part of **Item 4.3.2** above.) The World Bank notes that ineffective legislation and weak public sector institutions limit the ability of the central government to exert control over mineral resources and to mobilize investments for their development. Semi-precious gem stones and industrial minerals are being inefficiently mined, but detailed information is not available.²⁵

Within the Project Area, published sources indicate areas of mineral resources established by drilling along most of the Project Area including iron ore, chromium, gold, limestone, marbles, sand and gravel.²⁶

4.3.4 Urban Quality/Design of the Built Environment

The Project passes through three significant urban areas which may be briefly described as follows:

- **Kabul**, capital of the country and Kabul Province, is on the Kabul River at an elevation of

about 1,800 meters above msl (about 5,900 feet), making it one of the highest capital cities in the World. The city houses a population of approximately one million people and is the nation's chief economic and cultural center. It has long been of strategic importance because of its proximity to the Khyber Pass between Afghanistan and Pakistan. Kabul rose to prominence in 1504, when it was made the capital of the Mogul Empire by the conqueror Babur. Delhi replaced it as the imperial capital in 1526, but Kabul remained an important Mogul center until it was captured, in 1738, by the Persian ruler Nadir Shah. In 1747 Kabul became part of an independent Afghan state, and in the 1770s it replaced Kandahar as the capital of Afghanistan. It was a focus of British, Persian, and Russian rivalry for control of the Khyber Pass in the 19th century, when it was twice occupied (1839-1842 and 1879-1880) by British troops. The city grew as an industrial center after 1940.

Kabul was occupied by troops of the Union of Soviet Socialist Republics (USSR) in 1979; the USSR withdrew from Afghanistan on 15 February 1989. Over 50,000 people lost their lives during the Mujahideen infightings on the streets of Kabul in 1992-1996 period. The city was under the control of the Taliban government from 1996 to 2001. The Northern Alliance took over the city as the Taliban withdrew from Kabul and retreated southwards. No data is currently in hand indicating the city's growth trends, but the diminishing arable land for urban use has been noted as an issue.

- **Ghazni** (approximately 134 kilometers south of Kabul) lies beside the Ghazni River on a high plateau (elevation of 2,225 meters above msl) on the Lora River. It is Afghanistan's only remaining walled town and is dominated by a 45-meter high citadel built in the 13th century. It is the capital of Ghazni province with a population of 35,900 and a market center for sheep, wool, camelhair cloth, corn, and fruit. The famed Afghan sheepskin coats are made in the city. Ghazni's major fortress was taken by the British in 1839 and 1842 during the Afghan Wars and it became a strategic military target during the Russian-Afghan War. Ghazni is now a significant commercial and industrial center, dealing mainly in livestock, furs, silk, and agricultural products. No data is currently in hand indicating the city's growth trends, but the diminishing arable land for urban use has been noted as an issue.
- **Kandahar** had an estimated 1990 population of 237,500 persons. It is considered the birthplace and first capital of modern Afghanistan, founded by Ahmad Shah Durrani in 1747, and is today the second largest city of Afghanistan. The city is located on a broad, irrigated plain and is a commercial center for a fruit-growing and sheep-raising region. Industries housed in and around the city include fruit-processing plants and textile mills. Trade in hides, tobacco, textiles, and carpets are also important to the economic life of the city. No data is currently in hand indicating the city's growth trends, but the diminishing arable land for urban use has been noted as an issue.

The World Bank reports that due to the war conditions, urban infrastructure failed to match the increasing demands and deteriorated due to a lack of maintenance and war-related destruction. Public buildings are reported to have been looted of tools and equipment. Approximately 25 percent of urban housing was reported as seriously damaged or destroyed as of May 2002 and approximately 40 percent of housing units are reported to be located in unplanned areas.²⁷ Urban management capacity has been severely undermined. Urban water supply and sanitation, solid waste management and storm water drainage facilities are in need of urgent repair. Access to adequate and safe water and sanitation facilities is limited, although in some areas NGOs and communities have improved conditions. Currently an estimated 23 percent of the population has access to safe water, although this masks the wide differences among the provinces and districts. Coverage is poor. Less than 20 percent

of Kabul's population has access to piped water and many provincial and secondary towns have no networked services. Many urban families lack access to safe sanitation. Water borne diseases are a major cause of the prevailing high infant and mortality rates. The World Bank reports that in 1997, sanitation coverage was estimated to be 23 percent the urban population (versus eight percent of the rural population).²⁸

It is anticipated that the municipalities will assume major responsibility for reconstruction of the urban environment in close collaboration with residents. Investments in private facilities such as houses are likely to be the responsibility of families and NGOs rather than government programs. Public infrastructure (urban roads, sanitation, public parks, etc.) will be the responsibility of municipalities and carried out through local contractors or labor-based contracts. Flexible urban planning to facilitate appropriate development of housing and municipal services is noted as a priority need.²⁹

4.3.5 Historic and Cultural Resources

Historic and cultural resources include monuments, structures, works of art, the sites of outstanding universal value from historical, aesthetic, scientific ethnological and/or anthropological points of view, including unrecorded graveyards and burial sites. Afghanistan is rich in historic and cultural resources. The responsibility for preservation, maintenance and assessment of historical and cultural monuments in Afghanistan rests with the Archaeological Committee under the Ministry of Information and Culture (MOIC).

Within the Project Area, the most significant aboveground cultural resources are located within the urban areas. None are known to be susceptible to impacts as a result of the Proposed Action, but there is not known to be an available inventory of such resources and situation is not well documented. The Ghazni area is noted as an area with a high potential for archaeological resources and the possibility for archaeological resources exists in other provinces as well.

4.3.6 Reuse and Conservation Opportunities

Portions of the existing roadway will require stripping to the sub-base and reconstruction of the roadway. The stripped material may provide an opportunity for recycling in the reconstruction process.

4.4 ADDITIONAL ENVIRONMENTAL CONCERNS NOTED FOR CONSIDERATION

4.4.1 Socio-Economic Considerations

Economic considerations in Afghanistan have been overshadowed by political and military upheavals during two decades of war. Gross domestic product fell substantially because of the loss of labor and capital and the disruption of trade and transport. Severe drought added to the nation's difficulties in 1998-2001. The majority of the population continues to suffer from insufficient food, clothing, housing, and medical care, problems exacerbated by military operations and political uncertainties. Inflation remains a serious problem. Following the US-led coalition war that led to the defeat of the Taliban in November 2001 and the formulation of the Afghan Interim Authority (AIA) resulting from the December 2001 Bonn Agreement, international efforts to rebuild Afghanistan were addressed at the Tokyo Donors Conference for Afghan Reconstruction in January 2002 resulting in the creation of a trust fund to be administered by the World Bank. Priority areas for reconstruction include the construction of education, health, and sanitation facilities, enhancement of administrative capacity, the development of the agricultural sector, and the rebuilding of road, energy, and telecommunication links.

As of 1990, approximately 80 percent of Afghanistan's 10 million-person labor force was employed in agriculture, ten percent in the service sector and ten percent in industry. Industries are generally small-scale production of textiles, soap, furniture, shoes, fertilizer, and cement; hand-woven carpets; natural gas, coal, and copper.³⁰ No economic data is known to be available for the four provinces through which Kabul-Kandahar road passes. It is notable, however, that it passes through the country's two largest urban centers.

4.4.2 Public Health

Access to adequate and safe water and sanitation facilities is limited. It is estimated that 23 percent of the population has access to safe water. Many provincial and secondary towns have no networked services. Water borne diseases are a major cause of the prevailing high infant and mortality rates. Approximately 85,000 children under the age of five die annually from diarrheal diseases. As noted above, few residential or public buildings in Afghan cities have sewerage facilities and those that do discharge their wastewater directly into rivers without treatment. The World Bank reports that in 1997, sanitation coverage was estimated to be 23 percent of the urban population (versus eight percent of the rural population).³¹

Although public health facilities and services in Afghanistan suffered due to civil unrest and severe economic problems, the Kabul-Kandahar Road provides one of the main access routes to such health care facilities as are available for the population within the potentially affected area. In addition to the lack of access to safe water and the lack of sanitary waste disposal practices in the Project Area, poor air quality due to factors directly attributable to the condition of the Project Road constitute a significant public health issue.

4.4.3 Safety

Safety issues related to civil unrest and crime are major concerns in the Project Area as they are in the rest of the country. In terms of traffic safety, traffic volumes are light and current road conditions largely preclude excessive speeds. Non-motorized traffic (NMT) is

encountered in some areas, most frequently in the agricultural areas, but is also relatively light at present.

4.4.4 Gender & Disabled Persons Issues

The terms of reference for REFS specifically note that "all projects will take into consideration gender issues and accessibility for disabled persons".³²

It has been noted that the last twenty years of social upheaval have greatly affected the overall gender situation in Afghanistan, resulting in very restrictive policies vis-à-vis women's participation in public life, access to education, other services and employment opportunities. Women and girls were effectively excluded from any participation in public life during the Taliban regime. With the replacement of the Taliban regime, women have regained the right to education, employment opportunities and services, but the prevailing social norms are still very conservative and restrictive regarding women's participation in the national development effort. There are huge differences between Kabul and the much smaller secondary cities and the rural areas. There are also considerable regional differences with the more restrictive and conservative south and southeastern parts of the country, and the western and northern areas. There are also reported to be great differences between returning refugees and those who remained in the country.³³ No legislation in regard to discrimination against, or incentives for, the employment of the disabled is known to be in place in Afghanistan.

4.4.5 Noise

Ambient noise levels in the Project Area are relatively low, even in the more urbanized areas. Field investigations did not reveal the presence of "sensitive receptors", i.e., recipients of sound for whom exposures to excessive sound levels are detrimental - hospitals, for example - in proximity to the Project Road.

4.4.6 Other Infrastructure Systems

The formal infrastructure sector in Afghanistan is largely owned and operated through centralized ministries with some operational and production functions delegated to government enterprises. The reach of formal services, however, is very limited. In the urban water supply and sanitation sectors there is reported to be substantial private participation in service deliveries mainly through communities, NGOs and UN agencies. In rural areas NGOs and communities have been and are likely to remain the core providers of infrastructure services.

Water Supply Systems. Piped water supply systems exist only in urban areas and are in need of urgent repair. Coverage is poor. Less than 20 percent of Kabul's population has access to piped water and many provincial and secondary towns have no networked services.³⁴ No piped water supply systems are known to be within the potential direct impact area.

Wastewater Collection Systems. Virtually no rural areas and few residential or public buildings in Afghan cities have networked wastewater collection sewerage facilities and those that do discharge their wastewater directly into rivers without treatment. The World

Bank reports that in 1997, sanitation coverage was estimated to be 23 percent of the urban population (versus eight percent of the rural population).³⁵ No piped wastewater collection systems are known to be within the potential direct impact area.

Electrical Systems. Above ground electrical connections are evident within settlement areas. No underground systems are known to exist within the potential impact area.

Irrigation Systems. Portions of the Project Area are irrigated. Such systems appear to be highly localized and accommodated by the Project Road's existing (albeit ill maintained) drainage structures.

END NOTES – SECTION 4.0

- ¹ National Atlas of the Democratic Republic of Afghanistan, Organization for Surveying and Cartography and GEOKART Poland, 1995.
- ² National Atlas of the Democratic Republic of Afghanistan, Organization for Surveying and Cartography and GEOKART Poland, 1995, page VII.
- ³ National Atlas of the Democratic Republic of Afghanistan, Organization for Surveying and Cartography and GEOKART Poland, 1995, page 20.
- ⁴ Asian Development Bank, Afghanistan Country Strategy Paper.
- ⁵ Afghanistan Civil Infrastructure Assessment, Final Report to USAID/Afghanistan, 20 August 2002, page 274.
- ⁶ National Atlas of the Democratic Republic of Afghanistan, Organization for Surveying and Cartography and GEOKART Poland, 1995, pages 9-11.
- ⁷ Original estimate supplied by the Afghanistan Civil Infrastructure Assessment, Final Report to USAID/Afghanistan, 20 August 2002. Revised estimate by Jim Myers, Kabul 16 November 2002.
- ⁸ Lonely Planet
- ⁹ REFS Contract, page C-8.
- ¹⁰ National Atlas of the Democratic Republic of Afghanistan, Organization for Surveying and Cartography and GEOKART Poland, 1995, page VII.
- ¹¹ Lonely Planet
- ¹² Asian Development Bank, Afghanistan Country Strategy Paper.
- ¹³ National Atlas of the Democratic Republic of Afghanistan, Organization for Surveying and Cartography and GEOKART Poland, 1995, page 12.
- ¹⁴ National Atlas of the Democratic Republic of Afghanistan, Organization for Surveying and Cartography and GEOKART Poland, 1995, page VII.
- ¹⁵ World Bank, Technical Annex for a Proposed Grant... to Afghanistan for an Emergency Infrastructure Reconstruction Project, May 2002, Annex V, Attachment 1, page 46 with additional information supplied by Koen Tooner, UN Environmental Project (Telephone: 070n 276-431). Kabul, interviewed 18 November 2002.
- ¹⁶ CIA Profile
- ¹⁷ World Bank, Technical Annex for a Proposed Grant... to Afghanistan for an Emergency Infrastructure Reconstruction Project, May 2002, paragraph 8, page 2.
- ¹⁸ CIA Profile
- ¹⁹ World Bank, Technical Annex for a Proposed Grant... to Afghanistan for an Emergency Infrastructure Reconstruction Project, May 2002, paragraph 8, page 2.
- ²⁰ EIA.DOE.Gov Web Site
- ²¹ World Bank, Technical Annex for a Proposed Grant... to Afghanistan for an Emergency Infrastructure Reconstruction Project, May 2002, paragraph 9, page 2.
- ²² EIA.DOE.Gov Web Site
- ²³ World Bank, Technical Annex for a Proposed Grant... to Afghanistan for an Emergency Infrastructure Reconstruction Project, May 2002, paragraph 19, page 4.
- ²⁴ CIA Profile
- ²⁵ World Bank, Technical Annex for a Proposed Grant... to Afghanistan for an Emergency Infrastructure Reconstruction Project, May 2002, paragraph 9, page 2.

- ²⁶ National Atlas of the Democratic Republic of Afghanistan, Organization for Surveying and Cartography and GEOKART Poland, 1995, page 15.
- ²⁷ World Bank, Technical Annex for a Proposed Grant... to Afghanistan for an Emergency Infrastructure Reconstruction Project, May 2002, paragraph 7, page 2.
- ²⁸ World Bank, Technical Annex for a Proposed Grant... to Afghanistan for an Emergency Infrastructure Reconstruction Project, May 2002, paragraph 7, page 2.
- ²⁹ World Bank, Technical Annex for a Proposed Grant... to Afghanistan for an Emergency Infrastructure Reconstruction Project, May 2002, paragraph 16, page 4.
- ³⁰ CIA Profile
- ³¹ World Bank, Technical Annex for a Proposed Grant... to Afghanistan for an Emergency Infrastructure Reconstruction Project, May 2002, paragraph 7, page 2.
- ³² REFS Contract, Section C, Item B, page C-2.
- ³³ World Bank, Technical Annex for a Proposed Grant... to Afghanistan for an Emergency Infrastructure Reconstruction Project, May 2002, paragraph 79, page 15.
- ³⁴ World Bank, Technical Annex for a Proposed Grant... to Afghanistan for an Emergency Infrastructure Reconstruction Project, May 2002, paragraph 7, page 2.
- ³⁵ World Bank, Technical Annex for a Proposed Grant... to Afghanistan for an Emergency Infrastructure Reconstruction Project, May 2002, paragraph 7, page 2.

**5.0 POTENTIAL ENVIRONMENTAL
CONSEQUENCES**

5.0 ENVIRONMENTAL CONSEQUENCES

Introduction

Types of Impacts. Environmental consequences resulting from the impacts of projects such as the Kabul-Kandahar Road Rehabilitation Project include:

- Direct Impacts - i.e., those directly due to the Project itself such as the conversion of land previously used for agricultural or other purposes to transport use. Direct impacts also include the impact of construction expenditures in the local economy.
- Indirect Impacts - i.e., those resulting from activities prompted by the Project, but not directly attributable to it. The use of rock or crushed brick for the improved roadbeds, for example, has an indirect impact of increasing the demand for these materials.
- Cumulative Impacts - i.e., impacts in conjunction with other activities. A single road improvement may not exert a significant environmental impact, but if several roads comprising a network are developed in the same area, or are combined with agricultural reform programs in the same general area, the cumulative or additive effect could be large.

Impacts in all three categories may be either:

- Short-term – i.e., impacts which occur during road construction and affect land use, air quality and other factors. Many of these impacts, however, will be short-lived and without long-lasting effects. Even the effects of some relatively significant impacts such as borrow pits, for example, may be eventually erased if appropriate mitigation actions are taken. Many potential short-term negative impacts can be avoided or otherwise mitigated through proper engineering designs and by requiring Sub-Contractors to apply environmentally appropriate construction methods. Or;
- Long-term – i.e., road impacts that could, for example, affect regional land use and development patterns and regional hydrology and flooding if roads are poorly designed. Long-term negative impacts can also result from the loss of agricultural land to other land uses; air and water pollution; problems associated with scattered borrow pits; and haphazard growth.

Both short-term and long-term impacts may be either beneficial or adverse. Short-term positive impacts will include, for example, the generation of employment opportunities during construction period. Long-term benefits will include enhanced development opportunities, improved transport services, easier access to commercial and service facilities; faster communications and commodity transport; improved access to markets and growth centers and increased services and commercial facilities.

Requirements of 22 CFR 216. 22 CFR 216 states that the Section of the EA addressed to Environmental Consequences "will include:

- *The environmental impacts of the...proposed action;*
- *Any adverse effects that cannot be avoided should the proposed action be implemented;*

- *The relationship between short-term use of the environment and the maintenance and enhancement of long-term productivity;*
- *Any irreversible commitments of resources which would be involved in the proposal should it be implemented."*

The environmental impacts of the Proposed Action are presented in Sections 5.1 through 5.4 following the same environmental criteria headings, sequence and enumeration pattern as used in the foregoing Section 4.0 in its description of the potentially affected environment. An additional Sub-section (Section 5.5) has been added to meet the requirements of 22 CFR 216 in regard to Environmental Consequences:

- Adverse impacts that cannot be avoided.
- Short-term use of the environment versus long-term productivity; and
- Irreversible commitments of resources.

Under the heading of each environmental criteria the discussions present an assessment of:

- **Potential Impacts** – summary of impacts potentially arising the Proposed Action and the site-specific conditions of the Project Area; and
- **Mitigation** – a description of the actions incorporated in the Project to avoid or otherwise mitigate the potential impacts as warranted and those additional actions (if any) that warrant consideration.

5.1 PHYSICAL RESOURCES

5.1.1 Topography

Potential Impacts. Potential impacts to area topography are most likely to occur in the construction stage due to the possibilities of:

- Cut and Fill Requirements. There is a possibility that cut and fill activities may occur in certain sections and fill will be required to raise the current depressed road sections.
- Borrow Pit Excavations. Embankments and other requirements for fill may necessitate the use of borrow pits in some areas. Unless properly controlled, borrow pits cause drainage and visual problems and present a potential for increased vector activity (e.g., mosquitoes or water contamination). When water-filled, they also attract livestock to the roadway thereby slowing of traffic flow and creating safety hazards.
- Quarry Operations. Crushed rock will be needed for construction purposes. Considerable changes in this aspect of the topography could result from quarry operations. Potential site-specific sources have been identified for each of the Road Sections as indicated below.
- Erosion. Both wind and drainage-related could result due to both design and construction factors. Provisions for the control of erosion are discussed as a part of the discussions for soils and hydrology below.

Mitigation. Potential adverse impacts to topography in the Project Area will be avoided or otherwise mitigated. Specific contract provisions in each of the areas of potential impact are as follows.

- Cut and Fill Requirements. There is a possibility that cut and fill activities could occur in certain sections. The Conditions of Particular Application (COPA) portion of the Conditions of Contract include provisions to ensure:
 - Selection of less erodable material, placement of gabions and riprap and good compaction, particularly around bridges and culverts.
 - Specification that final forming and re-vegetation will be completed as soon as possible following fill placement to facilitate regeneration of a stabilizing ground cover.
 - Trenching where necessary to ensure successful establishment of vegetation.
 - Seeding with a fast growing crop and potential native seed mix immediately after fill placement to prevent scour and to encourage stabilization.
 - Placement of grass sods where applicable.
 - Stabilization of embankment slopes and road cuts by re-vegetation with grazing resistant plant species, placement of fiber mats, riprap, rock gabbions, or other appropriate technologies.
 - Completion of discharge zones from drainage structures with riprap to reduce erosion when required.

- Down drains/chutes lined with rip-rap/masonry or concrete to prevent erosion.
- Side slopes adjusted in the range from based on soil and other conditions and within a range as specified by the Project Specifications to reduce erosion potential or, if steeper, stabilized, covered with riprap or other material to prevent soil erosion.
- Stepped embankments for embankments greater than six meters. Construction in erosion- and flood-prone areas should be restricted to the dry season.
- Borrow Pits Excavations. Contract documents will specify that
 - Borrow areas will be located outside the ROWs.
 - Pit restoration will follow the completion of works in full compliance all applicable standards and specifications.
 - Arrangements for opening and using material borrow pits will contain enforceable provisions.
 - The excavation and restoration of the borrow areas and their surroundings, in an environmentally sound manner to the satisfaction of the USAID General Contractor (USAID/GC) will be required before final acceptance and payment under the terms of contracts.
 - Borrow pit areas will be graded to ensure drainage and visual uniformity, or to create permanent tanks/dams.
 - Topsoil from borrow pit areas will be saved and reused in re-vegetating the pits to the satisfaction of the USAID/GC.
 - Additional borrow pits will not be opened without the restoration of those areas no longer in use.
- Quarry Operations. To ensure adequate mitigation of potential adverse impacts, contract documents will specify only licensed quarrying operations are to be used for material sources. If licensed quarries are not available the Sub-Contractors may be made responsible for setting up their dedicated crusher plants at approved quarry sites.
- Erosion. Provisions for the control of erosion are discussed as a part of the discussions for soils and hydrology below.

The nature of the terrain, provisions incorporated in the contracting process and provisions for contract supervision are such that the potential for adverse impacts to topography is obviated.

5.1.2 Soils

Potential Impacts. Potential impacts to soils due to project location, project design, and operational phases of a project such as the Kabul-Kandahar Road Rehabilitation Project include:

- Loss of Soil for Agricultural Production. Although this potential impact is noted as a possibility, in this instance, however, virtually all rehabilitation activities will be confined to the existing ROW and little or no loss of agricultural land due to road widening or re-alignments will occur.
- Borrow Pits. Increased embankment heights and wider roadways may present demands for fill, portions of which are likely to be supplied by area soils.
- Erosion. Certain types of road improvements (e.g., road widening) result increased runoff and/or increased velocities could lead to additional soil loss. In this instance, however, virtually all rehabilitation activities will be confined to the existing ROW and no significant increase in the amount of impervious surfaces and/or the quantity or velocity of runoff is anticipated.
- Conversion of Agricultural Soils Due to Indirect/Induced Impacts. The road improvements often facilitate development along the affected road corridor. As noted above, the urban portions of the Project Area have been identified as locations in which such expansions and their effects on agricultural productivity are matters of concern.
- Contamination Due to Spills or Hazardous Materials. Provisions for the control of hazardous materials and actions to be taken in the event of accidental spills will be incorporated in contract documents.¹

Mitigation. Mitigation related to the potential soil-related impacts is recommended as follows:

- Loss of Soil for Agricultural Production. Losses due to direct impacts, i.e., the widening and paving of the roadway are likely to be minimal. Any productive soils as might be lost will be mitigated by the enhanced productivity of the remaining areas and improved access to markets.
- Borrow pits. Significant losses due to borrow pit excavations will be avoided through the mitigation actions discussed in **Section 5.1.1.**
- Erosion. Potential erosion impacts will be avoided by lining spillage ways with riprap to prevent undercutting. Drains will be provided at points where surface flows currently overtop the road, depositing soil and debris of the existing pavement, thereby creating serious hazards to traffic after storms. Improvements in drainage structures will better contain the intermittent flows to existing drainage ways and reduce sheet erosion which may occur when the road is overtopped by flash flooding. Mitigation plantings and fencing will be provided to stabilize the soil and reduce erosion. As detailed in the hydrology discussion below, storm drainage will be upgraded and drainage ways will be adequately sized, lined and contoured to minimize erosion potential. Contract documents also state that ditches are to be designed for the toe of slopes in cut sections with gutters or drainage chutes being employed to carry water down slopes to prevent erosion. Interceptor ditches shall be designed and constructed near the top of the back of slopes or on benches in the cut slopes as well as when there is a slope on adjacent ground toward the fill. When the roadway has a steep longitudinal slope, a drain is to be designed and constructed at the down-slope end of the cut to intercept longitudinal flow and carry it safely away from the fill slopes."²
- Conversion of Agricultural Soils Due to Indirect/Induced Impacts. Although the contract documents will contain provisions controlling direct impacts of land takings for both the

road and ancillary functions (asphalt plants, construction camps, etc.), control of the induced impacts is largely beyond the scope of the Project and will require actions as part of Component 2 of the Afghanistan REFS Program (Institutional Strengthening). (See also Land Use/Development Controls, **Item 5.3.1** below).

- Contamination Due to Spills or Hazardous Materials. Impacts may occur due to accidental spills or improper storage and use of hazardous materials.

5.1.3 Seismic & Geological Characteristics

Potential Impact. Potential adverse consequences of seismic events in the construction and operational phases could be exacerbated or lessened as a result of the rehabilitation of bridges and other structures.

Geological resources could be affected due to project-induced demand for resources such as rock, sand and building materials. Given Afghanistan's circumstances, the Project-induced demand is unlikely to cause or contribute significantly to their depletion, however. Specific sources used for road upgrading materials will depend upon the location of the segment being upgraded. Rock materials will be obtained from commercial suppliers and hauled by road to the segment being upgraded as needed. Existing sources in active operation are expected to be used in most cases although Sub-Contractors may elect to use other supply options provided they are cost competitive and provide rock meeting established quality standards.

Mitigation. The seismic and geological characteristics of the potentially affected area have been taken into account. Actions to ensure the use of proper sources of rock have been noted above to the degree warranted by the rehabilitation nature of the Project. Other than the actions as noted and adherence to good engineering practice, no mitigation actions related geological and seismic characteristics are warranted.

5.1.4 Hydrology

Potential Impacts. Direct impacts of the Project will include:

- Repair or replacement of 46 Bridges with a total length of 1,513 meters. It is anticipated that six of the bridges will require replacement; the remaining 40 will be repaired as necessary.
- Repair of 28 large and medium box culverts (generally minor repairs to the parapet walls).
- Repairs and replacement of headwalls as necessary for approximately 77 small box culverts.
- Repair of pipe culverts (current estimate 4,800) ranging in size from 46 cm to over 200 cm, many with head walls missing.

Other direct and indirect impacts could also affect:

- Surface Hydrological Characteristics. Surface hydrological impacts could occur during the construction period due to erosion and construction activities. Potential adverse

impacts to surface hydrology during the rehabilitation process can be avoided through the enforcement of appropriate contract provisions to ensure that construction camps and other potential sources of secondary impacts are properly sited and provided with drainage and wastewater facilities.

- Area Wetland Characteristics. No significant or ecologically important wetlands exist in the Project Area. Incidental wetlands are located in isolated roadside ditches where drainage will be improved. No significant adverse impacts to, or significant alterations of, area wetlands are anticipated in the corridors in either the construction or operational phases of the Project.
- Subsurface Hydrology. No impacts to groundwater resources are anticipated as a result of the proposed actions in the corridors in either the construction or operational phases of the Project. No wells/hand pumps within the proposed construction zones are located in the area of potential impact. There will be no net loss of water access points.
- Flood and Inundation Characteristics. Increased runoff in the both the construction and operational phases of the Project could result in adverse flood conditions. Raising the road formation level in flood-prone areas without installing culverts or other cross drainage structures to allow floodwaters to equilibrate and pass freely could result in adverse impacts. Local flooding conditions could be aggravated both by prolonging the flood period and by heightening the flood level on the upstream side of the roads.
- Riverbed Sediments. Repair and replacement of bridges may require disturbance of riverbed sediments.

Mitigation. Mitigation actions to address these potential impacts are recommended to include:

- Surface Hydrological Characteristics. Potential adverse impacts to surface hydrology in the construction phase of the Project will be avoided through the enforcement of contract provisions and oversight by the USAID/GC. Within the operational phase of the Project the proposed upgrading will reduce erosion from the roadway and will result in minor improvements in water quality (i.e. reduced silt loads). Provision of side drainage in villages and towns could improve in human health conditions along the alignment by reducing human contact with pollutants and disease sources.

Road drainage provisions and other rehabilitation activities are not expected to alter the current status of natural water bodies and irrigation structures adjacent to alignments. In addition to adherence to good engineering and construction practices and the enforcement of contract provisions related to drainage during both the construction and operational stages of the Project. Sub-Contractors will be obligated to coordinate with local land use planning authorities. Contract provisions will ensure that construction camps and other potential sources of secondary impacts are properly sited and provided with drainage and wastewater facilities.

On embankment areas less than three meters in height and where surface runoff is low, ditches shall be placed adjacent to the toe. For higher fills and large surface runoff, the ditch shall be separated from the fill by a three-meter wide bench.³ Contract documents require storm sewers to be designed for surface drainage in areas where open drainage channels are not appropriate such as in urban areas where development requirements dictate the need for closed conduits to handle the storm runoff.⁴

The COPA portion of the Conditions of Contract also state that *"The Sub-Contractor shall prevent interference with the supply to, of abstraction from, of the pollution of, water resources as a result of the execution of the Works. Areas where water is repeatedly used for dust suppression purposes (if any) shall be laid to fall to especially constructed settlement tanks to permit sedimentation of particulate matter. After settlement, the water may be re-used for dust suppression and rinsing. All water and other liquid waste products arising on the Site shall be collected and disposed of at a location on or off the Site and in a manner that shall not cause either nuisance or pollution. The Sub-Contractor shall not discharge or deposit any matter arising from the execution of the Work into any waters except with the permission of the regulatory authorities concerned. The Sub-Contractor shall at all times ensure that all existing stream courses and drains within and adjacent to the Site are kept safe and free from any debris and any materials arising from the Works. The Sub-Contractor shall protect all watercourses, waterways, ditches, canals, drains, lakes and the like from pollution, silting, flooding or erosion as a result of the execution of the Works."*

- Area Wetland Characteristics. No mitigation actions related to wetlands are warranted.
- Subsurface Hydrology. Due to the surface rehabilitation nature of the Project and the safeguards incorporated to control runoff, no impacts to subsurface hydrology are anticipated. The COPA portion of the Conditions of Contract specifically provide that also state that *"The Sub-Contractor shall prevent interference with the supply to, of abstraction from, of the pollution of, water resourcesincluding underground percolating water..."*
- Flood and Inundation Characteristics. Within the construction phase of the Project potential impacts to flood and inundation will be avoided through the enforcement of contract provisions and oversight by USAID/GC. Repairs of the Project Road's bridges and drainage structures will accommodate foreseeable conditions and will stabilize downstream slopes with concrete, or rock gabions, or walls to avoid erosion. Care will be taken to provide side drainage in villages and towns.
- Riverbed Sediments. Given the low level of industrialization and rural nature of most of the Project Area, the possibility of hazardous deposits within the sediment is considered remote. Contract documents will, however, contain provisions for analysis of the sediment if determined warranted by the USAID/GC.

5.1.5 Air Quality

Potential Impacts. Potential air quality impacts are can be hypothesized in both the construction and operational stages of the Project.

- Construction Stage. Impacts during construction can be anticipated due to fugitive dust generation in and around construction activities and related activities such as plants for crushing rocks, hot-mix and asphalt plants.
- Operational Stage. Once completed, the air quality impacts due to the proposed rehabilitation of Kabul-Kandahar Road will be overwhelmingly positive. Current severe high levels of suspended particulate matter (SPM) in the unpaved areas will be substantially reduced. Other air quality impacts due to increasing levels of vehicular traffic are most appropriately measured against a "base case" that estimates the likely ambient air quality without the project (but taking all other foreseeable changes into

account) versus the most likely situation with the project. In this instance the proposed road improvement activities are unlikely to have any substantial impact due to diverted or generated traffic resulting from the improvement activities. Economic development may lead to increased vehicular travel, and, if so, the improvements will facilitate the flow of the increased traffic - but will not have induced it. The foreseeable levels of traffic are unlikely to result in significant adverse impacts to air quality in the Project Area. Measured against a base case that takes economic growth and related factors into account, the net air quality impacts of the Project will lessen the additional pollutant emissions that would have resulted from use of poorly paved and unimproved roads. Improvements in road surface condition and traffic capacity will alleviate local congestion that might have otherwise occurred. It will improve traffic flow, thereby reducing engine idling and the resulting local air quality degradation. Improved vehicle performance on a new better road surface will serve to alleviate potential air pollution levels to a modest degree. The improvement activities will allow the traffic generated by the improved economic conditions to flow more smoothly and efficiently and will thus be beneficial.

Mitigation. Potential air quality impacts in the construction and operational stages of the Project are as follows:

- Construction Stage. Generation of dust due to construction activities will be mitigated through avoidance strategies combined with construction and monitoring. Contract documents will specify that:
 - Asphalt and hot-mix plants will be located at least 500 meters away from the nearest sensitive receptor (e.g., schools and hospitals).
 - Operators will be required to install emission controls.
 - Blasting (if any) will be carried out using small charges, and dust-generating items will be conveyed under cover.
 - Sub-Contractors will be required to spray road surfaces, excavation and construction sites to keep them moist for dust control.
 - Trucks carrying earth, sand or stone will be covered with tarps to avoid spilling.
 - Potential significant adverse impacts to adjacent residents or site employees during construction will be mitigated by either discontinuing until favorable conditions are restored, or, if warranted, sites may be watered to prevent dust generation, particularly at crushing plants.
 - Machinery and equipment will be fitted with pollution control devices, which will be checked at regular intervals to ensure that they are in working order. Best available pollution control technologies will be required.
 - Open burning will be prohibited in populated areas and requirements for spraying and related dust control measures and the proper use of solvents and volatile materials will be incorporated in the contract provisions.
 - Pre-construction monitor of existing ambient air quality may be undertaken to provide a baseline for the measurement of air quality impacts during the construction period if considered warranted by the USAID/GC.

- Routine air quality monitoring may also be required in areas of high potential impact (asphalt plants, construction camps, etc) during the life of the Project if considered warranted by the USAID/GC.
- Operational Stage. No mitigation related to potential air quality impacts during the operational phase of the Project is considered warranted.

5.1.6 Mines and Unexploded Ordnance

Special provisions have been made by USAID for the clearance of mines and UXO by the United Nations Mine Action Center (UN MAC).⁵

5.2 NATURAL/BIOLOGICAL RESOURCES

5.2.1 Flora

Potential Impacts. Construction activities will impact only a narrow band of vegetation adjacent to the existing highway. Plants could also be affected by the improper locations of roadside activities such as asphalt plants, construction camps and other ancillary features. Impacts to plant life during construction will be mitigated through the appropriate construction supervision activities to ensure that ancillary features are properly sited. Other impacts of road projects have included importation of new plant species upsetting the existing equilibrium as native species face competition for resources from new arrivals.

Mitigation. Contract specification for the control of ancillary facilities have already been noted. Contract documents will specify the use of native plant species.

5.2.2 Fauna (Wildlife)

Potential Impacts. Consideration has been given to potential direct impact to wildlife due to:

- Habitat Loss. Improvements will occur within the existing ROW with little if any loss of habitat. Borrow pits and quarries used will require the approval of the USAID/GC. No significant habitat loss is anticipated due to direct impacts.
- Habitat Fragmentation. Habitat fragmentation occurs when a road cuts through an ecosystem, fragmenting an area into weaker ecological sub-units, thus making the whole more vulnerable to invasion and degradation. In this instance, the fact that proposed rehabilitation actions will occur within areas already devoted to transport and the fact that all improvement activities will be contained within the existing ROWs minimizes any potential for further habitat fragmentation.
- Disruption of Wildlife Migration Patterns. Most animal species tend to follow established patterns in their daily and seasonal movement patterns. A road blocking a wildlife corridor results in either a cessation in its use because animals are reluctant to cross the road, an increase in mortality due to collisions, or a delay in migration patterns. No evidence has come to light indicating that the existing ROW interrupts wildlife migration corridors in the vicinity of the Project Road.
- Accidents Involving Wildlife. Accidents involving wildlife attempting to cross the road are a potential impact faced by many road projects. In this instance, the fact that the corridor is devoted to transport or otherwise altered by man minimizes any potential for such impacts. Field investigations revealed no evidence suggesting a potential for increased accidents involving wildlife due to the proposed road rehabilitation.

Consideration has also been given to potential indirect wildlife impacts under the following headings:

- Accessibility. Penetration of previously unmodified areas and upgrading existing roads generally facilitates an increase in the number of people having access and is sometimes accompanied by an increased likelihood of impacts to area wildlife. In this instance, the magnitude of the increased accessibility to areas bordering the roadway and the lack of significant wildlife habitat make significant impacts to wildlife unlikely.

- Ecological Disequilibrium. Opening of a transport corridor sometimes results in the introduction of a new plant and animal species along the roadway upsetting the dynamic balance that exists in the ecosystem and altering predator-prey relationships. In this instance, the fact that the corridor is devoted to transport or otherwise altered by man minimizes any potential for ecological disequilibrium.

Mitigation. The review of potential impacts to wildlife due to rehabilitation of the road indicated no need for mitigation.

5.2.3 Protected Areas

Potential Impact. One of the six designated and proposed protected areas identified by Section 4.2.3 is located within the Project's potentially affected areas: Ab-I-Estada Waterfowl Sanctuary for which *Istadeh-ye Mogor*, a large lake north of the town of Nawah, is the focus. Water courses feeding into *Istadeh-ye Mogor* are crossed by the Project Road ROW. Although the lake is reported to be dry at present due to drought conditions over the last five years, it will be particularly important to provide for future flows either overtopping the road via Mexican Bridges, properly sized culverts, or bridges.

Mitigation. Contract documents for construction packages potentially affecting Ab-I-Estada Waterfowl Sanctuary will require special design consideration to ensure the maintenance of drainage systems so as to adequately maintain the possibility of flow into *Istadeh-ye Mogor*.

5.3 OTHER ENVIRONMENTAL CONCERNS NOTED BY 22 CFR 216

As noted in the introductory remarks, issues addressed in this section are discussed under the following headings:

- Land Use and Development Policies & Controls (5.3.1)
- Use of Natural/Depletable Resources (5.3.2)
- Urban Quality/Design of the Built Environment (5.3.3)
- Historic and Cultural Resources (5.3.4)
- Energy & Conservation (5.3.5)
- Reuse & Conservation (5.3.6)

5.3.1 Land Use and Development Policies & Controls

Potential Impact. Potential land use impacts vary between the pre-construction, construction and operational phases of the Project as follows:

- Pre-Construction Phase. The assessment indicates that there is likely to be little if any impact to residences along the ROW as a result of the Proposed Action. There are, however, several areas in which the Project Road passes through village bazaars and commercial activities oriented to the road and farming areas in which productive agricultural land may be affected. Those who occupy the stalls and commercial areas along the verges of the road and/or infringe on the ROW and those engaged in farming and other roadside economic activities will be impacted and qualify as "project-affected persons" (PAPs) as that term is generally defined by the international assistance community, i.e., persons whose livelihood is directly or indirectly affected by a project. The potential for impact is most evident at, but not necessarily limited to, the roadside bazaars and commercial areas in and around Ghazni, Mogor, Qalat, Shan Juy and Kandahar
- Construction Phase. Potential impacts to land uses during the construction stage include:
 - Creation of Construction Camps. Construction workers camps constitute a temporary land use change and raise issues related to activities such as unauthorized tree felling to get fuel-wood even when alternative fuel is made available; poaching of edible animals and birds of the locality in spite of prohibitions; poor sanitation arrangement and improper methods used for disposal of solid wastes and effluent; and transmission of communicable diseases to the local people by the construction workers due to inappropriate health monitoring facilities.
 - Impacts of Traffic Disruptions and Detours on Existing Land Uses.
- Operational Phase. Once the road improvements are in place changes of neighboring land uses are expected to be minimal. It is anticipated, however, that the access to activities bordering the road in the urban areas and villages will be better organized as a result of the road improvements. Additional roadside commercial activities may be developed in response to increasing road traffic. Indirect impacts due to the road improvements are likely to include urban expansions.

Mitigation. Actions to mitigate potential adverse impacts to land uses are assessed as follows:

Given the REFS design-build approach, it is anticipated that the bid and contract documents will specify that lands required for the improvements are free of any squatters, encroachers or other claims and that such documentation will be required from the Government of Afghanistan. To mitigate the potential PAPs impacts it is recommended that the documentation certify that any claims have been settled in conformance with international practice. Within the Afghanistan context, the World Bank's Emergency Infrastructure Reconstruction Project (EIRP) will undertake activities very similar to REFS and has drafted Guidelines for Land and Asset Acquisition, Entitlement and Compensation (the Guidelines). Adoption or adaptation of the Guidelines is recommended for the purposes of the Kabul-Kandahar Road rehabilitation Project. Doing so will both mitigate the potential adverse impact and to ensure reasonable consistency in the assistance programs. The Guidelines deem PAPs eligible for compensation as:

- (1) Those who have formal legal title, water resources or structures/buildings including recognized customary and traditional rights;
- (2) Those who do not have such formal legal rights but have a claim to usufruct right rooted in customary law; (and)
- (3) Those whose claim to land and water resources or building/structures do not fall within (1) and (2) above, are eligible (for) assistance to restore their livelihood. The fact that even those who do not have legal or traditionally recognized property rights are still eligible for compensation to restore their livelihood should be particularly noted.

The Guidelines provide for voluntary contributions of land, occupancy, or assets and/or temporary or permanent relocations without compensation and specify that such contributions shall be documented. The Guidelines also provide a procedure for the compensation of PAPs with claims submitted to the local community representative (*shura* head). Two categories of compensation are recognized; i.e., those related to:

- Assets impacted but which remain economically viable. The Guidelines provide for compensation of PAPs losing access to a portion of their land or other productive assets with the remaining assets being economically viable require compensation at replacement costs for that portion of the land or assets lost according to the following principles.
 - Replacement land with an equally productive plot, cash or other equivalent productive asset.
 - Material assistance to fully replace solid structures that will be demolished;
 - Replacement of damaged or lost crops and trees at market value;
 - Other acceptable in-kind compensation;
 - In the case of cash contributions, the delivery of compensation should be made public, e.g., at a community meeting.
- Assets rendered economically non-viable. Persons losing access to all or a portion of their land or other economic assets rendering the remainder economically non-viable will have the option of compensation for the entire asset by provision of alternative land, cash or equivalent productive asset according to the principles above.

It is recommended that the certifying agency be required to ensure that all occupants of land and owners of land and other assets in the Project Area have been consulted in the compensation process. Gender-separate meetings are recommended consistent with the Guidelines to inform local populations about their rights to compensation and available options. Requirements for minutes of community meetings are recommended to reflect discussions, agreements reached and verifiable documentation of details of the agreement. It is also recommended that the certifying agency be required to provide a copy of the Minutes to the PAPs and to maintain all necessary documentation indicating adherence to the Guidelines.

- Construction Phase. Sub-Contractors will be required to coordinate all construction activities with neighboring land uses. Contracts for the Project activities will also require construction operators to attend to the health and safety of their workers, maintain and cleanup campsites, and respect the rights of local landowners. If located outside the ROW, written agreements with local landowners for temporary use of the property will be required and sites must be restored to a level acceptable to the owner within a predetermined time period. All diversions and accommodations of traffic during construction will require the approval of the USAID/GC Engineer.

Mitigation of indirect impacts due to induced development during the operational stage is beyond the scope of the Project, but require consideration as part of the overall REFS Program to ensure good environmental management once the road becomes operational. These include:

- Institutional Strengthening of the Ministry of Public Works (MPW).
- Traffic Safety Programs.

Initiatives in both of these areas are recommended for consideration as part of REFS Component 2; and

- Enhancement of Roadside Economic Activities. Consideration of market development activities in the vicinity of the Kabul-Kandahar Road is recommended as companion REFS Component 1 activities.

5.3.2 Energy & Conservation

Potential Impacts. Rehabilitation of the Kabul-Kandahar Road could facilitate economic development of Afghanistan's coal resources by facilitating transport. The known deposits, however, are located outside the Project Area. Demand for petroleum products are likely to increase in response to the improved transport conditions. The increase in demand is not considered adverse.

Mitigation. None warranted.

5.3.3 Use of Natural/Depletable Resources

Potential Impacts. As noted above in regard to energy resources, rehabilitation of the Kabul-Kandahar Road could facilitate economic development of Afghanistan's other natural resources by facilitating transport.

Mitigation. None warranted.

5.3.4 Urban Quality/Design of the Built Environment

Potential Impacts. The Project can be expected to have a beneficial impact on the overall urban quality of the cities it serves by contributing to their economic recovery. Details of land uses and potential impacts in immediate proximity to the road are discussed in **Item 5.3.1** above.

Mitigation. Other than ensuring that provisions are incorporated in contract documents to avoid impact to neighboring land uses and potential cultural resources in the impact area, none warranted.

5.3.5 Historic and Cultural Resources

Potential Impacts. No impacts to known cultural resources are anticipated. Unexpected discoveries could occur, however, in the construction process.

Mitigation. To avoid potential adverse impacts to historic and cultural resources, the Project specifications will state that the Sub-Contractor shall:

- Consult with provincial-level representatives of the Archaeological Committee under the Ministry of Information and Culture, obtain any necessary clearances in regard to historic and cultural resources prior, and provide written documentation of these consultations to the Contractor prior to the initiation of the Work.
- Protect sites of known antiquities, historic and cultural resources by the placement of suitable fencing and barriers;
- Adhere to accepted international practice and all applicable historic and cultural preservation requirements of the Government of Afghanistan, including all appropriate local government entities.
- In the event of unanticipated discoveries of cultural or historic artifacts (movable or immovable) in the course of the work, the Sub-Contractor shall take all necessary measures to protect the findings and shall notify the Contractor and provincial-level representatives of the Archaeological Committee and the Ministry of Information and Culture. If continuation of the work would endanger the finding, project work shall be suspended until a solution for preservation of the artifacts is agreed upon.

5.3.6 Reuse and Conservation

Potential Impacts. Material stripped from the roadway may provide an opportunity for recycling in the reconstruction process.

Mitigation. Contracts will specify that such materials will be recycled as part of the new sub-base when the characteristics of the material are suitable and placed on fill slopes and graded if not suitable for use as the sub-base.⁶

5.4 ADDITIONAL ENVIRONMENTAL CONCERNS NOTED FOR CONSIDERATION

5.4.1 Socio-Economic Considerations

Potential Impacts. The Project is expected to have a beneficial impact on the economy of both the potentially affected areas and the country as a whole by accommodating traffic and enhancing trade between the country's two largest cities and reducing the current driving time from approximately 14 to six hours. The road improvements will also facilitate exploitation of resources in proximity to the roadway. (Potential localized impacts to economic assets are discussed as part of **Item 5.3.1**)

Mitigation. Although mitigation of adverse economic impacts are not warranted due to the lack of such impacts, the beneficial economic of roadside development could be enhanced in conjunction with other REFS Component 1 activities. (Mitigation of localized impacts to economic assets are discussed as part of **Item 5.3.1**)

5.4.2 Public Health

Potential Impacts. Potential impacts to public health due to the proposed road rehabilitation can be identified as:

- Easier access to health care facilities. Positive health impacts may result due to quicker response time in emergency situations and improved access to health care facilities for those living in proximity to the improved roadway.
- Contamination of local water supplies during construction. Potential impacts to local water supplies include the possibility of temporary labor camps and the water supply and wastewater disposal associated with them during the construction period.
- Air Pollution. As noted in **Item 5.1.5**, potential air quality impacts during both the construction and operational stages of the Project. Potential air quality impacts during construction include those related to fugitive dust generation in and around construction activities and related activities such as plants for crushing rocks, hot-mix and asphalt plants. Potential air quality impacts during the operational stages of the Project are also addressed in **Item 5.1.5**. Overall emissions of air quality pollutants may be expected to increase due to increased traffic levels facilitated by the Project. There is a possibility, however, that pollutant levels in congested urban areas may be modestly reduced due to more efficient traffic flow when measured against a base case taking economic recovery and other factors into account.
- Noise levels with health consequences. Potential noise issues are discussed in **Item 5.4.4** below.
- Disease Transmission. Human health risks associated road projects have included the possibility of disease transmission along previously undeveloped corridors. Such impacts have been identified in retrospect as a major unintended environmental consequence of road developments in Africa and elsewhere. In this instance, the Project Road is an existing transport corridor. The improvement activities are unlikely to add to the risk of the transmission of new diseases. It should be noted, however, while not as drastic as the introduction of new diseases into previously unexposed areas, increases in sexually

transmitted diseases (STDs) are also often associated with road projects.

Mitigation. Mitigation related to the identified potential impacts to Public Health are as follows:

- Easier access to health care facilities. The anticipated impacts are beneficial and no mitigation is warranted.
- Contamination of local water supplies during construction. Contract provisions to ensure that ancillary facilities are properly sited will be incorporated in all contract documents.
- Air Pollution. Specific provisions in contracts to avoid adverse impacts to air quality are incorporated in the Project as previously discussed as part of **Item 5.1.5**. Within the operational stage of the Project the anticipated traffic levels for the foreseeable future are such that mitigation actions are not considered warranted.
- Noise levels with health consequences. Although it may not be consciously perceived, chronic exposure to noise can affect human welfare in varying degrees, both physiologically and psychologically. Chronic noise exposure can be a source of annoyance, creating communications problems and leading to elevated stress levels and associated behavioral and health effects. It can cause auditory fatigue, temporary and permanent lessening of hearing ability, sleep disorders and contribute to childhood learning problems. Potential noise issues associated with the Project are discussed in **Item 5.4.4** below.
- Disease Transmission. Contract documents will require Sub-Contractors to provide basic emergency health facilities for workers; and encourage programs aimed at the prevention of sexually transmitted diseases as a part of all construction employee orientation programs. Although mitigation of such impacts is beyond the scope of the proposed Project, the establishment of STD awareness programs is recommended.

5.4.3 Safety

Potential Impacts. Potential safety issues are foreseen as follows:

- Conflicts with non-motorized traffic. Impacts to safety in circumstances such as Afghanistan's could occur due to the incorporation or absence of provisions for non-motorized traffic (NMT).
- Safety issues due to construction-related traffic impediments. Diversions and detours are an inevitable impact of road rehabilitation projects and could give rise to safety issues.
- Safety impacts due to excessive speed. Road rehabilitation projects can inadvertently and adversely affect road safety due to excessive speeds encouraged to a degree due to the improved conditions.

Mitigation. Mitigation actions related to potential safety impacts are as follows:

- Conflicts with non-motorized traffic. Incorporation of 2.25-meter shoulders (rather than the currently proposed 1.25 meters) is recommended to provide adequate space for emergency pull-offs and to accommodate non-motorized traffic (NMT). It is recognized that the issue is one with significant budget implications. From a public safety point of

view (one of the environmental criteria established the USAID-approved Project Scoping Statement on which the EA is based), however, the provision of wider shoulders would be a significant Project enhancement. The issue is further discussed in Section 6.0 and was noted as an issue requiring resolution in Section 1.0.

- Safety issues due to construction-related traffic impediments. Contract provisions will require Sub-Contractors to obtain the concurrence of the USAID/GC for necessary detours and traffic re-routing schemes are recommended. Contract provisions also stipulate that "The Sub-Contractor shall provide the Contractor with a written traffic control plan which is to include when and where flagmen shall be employed and when and where traffic cones or other devices such as barricades and/or lights will be used. Where ... traffic diversions area planned for ... additional areas (will) be de-mined and the diversions clearly defined for travel." Contracts will require by-passes to be constructed and maintained around bridges to be reconstructed until such time as the bridge is open for traffic. By-passes will be removed and the affected areas re-graded so as to blend in with the existing contours when the bridge is opened.⁷
- Safety impacts due to excessive speed. Traffic Safety Programs are recommended for consideration as part of REFS Component 2. The recommendation will be further discussed as part of Section 6.0.

5.4.4 Gender & Disabled Persons Issues

Potential Impacts. Women and disabled persons are not specifically targeted as a part of the Kabul-Kandahar Road Rehabilitation Project. They will benefit, however, from the improved transport services. These benefits are significant and will improve access to health and educational facilities, reduce travel time and provide other positive impacts. Recruitment of local labor has been identified as an objective of the Project and in other circumstances (e.g., Bangladesh, India, China and elsewhere) similar projects have included specific provisions for gender equity employment opportunities. The types of construction activities are not expected to generate labor opportunities for women in the Afghanistan context due to the prevailing social norms or the disabled due to the nature of the work.

Mitigation. The project will result in positive impacts on women and disabled persons and no adverse impacts are anticipated and mitigation actions are considered warranted.

5.4.5 Noise

Potential Impacts. Potential noise impacts resulting from the Project can be identified in both the construction and operational stages as follows.

- Construction Stage. Temporary impacts in the immediate vicinity of the Project may occur due to construction. The magnitude of impact will depend upon the specific types of equipment to be used, the construction methods employed and the scheduling of the work. General conclusions can be based on the types of construction work anticipated, the types of equipment required and their associated range of noise levels. Construction noise is generally intermittent and depends on the type of operation, location and function of the equipment and the equipment usage cycle, and attenuates quickly with distance.
- Operational Stage. Sources of road noise during the operational stage of road projects

generally considered in the environmental assessment include:

- *Vehicle & Road Noise.* An increase in vehicular noise occurs if there is an increase in the number of vehicles compared to what would have otherwise been the case. Road noise, also known as frictional noise, is that resulting from the contact between tires and pavement. The level of noise created depends on the type and condition of the pavement. Frictional noise is generally greatest at high speeds and during quick breaking.
- *Driver Behavior.* Drivers contribute to road noise by the use of horns, the playing loud music, shouting and causing tires to squeal as a result of sudden breaking or acceleration.
- *Construction and Maintenance.* Road construction and maintenance generally require the use of heavy machinery. Although these activities may be intermittent and localized, they nevertheless contribute to the noise levels to the areas in which they occur.
- *Vibration.* Vibration induced by the resonance of traffic noise can have a detrimental effect on structures and can be a particular concern in the case of cultural heritage sites or lightly constructed buildings not designed to withstand such vibrations. No significant increases in vibration levels are anticipated as a result of the proposed action nor are there expected to impacts on neighboring structures.
- *Wildlife Disturbance.* Noise may prevent many animal species from approaching or crossing road corridors, thereby effectively rendering roadside habitat areas inaccessible to some species. No significant impact on wildlife is anticipated as a result of the proposed action since habitats near the alignment are highly degraded and inhabited by disturbance tolerant wildlife species.

Mitigation. Mitigation of noise impacts in the construction and operational phases of the Project will include:

- Construction Stage. Contracts will contain provisions to mitigate potential noise and vibration impacts during construction is recommended through the use of:
 - *Source Controls*, i.e., requirements that all exhaust systems will be maintained in good working order; properly designed engine enclosures and intake silencers will be employed; and regular equipment maintenance will be undertaken.
 - *Site Controls*, i.e., requirements that stationary equipment will be placed as far from sensitive land uses as practical; selected to minimize objectionable noise impacts; and provided with shielding mechanisms where possible.
 - *Time and Activity Constraints*, i.e., operations will be scheduled to coincide with periods when people would least likely be affected; work hours and work days will be limited to less noise-sensitive times. Hours-of-work will be approved by the site engineer having due regard for possible noise disturbance to the local residents or other activities. Construction activities will be strictly prohibited between 10 PM and 6 AM in the residential areas. When operating close to sensitive areas such as residential, nursery, or medical facilities, the Sub-Contractor's hours of working shall be limited to 8 AM to 6 PM.
 - *Community Awareness*, i.e., public notification of construction operations will

incorporate noise considerations; methods to handle complaints will be specified. Sensitive receptors will be avoided as possible (i.e., aggregate crushers, operators, etc.). Disposal sites and haul routes will be coordinated with local officials.

- *Baseline and Routine Noise Monitoring as Part of Construction Supervision.* Pre-construction monitor of existing noise and vibration may be undertaken to provide a baseline for the measurement of impacts during the construction period if determined to be warranted by the USAID/GC. Routine monitoring may also be required in areas of high potential impact (e.g., pile-driving sites and areas of intensive noise-generating activities) if considered warranted by the USAID/GC.

5.4.6 Other Infrastructure Systems

Potential Impacts. Road rehabilitation activities could impact other infrastructure systems such as water supply and wastewater collection networks, electrical lines, etc.

Mitigation. Sub-Contractors are required to coordinate with all relevant officials to avoid significant adverse impact to other infrastructure systems. To avoid potential adverse impacts to utilities, the contract documents state that Sub-Contractor shall:

- Ascertain and take into account in his method of working the presence of utility services on and in the vicinity of the Site.
- Take into account in his program the periods required to locate, access, protect, support and divert such services, including any periods of notice required to effect such work in consultation with authorities operating such services.
- Assume all responsibility to locate or to confirm the details and location of all utility services on or in the vicinity of the Site.
- Exercise the greatest care at all times to avoid damage to or interference with services.
- Assume responsibility for any damage and/or interference caused by him or his agents, directly or indirectly, arising from actions taken or a failure to take action, and for full restoration of the damage.
- Wherever existing ground surfaces are to be disturbed for construction of the Works, carry out full and adequate preliminary investigations to locate all services in the area by means of hand-dug trial holes and trenches in combination with electronic and electro-mechanical devices, where appropriate. Each service thus exposed shall be identified. Every such service at risk shall be fully exposed and adequately protected and supported in situ or diverted to the satisfaction of the appropriate authority prior to the commencement of such construction.
- When working in the vicinity of overhead power cables, ascertain and satisfy himself about the safe clearances to be maintained from the power cables in consultation with the authority operating the power line. Where existing overhead power lines, communications cables or other major utilities require relocation, the Sub-Contractor will use the services of specialist enterprises with the necessary skills and technology to carry out the work.

5.5 OTHER IMPACT STATEMENTS REQUIRED BY 22 CFR 216

5.5.1 Adverse Impacts That Cannot Be Avoided

Less-than-significant adverse impacts may occur during the road rehabilitation activities such as temporary impacts to air quality, noise levels due to construction and inconveniences due to traffic diversions and detours. These impacts will be mitigated by the contract provisions as specified herein, including actions such as water spraying to control dust and the restriction of noise-generating activities to daylight hours and the avoidance of such activities in sensitive areas such as the vicinity of hospitals, etc.

5.5.2 Short-Term Use Versus Long-Term Productivity

The Proposed Action will enhance long-term productivity of economic activities in the Project Area by facilitating the transport of goods to market and substantially reducing transport costs.

5.5.3 Irreversible Commitments of Resources

Certain natural and human resources will be irreversibly devoted to the Project, including the necessary construction materials and labor. Commitment of these resources will be offset by the Project benefits.

END NOTES – SECTION 5.0

¹ See Scope of Work, Kabul-Kandahar Highway Design and Rehabilitation, Part VII. Item 2.23. page 12, also Part IV (Environmental Guidelines).

² Draft Scope of Work, Kabul-Kandahar Highway Design and Rehabilitation, Part VII. Item 2.16, page 10.

³ Draft Scope of Work, Kabul-Kandahar Highway Design and Rehabilitation, Part VII. Item 2.16. page 10.

⁴ Draft Scope of Work, Kabul-Kandahar Highway Design and Rehabilitation. Part VII. Item 2.16. page 10.

⁵ REFS Contract, page C-8.

⁶ Draft Scope of Work, Kabul-Kandahar Highway Design and Rehabilitation, Part VII. Item 2.12. page 9.

⁷ Draft Scope of Work, Kabul-Kandahar Highway Design and Rehabilitation, Part VII. Item 2.21, page 12.

**6.0 COMPLIANCE PROCEDURES
AND OTHER RECOMMENDATIONS**

6.0 COMPLIANCE PROCEDURES AND RECOMMENDATIONS

6.1 COMPLIANCE PROCEDURES

Monitoring of environmental impacts during the construction process will be the responsibility of the USAID General Contractor (USAID/GC) as a part of contract supervision procedures. A Supervising Engineer (SE) will be assigned to each Construction Package. Compliance procedures will include routine site visits for each construction package, including the ancillary facilities associated with that package (labor camps, asphalt plants, borrow pit locations, etc.).

Major issues to be addressed in the monitoring and compliance reports will include:

- **Air Quality Impacts.** The Supervising Engineer (SE) will be responsible for compliance with contract provisions that specify:
 - Controlled locations of asphalt plants and similar sources of air pollution, use of quarries, etc., as tabulated by **Exhibit 6.1**.
 - Proper use of water sprays and other techniques to lessen dust impacts.
 - Prohibitions against open burning in populated areas.
 - Proper use of solvents and volatile materials.
 - Blasting (if any) to be carried out using small charges.
 - Transport of dust-generating items using tarps and other devices to minimize impacts.
 - Spraying of road surfaces, excavation and construction sites to keep them moist for dust control as determined advisable by the SE.
- **Water Quality Impacts.** Potential water quality impacts during the construction phase will also be mitigated through the controlled location of asphalt plants and similar sources of runoff, erosion controls, proper siting and provision of facilities at construction camps as tabulated by **Exhibit 6.1** with compliance assured through the oversight of the SE.
- **Soils Impacts.** Potential soil impacts will be mitigated through the control of waste disposal practices and runoff as tabulated by **Exhibit 6.1** as a routine part of construction supervision and enforced through the monitoring of the SE.
 - Embankment & Erosion Prevention Requirements
 - Borrow Pit Restoration Requirements.
 - Mining/Quarry Activities – I.e., the requirement that only licensed quarrying operations are to be used for material sources, if available, and the contingency provisions in the contracts if they are not. Selections of quarries used for the rehabilitation of the Kabul-Kandahar Road will require the approval of the SE.

EXHIBIT 6.1
MITIGATION REQUIRING COMPLIANCE ASSURANCE
BY THE SUPERVISING ENGINEER & OTHERS

For Air Quality, Water, Soil, Noise and Social Impacts

AIR QUALITY

Potential Impact Source	Mitigation Objective	Mitigation Measure	Implementation Mechanism & Responsibility
Material Transport	Minimization of dust during transport of fill and construction material	Rock, sand and other dust producing material will be sprayed prior to transport. Trucks must be covered with tarps. Only approved transport routes will be used.	Required by Project Contracts. Enforced by the Supervising Engineer (SE).
Earthwork Activities	Minimization of dust dispersal due to earthworks.	Sub-Contractors are required to spray roadways to minimize dust in dry conditions.	Required by Project Contracts. Enforced by SE.
Concrete Batching and Structural Work	Minimization of airborne particulate and gas emitted during the construction process.	Contracts specify that batch sites shall be located away from human settlements.	Required by Project Contracts. Enforced by SE.
Emissions from Asphalt Plants	Minimization of smoke, soot, airborne particulates and gas emitted due to plant operations.	Asphalt plants may not be located within 500 meters of human settlements. Baseline and periodic air quality monitoring is required.	Required by Project Contracts. Enforced by SE.
Emissions from Construction Equipment & Solvents.	Avoidance of excessive emissions due to poorly maintained equipment.	Contract stipulations require all construction equipment to meet acceptable standards and to be properly maintained. Solvents and volatile materials must be used properly to the satisfaction of the SE.	Required by Project Contracts. Enforced by SE.
On-Site Burning.	Avoidance of smoke and gases which may constitute a nuisance.	On-site burning to be banned in populated areas	Required by Project Contracts. Enforced by SE.

WATER QUALITY

Potential Impact Source	Mitigation Objective	Mitigation Measure	Implementation Mechanism & Responsibility
Uncontrolled Runoff During Construction Activities	Avoidance of inadequately planned runoff due to development of staging areas, labor camps, etc.	Runoff from during construction will be strictly controlled as a part of construction supervision activities. Monitoring will be undertaken as a routine part of construction supervision.	Required by Project Contracts. Enforced by SE.
Disruption of Irrigation	Avoidance of interruptions to irrigation flows due to construction activities.	Irrigation systems have been taken into account in design. Alternative water sources will be developed as warranted due to temporary interruptions.	Required by Project Contracts. Enforced by SE.

Relocation of Wells	Ensure adequate planning for relocation and use of temporary sources.	Locations of existing wells have been taken into account in design. Alternative water sources will be developed as warranted due to temporary interruptions.	Required by Project Contracts. Enforced by SE.
Effects of Construction Camps & Staging Areas	Avoidance of inappropriate wastewater disposal and runoff.	Provisions for the location and design standards for land use, drainage, health facilities, etc., are established by construction documents.	Required by Project Contracts. Enforced by SE.

SOILS

Potential Impact Source	Mitigation Objective	Mitigation Measure	Implementation Mechanism & Responsibility
Loss of Agricultural Land	Minimize use of farmland for road improvement purposes.	Loss of agricultural land has been avoided as much as possible. Use of corridors already dedicated to agricultural use minimizes the need for additional agricultural land. All fill material will be obtained from non-agricultural areas.	Avoidance of agricultural land has been incorporated in the decision-making process.
Borrow Pits in Inappropriate Locations	Avoid loss of agricultural land or other resources	Only government sanctioned quarries and construction material sources will be used.	Required by Project Contracts. Enforced by SE.
Inappropriate Exploitation and Restoration of Borrow Pit Areas.	Minimize loss of topsoil and creation of drainage problems and unsightliness.	Topsoil to re-vegetate the pits to the satisfaction of the SE. Borrow pit areas will be graded to ensure drainage and visual uniformity or to create permanent tanks/dams. Additional borrow pits will not be opened without the restoration of those areas no longer in use.	Required by Project Contracts. Enforced by SE.
Inadequate Slope Stabilization	Minimize soil loss during slope creation and due to erosion and slope failure in the longer-term.	Side slopes standards have been established to reduce erosion potential and/or, if necessary, stabilized, covered with rip-rap or other material to prevent soil erosion. Where appropriate embankment slopes and road cuts will be stabilized by re-vegetation with grazing resistant plant species, placement of fiber mats, rip-rap, rock gabions, or other appropriate technologies.	Incorporated in design. Enforced by SE. Operational maintenance by MPW.
Soil Loss Due to Water-Related Erosion.		Discharge zones from drainage structures will be furnished with rip-rap when warranted, particular in instances in which drainage structures are installed and/or road formation levels are raised and create bare slopes that require stabilization. Down drains/chutes will be lined with rip-rap/masonry or concrete to prevent erosion.	Incorporated in design. Enforced by SE. Operational maintenance by MPW.

Uncontrolled Runoff from Construction & Labor Camps	Avoid soil due to poorly designed and/or maintained constructor and labor camps.	Runoff will be controlled by proper siting of construction camps and staging areas.	Required by Project Contracts. Enforced by SE.
Inappropriate Use of Dredge Material	Ensure that any dredged material is properly handled.	Dredge material free of contaminants shall be used for reclamation and agricultural uses as appropriate.	Required by Project Contracts. Enforced by SE.

NOISE

Potential Impact Source	Mitigation Objective	Mitigation Measure	Implementation Mechanism & Responsibility
Blasting (if any)	Minimize high noise levels and high stress levels due to unanticipated blasting. Control time.	Blasting and drilling times will be limited. Public notification of blasting will be required.	Required by Project Contracts. Enforced by SE.
Pile Driving	Minimize high noise levels, vibrations and time of occurrence.	To be mitigated through use of : - Time limits for pile-driving activities. - Bored piles in sensitive areas. - Shrouds where warranted.	Required by Project Contracts. Enforced by SE.
Earth Moving	Minimize high noise levels and times of occurrence	Limit earth-moving times. Limit number of working vehicles. Use of low-noise emission vehicles. Proper maintenance of equipment. Use of noise barriers where warranted.	Required by Project Contracts. Enforced by SE.
Paving And Other Construction Activities.	Minimize high noise levels and times of occurrence.	Limit construction hours in sensitive areas. Use of properly maintained equipment. Use of noise barriers where warranted.	Required by Project Contracts. Enforced by SE.

SOCIAL

Potential Impact Source	Mitigation Objective	Mitigation Measure	Implementation Mechanism & Responsibility
Disruption of Economic Activities	Minimize loss of income due to disruptions.	Contractors are required to minimize disruption due to traffic detours and construction activities. Unavoidable disruptions will be compensate per the recommended Guidelines.	GOA and SE.
Dislocation of Homes and Businesses	Minimize loss of social connections and income.	Relocations, resettlement and income restoration will be mitigated per the Guidelines.	GOA.
Removal of Graves	Avoidance of family and social stress.	Mitigated in accordance with the recommended Guidelines.	GOA
In-migration of Labor	Avoidance of social tensions. due to competition for resources.	Mitigated by control of labor camps (if any) employee orientation and public information programs.	Construction requirements enforced by SE.
Traffic and Transport Disruption	Avoid social tensions and the opportunity cost of time lost due to traffic delays.	Public information programs to alert the public of detours, etc., are required. Adequate posting and directional assistance at detours will be enforced.	SE.

- Controls of hazardous materials.
- **Social Impacts.** Potential issues related to transport of construction materials, labor camps and other social impacts will be mitigated as a routine part of construction supervision. Compliance with the contract stipulation in regard to the use of local labor to the maximum extent feasibility will also be monitored by the SE.
- **Public Health.** Compliance with contract provisions to control potential contamination of local water supplies during construction; to control air pollution and noise levels; to provide basic emergency health facilities for workers; and encourage programs aimed at the prevention of sexually transmitted diseases as a part of all construction employee orientation programs; and other factors having a potential impact will be assured through the oversight of the SE. Although it is beyond the scope of the proposed Project, the establishment of STD awareness programs is recommended
- **Safety.** Detours and traffic re-routing schemes will require the approval of the SE. Contract documents state that "The Sub-Contractor shall provide the Contractor with a written traffic control plan which is to include when and where flagmen shall be employed and when and where traffic cones or other devices such as barricades and/or lights will be used. Where ... traffic diversions area planned for ...additional areas (will) be demined and the diversions clearly defined for travel."¹ Enforcement of these and related safety provisions during the construction process will be the responsibility of the SE. Safety issues related to the shoulder provisions for the accommodation of NMT are a design rather than a compliance issue and, as previously noted, will require resolution by the funding agencies.
- **Impacts to Other Infrastructure Networks.** Responsibility to ensure compliance with contract provisions to coordinate with all relevant agencies and organizations to avoid disruption of other infrastructure services (water supply, irrigation systems, electricity, etc.) rests SE.
- **Noise and Vibration Impacts.** Contract provisions for the control of noise and vibration impacts during the construction phase through the use of site controls, site controls, time and activity constraints and public awareness efforts as tabulated by Table 6.1 with compliance monitored by the SE.

6.2 RECOMMENDATIONS

6.2.1 Actions Within the Scope of the Project

Two issues requiring resolution have emerged in the EA process. The issues and recommendations related to them are as follows:

- **Shoulder Characteristics.** Current plans provide for shoulder widths of 1.25 meters on either side of the roadway. Recommendations have been forward, however, for shoulder widths of 2.25 meters so as to provide adequate space for emergency pull-offs and to accommodate non-motorized traffic (NMT). It is recognized that the issue is one with significant budget implications. From a public safety point of view, the provision of wider shoulders is recommended to mitigate the impact of higher speeds made possible by the road improvements and conflicts between through traffic, NMT and pedestrians, particularly in populated areas where increasing levels of NMT are likely.

- **Documented Adoption of Guidelines for Compensation.** Although the Project is not expected to result in impacts to residences, it is likely to impact roadside economic activities and assets, including commercial/bazaar activities and farms in certain areas. Details will be dependent on final design decisions yet to be made (including the selected shoulder characteristics). Recommended Guidelines to mitigate impacts to project-affected persons (PAPs), based on the precedents set by related policies in Afghanistan, are provided by **Appendix 2**.

6.2.2 Actions Beyond the Scope of the Project

Recommendations for actions beyond the scope of the Project, but generally within the scope of the REFS Program, are as follows:

- **Assist MPW in the Establishment of a Traffic Safety Program.** In addition to the safety requirements to be observed during the construction period, safety during the operational phase of the Project is a major concern. Potential safety impacts associated with highway improvement programs are illustrated by Vietnam's recently improved NH-5. High speed highways combined with roadside development and ineffective access and crossing provisions are inherent safety problems. Routine monitoring of accident data to ensure that the points of major conflicts are identified as they emerge is recommended. It is also recommended that MPW take the lead in the establishment of a safety enhancement program to include:
 - Use of Lights and Reflectors. Increased use of lights and reflectors should be strongly encouraged for both motorized and non-motorized traffic, particularly bicycles and other slow-moving vehicles. Such a program might include the free or subsidized distribution of reflectors. Such a program could be supported by corporate sponsors or non-governmental organizations (NGOs).
 - Public Awareness Programs. The increased traffic and traffic speed in portions of the rehabilitation corridor will be a major change in the environment for many residents. Programs to heighten awareness are recommended for incorporation in the Project before construction.

Initiatives in this area are recommended for consideration as part of REFS Component 2.

- **Assist Coordination of Future Land Use & Transport Plans.** The long-term impacts of the Kabul-Kandahar Road Rehabilitation Project could be more significant than the short-term impacts of the construction period and are largely beyond the scope of the Project. REFS Component 2 can assist in the inter-governmental action necessary to monitor these impacts and ensure that they are adequately managed in concert with other concerned agencies.
- **Support of Roadside Economic Activities.** Consideration of market development activities in the vicinity of the Kabul-Kandahar Road is recommended as companion REFS Component 1 activities.
- **Integrate Road Rehabilitation with REFS Institutional Strengthening Initiatives.** Institutional strengthening actions will be necessary as a part of the Project to ensure that the road is adequately maintained in the future, to ensure that future bidding and tendering procedures are in place and to ensure that environmental issues incorporated

in these activities. REFS Component 2 offers an opportunity to provide the necessary institutional initiatives.

- **Coordinate with Other Financing Organizations.** Rehabilitation of portions of the Kabul-Kandahar Road may be supported by organizations other than USAID, including other bilateral organization and the multi-lateral development banks. The establishment of a reasonably consistent technical/engineering standards for the rehabilitation activities (e.g., the widths of the shoulders in areas with significant levels of NMT) is highly recommended. A reasonable consistency in procedural standards and requirements is also highly recommended. Other very closely aligned projects such as the World Bank's Emergency Infrastructure Reconstruction (EIRP) will require Afghanistan's ministries to establish reporting procedures and will provide the ministries with institutional strengthening mainly to ensure conformance with procedures established by the Bank. Coordination of the technical reporting and procedures expected by the ministries by USAID, the World Bank, the Asian Development Bank and others is highly recommended so that the burden on local organizations to supply essentially the same information in different formats is minimized.

END NOTES – SECTION 6.0

¹ Draft Scope of Work. Kabul-Kandahar Highway Design and Rehabilitation. Part VII, Item 2.21, page 12.

LIST OF PREPARERS

LIST OF PREPARERS

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**APPENDIX A
CONDITIONS OF PARTICULAR APPLICATION
ENVIRONMENTAL PROVISIONS**

APPENDIX A

CONDITIONS OF PARTICULAR APPLICATION

ENVIRONMENTAL PROVISIONS

The following has been extracted from the Conditions of Particular Application (COPA) prepared for use in the Kabul-Kandahar Road Rehabilitation Project.

4.0 ENVIRONMENTAL

4.1 General Provisions and Precautions

The Sub-Contractor shall take all necessary measures and precautions and otherwise ensure that the execution of the Works and all associated operations on the Work Sites or off-site are carried out in conformity with statutory and regulatory environmental requirements of Afghanistan including those established by local governments. The Sub-Contractor shall take all measures and precautions to avoid any nuisance or disturbance arising from the execution of the Work. This shall, wherever possible, be achieved by suppression of the nuisance at source rather than abatement of the nuisance once generated. In the event of any spoil or debris or silt from the Work Sites being deposited on any adjacent land, the Sub-Contractor shall immediately remove all such spoil debris or silt and restore the affected area to its original state to the satisfaction of the responsible authorities.

4.2 Water Quality

The following conditions shall apply to avoid adverse impacts to water quality:

- The Sub-Contractor shall prevent any interference with the supply to, or abstraction from, water resources and the pollution of water resources (including underground percolating water) as a result of the execution of the Works.
- Areas where water is regularly or repetitively used for dust suppression purposes (if any) shall be laid to fall to specially-constructed settlement tanks to permit sedimentation of particulate matter. After settlement, the water may be re-used for dust suppression and rinsing. All water and other liquid waste products arising on the Site shall be collected and disposed of at a location on or off the Site and in a manner that shall not cause either nuisance or pollution.
- The Sub-Contractor shall not discharge or deposit any matter arising from the execution of the Work into any waters except with the permission of the Contractor and regulatory authorities concerned.
- The Sub-Contractor shall at all times ensure that all existing stream courses and drains within and adjacent to the Site are kept safe and free from any debris and any materials arising from the Works.
- The Sub-Contractor shall protect all watercourses, waterways, ditches, canals, drains, lakes and the like from pollution, silting, flooding or erosion as a result of the execution of the Works.

4.3 Air Quality

The following conditions shall apply to avoid adverse impacts to air quality:

- Open burning will be prohibited.
- Solvents and volatile materials will be used and stored in manners satisfactory to the Contractor.
- Blasting (if any) will be carried out using small charges, and dust-generating items will be conveyed under cover.
- In periods of high wind, dust-generating operations shall not be permitted within 200 meters of residential areas having regard to the prevailing direction of the wind.
- Asphalt and hot-mix plants sites shall not be established prior to the approval of the Contractor and shall be located at least 500 meters away from the nearest sensitive receptor (e.g., schools and hospitals). Operators will be required to install emission controls.
- Water sprays shall be used during the delivery and handling of materials when dust is likely to be created and to dampen stored materials during dry and windy weather.
- Stockpiles of materials shall be sited in sheltered areas or within hoarding, away from sensitive areas. Stockpiles of friable material shall be covered with clean tarpaulins, with application of sprayed water during dry and windy weather. Stockpiles of material or debris shall be dampened prior to their movement whenever warranted.
- Vehicle with an open load-carrying area used for transporting potentially dust-producing material shall have properly fitting side and tailboards. Materials having the potential to produce dust shall not be loaded to a level higher than the side and tail boards, and shall be covered with a clean tarpaulin in good condition. The tarpaulin shall be properly secured and extend over the edges of the side and tailboards.
- In periods of adverse weather adverse impacts to adjacent residents or site employees during construction will be mitigated by either discontinuing until favorable conditions are restored, or, if warranted, sites may be watered to prevent dust generation, particularly at crushing plants.
- Machinery and equipment will be fitted with pollution control devices, which will be checked at regular intervals to ensure that they are in working order. Best available pollution control technologies will be required.
- Pre-construction monitor of existing ambient air quality may be undertaken to provide a baseline for the measurement of air quality impacts during the construction period if considered warranted by the Contractor.
- Periodic air quality monitoring may also be required in areas of high potential impact (asphalt plants, construction camps, etc) during the life of the Project if considered warranted by the Contractor.

4.4 Protection of Soils

Cut and Fill Activities. In undertaking cut and fill activities associated with the Works the Sub-Contractor shall:

- Select less erodable material, placement of gabions and riprap and good compaction, particularly around bridges and culverts.
- Complete final forming and re-vegetation will be completed as soon as possible following fill placement to facilitate regeneration of a stabilizing ground cover.
- Trench where necessary to ensure successful establishment of vegetation.
- Seed with a fast growing crop and potential native seed mix immediately after fill placement to prevent scour and to encourage stabilization.
- Stabilize embankment slopes and road cuts by re-vegetation with grazing resistant plant species, placement of fiber mats, riprap, rock gabions, or other appropriate technologies.
- Complete discharge zones from drainage structures with riprap to reduce erosion when required.
- Line down drains/chutes with rip-rap/masonry or concrete to prevent erosion.
- Adjust side slopes adjusted in the range from based on soil and other conditions and within a range as determined in consultation with the Contractor to reduce erosion potential or, if necessary, cover with riprap or other material to prevent soil erosion.
- Use stepped embankments for embankments greater than six meters.

Borrow Pits. The following conditions shall apply to borrow pits:

- Borrow areas will be located outside the ROWs.
- Pit restoration will follow the completion of works in full compliance all applicable standards and specifications.
- The excavation and restoration of the borrow areas and their surroundings, in an environmentally sound manner to the satisfaction of the Contractor is required before final acceptance and payment under the terms of contracts.
- Borrow pit areas will be graded to ensure drainage and visual uniformity, or to create permanent tanks/dams.
- Topsoil from borrow pit areas will be saved and reused in re-vegetating the pits to the satisfaction of the Contractor.
- Additional borrow pits will not be opened without the restoration of those areas no longer in use.

Quarries. To ensure adequate mitigation of potential adverse impacts, only licensed quarrying operations are to be used for material sources. If licensed quarries are not available the Sub-Contractors may be made responsible for setting up their dedicated

crusher plants at approved quarry sites

Erosion. To avoid potential adverse impacts due to erosion, the Sub-Contractor shall:

- line spillage ways with riprap to prevent undercutting.
- Provide Mitigation plantings and fencing where necessary to stabilize the soil and reduce erosion.
- Upgrade and adequately size, line and contour storm drainage to minimize erosion potential.
- As noted in _____ ditches shall be designed for the toe of slopes in cut sections with gutters or drainage chutes being employed to carry water down slopes to prevent erosion. Interceptor ditches shall be designed and constructed near the top of the back of slopes or on benches in the cut slopes as well as when there is a slope on adjacent ground toward the fill. When the roadway has a steep longitudinal slope, a drain is to be designed and constructed at the down-slope end of the cut to intercept longitudinal flow and carry it safely away from the fill slopes.¹

4.5 Avoidance of Social Impacts

To avoid adverse social impacts, the Sub-Contractor shall:

- Not proceed without verification by the Government of Afghanistan that lands required for the improvements are free of any squatters, encroachers or other claims or entitlements as specified by the Guidelines and recommendations of the Environmental Assessment of the Kabul-Kandahar Road Rehabilitation Project as approved by USAID.
- Coordinate all construction activities with neighboring land uses and respect the rights of local landowners. If located outside the ROW, written agreements with local landowners for temporary use of the property will be required and sites must be restored to a level acceptable to the owner within a predetermined time period.
- Maintain and cleanup campsites.
- Attend to the health and safety of their workers by providing basic emergency health facilities for workers and incorporate programs aimed at the prevention of sexually transmitted diseases as a part of all construction employee orientation programs
- Obtain approval of all diversions and accommodations of traffic. As stipulated by Section ____ which states that "the Sub-Contractor shall provide the Contractor with a written traffic control plan which is to include when and where flagmen shall be employed and when and where traffic cones or other devices such as barricades and/or lights will be used. Where ... traffic diversions area planned for ... additional areas (will) be de-mined and the diversions clearly defined for travel."
- Construct and maintain by-passes around bridges to be reconstructed until such time as the bridge is open for traffic. By-passes will be removed and the affected areas re-graded so as to blend in with the existing contours when the bridge is opened.²

4.6 Noise

To avoid adverse impacts due to noise, the Sub-Contractor shall:

- Consider noise as an environmental constraint in his planning and execution of the Works.
- Use equipment conforming to international standards and directives on noise and vibration emissions.
- Take all necessary measures to ensure that the operation of all mechanical equipment and construction processes on and off the Site shall not cause any unnecessary or excessive noise, taking into account applicable environmental requirements.
- Maintain exhaust systems in good working order; properly design engine enclosures, use intake silencers where appropriate and regularly regular maintain noise-generating equipment.
- Use all necessary measures and shall maintain all plant and silencing equipment in good condition so as to minimize the noise emission during construction works.
- Schedule operations to coincide with periods when people would least likely be affected and limit work hours and work days to less noise-sensitive times. Hours-of-work will be approved by the Contractor having due regard for possible noise disturbance to the local residents or other activities. Construction activities will be strictly prohibited between 10 PM and 6 AM in the residential areas. When operating close to sensitive areas such as residential, nursery, or medical facilities, the Sub-Contractor's hours of working shall be limited to 8 AM to 6 PM.
- Incorporate noise considerations in public notification of construction operations and specify methods to handle complaints. Disposal sites and haul routes will be coordinated with local officials to avoid adverse traffic noise.
- Undertake pre-construction monitor of existing noise and vibration if determined warranted and requested by the Contractor to provide a baseline for the measurement of impacts during the construction period. Routine monitoring may also be required in areas of high potential impact (e.g., pile-driving sites and areas of intensive noise-generating activities) if considered warranted by the Contractor.

4.7 Fuel and Chemical Storage

The following conditions to avoid adverse impacts due to improper fuel and chemical storage:

- All fuel and chemical storage (if any) shall be sited on an impervious base within a bund and secured by fencing. The storage area shall be located away from any watercourse or wetlands. The base and bund walls shall be impermeable and of sufficient capacity to contain 110 percent of the volume of tanks.
- Filling and refueling shall be strictly controlled and subject to formal procedures.
- All valves and trigger guns shall be resistant to unauthorized interference and vandalism and be turned off and securely locked when not in use.

- The contents of any tank or drum shall be clearly marked. Measures shall be taken to ensure that no contaminated discharges enter any drain or watercourses.

4.8 Protection of Historic and Cultural Resources

To avoid potential adverse impacts to historic and cultural resources, the Sub-Contractor shall:

- Protect sites of known antiquities, historic and cultural resources by the placement of suitable fencing and barriers;
- Adhere to accepted international practice and all applicable historic and cultural preservation requirements of the Government of Afghanistan, including all appropriate local government entities.
- In the event of unanticipated discoveries of cultural or historic artifacts (movable or immovable) in the course of the work, the Sub-Contractor shall take all necessary measures to protect the findings and shall notify the Contractor and provincial-level representatives of the Archaeological Committee under the Ministry of Information and Culture. If continuation of the work would endanger the finding, project work shall be suspended until a solution for preservation of the artifacts is agreed upon.

4.9 Protection of Utilities

To avoid potential adverse impacts to utilities, the Sub-Contractor shall:

- Ascertain and take into account in his method of working the presence of utility services on and in the vicinity of the Site.
- Take into account in his program the periods required to locate, access, protect, support and divert such services, including any periods of notice required to effect such work in consultation with authorities operating such services.
- Assume all responsibility to locate or to confirm the details and location of all utility services on or in the vicinity of the Site.
- Exercise the greatest care at all times to avoid damage to or interference with services.
- Assume responsibility for any damage and/or interference caused by him or his agents, directly or indirectly, arising from actions taken or a failure to take action, and for full restoration of the damage.
- Wherever existing ground surfaces are to be disturbed for construction of the Works, carry out full and adequate preliminary investigations to locate all services in the area by means of hand-dug trial holes and trenches in combination with electronic and electro-mechanical devices, where appropriate,. Each service thus exposed shall be identified. Every such service at risk shall be fully exposed and adequately protected and supported in situ or diverted to the satisfaction of the appropriate authority prior to the commencement of such construction.
- When working in the vicinity of overhead power cables, ascertain and satisfy himself about the safe clearances to be maintained from the power cables in consultation with

the authority operating the power line. Where existing overhead power lines, communications cables or other major utilities require relocation, the Sub-Contractor will use the services of specialist enterprises with the necessary skills and technology to carry out the work.

END NOTES

¹ Draft Scope of Work, Kabul-Kandahar Highway Design and Rehabilitation, Part VII, Item 2.16, page 10.

² Draft Scope of Work, Kabul-Kandahar Highway Design and Rehabilitation, Part VII, Item 2.21, page 12.

**APPENDIX B
GUIDELINES FOR LAND AND ASSET
ACQUISITION, ENTITLEMENTS AND
COMPENSATION**

APPENDIX B

GUIDELINES FOR LAND AND ASSET ACQUISITION, ENTITLEMENTS AND COMPENSATION

The following presents the Guidelines for Land and Asset Acquisition, Entitlements and Compensation drafted for use in the World Bank Afghanistan Emergency Infrastructure Project. Adaptation of the Guidelines is recommended for incorporation in the Kabul-Kandahar Road Rehabilitation Project and other projects included in the USAID Afghanistan Rehabilitation of Economic Facilities and Services (REFS).

Guidelines for Land and Asset Acquisition, Entitlements and Compensation

I. Objectives

Land acquisition will be kept to a minimum and no person will be involuntarily displaced under subprojects financed by the proposed emergency reconstruction operations. Subproject proposals that would require demolishing houses or acquiring productive land should be carefully reviewed to minimize or avoid their impacts through alternative alignments. Proposals that require more than minor expansion along rights of way should be reviewed carefully. No land or asset acquisition may take place outside of these guidelines. A format for Land Acquisition Assessment is attached as Attachment 2(i).

These guidelines provide principles and instructions to compensate affected persons to ensure that all such persons negatively affected, regardless of their land tenure status, will be assisted to improve, or at least to restore, their living standards, income earning or production capacity to pre-project levels.

Categorization

Based on the number of persons that may be affected by the project (Project Affected People, PAPs) and the magnitude of impacts, projects may be categorized as S-1, S-2, or S-3 projects:

- a. S-1 projects are those that will involve the resettlement of more than 200 PAPs and where a full Resettlement Action Plan (RAP) must be produced. Such interventions will be ineligible for support under the proposed emergency reconstruction operations.
- b. S-2 projects are those which will involve the resettlement of less than 200 persons. In such cases, the following documentation is required: (1) a land acquisition assessment, (2) the Minutes or record of consultations which assess the compensation claimed and agreement reached, and (3) a record of the receipt of the compensation, or voluntary donation, by those affected (see below).
- c. S-3 projects are not expected to have any land acquisition or any other significant adverse social impacts; on the contrary, significant positive social impact and improved livelihoods are expected from such interventions.

II. Eligibility

PAPs are identified as persons whose livelihood is directly or indirectly affected by the project. PAPs deemed eligible for compensation are:

- (1) those who have formal legal rights to land, water resources or structures/buildings, including recognized customary and traditional rights;
- (2) those who do not have such formal legal rights but have a claim to usufruct right rooted in customary law;

- (3) those whose claim to land and water resources or building/structures do not fall within (1) and (2) above, are eligible to assistance to restore their livelihood.

Acquisition of Productive Assets and Compensation

PAPs are eligible for replacement costs for lost assets as described below:

- a. *Voluntary contributions.* In accordance with traditional practices, individuals may elect to voluntarily contribute land or assets and/or relocate temporarily or permanently from their land without compensation.
- b. *Contributions against compensation.* A contributor/asset loser considered "affected" will be eligible for compensation from the local community or alternatively from the Government. A PAP shall lodge his/her claim for compensation to the local community representatives/shura head and it shall be verified by the implementing agency. The claim shall be lodged within 2 weeks of completion of the consultations with the concerned community, and before project implementation begins.

Voluntary contribution, or contribution against compensation, should be documented. The documentation should specify that the land is free of any squatters, encroachers or other claims. A format is attached in Attachment 2(i), which includes a Schedule to be followed to assess any compensation claimed and the agreement reached.

III. Compensation Principles

The project implementing agencies shall ensure that any of the following means of compensation are provided in a timely manner to affected persons:

- (1) Project affected persons losing access to a portion of their land or other productive assets with the remaining assets being economically viable are entitled to compensation at replacement cost for that portion of land or assets lost to them. Compensation for the lost assets will be according to following principles:
 - a. replacement land with an equally productive plot, cash or other equivalent productive assets;
 - b. materials and assistance to fully replace solid structures that will be demolished;
 - c. replacement of damaged or lost crops and trees, at market value;
 - d. other acceptable in-kind compensation;
 - e. in case of cash compensation, the delivery of compensation should be made in public, i.e. at the Community Meeting.
- (2) Project affected persons losing access to a portion of their land or other economic assets rendering the remainder economically non-viable, will have the options of compensation for the entire asset by provision of alternative land, cash or equivalent productive asset, according to the principles in (1) a-d above.

Consultation Process

The implementing agencies will ensure that all occupants of land and owners of assets located in a proposed subproject area are consulted. There will be gender-separate community meetings for each affected *mantaqa/gozar* (urban infrastructure) or village (other projects) to inform the local population about their rights to compensation and options available in accordance with these Guidelines. The

Minutes of the community meetings shall reflect the discussions held, agreements reached, and include details of the agreement, based on the format provided in Attachment 2(ii).

The implementing agency shall provide a copy of the Minutes to affected persons and confirm in discussions with each of them their requests and preferences for compensation, agreements reached, and any eventual complaint. Copies will be recorded in the posted project documentation and be available for inspection during supervision.

Subproject Approval

In the event that a subproject involves acquisition against compensation, the implementing agency shall:

- a. not approve the subproject unless a satisfactory compensation has been agreed between the affected person and the local community;
- b. not allow works to start until the compensation has been delivered in a satisfactory manner to the affected persons;
- c. if more than 200 persons are affected and require compensation, the subproject shall be deemed ineligible for support under the emergency reconstruction operations.

Complaints and Grievances

All complaints should first be negotiated to reach an agreement at the local community/village level. If this fails, complaints and grievances about these Guidelines, implementation of the agreements recorded in the Community Meeting Minutes or any alleged irregularity in carrying out the project can also be addressed by the affected persons or their representative at the municipal or district level. If this also fails, the complaint may be submitted to the relevant implementing agency for a decision.

Verification

The Community Meeting Minutes, including agreements of compensation and evidence of compensation having been made shall be provided to the Municipality/district, to the supervising engineers, who will maintain a record hereof, and to auditors and socio-economic monitors when they undertake reviews and post-project assessment. This process shall be specified in all relevant project documents, including details of the relevant authority for complaints at municipal/district or implementing agency level.



Attachment 2(i)

Land Acquisition Assessment Data Sheet

(To be used to record information on all land to be acquired)

1. Quantities of land/structures/other assets required:
2. Date to be acquired:
3. Locations:
4. Owners:
5. Current uses:
6. Users:
 - Number of Customary claimants:
 - Number of Squatters:
 - Number of Encroacher:
 - Number of Owners:
 - Number of Tenants:
 - Others (specify): Number:
7. How land/structures/other assets will be acquired (identify one):
 - Donation
 - Purchase
8. Transfer of title:
 - Ensure these lands/structures/other assets free of claims or encumbrances.
 - Written proof must be obtained (notarized or witnessed statements) of the voluntary donation, or acceptance of the prices paid, from those affected, together with proof of title being vested in the community, or guarantee of public access, by the title-holder.
9. Describe grievance mechanisms available:

Attachment 2(ii)

Format to Document Contribution of Assets

The following agreement has been made on..... day of.....
between.....resident of(the Owner)
and(the Recipient).

1. That the Owner holds the transferable right ofjerib of
land/structure/asset in.....
2. That the Owner testifies that the land/structure is free of squatters or encroachers and not subject to
other claims.
3. That the Owner hereby grants to the Recipient this asset for the construction and development of
.....for the benefit of the villagers and the public at large.

(Either, in case of donation:)

4. That the Owner will not claim any compensation against the grant of this asset.

(Or, in case of compensation:)

4. That the Owner will receive compensation against the grant of this asset as per the attached Schedule.
5. That the Recipient agrees to accept this grant of asset for the purposes mentioned.
6. That the Recipient shall construct and develop the.....and take all possible precautions
to avoid damage to adjacent land/structure/other assets.
7. That both the parties agree that the.....so constructed/developed shall be public
premises.
8. That the provisions of this agreement will come into force from the date of signing of this deed.

Signature of the Owner:

Signature of the Recipient:

Witnesses:

1. _____

2. _____

(Signature, name and address)

**Schedule of
Compensation of Asset Requisition**

Summary of affected unit/item	Units to be Compensated	Agreed Compensation
a. Urban/agricultural land (m ²):	_____	_____
b. Houses/structures to be demolished (units/m ²):	_____	_____
c. Type of structure to be demolished (e.g. mud, brick, etc.)	_____	Not Applicable.
d. Trees or crops affected:	_____	_____
e. Water sources affected:	_____	_____

Signatures of local community representatives, shura head:

Include record of any complaints raised by affected persons:

Map attached (showing affected areas and replacement areas):

**APPENDIX C
PHOTOGRAPHS**

PIC 001 - KM 0+000 Typical Roadway Section



PIC 002 - KM 0+000 Typical Roadway Section



PIC 003 - KM 5+000 Typical Roadway Section



PIC 004 - KM 10+000 Typical Roadway Section



PIC 005 - KM 15+000 Typical Roadway Section



PIC 006 - KM 20+000 Typical Roadway Section



PIC 007 - KM 25+000 Typical Roadway Section



PIC 008 - KM 30+000 Typical Roadway Section



PIC 009 - KM 35+000 Typical Roadway Section



PIC 010 - BRIDGE (Good Condition)



PIC 011 - KM 40+000 Typical Roadway Section



PIC 012 - BRIDGE (Damaged, Needs Reconstruction)



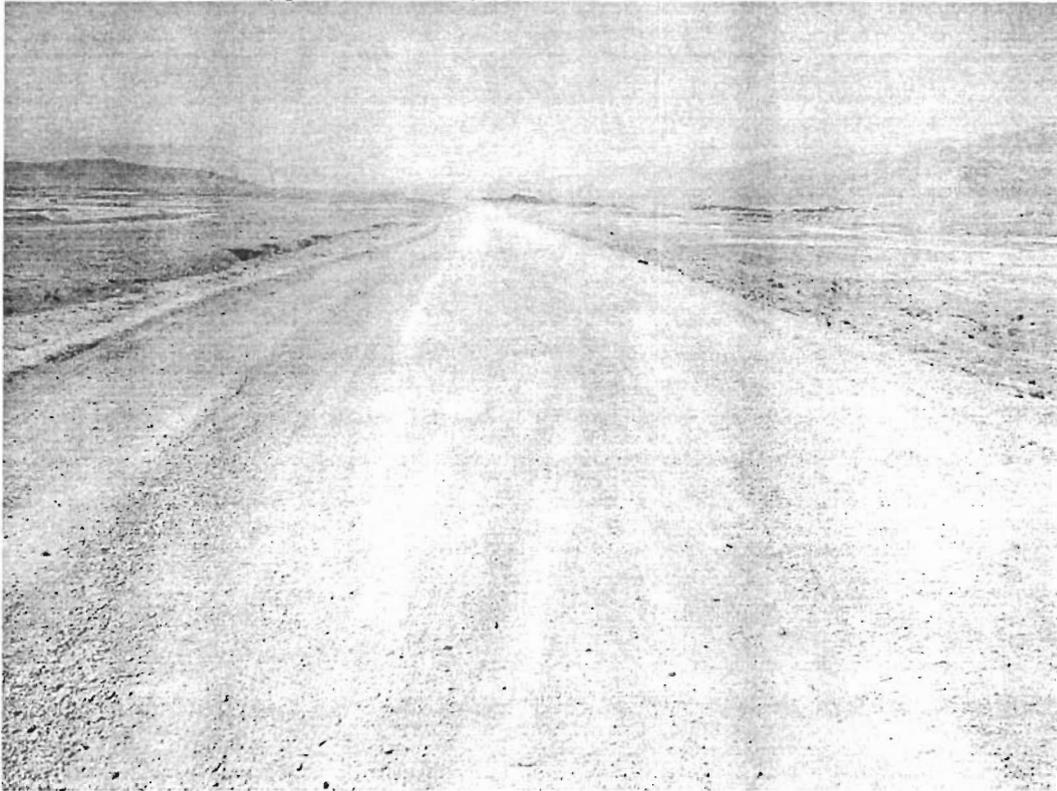
PIC 013 - KM 45+000 Typical Roadway Section



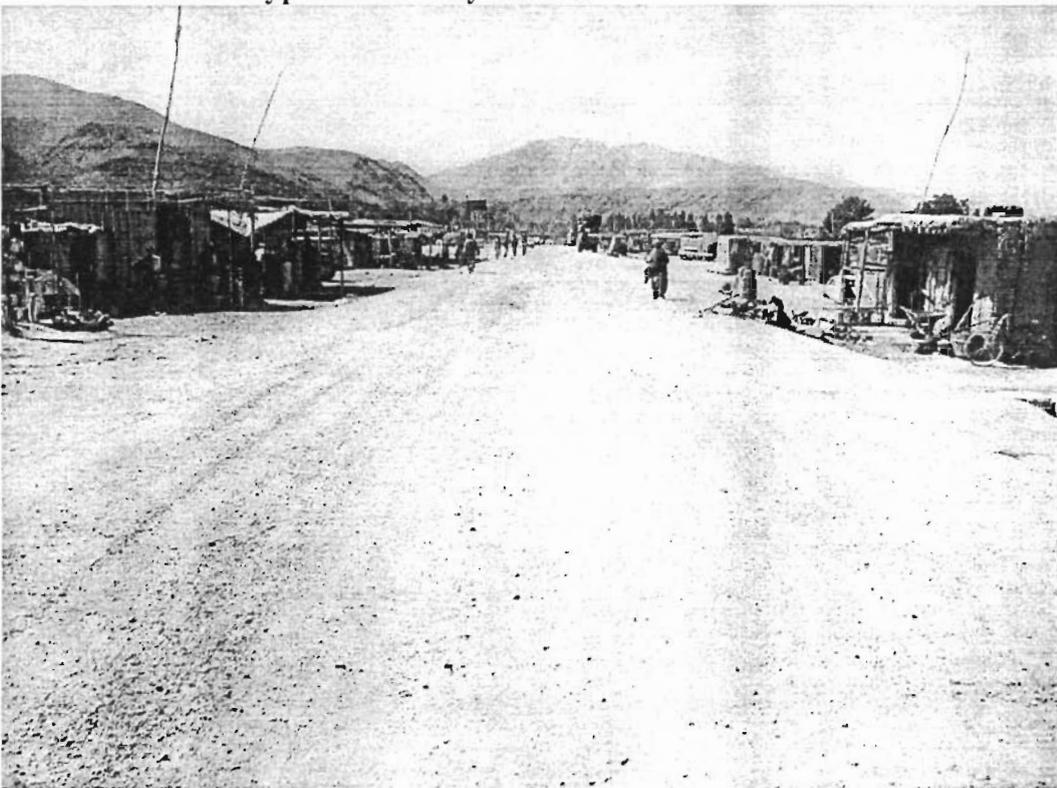
PIC 014 - KM 50+000 Typical Roadway Section



PIC 015 - KM 55+000 Typical Roadway Section



PIC 016 - KM 60+000 Typical Roadway Section



PIC 017 – Typical Long Bridge



PIC 018 - BRIDGE (Side View)



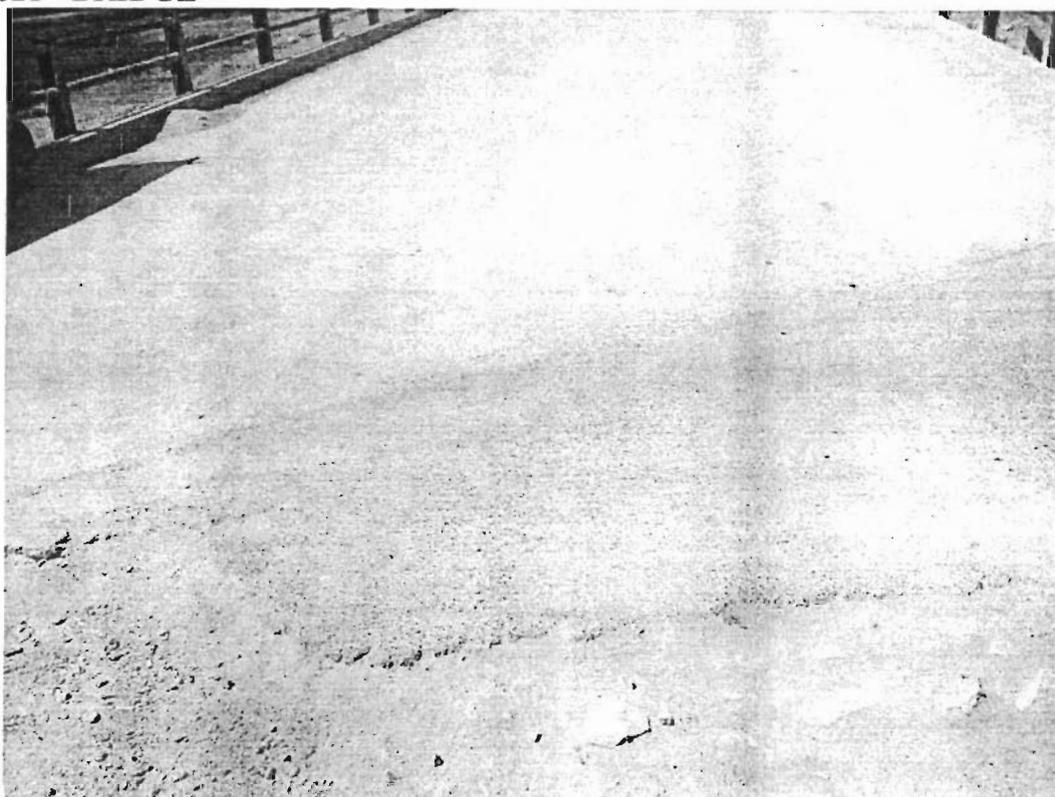
PIC 019 - KM 65+000 Typical Roadway Section



PIC 020 - KM 70+000 Typical Roadway Section



PIC 021 - BRIDGE



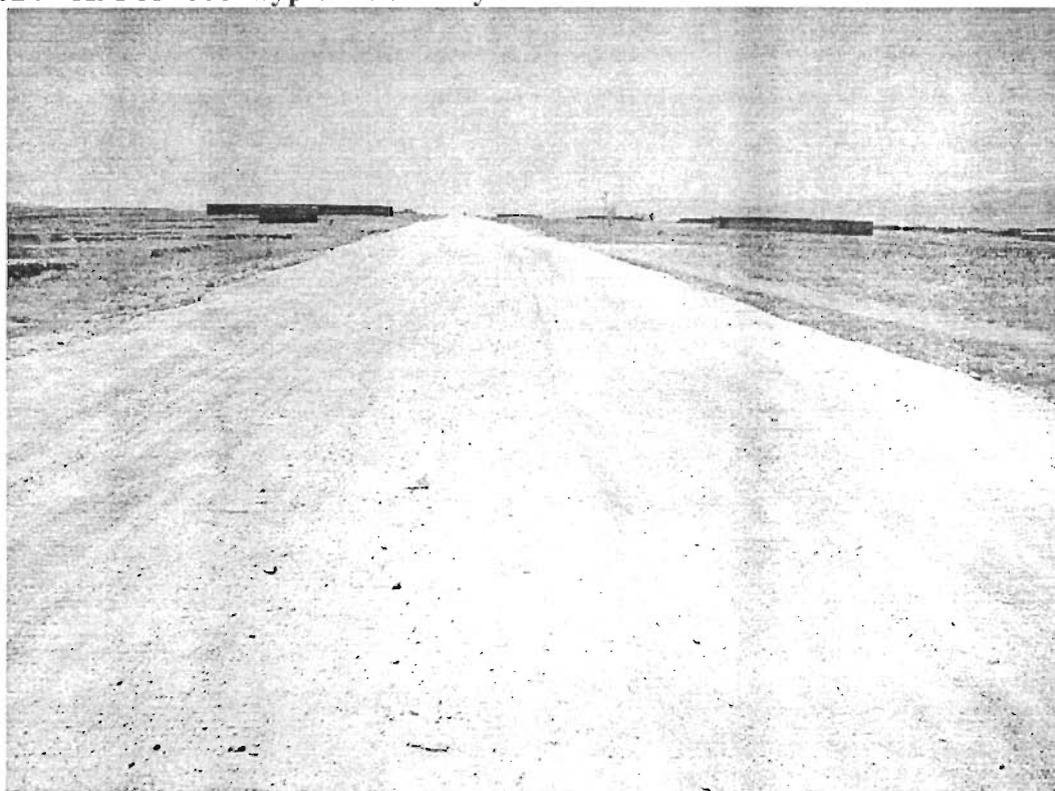
PIC 022 - KM 75+000 Typical Roadway Section



PIC 023 - KM 80+000 Typical Roadway Section



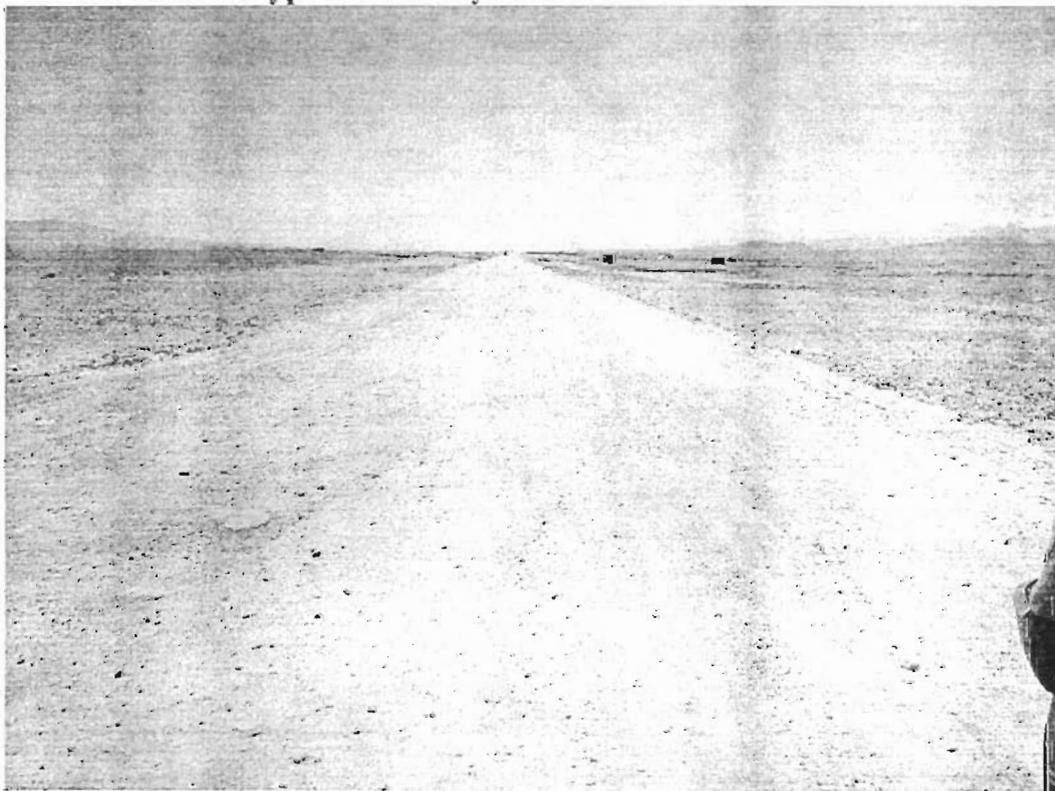
PIC 024 - KM 85+000 Typical Roadway Section



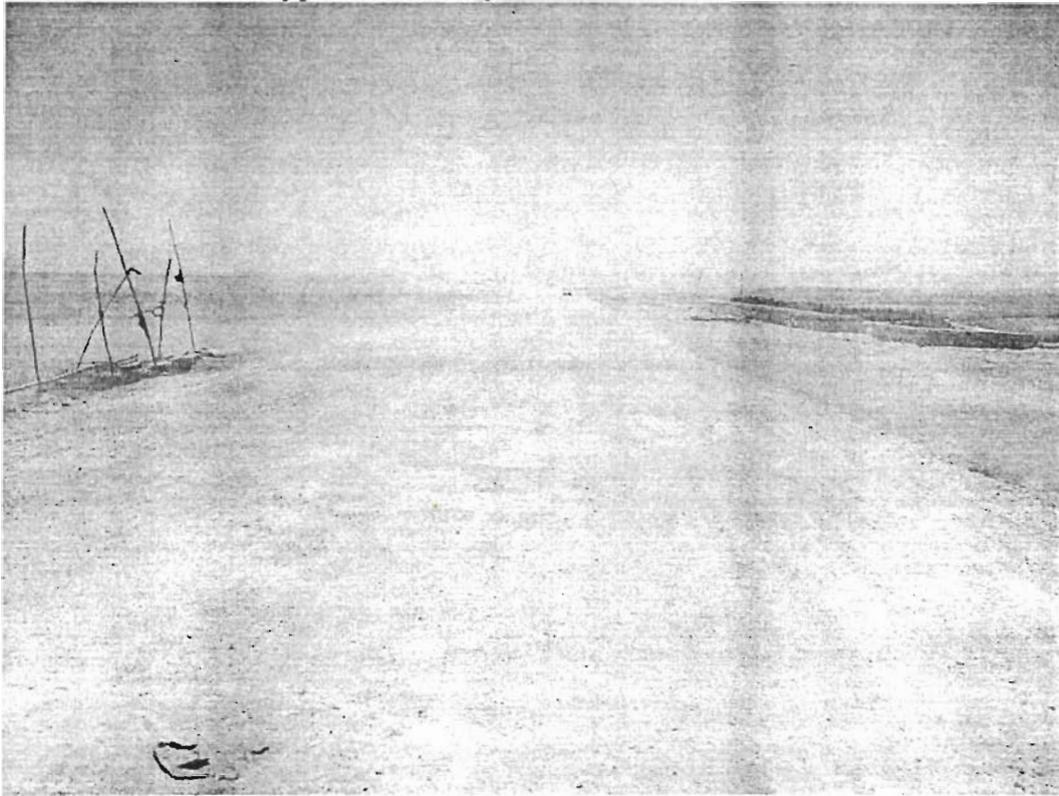
PIC 025 - KM 90+000 Typical Roadway Section



PIC 026 - KM 95+000 Typical Roadway Section



PIC 027 - Km 100+000 Typical Roadway Section



PIC 028 - KM 105+000 Typical Roadway Section



PIC 029 -Km 110+000 Typical Roadway Section



PIC 030 - KM 115+000 Typical Roadway Section



PIC 031 - KM 120+000 Typical Roadway Section



PIC 032 - KM 130+000 Typical Roadway Section



PIC 033 - KM 140+000 Typical Roadway Section



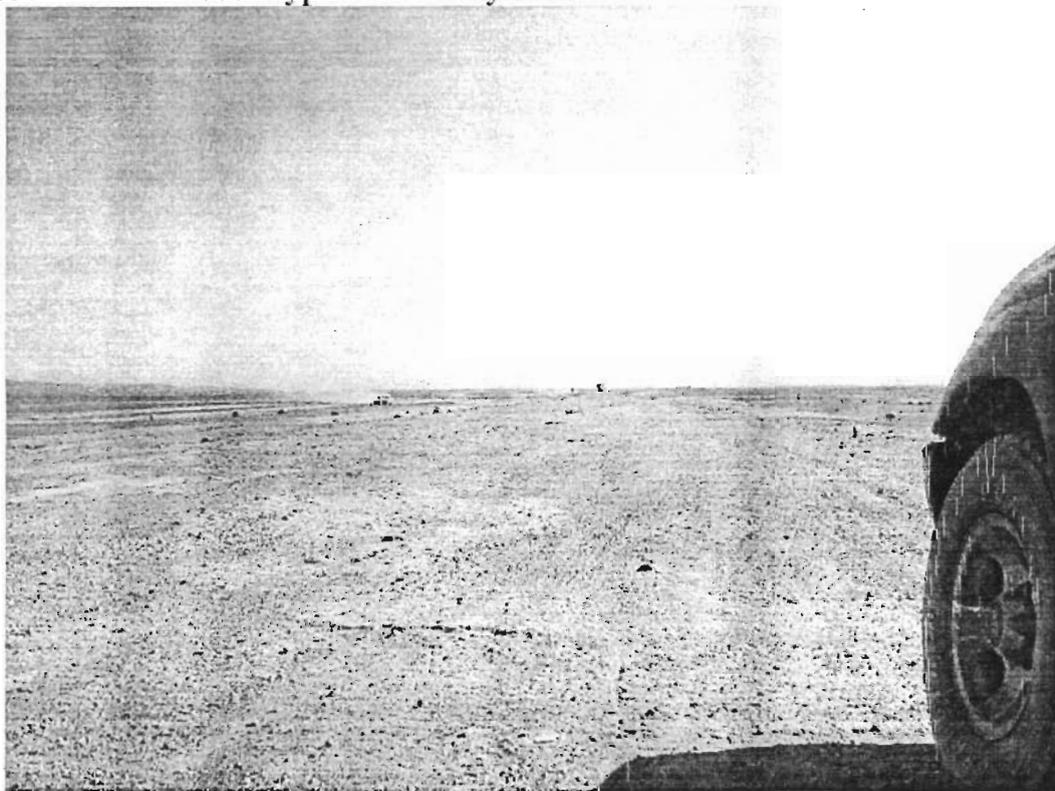
PIC 034 - BRIDGE



PIC 035 - KM 150+000 Typical Roadway Section



PIC 036 - KM 160+000 Typical Roadway Section



PIC 037 - KM 170+000 Typical Roadway Section



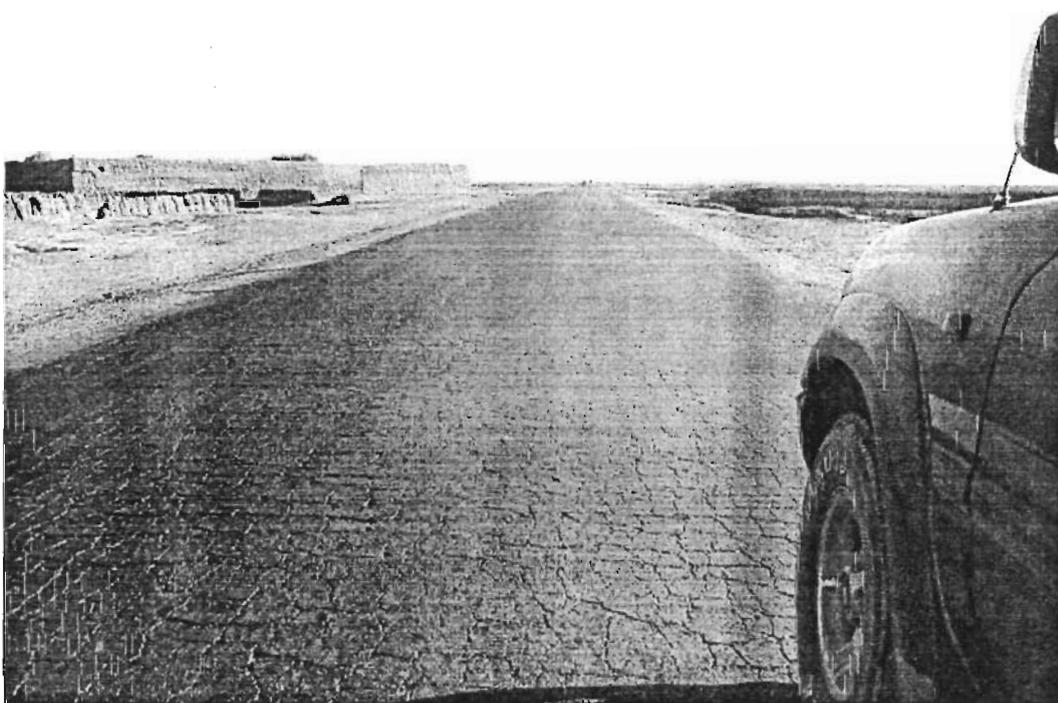
PIC 038 - KM 180+000 Typical Roadway Section



PIC 039 - KM 190+000 Typical Roadway Section



PIC 040 - KM 200+000 Typical Roadway Section



PIC 041 - KM 210+000 Typical Roadway Section



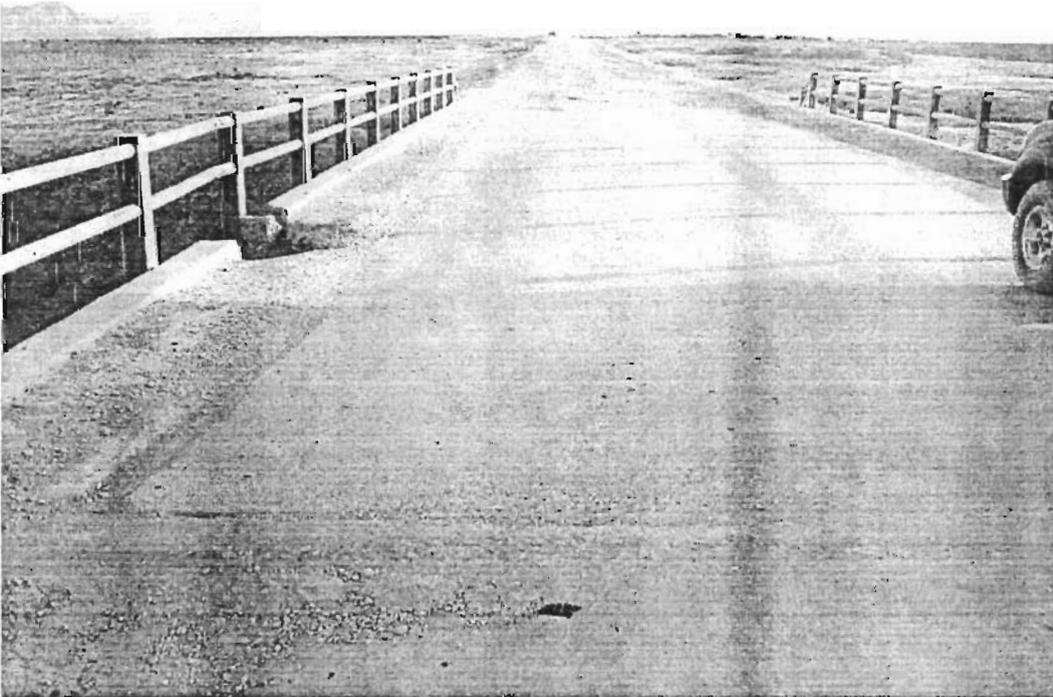
PIC 042 - KM 220+000 Typical Roadway Section



PIC 043 - BRIDGE (Damaged, needs replacement)



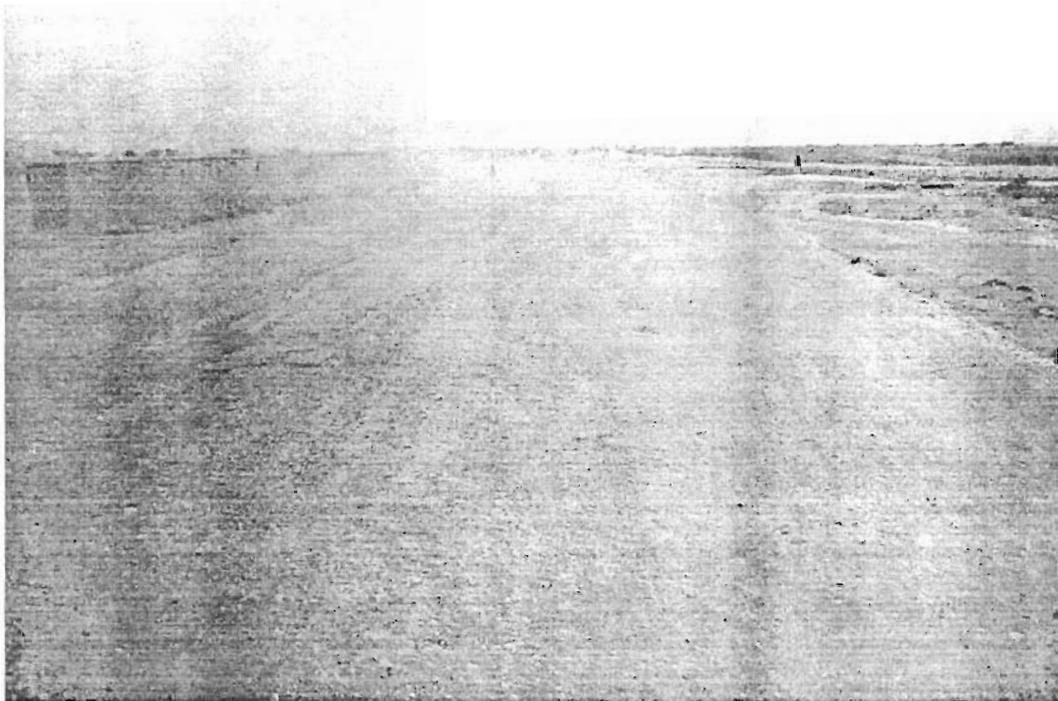
PIC 044 - BRIDGE (Damaged needs some repair)



PIC 045 - KM 230+000 Typical Roadway Section



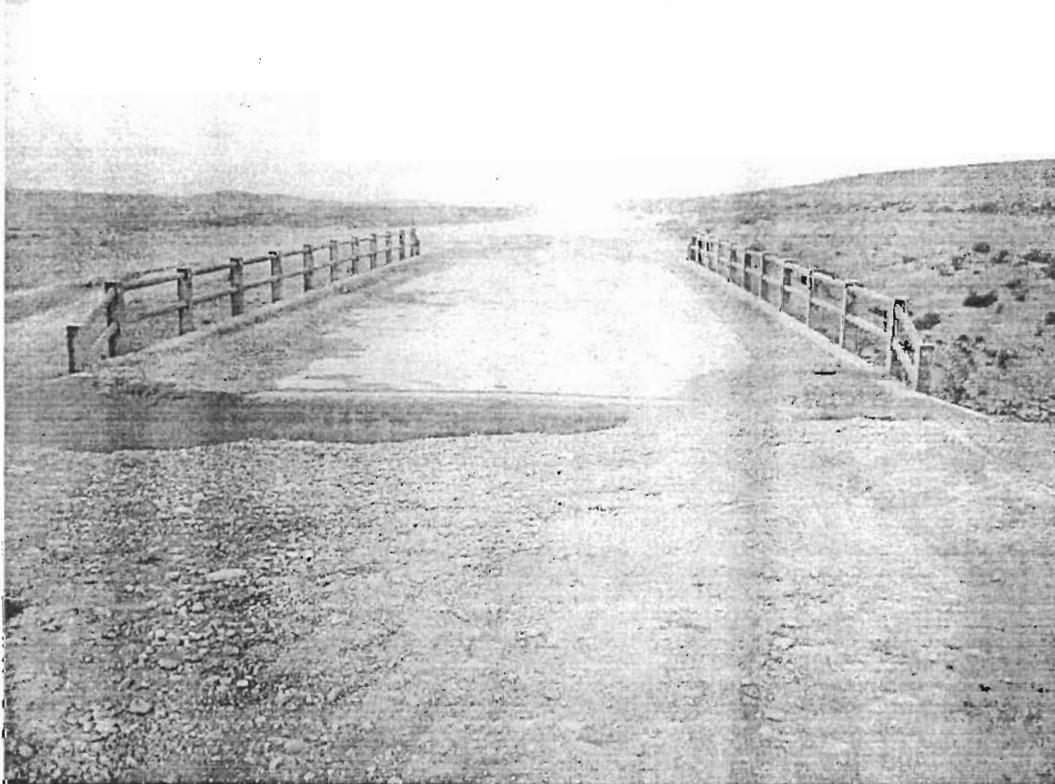
PIC 046 - KM 240+000 Typical Roadway Section



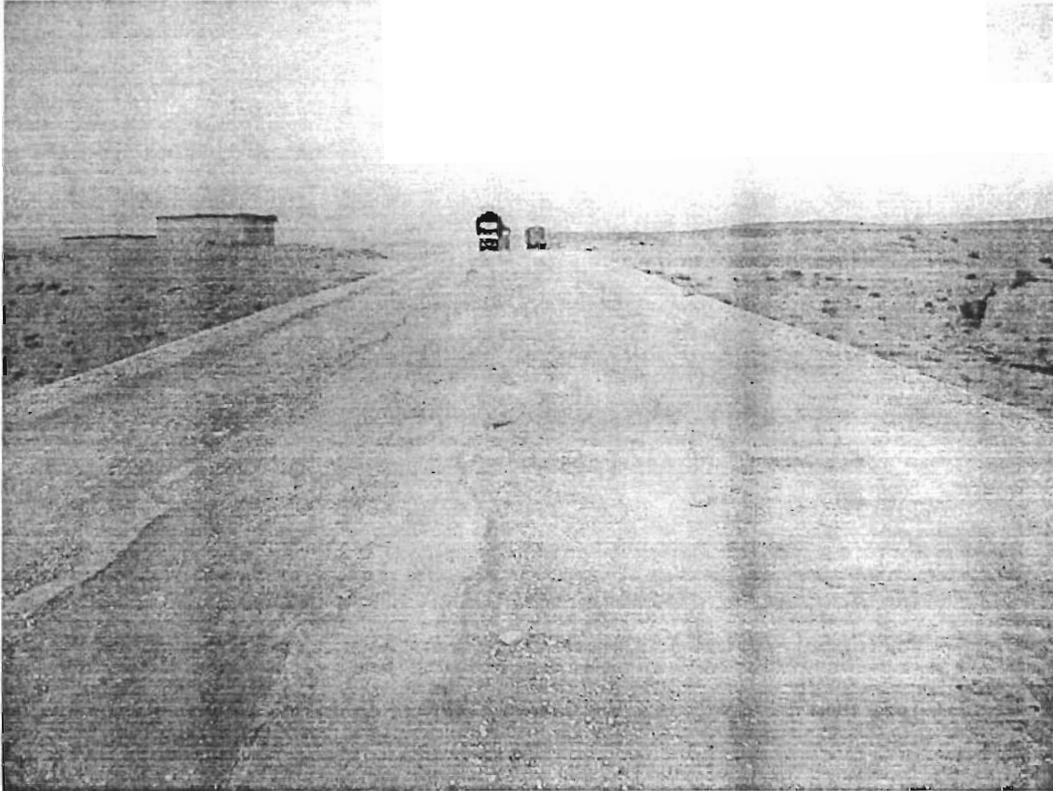
PIC 047 - KM 250+000 Typical Roadway Section



PIC 048 - BRIDGE (Abutments damaged, need repair)



PIC 049 - KM 260+000 Typical Roadway Section



PIC 050 - KM 270+000 Typical Roadway Section



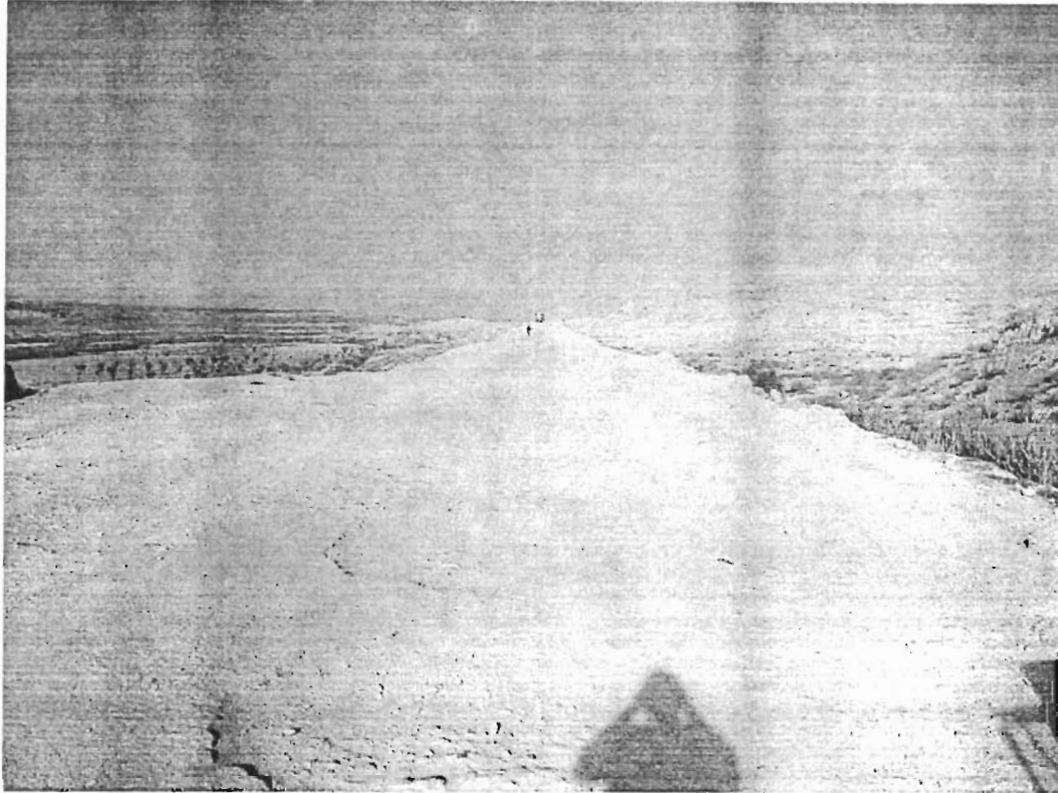
PIC 051 - BRIDGE (Piers & Girders)



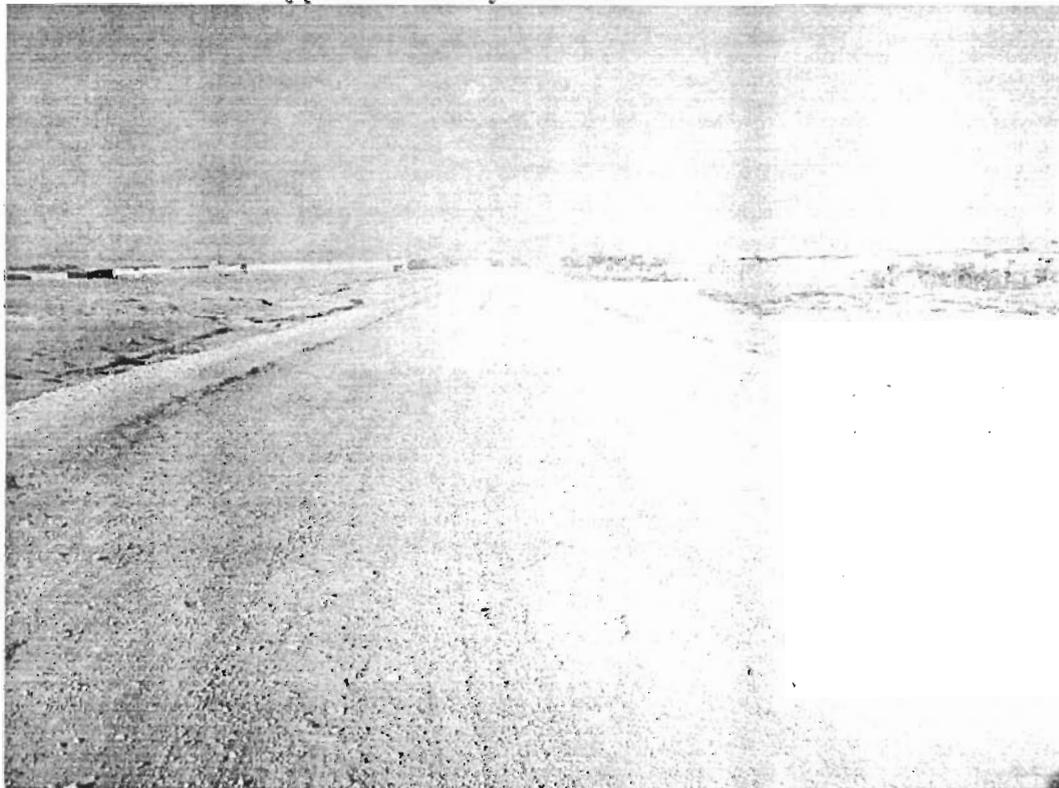
PIC 052 - BRIDGE (Side View)



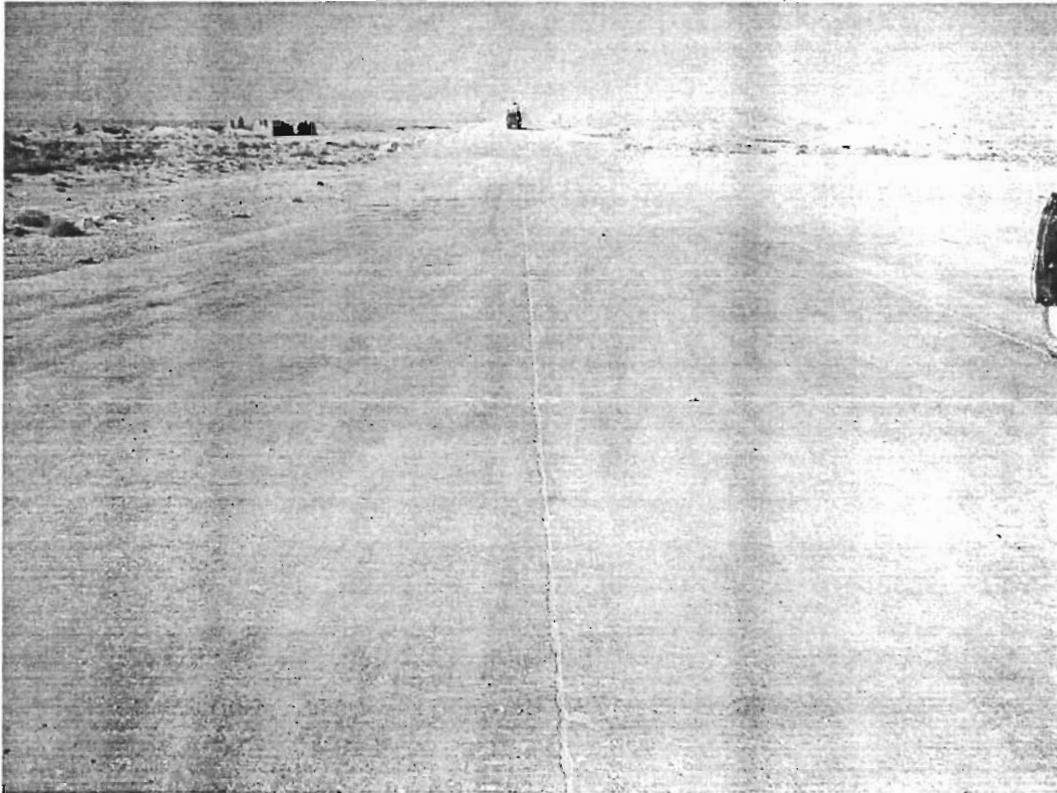
PIC 053 - KM 280+000 Typical Roadway Section



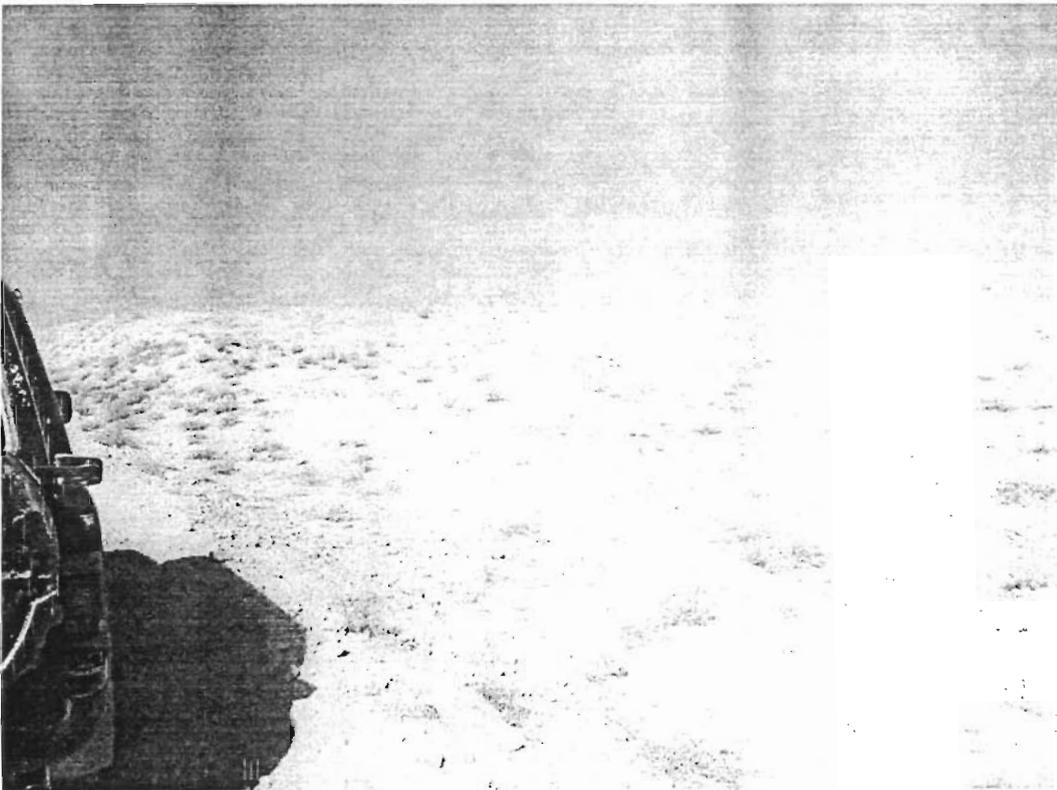
PIC 054 - KM 290+000 Typical Roadway Section



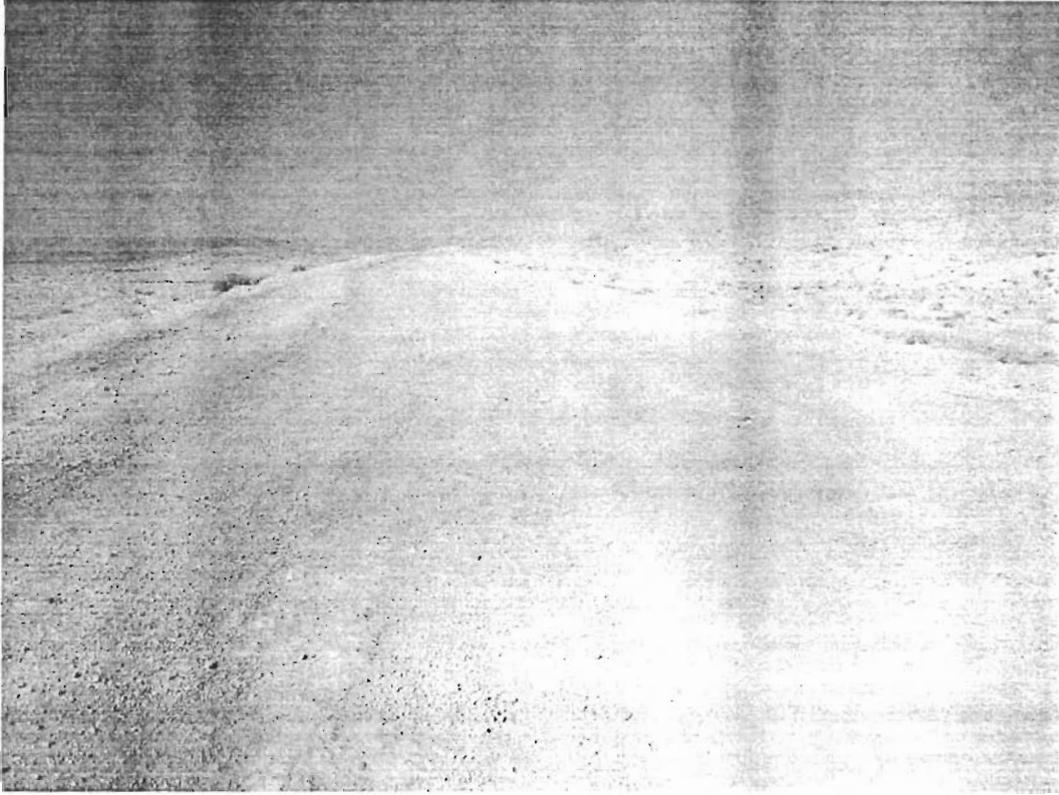
PIC 055 - MEXICAN BRIDGE (Overflow Concrete Pavement)



PIC 056 - MINE FIELDS ON RIGHT SIDE



PIC 058 - KM 300+000 Typical Roadway Section



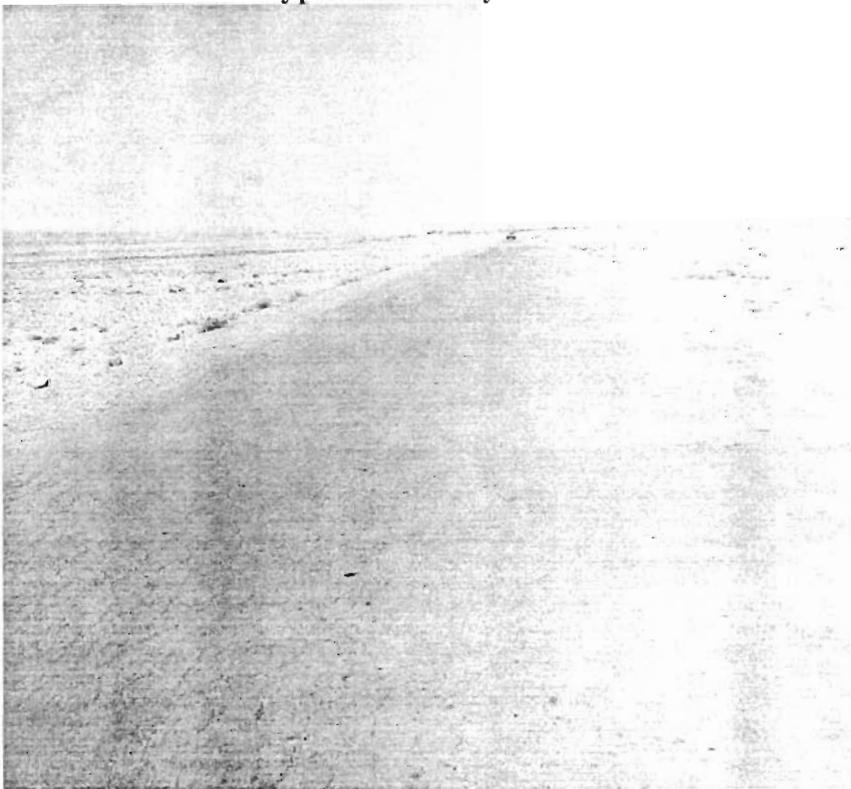
PIC 059 - KM 330+000 Typical Roadway Section



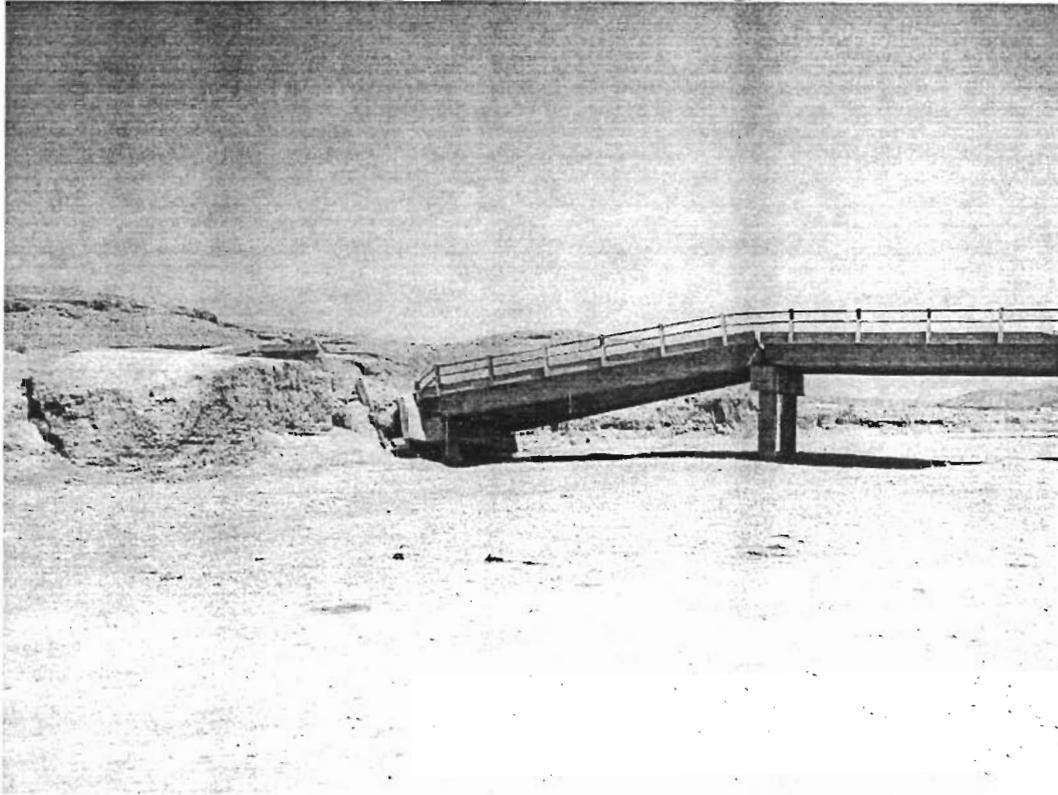
PIC 060 - KM 340+000 Typical Roadway Section



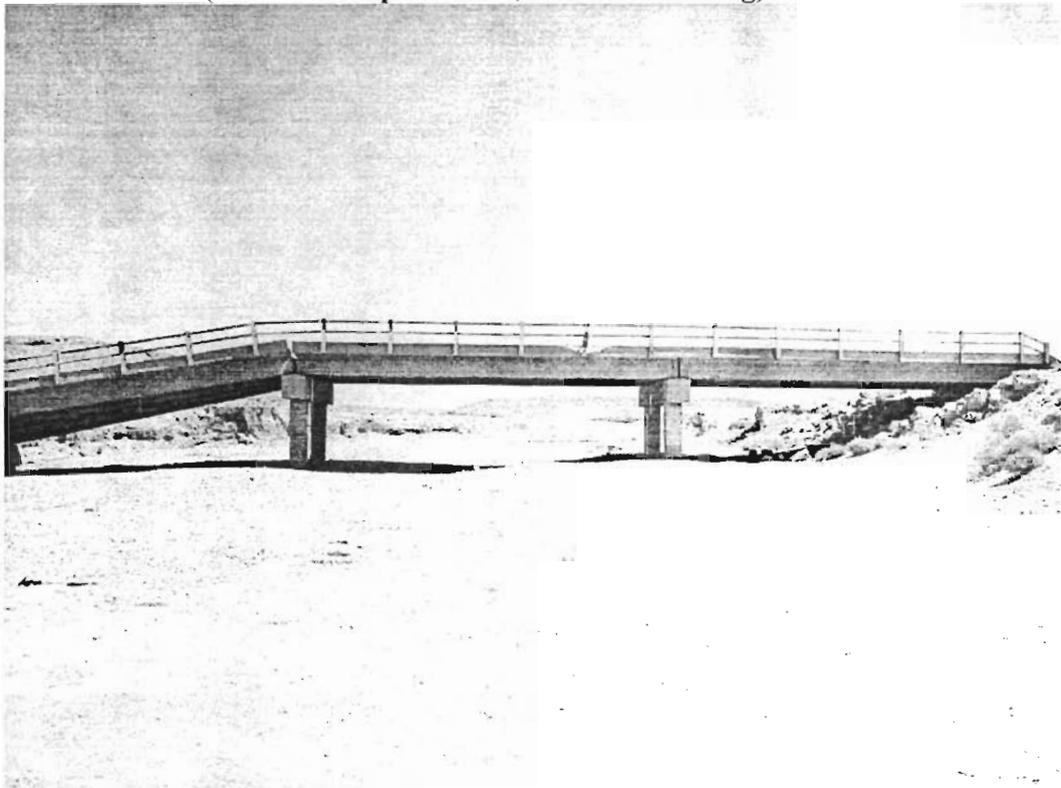
PIC 061 - KM 350+000 Typical Roadway Section



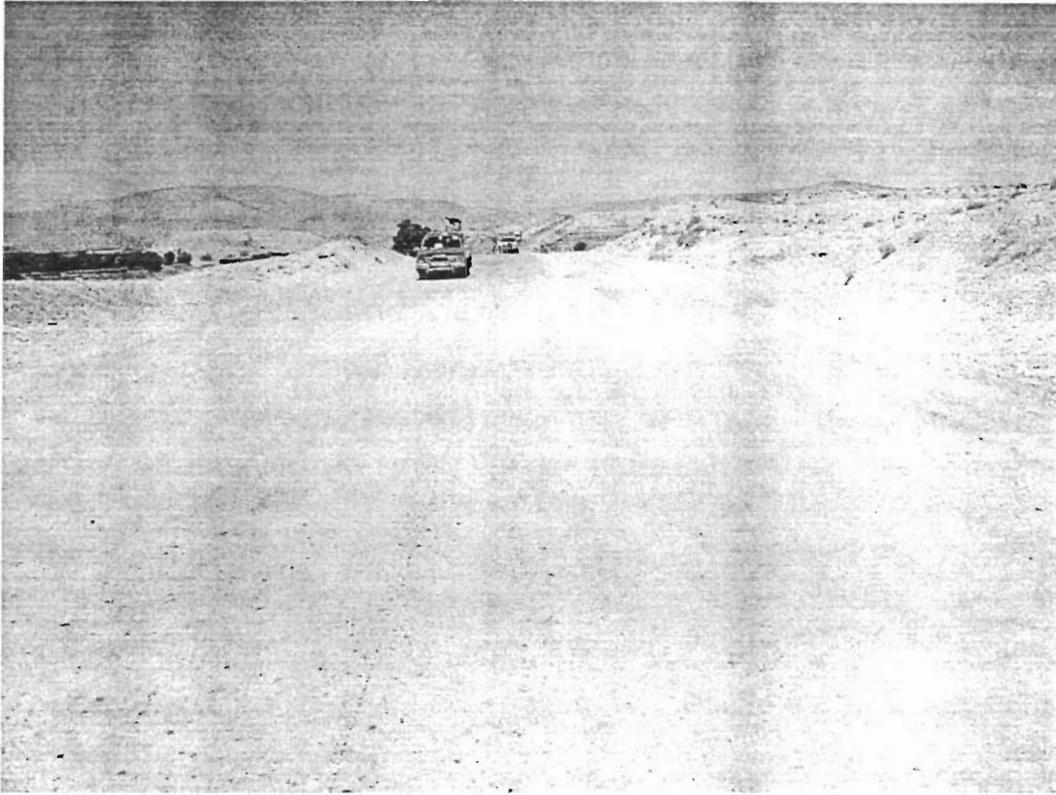
PIC -62 - BRIDGE (Abutment Span down, need rebuilding)



PIC 063 - BRIDGE (Abutment Span down, needs rebuilding)



PIC 064 - KM 360+000 Typical Roadway Section



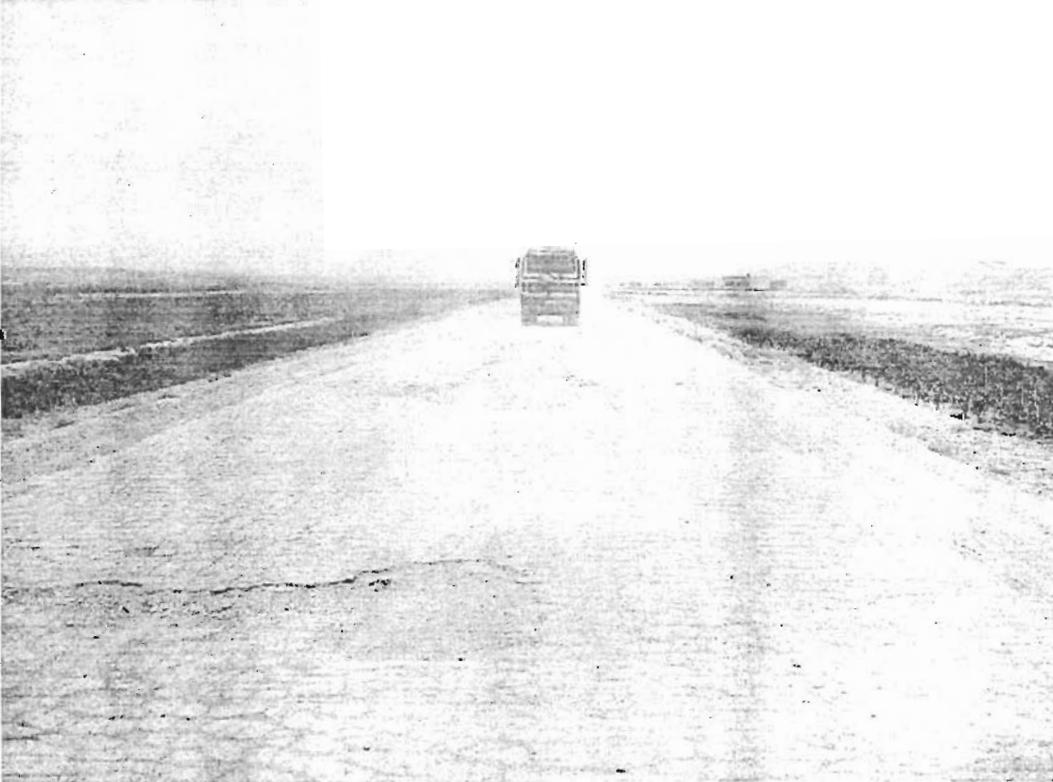
PIC 065 - KM 370+000 Typical Roadway Section



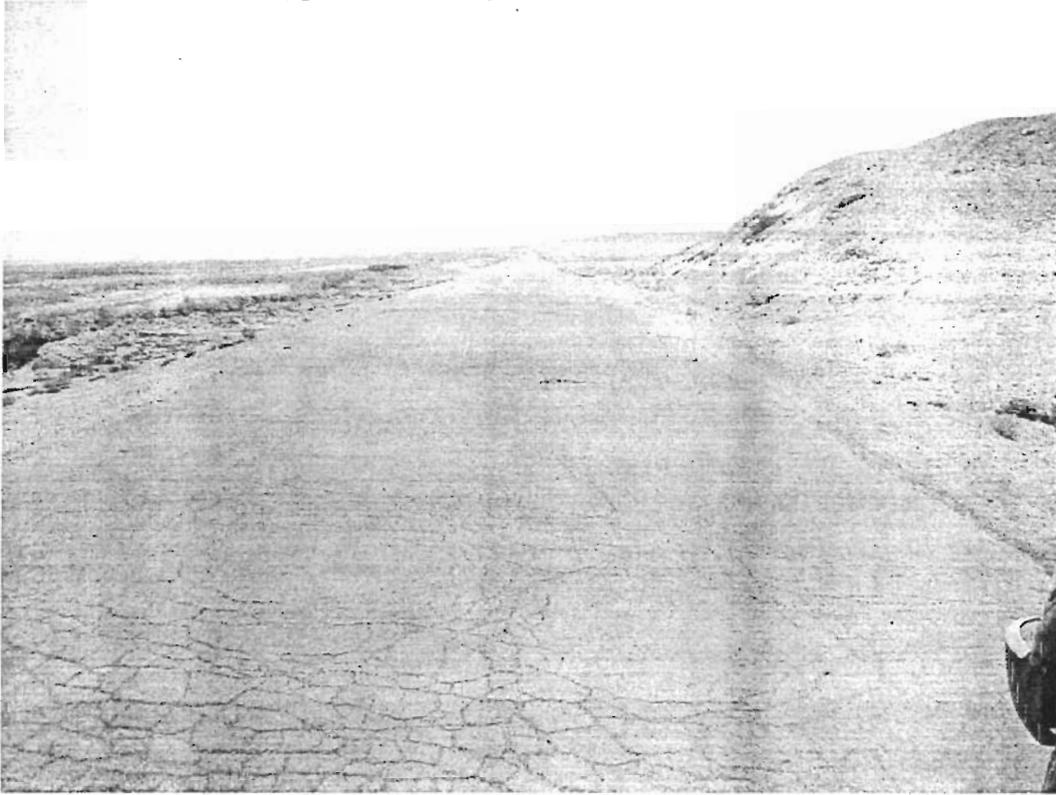
PIC 066 - FUEL TRANSPORTS DESTROYED BY MILITARY



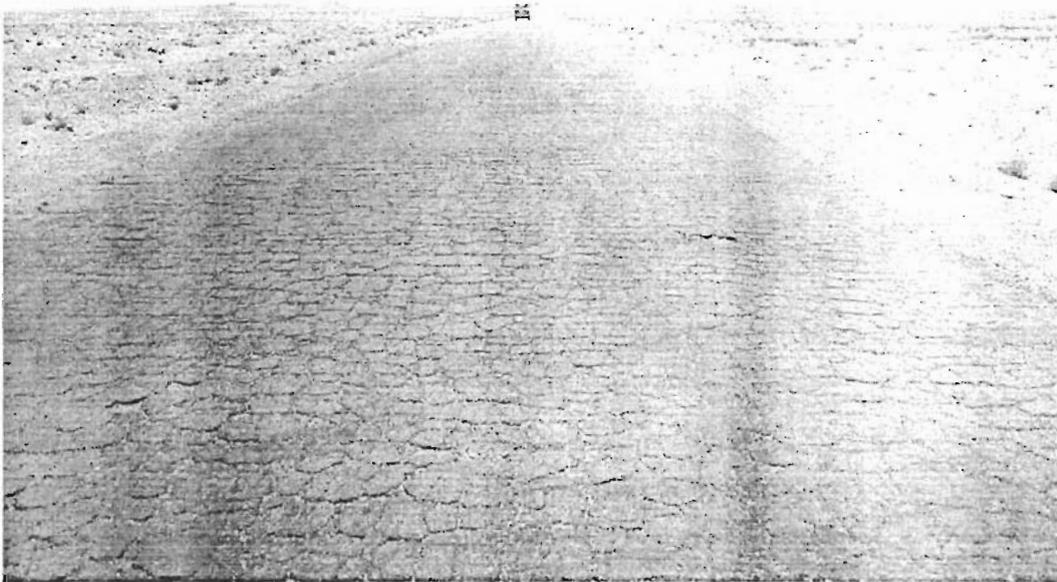
PIC 067 - KM 380+000 Typical Roadway Section



PIC 068 - KM 390+000 Typical Roadway Section



PIC 069 - KM 400+000 Typical Roadway Section



PIC 070 - KM 410+000 Typical Roadway Section



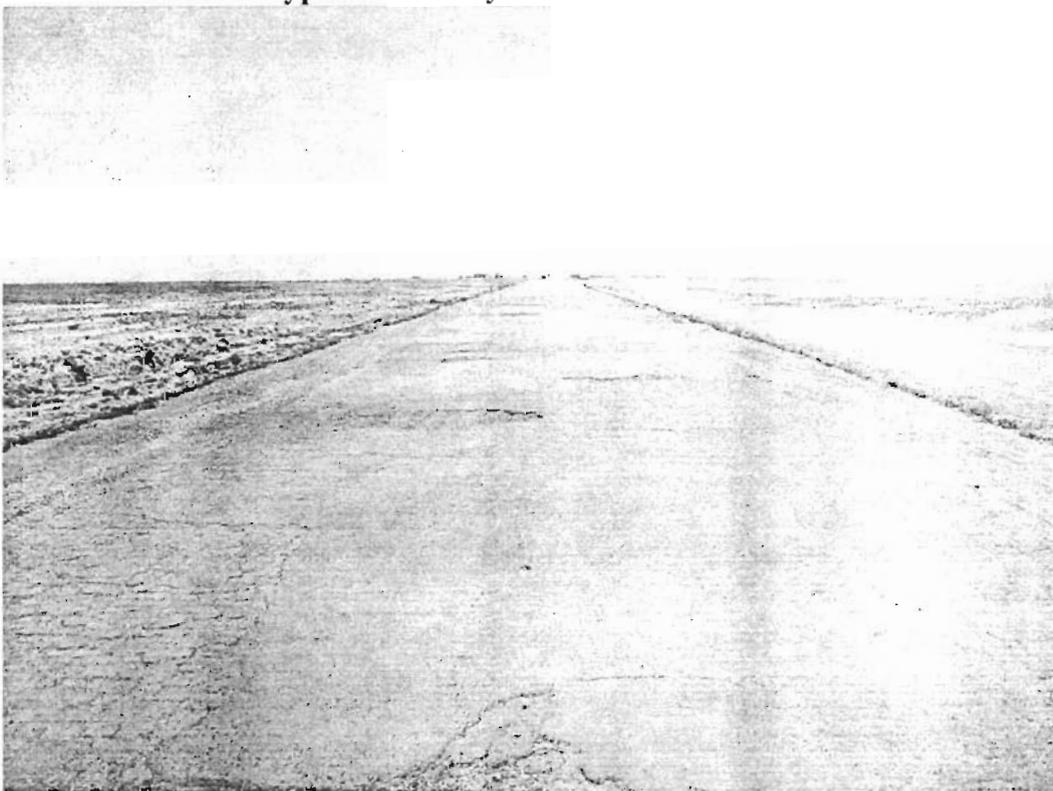
PIC 071 - KM 420+000 Typical Roadway Section



PIC 072 - EDGE PAVEMENT ERODED



PIC 073 - KM 430+000 Typical Roadway Section



PIC 074 - EDGE PAVEMENT ERODED



PIC 075 - KM 440+000 Typical Roadway Section



PIC 076 - KM 450+000 Typical Roadway Section



PIC 077 - KM 460+000 Typical Roadway Section

