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Gardez – Khost Road Rehabilitation

Paktya and Khost Provinces, Afghanistan

Project Environmental Assessment

As part of the Afghanistan Infrastructure Rehabilitation Program (AIRP)



The LOUIS BERGER Group, Inc.,
BLACK & VEATCH SPECIAL PROJECTS
CORP. JOINT VENTURE

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LIST OF ACRONYMS/GLOSSARY

A		N	
AASHTO		NEPA	National Environmental Protection Agency
AC	Asphalt Concrete	NGO	Non-Governmental Organization
ADB	Asian Development Bank	NMT	Non-Motorized Traffic
ATTA	Afghan Trade and Transit Agreement	P	
B		PAP	Project-Affected Person
C		PRT	Provincial Reconstruction Team
CFR	Code of Federal Regulations	Q	
COPA	Conditions of Particular Application	R	
CSC	Construction Supervision Consultant	REFS	Rehabilitation of Economic Facilities and Services
D		ROW	Right-of-Way
dB	Decibel	S	
E		SE	Supervising Engineer
EA	Environmental Assessment	<i>Shura</i>	District (typically 15-20 <i>gozars</i>)
EMA	Environmental Management Act	SPM	Suspended Particulate Matter
EU	European Union	T	
F		TOR	Terms of Reference
FAO	Food and Agriculture Organization	U	
FIDIC	<i>Federation International Des Ingenieurs Conseils</i> (International Federation of Consulting Engineers)	UN	United Nations
G		UNEP	United Nations Environmental Program
GC	General Contractor	USACE	United States Army Corps of Engineers
GCOC	General Conditions of Contract	USAID	United States Agency for International Development
GoA	Government of Afghanistan	USAID/GC	USAID General Contractor
<i>Gozar</i>	Neighborhood	UXO	Unexploded Ordnance
GPD	Gross Domestic Product	V	
H		VOC	Vehicle Operating Cost
I		W	X
IEE	Initial Environmental Examination	Y	Z
ISAF	International Security Assistance Forces		
IRP	Infrastructure Rehabilitation Program		
J			
K			
KM	Kilometer		
KWH	Kilowatt Hours		
L			
LCB	Local Competitive Bidding		
M			
MIWRE	Ministry of Irrigation Water Resources and Environment		
MOEW	Ministry of Energy and Water		
MOI	Ministry of Interior		
MOTCA	Ministry of Transport and Civil Aviation		
MPW	Ministry of Public Works		
MRRD	Ministry of Rural Rehabilitation and Development		
MSL	Mean Sea Level		
M/S	Meters per Second		
MYC	Ministry of Youth and Culture		

SUMMARY OF FINDINGS

1. INTRODUCTION

This document presents an Environmental Assessment (EA) of the Gardez – Khost Road Rehabilitation Project (the Project). The design and construction of the road is funded directly by the United States Agency for International Development (USAID) as part of the Afghanistan Infrastructure Rehabilitation Project (AIRP).

The Gardez - Khost Road covers approximately 103 kilometres travelling in an east-southeast direction from the traffic circle in the centre of Gardez in Paktya Province to Khost in Khost Province. This road will be a natural extension of the 122-kilometer Kabul to Gardez Road, completed under a previous USAID funded project, and will form part of a western-standard highway from Kabul into the heart of Khost Province near the Pakistani border. The road will comprise a seven meter wide asphalt surface with one meter gravel shoulders. As part of the Project approximately eight hundred road related structures will be rehabilitated including bridges, culverts, retaining walls etc.

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 Rehabilitation of the Gardez – Khost Road is deemed to constitute such a road improvement project.

In response to this requirement, this document, together with its attachments and incorporations by reference, constitutes the EA required for the Gardez – Khost Road 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 (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);
- **Areas of Controversy** (Item 2); and
- **Issues to be Resolved** (Item 3).

2. 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 construction activities such as temporary impacts to air quality, noise levels due to construction and inconveniences. These impacts will be mitigated by the contract provisions as specified herein, including actions such as pollution prevention, etc.

3. 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. Stakeholder consultation has been undertaken as part of the Project and the finding can be found in **Section 5.0**. However, no such areas of controversy have emerged.

4. ISSUES TO BE RESOLVED

The issue alluded to above and requiring resolution within the scope of the project is:

- **Documented Adoption of Guidelines for Compensation.** The Project is not expected to result in significant impacts to residences and agricultural land, however details will be dependent on final design decisions yet to be made. Recommended Guidelines to mitigate impacts to project-affected persons (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 5.2**.

END NOTES – SECTION 1.0

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

1.0 INTRODUCTION

1.1 PURPOSE OF THE ENVIRONMENTAL ASSESSMENT

This document presents an Environmental Assessment of the Gardez – Khost Road Project. The road design and construction is funded by USAID as part of the Infrastructure Rehabilitation Project in Afghanistan (AIRP). The purpose of the EA is to ensure that environmental issues have been foreseen in its development and implementation plans. Details of the proposed Project are provided by **Section 2.0**, Description of the Proposed Action and its Alternatives.

To ensure that environmental issues associated with projects such as the Gardez – Khost Road are adequately foreseen, all projects identified for funding by USAID are subject to the Environmental Procedures established by Title 22 of the U.S. Code of Federal Regulations, Part 216 (22 CFR 216). Unless they are categorically excluded as a meeting established criteria (including a criterion which states that the project *“does not have an effect on the natural or physical environment”*), all projects require the preparation of an IEE and/or an Environmental Assessment.¹ The intent of the IEE is to allow a “Threshold Decision” defined by the regulations as a *“formal Agency decision which determines...whether a proposed Agency action is a major action significantly affecting the environment”* and, therefore, does require preparation of an EA (referred to as a “Positive Determination”); or, conversely, finds the data and safeguard commitments provided by the IEE are sufficient to conclude the contrary i.e., a finding that there is sufficient analysis to conclude that the Project will not have an adverse effect on the environment (referred to as a “Negative Determination”). A Negative Determination allows the project to proceed without further environmental investigation except as may be noted in the conditions of the determination. The IEE step is not always necessary. Certain categories of projects are generally deemed to have a significant effect on the environment may proceed directly to the preparation of an EA. The Gardez – Khost Road Project is deemed to have significant effect on the environment due to the scale of works and its location, as such a full EA is considered warranted in this instance without the need for an IEE.

As part of the EA process a Scoping Statement was prepared for the Project. This document follows up the recommendations made in the Scoping Statement which was submitted to USAID for review in December 2008.

1.2 ORGANIZATION OF THE ENVIRONMENTAL ASSESSMENT

The EA is organized as follows:

- **Section 1.0: Introduction.** The section in hand provides introductory information.
- **Section 2.0: Project Description and Consideration of Alternatives.** Section 2.0 presents details of the proposed Project, a description of Project alternatives and a description of the existing environmental policies and procedures in Afghanistan.
- **Section 3.0: Affected Environment.** Section 3.0 presents the relevant environmental criteria as identified based on USAID regulations, and additional environmental considerations and issues associated with road projects and the specifics of the Project. The discussions of the criteria present a statement of the existing conditions both on a national and project specific basis.
- **Section 4.0: Environmental Consequences.** This section describes the potential socio - environmental consequences, or impacts, arising from Project activities and the required measures to mitigate any such impacts. This section also briefly describes the types of impacts considered and a description of the 22

¹ Projects having as potential for impact on the global environment or outside the jurisdiction of any country may require the preparation of an Environmental Impact Statement as defined by the National Environmental Policy Act. None of the actions discussed herein fall within this definition.

CFR 216 requirements for Section 4.0

- **Section 5.0: Stakeholder Consultation.** Presents the findings of consultation with relevant Project Stakeholders.
- **Section 6.0: Environmental Compliance Plan.** Section 6.0 outlines the necessary mitigation and monitoring program for the Project. It also makes further recommendations within and outside of the scope of the Project.

2.0 DESCRIPTION OF THE PROPOSED ACTION AND ITS ALTERNATIVES

2.1 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; and*
- *Identify the Agency’s preferred alternative or alternatives, if more than one exists.*

Accordingly, this section of the EA is organized to address the issues identified by 22 CFR 216 item-by-item as follows:

- **Environmental Setting** (Item 2.2)
- **The Proposed Action** (Item 2.3)
- **Alternatives Considered** (Item 2.4). These include:
 - The “No Action” Alternative (Item 2.4.1)
 - Alternatives Eliminated From Detailed Study (Item 2.4.2);
 - Alternatives Considered in Detail (Item 2.4.3); and
 - Comparative Analysis (Item 2.4.4)

In addition to the items listed above this section of the report will also describe the **Afghan Environmental Policies and Procedures** (Item 2.5).

2.2 ENVIRONMENTAL SETTING

The Government of Afghanistan (GoA), in consultation with Donors, the UN and International NGO agencies has identified the need to provide improved access to regions of Afghanistan in order to facilitate economic growth, human and economic development and stability operations. By strengthening transportation connectivity to regional (often remote) areas, goods such as medical supplies, foodstuffs, and building materials can be moved from major hubs such as Kabul and neighboring countries such as Pakistan more quickly, more frequently, and in greater numbers. In addition, the same benefits will be derived for the export of regional good such as fruits, vegetables, and natural resources. Paktya and Khost Provinces are one such region.

The proposed Project Road connects Gardez, Provincial Capital of Paktya with Khost, the Provincial Capital of Khost. **Exhibit 2-1** illustrates the location of the Project within the context of Afghanistan, **Exhibit 2-2** indicates the Projects location within the Provinces of Paktya and Khost.



Exhibit 2-1. Gardez – Khost Road, Afghanistan

The following summarizes the conditions along the Project Road.

KM*	Description
0.0	The project road starts at the Gardez traffic circle in the centre of Gardez. The circle connects the Project Road to the recently rehabilitated Kabul – Gardez Road. The area around the circle comprises mostly commercial properties selling a wide range of goods including food stuffs and other general domestic goods. The busy city centre has seen an increase in trade since the completion of the Kabul – Gardez road. The Project road traverses immediately south out of the city centre for approximately three kilometers. These three kilometers are characterized by typical Afghan suburbia, comprising a mix of small shops and stallholders and residential properties. Parts of this section of the road are unpaved and elevated levels of dust are an obvious nuisance to the population in this area.
2.0	After leaving the city of Gardez the Project road crosses the Jilga River at KM2.0 and then passes the US Provincial Reconstruction Team Base (PRT) at around KM4.0. The areas surrounding environment is characterized by scrub land and some small patches of rain-fed agricultural land mainly growing wheat. The only other economic activity noted in this area was bee keeping.
6.0	The road then turns south east towards the mountains. This relatively straight section of road is of tarmac construction but is heavily pot holed and driving conditions are awkward and slow. A dry river bed runs parallel to the road for several kilometers until the road starts to make a gradual ascent into

	the mountains. The tarmac surface finally disintegrates to comprise dust and stone.
14.0	There is little population to be noted until KM14.0 where a newly constructed school was observed. The school is set back more than 15 meters from the roadway. A small village followed the school. Large piles of wood were stacked around the village.



Exhibit 2-2. Gardez – Khost Road

19.0	The road continues to rise into the mountains whereupon, at around KM19.0, they become heavy forested with several species of pine tree.
21.4	 <p>The road condition is still poor in this section as it rises towards the peak of the mountain pass. Herds of cattle could be seen blocking the route as illustrated above. However, traffic volumes are relatively light and as such, delays caused by non motorized transport are generally short.</p>
23.8	The road reaches the summit of the mountain pass (Sata Kanda) at an elevation of around 2990 meters above mean sea level (msl). A police checkpoint is located at the summit. The road then

	<p>descends sharply into the mountain valley below for several kilometers negotiating a number of unprotected hairpins.</p>
<p>29.9</p>	 <p>The road descent becomes more gentle as the road winds its way out of the high mountain section and down into the lower valley. The valley is heavily forested on its upper slopes.</p>
<p>KM37</p>	 <p>The road crosses a dry river bed causeway crossing at KM37.0 and past some small villages, such as that illustrated above at KM40.0. The road then passes Firebase Wilderness at KM44.5. The landscape in this lower section of the valley is dominated by scrubby bush rather than the pine trees at the higher elevations.</p>
<p>KM58</p>	<p>The Project Road runs parallel to the River Shamal. USACE road engineering works have recently been completed in this section of the road. Traffic volumes appear to be higher with numerous taxis noted. The road continues to pass through small villages all of which have wood for sale, stacked up in huge piles by the roadside. It is noticeable that since living Gardez very little property is located within the right-of-way.</p>
<p>KM70</p>	<p>The road finally descends out of the valley and into the wide open Shamal Plain towards Khost. The air temperature rises and more agricultural land can be observed. The road continues to meander</p>

	gradually into the flat plain crossing several small span bridges. The road leaves the unpaved surface and begins to traverse a tarmac surface at KM78.3.
KM80	 <p>The straight, flat road points almost straight east towards Khost from this point. The road has moved away from the Shamal river which flows a couple of kilometers south of the road. Without irrigation waters the landscape is barren and dusty.</p>
KM95	The surrounding landscape becomes dominated by agricultural uses as it gets closer to the urban center of Khost. Corn appeared to be a primary crop, although it is assumed that wheat and other vegetables, as well as poppies, are grown in this area.
KM100	The road enters the outskirts of Khost and ends at the towns first traffic circle. Khost itself is aesthetically a very pleasant town, with tree lined roads and carefully maintained gardens. The gardens of the Governors residences are particularly beautiful in the summer.

2.3 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 activities proposed to apply to all portions of the highway included in the Project are detailed below.

The current condition of the Gardez to Khost Road is a combination of unimproved roadway and partially gravelled surfaces. Overloaded trucks and an under-designed road have caused damage. The existing road alignment of 103 kilometres is currently a non-maintained road at grade and is often flooded by spring run-off and localized rainstorms that make the road impassable. As stated above, the paved section begins in Gardez and heads in an east-southeast direction up and over the Sata Kanda Pass. The summit of the pass is 2,900 meters above sea level and normally requires winter maintenance for safe passage. The road from the Sata Kanda Pass checkpoint to the city of Khost is a mix of gravel and tarmac surfaces. The road follows a river canyon in this sections and is characterized by embankments overlooking the road itself. Time of travel from Gardez to the Sata Kanda pass is approximately 30 minutes. Time of travel to Khost from the Sata Kanda checkpoint is approximately 4 hours.

Design and construction to replace the existing Gardez River Bridge, located immediately south of Gardez, is being funded by the U.S. Army Corps of Engineers, Afghanistan Engineer District (USACE). The scope of work consists of a new bridge offset approximately 10 meters from the existing bridge. The Gardez to Khost project will transition and tie into the new bridge structure. Currently, there are about 800 structures along the alignment including irrigation culverts, cross drainage structures, low water crossings, and retaining walls. Drainage structures along the road have been poorly maintained or have had no maintenance. USACE contracted with an engineering firm to conduct a complete survey of the existing road at 20-meter intervals along the centre-line of the existing road. To date, the data covers approximately 86 kilometres of the total roadway length. There is no current foundation soils data available. The reconstructed road shall follow the existing alignment dependent on engineering considerations to minimize the amount of de-mining and rights-of-way (ROW) issues. The selection criteria should include the consideration of cost, security, and the population served. The road wearing surface shall be upgraded to an asphalt-concrete (AC) surface road and shall adhere as closely as possible to AASHTO Standards.

Hadi, I need an updated project description in here to replace that above

2.4 ALTERNATIVES CONSIDERED

2.4.1 THE "NO ACTION" ALTERNATIVE - The "No Action" Alternative in this instance is defined as a decision not to undertake the proposed construction of the Gardez - Khost Road. 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.

2.4.2 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 Gardez - Khost Road are such that it offers few design alternatives with meaningful differences in their environmental implications.
- **Technological Alternatives.** All projects conducted as part of AIRP 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. Consideration of technologically advanced and capital intensive approaches to road construction in these circumstances was, therefore, eliminated from detailed consideration.

2.4.3 ALTERNATIVES WARRANTING CONSIDERATION IN DETAIL - Of the three categories of alternatives noted above, no alternative is considered to warrant consideration in detail from an environmental perspective.

2.5 AFGHAN ENVIRONMENTAL POLICIES AND PROCEDURES

2.5.1 General - In June 2002, for the first time in the history of Afghanistan, an authority for environmental management was mandated in the newly formed government – The Ministry of Irrigation, Water Resources and Environment (MIWRE). Since 2002 several ministerial changes have occurred, MIWRE is now defunct and has been replaced by the Ministry of Energy and Water (MoEW). Of most relevance to this report is the creation of the new National Environmental Protection Agency (NEPA), whom, with the aid of UNEP have produced environmental legislation.

2.5.2 Legislative Framework - The Environmental Management Act (EMA) drafted by NEPA focuses on several areas including:

- Integrated Environmental Management
 - Environmental Impact Assessment
 - Integration of Environmental Issues into Development Planning
- Integrated Pollution Control
 - Pollution Prevention Control (including licensing)
 - Waste Management (duty of care, waste management licenses etc)
- Water Resource Conservation and Management
- Biodiversity and Natural Resource Conservation and Management
 - National Biodiversity Strategy
 - Protected Areas Management
 - Sustainable Use and Conservation of Species
 - Species Trade
 - Access to Genetic Resources
- Compliance and Enforcement

In addition to the EMA several other environmental related laws currently exist as illustrated by the table below.

Afghan Environmental Law	Date
Water Law	1981
The Forestry Law	2000
Law for Land Ownership	2000
Nature Protection Law	1986/2000
Hunting and Wildlife Protection Law	2000
Range Management Law	2000
Agriculture Cooperative Development Law	2000
Charter for the Development of Fertilizer and Agro-chemicals	2000

2.5.3 Afghan Environmental Assessment Procedures

Prior to 2005 no formal EA process has been practiced in Afghanistan. As a result many projects, such as deep-well drilling or large-scale irrigation projects were conducted without considering the environmental consequences of such activities. Additionally, there wasn't, and in some circumstances, still isn't any consistent application of EA amongst donor agencies and international organizations currently working in the country.

Specific guidelines have now been produced as part of the Environmental Management Act to deal with Environmental Impact Assessment. In theory there are several key stages in the assessment procedure as follows:

1. Any project, plan or policy of significant size or scope (no screening list defined as yet) shall submit to NEPA a brief containing enough information to enable NEPA to determine the potential adverse effects and positive impacts of the project, plan or policy.

2. After reviewing the brief and acting on behalf of the EA Board of Experts (yet to be established) NEPA will either:
 - a. Recommend the project proceeds without further environmental assessment; or
 - b. Submit an environmental assessment / comprehensive mitigation plan
3. The outline of the EA is roughly similar to that contained herewith, however, alternatives should also be considered, e.g. alternative design, technologies, routes etc.
4. Once the EA has been approved by the Executive Secretary General (acting on the advice of the EA Board of Experts) a permit is granted allowing continuation of the proposed project, plan or policy. If the permit is refused for whatever reason an appeal can be submitted within 60 days of the refusal.

The regulations also state that Public Participation should also be part of the EA process. Public participation in this sense includes distributing copies of the EA to affected persons and undertaking public hearings.

3.0 AFFECTED ENVIRONMENT

3.1 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; and
- Identification of the relevant environmental criteria for EA purpose.

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.

3.1.1 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 project such as the proposed construction of the Gardez – Khost 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. Accordingly, the Project Area for the purpose of the EA is defined as the right of way, however, the scope of the examination will also be expanded to ensure that environmental impacts such as the example of potential down-stream hydrological impacts are taken into account.

3.1.2 Identification of the Relevant Environmental Criteria - A Project Environmental Assessment Scoping Statement was conducted for the Gardez – Khost Road Project in November 2008. The objective of the Scoping Statement is to summarize the results of the scoping process that has been conducted to identify significant environmental issues related specifically to the rehabilitation of the Project Road. In particular the scoping study provides:

- A determination of the scope and significance of issues to be analyzed in the Environmental Assessment or Impact Statement, including direct and indirect effects of the project on the environment.
- Identification and elimination from detailed study of the issues that are not significant or have been covered by earlier environmental review, or approved design considerations, narrowing the discussion of these issues to a brief presentation of why they will not have a significant effect on the environment.

In summary, the scoping statement identified that impacts associated with the following socio-environmental characteristics could be adequately managed by standard contractual provisions:

- Use of Natural / Depletable Resources - No impacts identified.
- Protected Areas – No Protected Areas within 200 kilometers of the Project Road.

- Urban Quality - No impacts identified.
- Historic and Cultural Resources - No cultural or historic resources identified.
- Socio-economics - Impacts will be beneficial.
- Public Health - Impacts will be beneficial

Although the scoping statement screened out the potential issues associated with these socio-environmental characteristics the EA will still present a short discussion of the existing conditions of these characteristics. This will provide the reader with comprehensive understanding of the Project Area. The EA will also present the contractual measures required to mitigate potential construction related impacts associated with the socio-environmental characteristics above. The EA has set out these contractual measures as part of **Appendix A**. In addition to the above, the Scoping Statement matrix recommends further *detailed* study in the EA of the following characteristics:

- Topography;
- Soils;
- Geology and Seismic Characteristics;
- Hydrology;
- Air Quality;
- Flora;
- Fauna;
- Land Use and Development Policies and Controls;
- Safety;
- Noise; and
- Other Infrastructure

Potential impacts and measures incorporated in the Project to avoid or otherwise mitigate the potential impacts are identified in **Section 4.0**. These include measures incorporated in contracting procedures and the Project design. **Section 4.0** will follow the same sequence and enumeration pattern as **Section 3.0**. Management of the mitigation measures is described in **Section 6.0**.

3.2 PHYSICAL RESOURCES

3.2.1 Topography - Afghanistan's topography in general is dominated by the Hindu Kush Mountains which run northeast to southwest through the central portion of the country 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 (Afghanistan's northern west border) at 258 meters above mean sea level (msl). The highest point is at Nowshak (northeast border with Pakistan) 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

The topography and geometry of the Project Road varies considerably. The existing road has approximately nine meters platform width (7 meters asphalt pavement and one-meter earth shoulders) on approximately 69 kilometers of the road. The remaining section has no asphalt, but the roadway width continues to be nine meters. For the first 23 kilometers out of Gardez, the terrain rises gradually towards the Sata Kanda mountain pass (2400 – 2600 meters above msl), with numerous small rivers parallel and crossing the road. Grades are less than 2%. The next two kilometers are mountainous (Sulaiman Mountains), with the river on the right and 1:1 slopes on the left. The grade through this section is 5-6% and maximum elevations reach approximately 2900 meters above msl. The following 53 kilometers are mountainous, following the river valley, with grades varying from 5-8%, and many tight horizontal curves. No pavement exists in this section of the road. The last 21 kilometers pass through small villages and agricultural land (approximately 1300 meters above msl). This area is known as the Shamal Plain (after the Shamal River) the grades are approximately 2-3% and the horizontal alignment is virtually straight. Some small river beds exist along and crossing the roadway. No licensed quarries are known to exist within the Project Area. **Exhibits 3-1 to 3-4** illustrate the topography of the sites immediate environs.

Exhibit 3-1. KM +0 – KM +25 (approx)

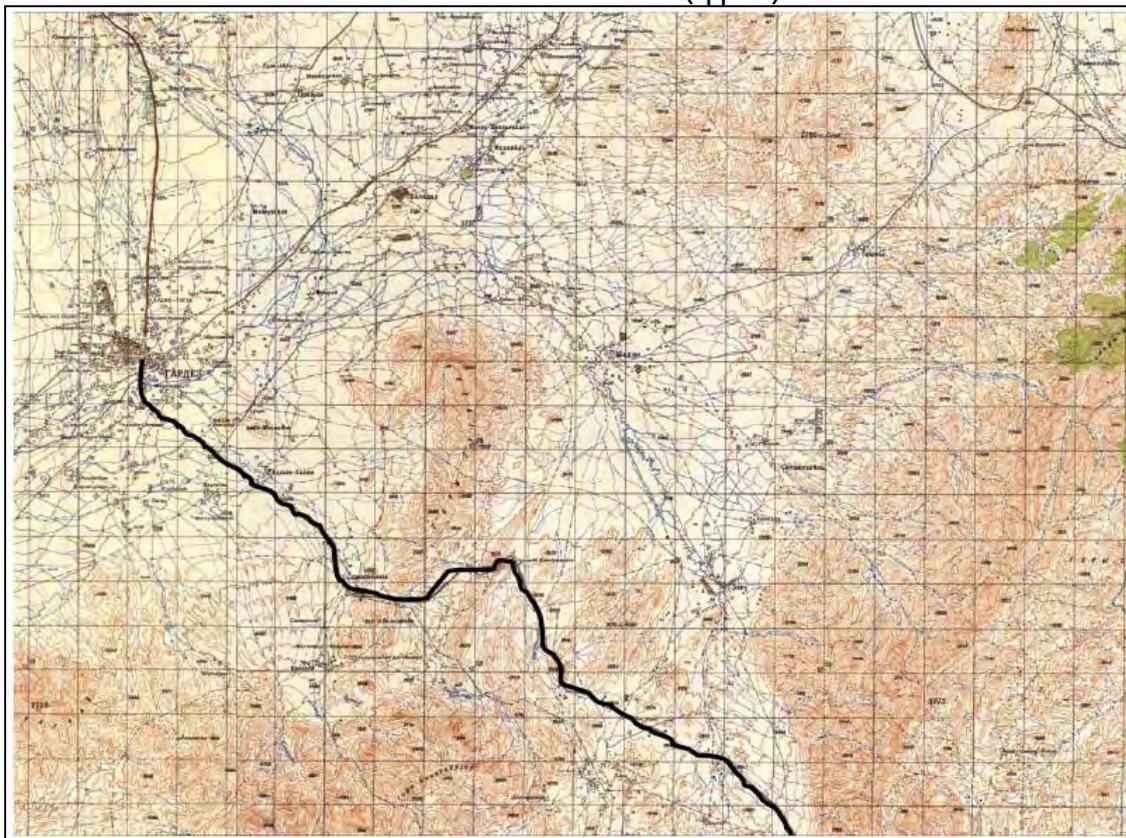


Exhibit 3-2. KM+25 – KM+60 (approx)

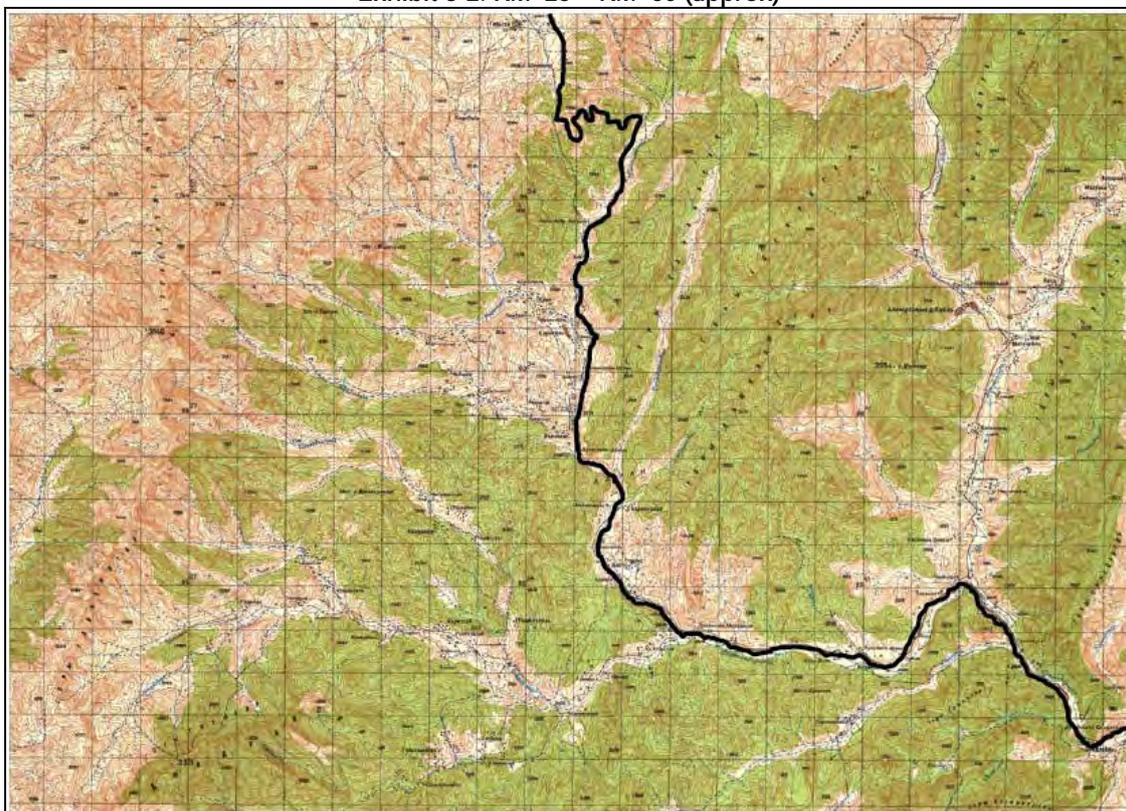


Exhibit 3-3. KM+60 – KM+85

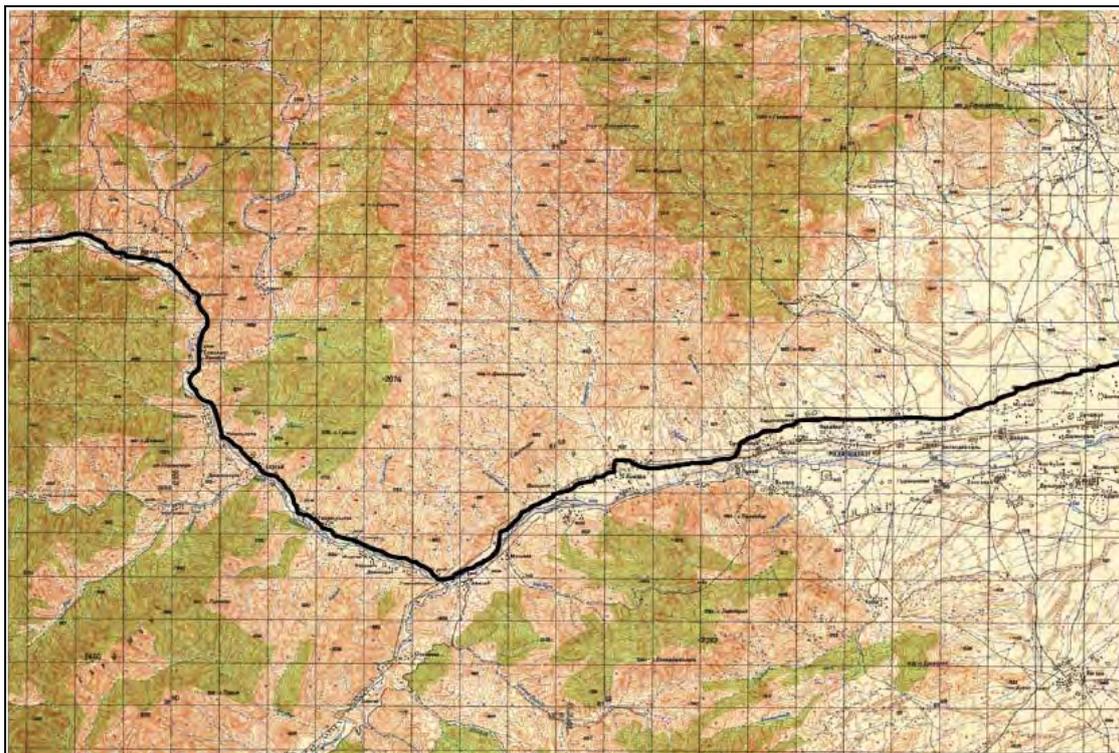
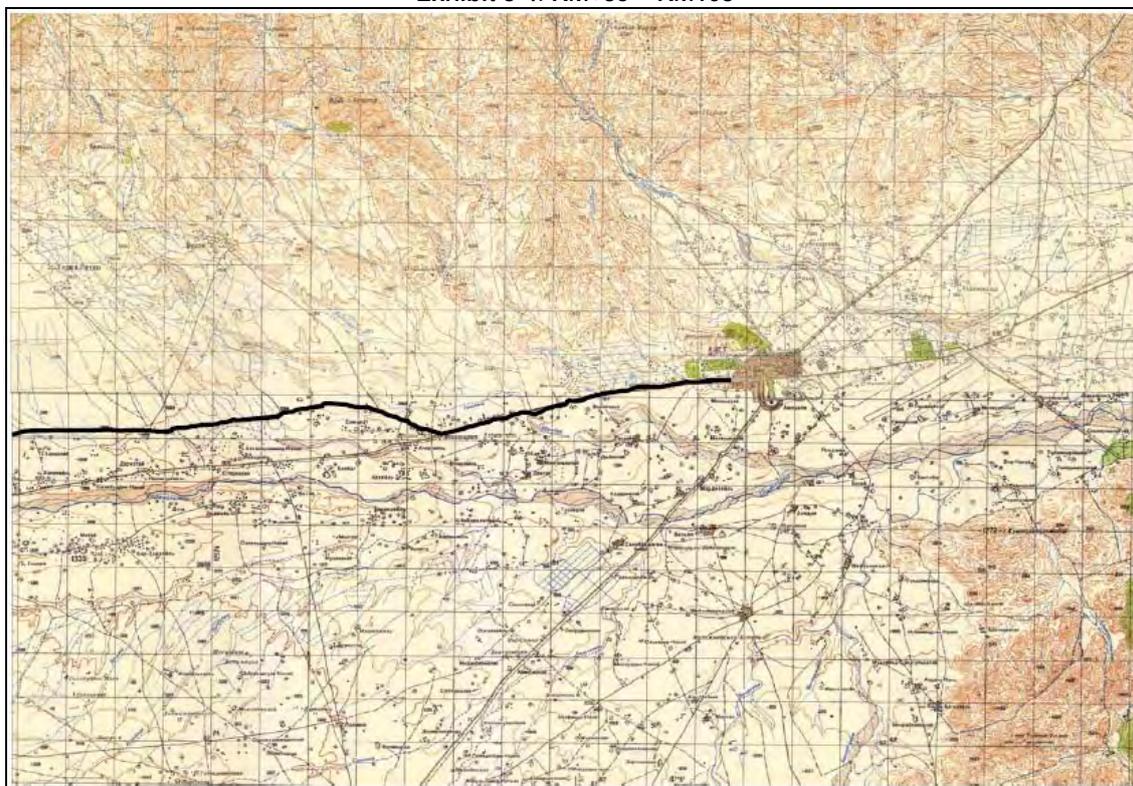


Exhibit 3-4. KM+85 – KM103



3.2.2 **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 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.

Soils in the Project Area are Mesic (Mesic soil is a medium type of soil (hence the name, which means middle) that drains well yet retains some water) between KM0-15 and from KM40-103. The Mesic soils in this region have a soil temperature regime (STR) between 8 and 10 degrees Celsius. In the mountain area the soils are classified as xeric (characterized by a strong moisture deficit) and are rocky with a low organic content. Small pockets of agricultural land are present in the mountain valley. More agricultural land can be observed on the Shamal Plain, although irrigation practices limit the exploited area to within a kilometer or so of the Shamal River banks.

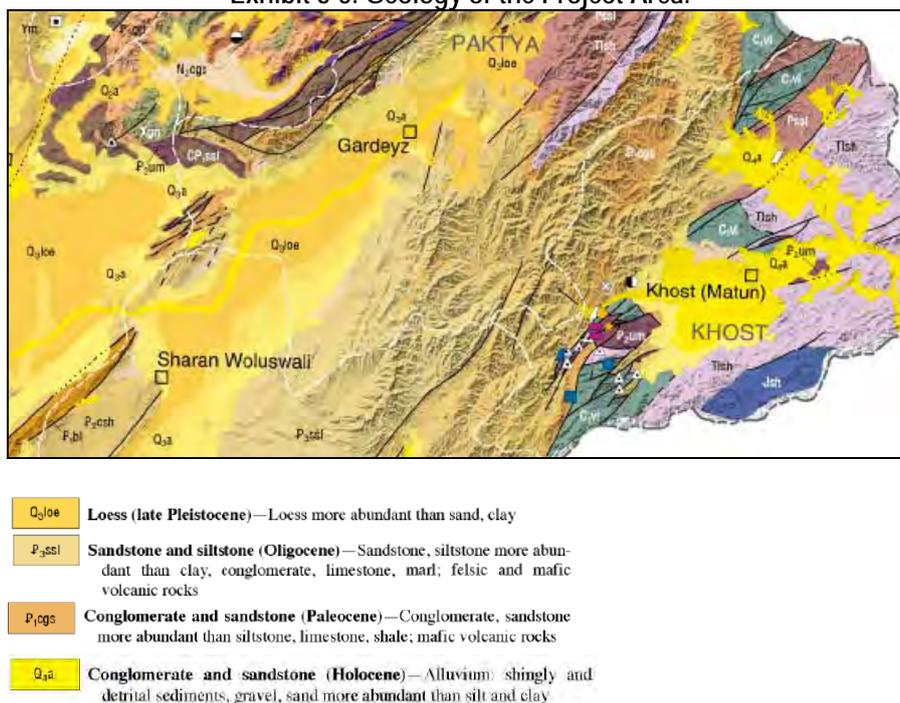
3.2.3 Seismic & Geological Characteristics - Afghanistan has some of the most complex and varied geology in the world. The oldest rocks are Archean and they are succeeded by rocks from the Proterozoic and every Phanerozoic system up to the present day. The country also has a long and complicated tectonic history, partly related to its position at the western end of the Himalaya. This diverse geological foundation has resulted in a significant mineral heritage with over 1400 mineral occurrences recorded to date. Historical mining concentrated mostly on precious stone production, with some of the oldest known mines in the world believed to have been established in Afghanistan to produce lapis lazuli for the Egyptian Pharaohs. More recent exploration in the 1960s and 1970s resulted in the discovery of significant resources of metallic minerals, including copper, iron and gold, and non-metallic minerals, including halite, talc and mica.

The bedrock geology of Afghanistan can be thought of as a jigsaw of crustal blocks separated by fault zones, each with a different geological history and mineral prospectivity. This jigsaw has been put together by a series of tectonic events dating from the Jurassic. Most relevant Block to the Project area is the Kabul Block. To the east of the Afghan Block is a complex collage of tectonic units that marks the collision zone with the Indian plate. During the Cretaceous period, the East Nuristan volcanic arc was accreted to the margin of Eurasia. This was followed by the docking of the Kabul Block. The Kabul Block is somewhat of an enigma in Afghan geology. It includes, to the west and east, the Kabul and Khost ophiolites respectively, but is itself formed of Lower Palaeozoic basement overlain by Mesozoic sediments. It is now believed that the Block was a sliver of continental crust, separated from the Indian and Afghan blocks by oceanic crust that got caught up in the collision and was accreted to the edge of the Afghan Block before final collision with India. The Kabul Block is particularly prospective for sediment-hosted copper in its basement sediments and chromite in the ophiolites.³ Within the Project area itself the geology can be divided into four portions (see **Exhibit 3-5**) along the project roads alignment as follows:

1. KM0-15 (Gardez to the ascent to the mountain pass) – Loess
2. KM15-65 (Mountain Region) – Sandstone and Siltstone
3. KM65-70 (Lower mountain valley) – Conglomerate and Sandstone (Paleocene)
4. KM70-103 – (Shamal Plain) – Conglomerate and Sandstone (Holocene)

Much of the country is known to be seismically active. The Sulaiman Range which divides the Project Road is part of the Chaman Fault which is in turn part of the India – Eurasia collision. Accordingly, earthquakes in this region have the potential to be extremely destructive.⁴

Exhibit 3-5. Geology of the Project Area.



3.2.4 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. Five river basins can be differentiated in Afghanistan:

The Kabul Basin (Indus). The Kabul Basin includes the Kabul and Logar 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 road from Khost to the top of the Sata Kanda mountain pass is located in this basin.

The Hilmand Basin. The rivers of the Hilmand 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 Arghandab River forms part of the Hilmand Basin. The portion of the road from Gardez to the top of the Sata Kanda mountain pass is located in the Hilmand Basin.

The Northern Basin. The rivers in the northern part of the country flow northward to the Amu Darya River on the country's northern boundary (and eventually to the Aral Sea) or disappear in the desert sands.

The Amu Darya Basin. The Amu Darya basin has its headwater in the High Pamir Mountains of Afghanistan and Tajikistan. The Basin covers 14% of the national territory but drains more than 57% of the total annual water flow of Afghanistan. Therefore the basin has great hydropower potential that is largely unused.

The Harirod – Murghab. The Harirod – Murghab river basin contributes a tiny 4 percent of the total flow of Afghanistan. The main rivers are the Hari, which takes its source from the western slope of the Koh-i-Baba Mountains in the central highlands and the Murghab, which comes from the Tir Band-I Mountains.

The following table summarizes the key features of each basin:

River Basin	Amu Darya	Harirod-Murghab	Hilmand	Kabul	Northern
Area (km ²)	90,692	77,604	262,341	76,908	70,901

Settled Population	2,968,122	1,722,275	5,887,571	7,184,974	2,783,033
Population Density	33	22	22	93	39
Water Bodies	62	13	2,271	25	33
Marshlands	678	127	2,284	264	205
Irrigated Land	3,540	1,725	4,758	3,060	2,378
Rain fed Land	13,156	9,371	2,344	1,554	18,747
Rangeland	56,643	52,481	113,258	37,152	32,148
Forest Cover	648	99	114	12,141	64

As stated above, the Project Road is located within the Hilmand and Kabul basins. The following is a short summary of both basins characteristics:

Hilmand Basin - Hilmand means 'abundant water' in old Persian and is the largest basin in Afghanistan covering almost half of the country. The basin covers the southern half of the country from the Province of Herat to Gardez all the way down to the Sistan depression bordering Iran. Most of Afghanistan's Karezes are located in the Hilmand Basin. Water from Karezes flows freely via underground tunnels from alluvial aquifers for surface irrigation. Dug for over centuries by local craftsmen from shafts at close intervals, karezes are usually small in dimension but maybe many kilometers in length. Karez water is used for both irrigation and drinking water. No Karez systems were located within the vicinity of the Project Road. The Hilmand basin is divided into fifteen watersheds:

- Adraskan Rod (River)
- Farah Rod
- Khuspas Rod
- Khash Rod
- Upper Hilmand (above Kajakai Dam)
- Middle Hilmand
- Lower Hilmand
- Sistan – Hilmand
- Chagay
- Upper Arghandab
- Lower Arghandab
- Tarnac Rod
- Arghistan Rod
- Sardeh wa Ghazni Rod
- Dasht-I Nawur

Exhibit 3-6. Sardeh wa Ghazni Rod watershed	
Area (km ²)	17252
Settled Population	1868342
Population Density	108.3
Water Bodies (km ²)	146.2
Marshlands (km ²)	30.0
Irrigated Land (km ²)	1065
Rain fed Land (km ²)	337
Rangeland (km ²)	11791
Forest Cover (km ²)	35

The first portion of the road is located in the Sardeh wa Ghazni Rod watershed. Waters draining from the Spin Gar Mountains in Paktya flow through Gardez before filling in the Sardeh Dam Reservoir and expelling in the Jilga River (also known as the Sardeh Rod). The Project road crosses the Jilga River at KM2.0. The bridge crossing the Jilga is currently being rehabilitated as part of another project and as such impacts associated with these works are considered to be indirectly associated with the Gardez – Khost Road Project.

The Jilga River takes the majority of its flow from the Spin Gar Mountains and therefore has a seasonal flow that peaks in late spring. Flow rates for the Jilga are low ranging from 0.1 cubic meters per second in January rising to a peak of approximately 1.5 meters per second in May / June. The extent to which water from the river is used for agricultural purposes is unknown although given the low flow rates for the river and the presence of kereze systems in the vicinity of Gardez (but not within the vicinity of the

Project Road) it is assumed that most water used for agricultural purposes around Gardez is ground water.⁵

The Jilga meets with the Ghazni Rod in Giro district and flows into the Abi-I Istada salty lake. Abi-Istada is a large saline lake located approximately 2,000 m above msl in the southern corner of Ghazni Province. The site is important for the migrating greater flamingos that arrive at the high water level in late spring, breeding in the summer and departing during low water level in the autumn. More than 100 other bird species are present in the area. It was also once an important stopover for the Siberian Crane (the last observed Siberian Crane at Abi-Istada was shot dead by a hunter in 1986). When the lake overflows in good rainfall years in the spring, the water drains into the Lora River of the Arghistan watershed which contributes to the Hilmand River. **Exhibit 3-6** summarizes the main characteristics of the watershed.

Kabul Basin - As stated above, the second portion of the Project Road is located within the Kabul (Indus) Basin. The Kabul basin includes all Afghan rivers that join the Indus River in Pakistan which eventually empty into the Arabian Sea of the Indian Ocean. The basin covers 12% of the national territory, but alone it drains 26% of the total annual water flow of Afghanistan. As such, the basin has major hydropower potential which is already partly developed including the Darunta Dam and the Bandi Naghlu Dam. The Kabul basin is divided into eight main watersheds:

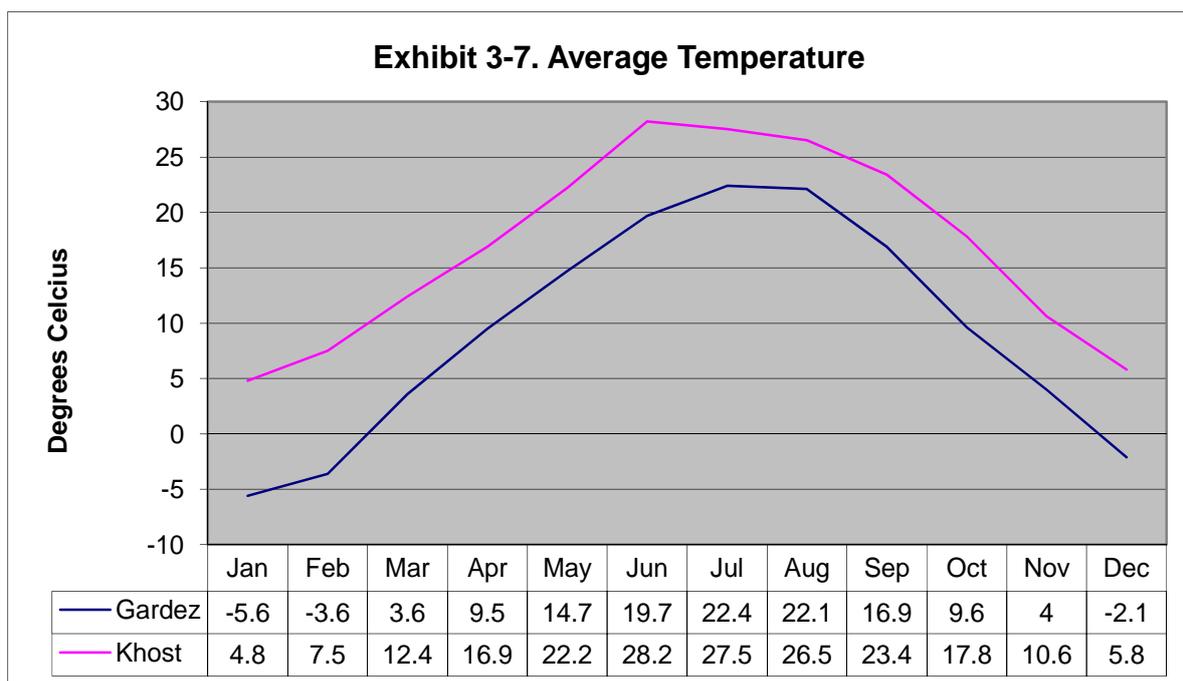
- Kabul
- Chak wa Logar Rod
- Ghorband wa Panjshir
- Alingar
- Kunar
- Shamal
- Gomal
- Pishin Lora

The second portion of the road is located within the Shamal watershed. The Shamal watershed drains water from the Suleiman Mountains in Paktya and Khost provinces. The Shamal River takes its source from a multitude of streams that join near Khost province center. The main tributaries of the Shamal River are the Tangay and Spera rivers. The Shamal watershed faces toward the Indian sub-continent and is influenced by the monsoon season, thus benefiting from heavy rainfalls in the summer (see **Exhibit 3-7** - Khost precipitation). The Shamal River has its first peak in river flow in the winter months of February – April and a second peak in summer, July – August. The Project Road itself does not cross the Shamal River, but runs adjacent to its north bank for approximately 20 or so kilometers (between KM60 and 80), after which the road turns north east away from the river towards Khost.

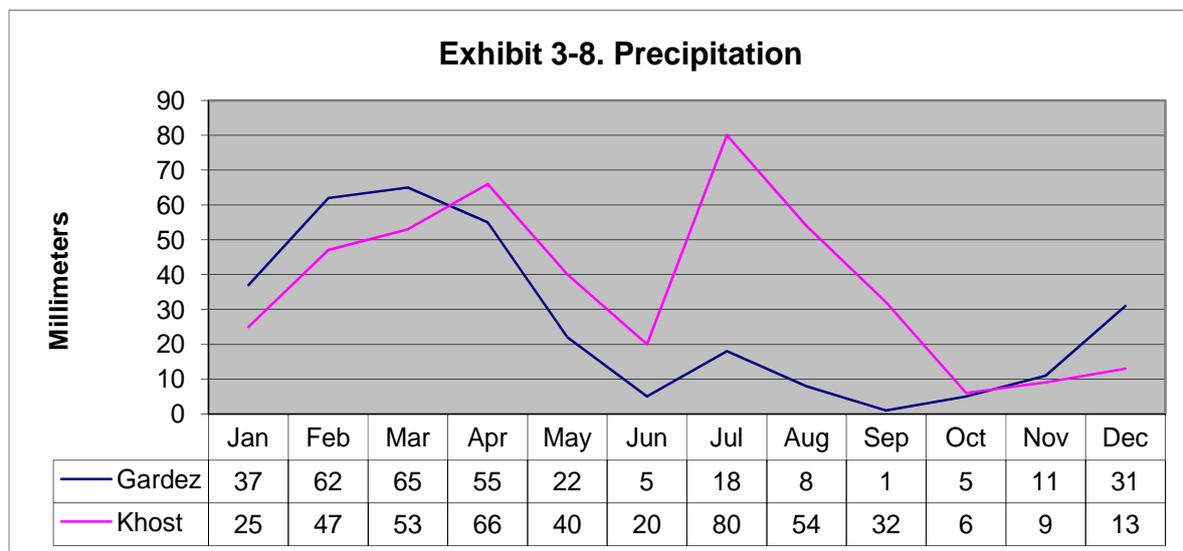
3.2.5 Air Quality and Climate - Climate, particularly precipitation and wind patterns, is a major determinant of air quality. Afghanistan's climate is continental, arid to semi-arid, with considerable variations from place to place according to altitude. Its lowland areas have cold winters and hot summers. 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.⁶

The climate in the project area is continental and dry; it varies according to elevation from moderately warm (in valleys and basins) to cold (above 2,500 meters). The following describes the climates in the mountain region and the lower elevation Shamal Plain.

Shamal Plain – Winters in this area are mild with few clouds. Normal temperatures are 3-6°C in the daytime with nighttime frost down to -5°C. Precipitation generally falls as drizzle, less often as snow. Spring is humid with warm days and cool nights. Summer is hot and the weather is mostly clear and dry, precipitation can be heavy in the summer months in Khost, as illustrated by **Exhibit 3-8**. Fall lasts from October to November. Winds are predominantly northerly and southerly during the years with mean speeds of 1-4 m/s.



Mountains – In the mountains the winters are cold and dominated by snow. Average temperatures range between -5°C to -10°C in the daytime to -20°C to -25°C at night. The snow usually melts in the late spring and is combined with periods of high rainfall. Summer in the mountains is cool with temperatures between 10°C and 15°C during the daytime. Snow often blocks the road during the winter months and heavy rainfall can turn sections of the mountain pass into rivers of mud. Accordingly the winter months in the mountain pass can be extremely dangerous for drivers and their passengers. Exhibits 3-7 and 3-8 illustrate the annual temperature and precipitation levels in Gardez and Khost.



Climatic and soil conditions of the Project Area are such, that it is likely to be subject to dust storms in the summer months, leading to higher levels of suspended particulate matter (SPM). Generally, however, except for the effects of traffic, ambient air pollution levels outside of the urban areas are considered to be relatively low due to the low level of industrialization. Notwithstanding the above, elevated levels of SPM are present in areas in which road conditions prompt traffic to use unpaved areas adjacent to the highway (e.g., in areas of bridge or

road collapses).

3.2.6 Mines and Unexploded Ordnance - Due to recent conflict in the region mines and unexploded ordnance (UXO) may be present in portions of the Project Area. De mining will be the responsibility of LBG/BV JV. No work shall commence until the area has been de-mined and the area certified as safe.

3.3 NATURAL/BIOLOGICAL RESOURCES

3.3.1 Flora - Afghanistan's vegetation is typical of the semi-deserts and steppes. Ephemeric 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, ashes, willows, poplars and fruit trees in orchards. Himalayan forest, including evergreen oak woods grow in the borderland between Afghanistan and Pakistan.⁷ 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. 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.⁸ From Gardez, the first eighteen kilometers of the route comprise open barren land and are somewhat visually uninspiring. However, this soon changes as the road starts its ascent into the mountain pass (**Exhibit 3-9**). Coniferous trees (Pine, Cedar, Fir and Spruce) dominate the landscape for the next 20 or so kilometers.

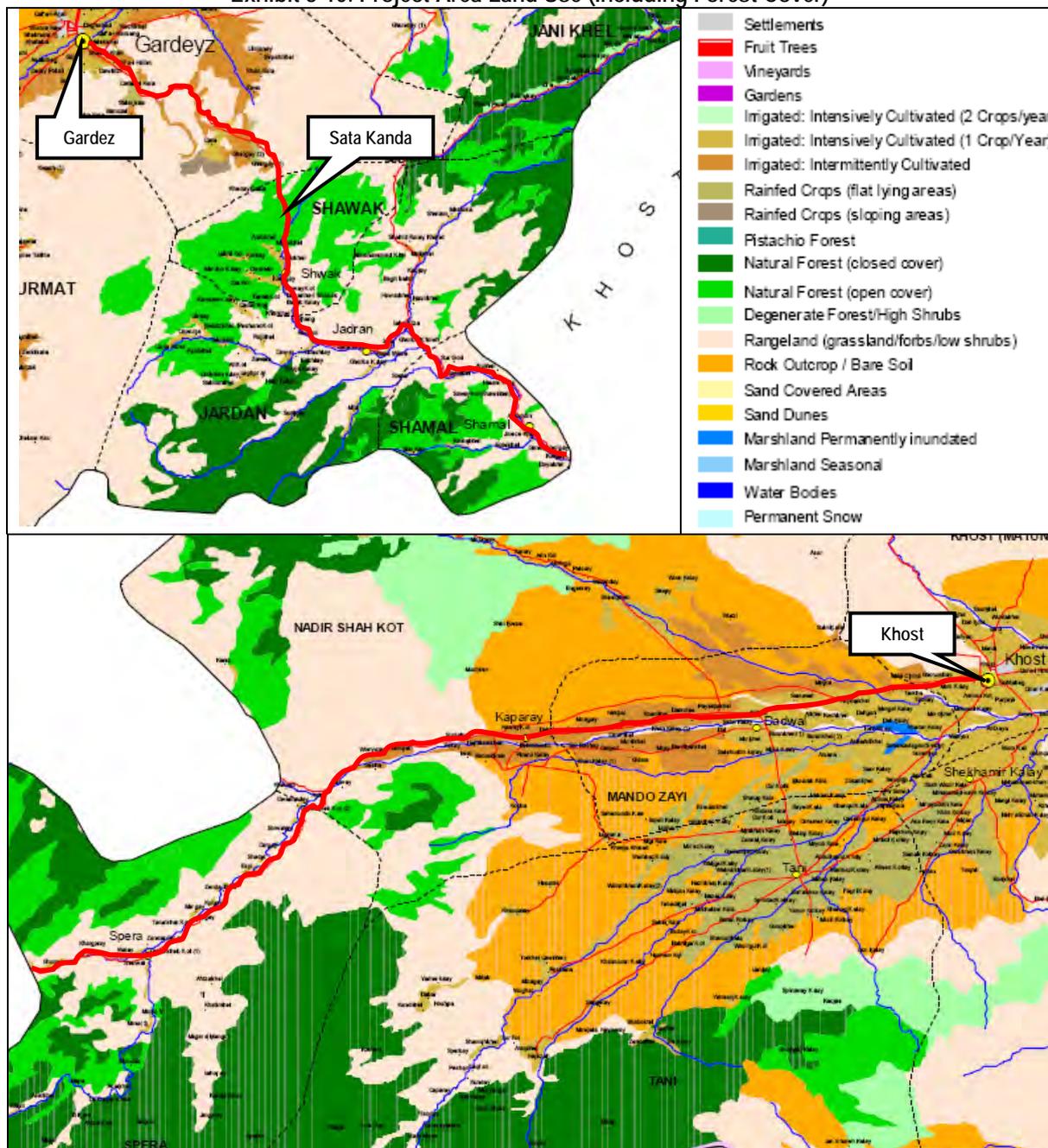
Exhibit 3-9. Sulaiman Mountains



Some sections of the mountain pass closer to the road appear to have been cleared of most of the pine trees, but further up the mountain slopes the trees are more abundant most probably due to their inaccessibility.

Logging of these Coniferous trees is one of the main economic activities in the region and appears to be uncontrolled. Such uncontrolled management of the forests will no doubt lead to their complete denudation within the next twenty years. This is a serious concern for the flora habitat of Afghanistan given that this region is one of few remaining heavily forested areas. Wood markets are evident in almost every village through the mountain pass with huge stockpiles of wood gathered by the roadside. Most of the wood is collected by truck and transported to the main wood markets in larger towns and cities. The large logs are cut into planks, the smaller trunks are used for building houses and the roots and branches are used for burning. Further down the valley towards Khost the forested areas become sparse. The flora in this flat plain is dominated by fruit trees and agricultural crops. **Exhibit 3-10** illustrates the forest cover and general land use of the Project area.

Exhibit 3-10. Project Area Land Use (Including Forest Cover)



Analysis of the available data for this region has revealed no documentation of potential habitat for threatened or endangered plant species within the immediate vicinity of the Project Road. It is possible that some special status flora may exist within the Suleiman Range, but they are unlikely to be impacted by Project Works. Most of the forested areas are set well back from the road side which has seen significant exploitation of forest resources and as such are unlikely to provide habitat for rare or endangered plant species. The only region where trees are located close to the roadside is in the steep mountain pass section of the road. However, most of the trees are located well above or below the road on steep mountain slopes. The Project Road width in the mountain pass area is such that limited cut and fill activities will occur thus reducing the potential impact of Project works on the mountain flora.

3.3.2 Fauna - The fauna of Afghanistan is similar to that of the rest of Central Asia. Beast of prey (e.g., snow

leopards, brown bears, wolves, striped hyenas, jackals and foxes) are believed to live in the mountains of Badakhshan. 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.⁹ However, within the Project Area little in the way of wildlife can be observed. Consultation with local residents revealed that the most prominent animal species in the Project Area were fox, wolf, and rabbit. It is possible that higher up in the more remote parts of the mountains other species are present, however, the fauna of this region has not been documented within the last 25 years and as such the exact nature of the species in this region is unknown.

3.3.3 Protected Areas - Six protected areas have been identified in the country. They are described below and indicated by Exhibit 3-11.

Ab-I-Estada Waterfowl Sanctuary. Established in 1977, Ab-I-Estada Waterfowl Sanctuary (27,000 hectares) is located in conjunction with *Istadeh-ye Mogor*, a large lake north of the town of Nawah. Although the sanctuary is more than 200 kilometers from the Project road it is fed by the waters of the Jilga river which the Project Road crosses at KM2.0.

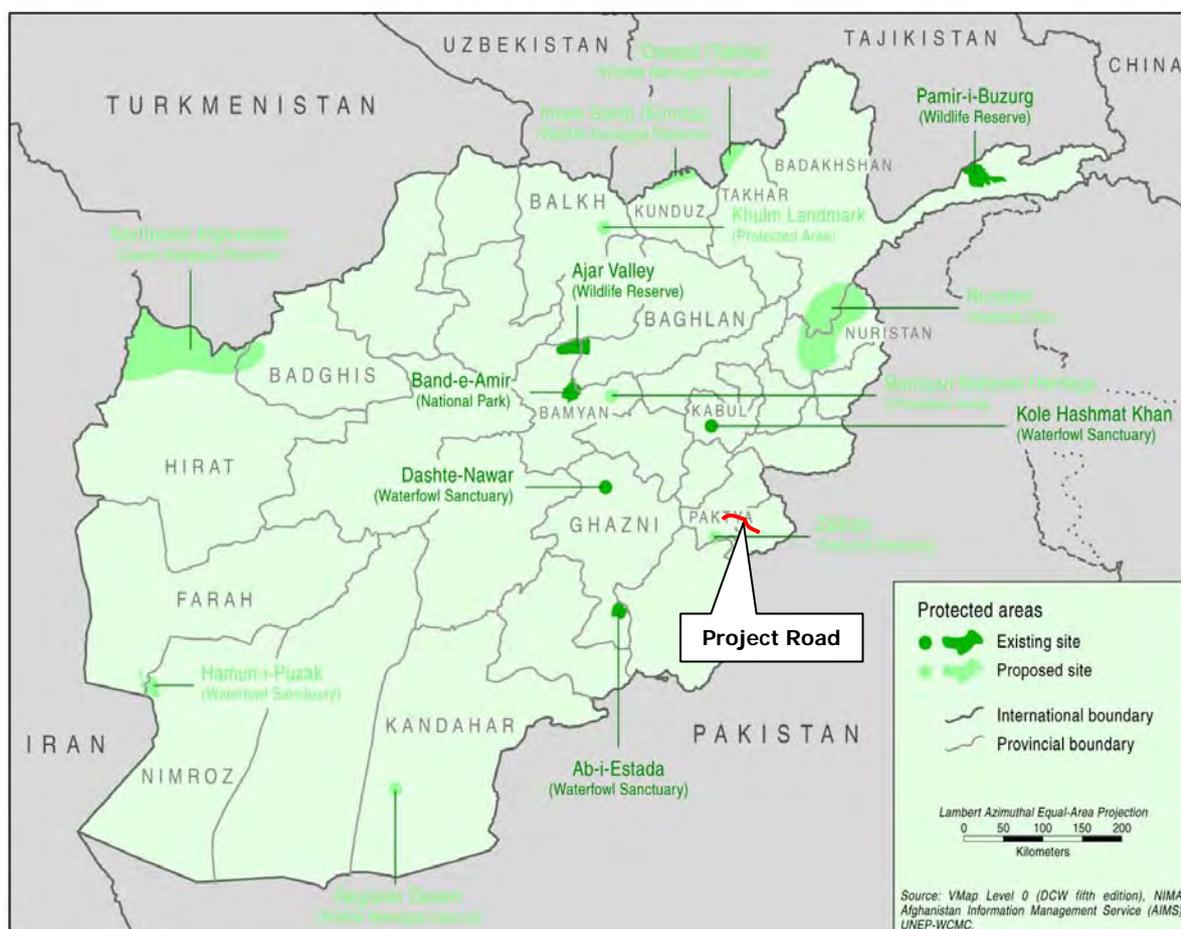


Exhibit 3-11. Protected Areas of Afghanistan

Ajar Valley Wildlife Reserve. Established in 1978, the Ajar Valley Wildlife Reserve (40,000 hectares) is a former royal hunting ground located in Bamyan Province in the central part of the country. The Reserve is more than 200 kilometers from the Project Area and will not be affected by project works.

Bande Amir National Park. Established in 1973, the Bande Amir National Park (41,000 hectares) is also located in Bamyan Province near the Ajar Valley Wildlife Reserve in the central part of the country. The Park is located more than 200 kilometers from the Project and will not be affected by project works.

Dashte-Nawar Waterfowl Sanctuary. Established in 1977, the Dashte-Nawar Waterfowl Sanctuary (7,500 hectares) is located in Ghazni Province. The sanctuary is located more than 200 kilometers from Paktya nad Khost.

Pamir Buzurg Wildlife Sanctuary. Established in 1978, the Pamir Buzurg Wildlife Sanctuary (67,938 hectares) is located in the extreme northeastern part of the country more than 200 km from the Project.

Kole Hashmat Khan Waterfowl Sanctuary (established 1973). Established in 1973, the Kole Hashmat Khan Waterfowl Sanctuary (191 hectares) is a former royal hunting ground located south of Kabul. The sanctuary is more than 150km north of the Project Road.

3.4 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)

3.4.1 Land Use and Development Policies & Controls - 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.¹⁰ Land uses within the vicinity of the Project Area can be characterized as follows:

Agricultural Land. As illustrated by **Exhibit 3-10** agricultural land is the dominant land use in the first 15-20kms of the project road. After this point the road passes patches of agricultural land within the lower portions of the mountain valley towards Khost. Within the valley plain the dominant land use within the vicinity of the road is agricultural, this is mainly due to the road running parallel with the Shamal river in this area.

Urban. The main urban areas are located at either end of the Project Road, Gardez to the west and Khost to the East. The road bisects multiple small villages (Shamal, Shwak, Kaparay) en-route to Khost from Gardez.

Range Land. Rangeland dominates the lower portions of the mountain valley. The denuded forest slopes have made way to the scrubby rangeland and look unlikely to recover their status as a forested area.

Land use and development policies and controls are largely within the purview of the Ministry of the Interior (MOI) as the agency responsible for municipal governance and oversight. No policies or controls have been identified which will impact upon the construction works

3.4.2 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.¹¹

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.¹² Only about four percent of the population is

reported to have access to electricity - mainly in the urban areas.¹³ Electricity in Gardez is supplied by a diesel generator donated to the town by the Czech Republic in 2006. The only electrical supply systems in the villages outside of Gardez are powered by small petrol driven generators.

Energy Resources. The Soviets estimated Afghanistan's proven and probable natural gas reserves at up to five trillion cubic feet 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 Badakshan 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.¹⁴ 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. Transmission and distribution pipelines have corroded and about 30 percent of the gas is lost due to leakage. The existing coalmines are hardly operable.¹⁵ No gas pipelines or coal mines are known to exist in the Project Area.

Petroleum Products. Afghanistan has significant oil 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.¹⁶ 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.¹⁷ No petroleum producing facilities are known to exist in the Project Area.

3.4.3 Use of Natural/Depletable Resources - Construction of the Project Road will require the use of certain natural resources. The country is well supplied with rock, sand and other quarried construction materials as required for the proposed construction works. Construction materials from natural/Depletable resources will include the following:

- Rock – It is unlikely that any licensed quarries exist in the Project Area. However, it is likely that un-official quarries exist within the mountainous area of the Project Road. USACE used quarried rock materials during the previous rehabilitation of small section of the Project Road. The source of the materials should be confirmed with USACE.
- Gravel and Sand – Gravel and sand will be sourced from a local supplier and hauled directly to site.
- Wood – Wood is required during the rehabilitation process to help construct bridges, culverts etc and as a general material for camp construction.
- Water – Water will be extracted from the Shamal and Jilga Rivers and their tributaries. Issues associated with such extraction are discussed under the heading of Hydrology above.

3.4.4 Urban Quality/Design of the Built Environment - For virtually all urban areas of Afghanistan, urban infrastructure investments in recent years failed to match the increasing demands and deteriorated due to a lack of maintenance and war-related destruction. 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. Most of the country's urban population lacks 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 mortality rates.

Gardez has recently been the focus of a water supply construction program co-funded by the World Bank and

USAID. However, as mentioned above, the recently completed system has broken down and is awaiting repair. In general, urban quality is relatively poor although Khost is somewhat more aesthetical pleasing than Gardez due to its fertile nature promoting the growth of flora throughout the town. Gardez is dryer and consequently dustier which gives the town a rather run down and dirty feeling. The small villages that dot the countryside all suffer from years of neglect, none of the buildings are worthy of any note.

3.4.5 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 Youth and Culture (MYC).

Numerous archaeological discoveries, including Indo-Greek, Sassanid, Hephthalite, and Turki-Shāhī coins, as well as several Hindu statues from the 7th century have been found in and around the town of Gardez. In fact Chinese accounts such as Hsuan-tsang's in the 7th century report Hindu kingdoms in the Kabul, Gardez and Ghazni areas. Accidental finds of marble statuary representing the elephant god Ganesh were found in Gardez and some scholars have advanced the theory that the concept of Ganesh actually originated in the Afghan area.

According to the medieval *Tārīkh-e Sīstān*, Gardez was founded by the Kharijite warlord Hamza bin Abdullah Shāhī. In 870, the city was conquered by the Saffarid ruler Ya'qub bin Layt and in 975, the Ghaznavids took over the city, while the converted Aflahids entered the Ghaznavid nobility. In 1162, the city fell to the Sultāns of Ghōr. Renowned for its multi-storied houses - as mentioned by the Central Asian conqueror Babur - the city was part of the Mughal Empire in the 16th century. However, nothing is known of the town during the subsequent centuries and no building remains from these early dates. During the Anglo-Afghan wars, Gardez was handed over to the newly created country *Afghanistan* and was part of the "buffer-state" between British India and Tsarist Russia. Notwithstanding Gardez's cultural history, field observations did not reveal the presence of any historical or cultural heritage within the Project's potential impact area. The Project road passes several graveyards on its way to Khost, none of which are located close enough to be impacted upon by Project works.

Little historical data is known about Khost although anecdotal information suggests that its cultural heritage is not as diverse as Gardez. The city was besieged for eight years during the Soviet occupation of Afghanistan and widespread damage to the city was caused. No sites of historical or cultural heritage were noted within the vicinity of the Project Road in Khost.

In addition to the above, consultation with the Ministry of Youth and Culture did not reveal the presence of cultural or historic resources within the vicinity of the Project Road. The MYC does have a list of cultural and historic sites in Afghanistan but would not provide this list to LBG in case these sites were looted.

3.5 ADDITIONAL ENVIRONMENTAL CONCERNS NOTED FOR CONSIDERATION

3.5.1 Socio-Economic Considerations - In 2001, Afghanistan emerged from 22 years of war to face increased economic, political and social challenges. In the wake of a protracted drought (1999-2001) and a decade of relentless political violence through years of civil war and Taliban oppression, the predominantly rural economy was severely weakened. Livelihoods were devastated by the decimation of livestock and agricultural production. Falling incomes, loss of assets and the ravages of war saw over 5 million people displaced as refugees in neighbouring countries. As a recent World Bank report suggests, "Afghanistan was essentially left out of the last 25 years of global development, with virtually no increase in per capita income during this period and an average life expectancy of only 43 years."⁴ Indeed, Afghanistan remains one of the world's poorest countries, with an average per capita GDP of US\$300 per annum (including opium). It has persistently poor social indicators and a gender gap only exceeded by Niger.

From this disheartening base the economy has recovered fairly well, although at a declining rate.¹⁸ To a significant degree, economic growth has been associated with the cessation of drought and war, as well as the benefits of reconstruction, such as the booming construction industry. Sustaining the targeted nine percent growth rate will require higher agricultural yields, less dependence on the poppy economy and diversification of economic activities with the growth of other sectors.¹⁹ Exhibit 3-12 provides an overview of socio-economic statistics in Afghanistan as of 2007.

Exhibit 3-12. Social and Economic Indicators in Afghanistan

Population:	31 million (July 2006 est.)
Ethnic Groups:	Pashtun 42%; Tajik 27%; Uzbek 9%; Hazara 9%; Aimak 4%; Turkmen 3%; Baluch 2%; other 4%
Religions:	Sunni Muslim 80%; Shiite Muslim 19%; other 1%
Literacy Rate:	28% of population over 15 years of age
GDP:	\$21.5 billion (purchasing power parity)
GDP Per Capita:	\$800 (purchasing power parity)
GDP Real Growth:	11% (2007 Afghan gov't estimate)
Unemployment Rate:	40%
Children in School	5 million (2007), of which 1.8 million are girls. Up from 900,000 in school during Taliban era
Afghans With Access to Health Coverage	80% - compared to 8% during Taliban era. Infant mortality has dropped 18% since Taliban to 135 per 1,000 live births. 680 clinics built with U.S. funds since Taliban era.
Roads Built Since Taliban Era	4,000 miles, with another 1,000 miles to be completed in 2007.
Access to Electricity	10% of the population
Revenues:	\$715 million for 2007 (Afghan gov't. est.); \$550 million 2006
Expenditures	\$1.2 billion for 2007 (est.); 900 million in 2006
External Debt:	\$8 billion bilateral, plus \$500 million multilateral. U.S. forgave \$108 million in debt to U.S. in 2006
Foreign Exchange Reserves:	\$2 billion
Foreign Investment	\$1 billion est. for 2007; about \$1 billion for 2006
Major Exports:	fruits, nuts, carpets, semi-precious gems, hides, opium
Oil Production:	negligible
Oil Proven Reserves:	3.6 billion barrels of oil, 36.5 trillion cubic feet of gas, according to Afghan government on March 15, 2006
Major Imports:	food, petroleum, capital goods, textiles
Import Partners:	Pakistan 38.6%; U.S. 9.5%; Germany 5.5%; India 5.2%; Turkey 4.1%; Turkmenistan 4.1%
Source: CIA World Factbook, January 2007, Embassy of Afghanistan in Washington, D.C.; Afghan Finance Minister statements (April 2007), President Bush speech on February 15, 2007.	

The legal economy of this region of Paktya and Khost is dominated by the cutting and selling of wood from the mountain forests. The economy of Gardez has improved steadily since the completed rehabilitation of the Kabul –Gardez road last year. However, Gardez still suffers from high levels of unemployment. Elsewhere, notably in the Khost poppy cultivation is a problem. According to the Governor of Khost there is substantial investment in the region from other countries including the United Arab Emirates and Pakistan.

3.5.2 Public Health and Safety - 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. Few residential or public buildings in Afghan cities have sewerage facilities and those that do discharge their wastewater directly into rivers without treatment.

Public health facilities are considerably better in both Khost and Gardez than the villages that line the route. Gardez has a newly installed, if not functioning, water supply network and both towns have a number of health facilities. Little population exists in the mountain region, but further down in the valley the number of health clinics is limited. Additionally, the health clinics often do not have adequate staff numbers and also suffer from a lack of available drugs. This is a similar situation throughout much of Afghanistan where healthcare in urban areas is significantly better than the poorer rural areas.

Safety issues related to civil unrest and crime are a significant concern in this region of Afghanistan. Both Khost and Gardez have been the sites of suicide bombings in their town centers within the last year. Khost is a particularly unstable region due to its proximity with the porous Pakistani border. Attacks of supply vehicles and police are frequent in the mountain pass portion of the Project Road.

Traffic safety is also a significant problem in the mountain region. Anecdotal information from road users indicated that accidents involving trucks, cars and non motorized transport are frequent on the Project road especially during the winter months. As mentioned previously, the tight mountain hairpins are not protected by any type of safety barriers which can be extremely hazardous during freezing conditions. Certain portions of the road also become dangerous when heavy rainfall turns the road to mud.

3.5.3 Gender & Disabled Persons Issues - It has been noted that the last twenty five 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 the urban areas 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.²⁰ No legislation in regard to discrimination against, or incentives for, the employment of the disabled is known to be in place in Afghanistan.

3.5.4 Noise – Noise can disturb sleep and relaxation, interfere with an individual's ability to perform complicated tasks, be a source of annoyance, influence mood and stress levels, and otherwise detract from the quality of life. Economic effects of noise include impacts to property values, impaired health, and lowered working efficiency.²¹

Noise levels within the Project corridor are generally low, especially in the mountainous areas where traffic volumes are lowest. Several sensitive receptors are located close to the project road, most notably a newly constructed school at KM14 which is located within 20 meters of the right of way. In the urban areas of Khost and Gardez noise levels are moderate due to the higher number of vehicles using the road in these areas.

3.5.5 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. The available data indicated the following:

Water Supply Systems. No piped water systems are known to exist in the rural areas of Gardez and Paktya. However, a recent combined USAID / World Bank funded project constructed a water supply system in Gardez. The network aims to supply 2,400 m³ per day to the town of Gardez. Construction of the system was completed in late 2006, however, anecdotal information suggests that the system is now out of order and waiting to be repaired. Notwithstanding the above, rehabilitation activities from the Gardez traffic circle to the outskirts of town may potentially impact upon any subsurface water supply systems unless project works are appropriately coordinated with the relevant authorities (MPW).

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. No piped wastewater collection systems are known to be within the potential direct impact area.

Electrical Systems. Electrical supply networks are evident in both Gardez and Khost. In fact the street lights in the center of Khost are solar powered reducing their dependency on such networks. Works should be coordinated with the relevant authorities to ensure that power networks are not interfered with.

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 3.0

- 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 Afghan geological Survey, Ministry of Mines. <http://www.bgs.ac.uk/afghanminerals/geology.htm>
- ⁴ Earthquakes in Afghanistan, <http://cires.colorado.edu/~bilham/Afghan.pdf>
- ⁵ Watershed Atlas of Afghanistan, Raphy, 2005.
- ⁶ Lonely Planet
- ⁷ National Atlas of the Democratic Republic of Afghanistan, Organization for Surveying and Cartography and GEOKART Poland, 1995, page VII.
- ⁸ Asian Development Bank, Afghanistan Country Strategy Paper.
- ⁹ National Atlas of the Democratic Republic of Afghanistan, Organization for Surveying and Cartography and GEOKART Poland, 1995, page VII.
- ¹⁰ CIA Profile
- ¹¹ World Bank, Technical Annex for a Proposed Grant... to Afghanistan for an Emergency Infrastructure Reconstruction Project, May 2002, paragraph 8, page 2.
- ¹² CIA Profile
- ¹³ World Bank, Technical Annex for a Proposed Grant... to Afghanistan for an Emergency Infrastructure Reconstruction Project, May 2002, paragraph 8, page 2.
- ¹⁴ EIA.DOE.Gov Web Site
- ¹⁵ World Bank, Technical Annex for a Proposed Grant... to Afghanistan for an Emergency Infrastructure Reconstruction Project, May 2002, paragraph 9, page 2.
- ¹⁶ EIA.DOE.Gov Web Site
- ¹⁷ World Bank, Technical Annex for a Proposed Grant... to Afghanistan for an Emergency Infrastructure Reconstruction Project, May 2002, paragraph 19, page 4.
- ¹⁸ GDP growth rates were 25-30 percent in 2002-03, 15-20 percent in 2003-04 and estimated at 8 percent in 2004-05. See UNDP (2004), *Afghanistan National Human Development Report: Security with a Human Face*. Kabul: UNDP; and GoA (2005), *Afghanistan Statistical Yearbook 2005*. Kabul: GoA.
- ¹⁹ Urban Livelihoods in Afghanistan, Beale and Shutte, 2006
- ²⁰ World Bank, Technical Annex for a Proposed Grant... to Afghanistan for an Emergency Infrastructure Reconstruction Project, May 2002, paragraph 79, page 15.

²¹ Center for Environmental Excellence, AASHTO.
http://environment.transportation.org/environmental_issues/construct_maint_prac/compendium/manual/3_13.aspx

4.0 ENVIRONMENTAL CONSEQUENCES

4.1 INTRODUCTION

This section describes the potential socio-environmental consequences, or impacts, arising from Project activities and the required measures to mitigate any such impacts. This section also briefly describes the types of impacts considered and a description of the 22 CFR 216 requirements for the following section.

It should be noted that the Scoping Statement prepared as part of this Project identified certain socio-environmental characteristics that could have their impacts mitigated by contractual provisions and as such did not require further significant analysis at the EA stage. Although further detailed analysis of these characteristics has not been undertaken here in **Section 4.0** the relevant contractual provisions for these characteristics have been included as part of the Projects overall environmental mitigation objectives.

4.1.1 TYPES OF IMPACTS

Environmental consequences resulting from the impacts of projects such as the Gardez – Khost Road Project include:

- Direct Impacts - i.e., those directly due to the Project itself such as the impacts to air quality resulting from construction activities, equipment and vehicles. 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 and other construction materials, 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 road improvements 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 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., construction impacts that could, for example, affect regional hydrology and flooding if poor design practices are used.

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.

4.1.2 **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 4.1 through 4.4 following the same environmental criteria headings, sequence and enumeration pattern as used in the foregoing Section 3.0 in its description of the potentially affected environment. An additional Sub-section (Section 4.5) 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 criterion 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.

4.2 PHYSICAL RESOURCES

4.2.1 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. Cut and fill activities will be required along portions of the Project Road, most notably within the mountain pass and mountain valley sections. However, it should be noted that the roadway width is at least nine meters wide throughout the mountainous section of the road thus reducing the amount of cut and fill associated with the project. **Hadi, how much will be cut & fill ??**
- 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. **Hadi, approximately how many borrow pits will be required for the project.**
- Quarry Operations. Crushed rock will be needed for construction purposes. Opening and operating quarries can result in potentially negative environmental, social and health and safety related impacts. **Hadi, is there a quarry site or will one be opened?**

- Erosion. Both wind and drainage-related erosion 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 by implementing specific contract provisions in each of the areas of potential impact as follows:

- Cut and Fill Requirements. Cut and fill activities will occur in certain sections of the mountain pass and the mountain valley areas. The design incorporates provisions to ensure:
 - Selection of less erodable material, placement of gabions and riprap and good compaction, particularly around bridges and culverts.
 - Avoidance of the creation of cut slopes and embankments which are of an angle greater than the natural angle of repose for the local soil type.
 - As far as possible cut shall be balance by fill activities.
 - Trenching where necessary to ensure successful establishment of vegetation.
 - Stabilization of embankment slopes and road cuts by 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 to reduce erosion potential or, if steeper, stabilized, covered with riprap or other material to prevent soil erosion.

In addition to the above, in the event that cut cannot be balanced by fill and that haulage of fill materials is too expensive disposal will be in an appropriate manner that will not cause significant impacts to surface water courses, property, or agricultural land.

- Borrow Pits Excavations. Contract documents will specify that:
 - Borrow areas will be located outside the ROWs.
 - Borrow pit excavation should be coordinated to ensure that as few borrow pits are opened as possible.
 - Borrow pit areas will be graded to ensure drainage and visual uniformity.
 - Borrow pits will be located out of urban areas to reduce the potential for human accidents in the pit.
 - Topsoil from borrow pit areas will be saved and reused in re-vegetating the pits to the satisfaction of the USAID/GC.
 - Consultation with the local population should be held to determine if they would like the borrow pit to remain open. The borrow pit can then act as a water resources for cattle. Pit restoration will follow the completion of works if the local population decides it is not needed.
 - 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. This will include re-vegetation and stabilization

of slopes.

- Additional borrow pits will not be opened without the restoration of those areas no longer in use.
- Quarry Operations. There are no licensed quarries within the Project Area. As such, sub-contractors will be made responsible for setting up their own dedicated quarries and crusher plants. Prior to opening of the sites, the sub-contractor will require approval from the relevant local authorities and the Supervising engineer to ensure that land owners are adequately compensated for land use and that the sites are not located in an area likely to cause significant detriment to the local environment. To ensure that this is the case sub-contractors should ensure that quarries and crusher plants are:
 - Located at least 500 meters from urban areas to prevent noise impacts
 - Located outside of agricultural land
 - Not located within forested areas, the avoidance of tree cutting in the mountain areas should be strictly limited.
 - Where possible located on government owned lands
- Erosion. Provisions for the control of erosion are discussed as a part of the discussions for soils and hydrology below.

4.2.2 Soils

Potential Impacts. Impacts to soils due to project location, project design, and operational phases of a project such as the Gardez - Khost Road Project include:

- Loss of Soil for Agricultural Production. Rehabilitation activities may impact upon bands of agricultural land adjacent to the Project Road.
- Borrow Pits. Impacts relating to borrow pits are discussed as part of the Topography section above.
- Erosion. Certain types of road improvements (e.g., road widening) could result increased runoff and/or increased velocities which could lead to additional soil loss. In this instance, however, virtually all construction 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. However, road rehabilitation works will require the construction of embankments, repairing of drainage structures and cutting of slopes. As such, potential soil erosion impacts may occur as part of the project, most notably around the mountain pass and mountain valley areas.
- Conversion of Agricultural Soils Due to Indirect/Induced Impacts. Road improvements often facilitate development along the affected road corridor.
- Contamination Due to Spills or Hazardous Materials. Such accidental spills of hazardous liquids or poor storage practices of hazardous materials may occur during the rehabilitation stage if not properly managed.

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

- Loss of Soil for Agricultural Production. Although this potential impact is noted as a possibility, in this instance, however, virtually all construction 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. In addition, the ROW is more than 9 meters wide for most of its extent and the project road traverses little agricultural land further reducing the potential loss of soil for agricultural production. It should also be noted that any productive soils that might be lost will be mitigated by the enhanced productivity of the remaining areas and improved access to markets.

- 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. 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. Interceptor ditches shall be 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. In addition, re-vegetation of slopes and embankments will be required and shall incorporate the following:
 - Topsoil should be stored and reused. This requires that topsoil be separated from subsoil during the initial excavation. The more fertile topsoil can later be deposited on the slopes to form a superficial layer conducive to seedling establishment.
 - Slope surface should be shaped for maximum seedling survivability.
 - The correct varieties of vegetation should be used, according to soil type, climate, ease of maintenance, and desired engineering function. Whenever possible local varieties should be used.
 - Re-vegetation should occur at the right time of the year (for example, take advantage of the rainy periods).
 - Re-vegetation of disturbed areas should occur immediately after disturbance has stopped, not after construction has been completed.
- 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.
- Contamination Due to Spills or Hazardous Materials. Contract documents will contain provisions requiring contingency plans for actions in the event of contamination due to spills or hazardous materials.

4.2.3 SEISMIC & GEOLOGICAL CHARACTERISTICS

Potential Impact. Seismic Issues - Seismic events in this area of Afghanistan have the ability to cause widespread damage to structures, especially in the Sulaiman Mountains where the part of the Chaman Fault lies.

Geological Issues - Given Afghanistan's circumstances, the Project-induced demand for geological resources is unlikely to cause or contribute significantly to their depletion. Rock materials will be obtained from locations in or near the project site and hauled by road to the site 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. Issues relating to quarried materials are discussed above in the Topography section.

Mitigation. Seismic Issues - The seismic characteristics of the potentially affected area have been taken into account during the design phase of the Project. Earthquake loading has been applied to the design of structures to ensure that seismic events do not have negative impacts during the operational phase of the Project.

Geological Issues - Actions to ensure the use of proper sources of rock have been noted above to the degree warranted by the nature of the Project. Other than the actions as noted and adherence to good engineering practice, no mitigation actions related geological characteristics are warranted.

4.2.4 HYDROLOGY

Potential Impacts. Direct impacts of the Project will include:

- Surface Hydrological Characteristics. Surface hydrological impacts could occur during the construction period of the Project. Potential adverse impacts to surface hydrology during the construction 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. The Abi-Istda wetland is fed partly by the Jilga River which the Project Road crosses at approximately KM2.0. The potential exists for indirect impacts to the wetland resulting from poor construction management at the river area.
- Subsurface Hydrology. Project works have the potential to impact subsurface hydrology in a variety of ways. The most significant being groundwater pollution from construction works (including impacts resulting from construction camps) and extraction of limited groundwater resources for construction activities.
- Flood and Inundation Characteristics. Certain portions of the Project Road, particularly in the mountains and valleys, are liable to flooding during the spring melt.
- Riverbed Sediments. Construction of the bridge will require the use of river bed sediments for construction aggregates. It is possible that these sediments could be contaminated depending on the quality of the water sources.

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 and will include the following:
 - The Contractor shall ensure that no tools or machinery are washed in any water source or areas that shall drain into an existing watercourse, stream, or canal.
 - The Contractor shall ensure that rain run-off from the construction sites is not deposited directly into any watercourse, stream, or canal.
 - The Contractor shall ensure that all temporary construction facilities are located at least 50 meters away from a water course, stream, or canal.
 - The Contractor shall weekly check all equipment for prevention of oil and or lubrication leaks and ensure that all equipment oil and lubrication replacements are performed only in maintenance and repair areas.”
 - The Contractor shall not interrupt or interfere with the flow, or level, of irrigation waters without making prior arrangements with and obtaining the agreement of the authorities having jurisdiction.
 - The Contractor shall arrange with the authorities having jurisdiction those works which might interfere with the flow of irrigation waters to be carried out at such times as will cause the least disturbance to irrigation operations. Should any operation being performed by the Contractor interrupt existing irrigation facilities, the Contractor shall restore the irrigation appurtenances to their original working conditions within 24 hours of being notified of the interruption.

- The Contractor shall take all necessary measures to remove water including ground water flows from the area of his work when, necessary and/or as required by the Engineer to allow satisfactory execution of work in progress or for the protection of completed work. The exception to this requirement is established irrigation ditches or other irrigation structures. In the case of this type of water flow, the Contractor shall ensure that his works do not impede the flow of the irrigation water at any time due to his works.
- The Contractor shall construct, maintain, remove and reinstate as necessary temporary drainage works and take all other precautions necessary for the avoidance of damage by flooding and silt washed down from the Works. The Contractor shall also provide adequate precautions to ensure that no spoil or debris of any kind are allowed to be pushed, washed down, fallen or be deposited on land adjacent to the Site.
- Area Wetland Characteristics. Two factors reduce the potential Project related impacts to the Abi-Istda wetlands. Firstly, construction of the bridge crossing the Jilga River is part of a separate project. Management of potential impacts from these works should be adequately mitigated by the USACE who are managing the bridge construction. Impacts resulting from the USACE bridge works are likely to be limited to the construction phase. Secondly, the wetlands are located more than two hundred kilometers from the bridge site, as such potential pollution issues will not have a significant impact on the wetlands. It is also considered unlikely that the bridge will alter the hydrology of the Jilga River due to the fact that the bridge is replacing a similar structure. As such, no mitigation actions related to wetlands are warranted.
- Subsurface Hydrology. Short term, impacts to surface water courses are possible during the course of the rehabilitation phase of the Project. However, the COPA portion of the Conditions of Contract shall specifically 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. Construction 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. As such, the project is deemed to have a beneficial impact of flood and inundation characteristics.
- 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.

4.2.5 AIR QUALITY

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

- Construction Stage. Impacts during construction can be anticipated due to fugitive dust generation in and around construction activities. Air quality may also be affected by the use of old or poor quality machinery and the inadequate location of dust generating machines / equipment.
- Operational Stage. Completion of rehabilitation may result in increased traffic volumes using the road. Such an increase will also lead to a rise in the level of vehicular emissions.

Mitigation. Potential air quality impacts in the construction and operational stages of the Project will be mitigated by implementation of the following controls:

- 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.
 - 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. Once completed, the air quality impacts due to the proposed construction of Gardez - Khost Road will be overwhelmingly positive. Current severe high levels of suspended particulate matter (SPM) in areas in which road conditions prompt traffic to use unpaved areas adjacent to the highway (e.g., in areas of bridge or road collapses) 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 recovery in Afghanistan 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.

4.2.6 MINES AND UNEXPLODED ORDNANCE

Special provisions will be made by LBG/BV JV for the clearance of mines and UXO.

4.3 NATURAL/BIOLOGICAL RESOURCES

4.3.1 FLORA

Potential Impacts. The mountainous areas of the Project Road are heavily forested, as such the potential exists for project works to induce deforestation in several ways. Firstly, rehabilitation of the Project road will lead to improved access to the forest areas, thus potentially allowing for greater levels of deforestation to occur. Secondly, Project works will necessitate the use of wood for certain construction activities, this could lead to localized felling of trees. Thirdly, construction camps may use wood as a fuel for heating and for cooking, again this could lead to localized felling of trees.

However, it should be noted that few trees are actually located within the right of way. The areas immediately adjacent to the Project Road are heavily disturbed by human activity and little flora exists within these zones. The vegetation that is present within these areas is of little biological significance.

Mitigation. Impacts to plant life during construction will be mitigated through the appropriate construction supervision activities to ensure that ancillary features are properly sited. However, one significant issue remains. Wood for construction purposes should ideally be procured from a sustainable source. However, the felling of trees in the mountain area appears to be uncontrolled. Accordingly, procuring wood for use from the markets within the project area would be promoting unmanaged destruction of the forests. However, given that most of Afghanistan's logging is uncontrolled there is no way of knowing the exact source of procured wood. Therefore, for the purpose of this Project it is recommended that wood is procured from the markets within the Project Area. Within a wider context it is recommended that NEPA takes an active role in protecting and managing the forests within the Sulaiman Mountains. Such a program is beyond the scope of this Project but essential for the sustainable development of the country.

4.3.2 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 / quarries / construction camps used will require siting 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 construction 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.
- **Aquatic Wildlife.** No special status aquatic wildlife is known to exist in the Shamal / Jilga Rivers or any of their tributaries. In addition, it is considered unlikely that the short term construction works would impact significantly on the existing aquatic wildlife (including their migration and breeding patterns).
- **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 construction.

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

4.3.3 PROTECTED AREAS

Potential Impact. None of the six designated and proposed protected areas identified by **Section 3.3.3** is located within the Project's potentially affected area. The Abi-Istda Wetlands are located downstream of the Jilga River, but as discussed above (Hydrology) the Project is unlikely to have a significant impact on the wetlands.

Mitigation. None warranted.

4.4 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 (4.4.1)
- Use of Natural/Depletable Resources (4.4.2)
- Urban Quality/Design of the Built Environment (4.4.3)
- Historic and Cultural Resources (4.4.4)
- Energy & Conservation (4.4.5)
- Reuse & Conservation (4.4.6)

4.4.1 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. There are several areas in which the Project Road passes through villages and farming areas in which productive agricultural land and homes/businesses may be affected. Those who occupy these 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 are detailed in **Section 2.0**.

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.

Mitigation.

Pre-Construction Phase. It is anticipated that the bid and contract documents will specify that lands required for the improvements must be free of any squatters, encroachers or other claims and that such documentation to that effect 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 IRP 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 Gardez - Khost Road 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. 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.

Operational Phase. No mitigation required.

4.4.2 ENERGY & CONSERVATION

Potential Impacts. No impacts to energy and conservation have been identified.

Mitigation. None warranted.

4.4.3 USE OF NATURAL/DEPLETABLE RESOURCES

Potential Impacts. Certain natural resources will be required for Project works including rock, gravel, sand, wood and water. The issue of quarried rock materials is discussed above under **Item 4.2.2** (Topography). Issues relating to the use of wood are discussed under **Item 4.3.1** (Flora). The potential impacts resulting from water extraction are discussed under **Item 4.2.4** (Hydrology). Gravel and sand, if not readily available in the Project area, will be hauled to the site.

Mitigation. Apart from the measure outlined under the Items above, no further mitigation actions are warranted.

4.4.4 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 villages 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 4.4.1** 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.

4.4.5 HISTORIC AND CULTURAL RESOURCES

Potential Impacts. No cultural or historical resources have been identified in the project area. 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:

- Adhere to accepted international practice and all applicable historic and cultural preservation requirements of the Government of Afghanistan, including all appropriate local government entities, and

- 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 Youth 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.

4.5 ADDITIONAL ENVIRONMENTAL CONCERNS NOTED FOR CONSIDERATION

4.5.1 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 two of the country's larger cities and reducing the current driving time. The Project is also anticipated to enhance international trade between Afghanistan and Pakistan. In the short term the Project will also boost local labor opportunities. 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 4.4.1**)

Mitigation. None required.

4.5.2 PUBLIC HEALTH AND SAFETY

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

Public Health

- 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 4.2.5**, potential air quality impacts may exist 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 4.2.5**. 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 4.5.4** 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.

Safety

- Conflicts with non-motorized traffic. Every year more than 1.17 million people die in road crashes around the world. The majority of these deaths, about 70 percent occur in developing countries. Sixty-five percent of deaths involve pedestrians and 35 percent of pedestrian deaths are children. Over 10 million are crippled or injured each year. The majority of road crash victims (injuries and fatalities) in developing countries are not the motorised vehicle occupants, but pedestrians, motorcyclists, bicyclists etc.
- Safety issues due to construction-related traffic impediments. Diversions and detours are an inevitable impact of road construction projects and could give rise to safety issues.
- Safety impacts due to excessive speed. Road construction projects can inadvertently and adversely affect road safety due to excessive speeds encouraged to a degree due to the improved conditions.
- Safety impacts due to poor road conditions. Anecdotal information indicates that poor road conditions cause many accidents on the Project Road, particularly on the non-paved sections within the mountain pass and mountain valley sections. Because of lack of funds and poor maintenance capability, known hazardous locations are often left untreated and remain causes of accidents. Drivers are often presented with misleading information or no advance warning, sightlines may be inadequate, pedestrians may not be catered for and accidents may occur because of a driver's inability to cope with the particular combination of circumstances and environment. By identifying and eliminating the features that make sites hazardous, engineers can improve road safety. This often means reducing the complexity of an intersection or enabling manoeuvres to be made in stages. Reducing the number of decisions drivers must make at any one time simplifies the driving task and helps drivers to progress in safety and comfort with a minimum of conflict with other traffic and pedestrians.

Mitigation. Mitigation related to the identified potential impacts to Public Health is 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 4.2.5**. 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. Potential noise issues associated with the Project are discussed in **Item 4.5.4** 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.

Mitigation relating to Public Safety is as follows:

- 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.*" 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.

- Safety impacts due to excessive speed. Traffic Safety Programs are recommended for consideration. The recommendation will be further discussed as part of **Section 5.0**.
- Conflicts with non-motorized traffic. NMT is a part of everyday life on the road in Afghanistan. Rehabilitation of the Project Road is unlikely to change this situation. Cattle and humans will continue to use the road as the quickest route between villages and markets and accidents will be a consequence of this use. Although beyond the scope of this Project, it is recommended that the MoTCA undertakes a program of traffic awareness in the Project Area, especially within schools. Education is possibly one of the best ways to curb poor driver behavior and poor pedestrian awareness. In particular Teaching safety skills to children can provide lifelong benefits to society, but should be seen as a long term intervention strategy. Experience in many countries has shown that reliance on individuals or organizations visiting schools to give talks on road safety are not effective on their own. Children may remember the messages in the short term, but effective and sustainable development of positive attitudes towards road safety are best achieved by inclusion in the core curriculum, either as a compulsory subject in its own right or as a cross-curricular theme
- Safety impacts due to poor road conditions. The potential for accident reduction through low-cost, engineering measures at hazardous sites is particularly high. Simple measures can significantly reduce problems at such sites. For example, the use of road signs and markings to channelise traffic through complex intersections, or to provide safe waiting areas for turning vehicles can often result in substantial reductions in accidents. Rehabilitation of the Project Road should reduce the number of traffic related incidents due to poor road conditions, as such no mitigation actions are warranted.

4.5.3 GENDER & DISABLED PERSONS ISSUES

Potential Impacts. Women and disabled persons are not specifically targeted as a part of the Project. They will benefit, however, from the improved transport services. These benefits 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.

4.5.4 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 braking.

- *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 braking 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 be 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 as 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 monitoring 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.

4.5.5 OTHER INFRASTRUCTURE SYSTEMS

Potential Impacts. Road construction activities could impact other infrastructure systems such as water supply and electrical lines.

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:

- Before commencing construction work undertake a survey to establish the detailed location of all utilities affected by the Works. Survey results shall be recorded in plan form to the satisfaction of the Engineer and surface pegs fixed on the site to indicate the location of all underground utilities. These pegs shall remain for the duration of the contract.
- Where works of either a temporary or permanent nature are to be undertaken by the Contractor in the vicinity of utilities, the Contractor shall adopt appropriate construction methods, provide adequate protective devices and take precautionary measures, in order to avoid damage to the utilities. Any damage to utilities caused directly or indirectly by the Contractor's work will be considered the Contractor's responsibility.
- Be responsible for locating all existing structures affected by or affecting the work under this Contract, prior to the start of construction. Any delay or extra expense to the Contractor due to the encountering of existing structures shall not constitute a claim for extra work, additional payment, time or damages

4.6 OTHER IMPACT STATEMENTS REQUIRED BY 22 CFR 216

4.6.1 ADVERSE IMPACTS THAT CANNOT BE AVOIDED

Less-than-significant adverse impacts may occur during the road construction activities such as temporary impacts to air quality, noise levels due to construction and inconveniences. These impacts will be mitigated by the contract provisions as specified herein.

4.6.2 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.

4.6.3 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.

5.0 STAKEHOLDER CONSULTATION

5.1 GENERAL

As part of the Environmental Assessment Scoping Statement LBG undertook a program of consultation with relevant stakeholders in order to assess the potential direct and indirect impacts of the Project. The stakeholders consulted include:

- Ministry of Public Works (MPW)
- Ministry of Transport and Civil Aviation (MoTCA).
- Ministry of Youth and Culture (MYC)
- Ministry of Rural Rehabilitation and Development (MRRD)
- National Environmental Protection Agency (NEPA)
- Governor of Paktya Province
- Governor of Khost Province

LBG also made a site visit to the Project Area to discuss the project with the local population. Although security issues prevented free movement within many of the villages along the alignment, LBG were still able to speak to villagers, shop keepers and road users at various points along the road. The following section provides a summary of the public consultation undertaken at the scoping stage of the Project.

5.2 LOCAL POPULATION

In general the road from Gardez to Khost is not a very safe place and as such, public consultation in the project area can be somewhat tricky. However, LBG did manage to speak to numerous people along the Project road during the course of the road reconnaissance including shop keepers, truck drivers and villagers. The following summarizes their points raised.

Rahim Jan is a shopkeeper in the village of Sadray (KM59.2). He runs a small road side shop selling a variety of goods from foodstuffs and beverages to bicycle tyres and soap. He was extremely happy to hear about the road rehabilitation project. He felt that rehabilitation of the road would decrease journey times and lower the price of travel. This was imperative for a shopkeeper like Rahim who traveled to Khost on a regular basis to buy items for his shop. When asked why he traveled the longer distance to Khost (two hours) for his goods rather than Gardez he replied that goods were much cheaper in Khost because they had been imported from nearby Pakistan. The only negative environmental impact he could foresee was an increase in the levels of dust caused by heavy vehicles in the construction phase. Rahim agreed that the best way to resolve this issue was for the roads to be watered during dry periods.

Alif Khan drives a truck delivering wood between the mountain pass, Gardez and Kabul. He is happy the road will be built. He drives to all of the local wood markets that line the western portion of the road looking for wood cutters who want to rent his haulage service. His vehicle is often breaking down between the pass and Gardez due to the poor condition of the road. Mr Khan commented that the most common fault was flat tyres and replacement of filters. He also stated that driving conditions can be extremely dangerous especially in bad weather, he had witnessed many accidents along the road. However, he did not feel that the road was dangerous from a security point of view.

Habib Jan, a beekeeper from Gardez, had set up about fifty hives approximately four kilometers from Gardez adjacent to the Project Road. He had been working in this region as a bee keeper for over ten years. He commented that the best honey in central Asia came from this region. However, most of the honey he produced

was sold in Pakistan as he received a higher price for the honey there. He usually makes between ten and fifteen US dollars per day from selling honey to passers by as well as the income derived from export to Pakistan. He felt that his profit margins would increase as the price of transport dropped resulting from reductions in road journey times. He was not concerned about the potential for social or environmental impacts from project works as he felt a rehabilitated road would only be beneficial for the people.



Exhibit 5-1. Public Consultation in Sadray, Paktya Province

5.3 OTHER STAKEHOLDERS

In addition to the people living within the vicinity of the Project Road consultation was undertaken with other various stakeholders. The following summarizes their comments on the Project.

Governor of Khost Province. LBG met with the Governor of Khost, Mr Arsala Jamal, in Kabul on July 18th, 2007. He commented that the road was in urgent need of rehabilitation as it was often impassable during poor weather due to its deleterious condition. The Governor stated that sections of the mountain pass were often closed for hours at a time during the winter and that he himself had been stranded in the pass for over eight hours last winter due to a landslide. He believed it was imperative to upgrade the road as it would open up an important trade route between Afghanistan and Pakistan. The Governor mentioned that Khost has one of Afghanistan's most prestigious universities and was one of the most beautiful cities in the country. However, he also agreed that Khost was one of the most dangerous cities in the country. In general the Governor was extremely happy for the Project to start but with several conditions. Firstly he feels that there should be no unnecessary diversions during project works, secondly he would like to watering of dusty roads during the dry periods of the year so as to reduce the potential air quality impacts on the roadside population. Lastly, he wanted to see as much local labor used as possible.

Governor of Paktya Province. LBG met with the Governor of Paktya Province, Rahmatullah Rahmat, on July 22nd, 2007. The Governor was extremely happy that LBG had taken the time to meet with him to discuss the relative merits of the road project. Governor Rahmat had lived in Gardez for the past six years and in general he

had seen a slight improvement in the quality of life for the local population. He hoped that the road to Khost would bring as many benefits as the recently completed road from Gardez to Kabul. He felt that by improving these roads the Paktya province would show strong economic growth, which would in turn prove to the local population that the government is strong and can help the people. However, he stated that unemployment is still a problem in the region and that in turn was causing some discontent amongst certain elements of the population who were turning to support Taliban. The Governor made the point that upgrading the road would be beneficial for the region in both import and export terms. He stated that fruit and vegetables from the Ghazni and Wardak Provinces could be transported to Pakistan and other goods could return from Pakistan in the same vehicles. The Governor could not think of any negative social or environmental impact associated with the Project.

Ministry of Public Works (MPW) – Dr Rasooli, Technical Deputy Minister for MPW, was interviewed in November 2008 to solicit his opinions of the Project. Dr Rasooli was concerned that any compensation due should be managed adequately. He wanted a clear idea of the areas to be cleared and consultation with the affected parties.

Ministry of Transport and Civil Aviation (MoTCA). No representative at the MoTCA was available for comment.

Ministry of Youth and Culture (MYC) – The Ministry had been attacked the week prior to our proposed meeting, as such nobody at the ministry was unavailable for comment.

Ministry of Rural Rehabilitation and Development (MRRD) – Engineer Raz Mohammad Raz, Deputy Minister Administration and Finance at the MRRD was consulted for his opinions of the Project in November 2008. He could think of no significant negative environmental or social impacts that were of specific interest to the MRRD. He thought the project would only bring positive impacts to the Project area.

National Environmental Protection Agency (NEPA) – Despite numerous requests NEPA were unavailable for comment on the matter of the road.

6.0 ENVIRONMENTAL COMPLIANCE PLAN

6.1 INTRODUCTION

The purpose of this final section of the report is to outline an environmental compliance plan (ECP). The purpose of the ECP is to take the mitigation measure outlined in Section 4.0 and put them into an ordered management plan which will allow for the timely implementation of the mitigation measures by the relevant persons. The ECP has two basic components, firstly it sets out an Environmental Mitigation Plan in tabular format. The Mitigation plan will be implemented in two phases, pre-construction and construction. No mitigation was found to be warranted during the operational phase of the Project. Secondly an Environmental Monitoring Plan is outlined. The purpose of the Monitoring Plan is to describe the mitigation issues requiring monitoring and the methods, responsibilities and schedule for doing so.

6.2 ENVIRONMENTAL MITIGATION PLAN

Exhibit 6-1 provides the Environmental Mitigation Plan for the Project.

<i>EXHIBIT 6-1</i>				
<i>ENVIRONMENTAL MITIGATION - PRE-CONSTRUCTION PHASE</i>				
	<i>Issue</i>	<i>Mitigation</i>	<i>Responsibility</i>	<i>Schedule</i>
Topography	<i>Cut and fill activities</i>	<ul style="list-style-type: none"> ▪ <i>Selection of less erodable material, placement of gabions and riprap and good compaction, particularly around bridges and culverts.</i> ▪ <i>Avoid the creation of cut slopes and embankments which are of an angle greater than the natural angle of repose for the local soil type.</i> ▪ <i>Balance cut with fill.</i> ▪ <i>Stabilization of embankment slopes and road cuts by placement of fiber mats, riprap, rock gabbions, etc.</i> ▪ <i>Completion of discharge zones from drainage structures with riprap.</i> ▪ <i>Down drains/chutes lined with rip-rap/masonry or concrete.</i> ▪ <i>Side slopes adjusted to reduce erosion potential or, if steeper, stabilized, covered with riprap or other material.</i> 	<i>LBG Engineers.</i>	<i>To be implemented at the design phase.</i>
	<i>Borrow Pits</i>	<ul style="list-style-type: none"> ▪ <i>Borrow pit locations to be identified in suitable locations</i> 	<i>LBG Engineers</i>	<i>Anytime prior to construction</i>
	<i>Quarry Ops</i>	<p><i>Sub-contractors will be made responsible for setting up their own dedicated quarries and crusher plants. Prior to opening of the sites, the sub-contractor will require approval from the relevant local authorities and the Supervising engineer to ensure that land owners are adequately compensated for land use and that the sites are not located in an area likely to cause significant detriment to the local environment. To ensure that this is the case sub-contractors should ensure that quarries and crusher plants are:</i></p> <ul style="list-style-type: none"> ▪ <i>Located at least 500 meters from urban areas to</i> 	<i>LBG Engineers / MPW</i>	<i>Anytime prior to construction</i>

		<p>prevent noise impacts</p> <ul style="list-style-type: none"> ▪ Located outside of agricultural land ▪ Not located within forested areas, the avoidance of tree cutting in the mountain areas should be strictly limited. ▪ Where possible located on government owned lands 		
Soils	Impacts to Agricultural Land	<ul style="list-style-type: none"> ▪ Road alignment changes / temporary diversion routes should interfere as little as possible with agricultural land 	LBG Engineers	To be implemented at the design phase. Temporary diversions will also be correctly managed at the construction phase.
	Erosion	<ul style="list-style-type: none"> ▪ Spill ways will be lined with riprap to prevent undercutting. ▪ Areas will be minimized where land clearing is required. ▪ Drains will be provided at points where surface flows currently overtop the road. ▪ Storm drainage will be upgraded and drainage ways will be adequately sized, lined and contoured to minimize erosion potential. ▪ Interceptor ditches shall be 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. 		
Geo / Seismic	Seismic Issues	<ul style="list-style-type: none"> ▪ All structures will have earthquake loading incorporated in their design. 	LBG Engineers	Implemented at the design stage.
UXO	UXO	<ul style="list-style-type: none"> ▪ No works shall proceed until the area has been adequately de-mined. 	De-mining contractors	Anytime prior to construction
Land Use	PAPs	<ul style="list-style-type: none"> ▪ Project affected persons will be identified and compensated. 	Governors of Paktya and Khost. Process to be reviewed by LBG.	Prior to construction
Health & Safety	Road safety	<ul style="list-style-type: none"> ▪ Designs will incorporate road safety standards and signage. 	LBG Engineers	Implemented at the design stage.
Other Infrastructure	Protection of Utilities	<p>Before commencing construction work a survey to establish the detailed location of all utilities affected by the Works shall be undertaken. Survey results shall be recorded in plan form to the satisfaction of the Engineer and surface pegs fixed on the site to indicate the location of all underground utilities. These pegs shall remain for the duration of the contract.</p>	Sub-Contractor / LBG Engineers	Prior to construction.

ENVIRONMENTAL MITIGATION - CONSTRUCTION PHASE				
	Impact	Mitigation	Responsibility	Schedule
Topography	<i>Cut and Fill</i>	<p><i>Cut and fill activities will mostly be mitigated by good design practices. However, contracts will also specify that:</i></p> <ul style="list-style-type: none"> ▪ <i>In the event that cut cannot be balanced by fill and that haulage of fill materials is too expensive disposal will be in an appropriate manner that will not cause significant impacts to surface water courses, property, or agricultural land.</i> 	<p><i>Implemented by Sub-contractor (via contact provisions outlined in Appendix A) with oversight from the USAID/SE</i></p>	<p><i>Throughout construction phase.</i></p>
	<i>Borrow Pits</i>	<p><i>Contracts will specify that:</i></p> <ul style="list-style-type: none"> ▪ <i>Borrow areas will be located outside the ROWs.</i> ▪ <i>Borrow pit excavation should be coordinated to ensure that as few borrow pits are opened as possible.</i> ▪ <i>Borrow pit areas will be graded to ensure drainage and visual uniformity.</i> ▪ <i>Borrow pits will be located out of urban areas to reduce the potential for human accidents in the pit.</i> ▪ <i>Topsoil from borrow pit areas will be saved and reused in re-vegetating the pits to the satisfaction of the USAID/GC.</i> ▪ <i>Consultation with the local population should be held to determine if they would like the borrow pit to remain open. The borrow pit can then act as a water resources for cattle. Pit restoration will follow the completion of works if the local population decides it is not needed.</i> ▪ <i>The excavation and restoration of the borrow areas and their surroundings, in an environmentally sound manner to the satisfaction of the USAID/GC will be required before final acceptance and payment under the terms of contracts. This will include re-vegetation and stabilization of slopes.</i> ▪ <i>Additional borrow pits will not be opened without the restoration of those areas no longer in use.</i> 	<p><i>Implemented by Sub-contractor (via contact provisions outlined in Appendix A) with oversight from the USAID/SE</i></p>	<p><i>Throughout construction phase.</i></p>

Soils	<i>Erosion</i>	<p><i>Contract provisions will ensure that:</i></p> <ul style="list-style-type: none"> ▪ <i>Topsoil should be stored and reused. This requires that topsoil be separated from subsoil during the initial excavation. The more fertile topsoil can later be deposited on the slopes to form a superficial layer conducive to seedling establishment.</i> ▪ <i>Slope surface should be shaped for maximum seedling survivability.</i> ▪ <i>The correct varieties of vegetation should be used, according to soil type, climate, ease of maintenance, and desired engineering function. Whenever possible local varieties should be used.</i> ▪ <i>Re-vegetation should occur at the right time of the year (for example, take advantage of the rainy periods).</i> ▪ <i>Re-vegetation of disturbed areas should occur immediately after disturbance has stopped, not after construction has been completed.</i> 	<i>Implemented by Sub-contractor (via contact provisions outlined in Appendix A) with oversight from the USAID/SE</i>	<i>Throughout construction phase.</i>
	<i>Spills/leaks</i>	<i>Contract documents will contain provisions requiring contingency plans for actions in the event of contamination due to spills or hazardous materials.</i>	<i>Implemented by Sub-contractor (via contact provisions outlined in Appendix A) with oversight from the USAID/SE</i>	<i>Throughout construction phase.</i>
Hydrology	<i>Surface Hydrology</i>	<ul style="list-style-type: none"> ▪ <i>No tools or machinery shall be washed in any water source or areas that shall drain into an existing watercourse, stream, or canal.</i> ▪ <i>Rain run-off from the construction sites shall not be deposited directly into any watercourse, stream, or canal.</i> ▪ <i>All temporary construction facilities shall be located at least 50 meters away from a water course, stream, or canal.</i> ▪ <i>Equipment will be checked weekly for prevention of oil and or lubrication leaks. All equipment oil and lubrication replacements shall be performed only in maintenance and repair areas.</i> ▪ <i>No interruption or interference with the flow, or level, of irrigation waters shall be undertaken without making prior arrangements with and obtaining the agreement of the authorities having jurisdiction.</i> ▪ <i>Should any operation being performed by the Contractor interrupt existing irrigation facilities, the Contractor shall restore the irrigation appurtenances to their original working conditions within 24 hours of being notified of the interruption.</i> ▪ <i>Construction, maintenance, removal and reinstatement as necessary of temporary drainage works shall be undertaken along with</i> 	<i>Implemented by Sub-contractor (via contact provisions outlined in Appendix A) with oversight from the USAID/SE</i>	

		<i>all other precautions necessary for the avoidance of damage by flooding and by silt washed down from the Works.</i>		
	<i>Subsurface Hydrology</i>	<i>COPA portion of the Conditions of Contract shall specifically state that "The Sub-Contractor shall prevent interference with the supply to, of abstraction from, of the pollution of, water resourcesincluding underground percolating water..."</i>	<i>Implemented by Sub-contractor (via contact provisions outlined in Appendix A) with oversight from the USAID/SE</i>	<i>Throughout construction phase.</i>
Air Quality	<i>Construction Impacts</i>	<p><i>Contract provisions shall state:</i></p> <ul style="list-style-type: none"> ▪ <i>Asphalt and hot-mix plants will be located at least 500 meters away from the nearest sensitive receptor (e.g., schools and hospitals).</i> ▪ <i>Operators will be required to install emission controls.</i> ▪ <i>Sub-Contractors will be required to spray road surfaces, excavation and construction sites to keep them moist for dust control.</i> ▪ <i>Trucks carrying earth, sand or stone will be covered with tarps to avoid spilling.</i> ▪ <i>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.</i> ▪ <i>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.</i> ▪ <i>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.</i> ▪ <i>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.</i> ▪ <i>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.</i> 	<i>Implemented by Sub-contractor (via contact provisions outlined in Appendix A) with oversight from the USAID/SE</i>	<i>Throughout construction phase.</i>

Flora	<i>Siting of equipment and ancillary features.</i>	<i>Contract provisions will ensure that all ancillary features are properly sited during construction works</i>	<i>Implemented by Sub-contractor (via contact provisions outlined in Appendix A) with oversight from the USAID/SE</i>	<i>Throughout construction phase.</i>
Health & Safety	<i>Health and Safety Impacts</i>	<i>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. Contract provisions shall also 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." 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.</i>		
Historic / Cultural	<i>Unanticipated finds</i>	<i>Contracts will state that the Sub-Contractor shall:</i> <ul style="list-style-type: none"> ▪ <i>Adhere to accepted international practice and all applicable historic and cultural preservation requirements of the Government of Afghanistan, including all appropriate local government entities, and</i> ▪ <i>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 Youth 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.</i> 	<i>Implemented by Sub-contractor (via contact provisions outlined in Appendix A) with oversight from the USAID/SE</i>	<i>Throughout construction phase.</i>

Noise	Construction noise	<p>Contract provisions shall ensure:</p> <ul style="list-style-type: none"> ▪ <i>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.</i> ▪ <i>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.</i> ▪ <i>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.</i> ▪ <i>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.</i> ▪ <i>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.</i> 	Implemented by Sub-contractor (via contact provisions outlined in Appendix A) with oversight from the USAID/SE	Throughout construction phase.
Other Infrastructure		<p>contract documents state that Sub-Contractor shall:</p> <ul style="list-style-type: none"> ▪ <i>Where works of either a temporary or permanent nature are to be undertaken by the Contractor in the vicinity of utilities, the Contractor shall adopt appropriate construction methods, provide adequate protective devices and take precautionary measures, in order to avoid damage to the utilities. Any damage to utilities caused directly or indirectly by the Contractor's work will be considered the Contractor's responsibility.</i> ▪ <i>Be responsible for locating all existing structures affected by or affecting the work under this Contract, prior to the start of construction. Any delay or extra expense to the Contractor due to the encountering of existing structures shall not constitute a claim for extra work, additional payment, time or damages</i> 	Implemented by Sub-contractor (via contact provisions outlined in Appendix A) with oversight from the USAID/SE	Throughout construction phase.

6.3 MONITORING PLAN

6.3.1 **General** - Monitoring of mitigation measures is an essential component of Project works. Without monitoring, mitigation actions may be neglected or ignored altogether. The results of the Environmental Monitoring Program will be integrated as a routine part of project management. Environmental monitoring reports, based on weekly site visits by the USAID/GC, are planned to be submitted together with other project progress reports. The preparation of a monthly reporting format (**Exhibit 6-2**) incorporating a checklist of the essential environmental criteria is planned and presented herewith.

<i>EXHIBIT 6-2.</i> <i>ENVIRONMENTAL OBSERVATIONAL MONITORING REPORT</i> <i>CONSTRUCTION PHASE</i>		
<i>Name (of person completing the report):</i>		
<i>Position:</i>		
<i>Date:</i>		
<i>Reviewed By:</i>		
<i>Topography – Borrow Pits</i>		
<i>Are borrow areas located outside the right of way?</i>	Yes	No
	<i>Actions: If borrow pits are located within the RoW they should be closed (to the satisfaction of the USAID/GC) and alternative borrow pit opened outside of the RoW</i>	
<i>Has borrow pit excavation been coordinated to ensure that as few borrow pits are opened as possible?</i>	Yes	No
	<i>Actions:</i>	
<i>Have borrow pits been graded adequately to prevent animals and humans falling into the pits?</i>	Yes	No
	<i>Actions: Poorly graded borrow pits should be re-graded by the sub-contractor and approved by the USAID/GC.</i>	
<i>Are borrow pits located out side of urban areas?</i>	Yes	No
	<i>Actions: Any borrow pits located within urban areas should be closed to the satisfaction of the USAID/GC</i>	
<i>Has topsoil from borrow pit areas been saved for re-use?</i>	Yes	No
	<i>Actions: In the event that top-soil has not been saved the Sub-contractor should be reminded of his obligations when opening future borrow pits.</i>	
<i>Has consultation been undertaken with the local population to determine which borrow pits shall remain open after completion of works?</i>	Yes	No
	<i>Actions: After completion of works consultation with locals by sub-contractor should be undertaken to determine what status of borrow pit is required.</i>	
<i>Has restoration of the borrow areas and their surroundings been undertaken in an environmentally sound manner for pits no longer required. This will include re-vegetation of soils and stabilisation of slopes.</i>	Yes	No
	<i>Actions: Sub-contractor should re-visit borrow areas and restore areas to the satisfaction of the USAID/GC</i>	
<i>Have any aadditional borrow pits been opened without the restoration of those areas no longer in use.</i>	Yes	No
	<i>Actions: Sub-contractor should restore old borrow pits to the satisfaction of the USAID/GC before opening of new pits.</i>	
<i>Topography – Cut and Fill</i>		

Has excess fill material been disposed of in an adequate manner avoiding buildings, agricultural land and surface water courses? If not, has such disposal been approved by the land owners / mirabs?	Yes	No	<i>Actions: If not, ensure that excess fill material is removed from the sensitive area by the sub-contractor and restored to its former status to the satisfaction of the landowners / mirabs and USAID/GC</i>
Soils – Erosion			
Where practical, has topsoil been stored for re-use?	Yes	No	<i>Actions: If not inform sub-contractor that topsoil should be stored for re-use in future</i>
Have slope surfaces been shaped for maximum seedling survivability?	Yes	No	<i>Actions: If not inform sub-contractor of his obligations and ensure that slopes are shaped to the approval of the USAID/GC</i>
Have the correct varieties of vegetation been chosen for embankment / slope protection?	Yes	No	<i>Actions: if not, inform sub-contractor that re-vegetation with correct varieties must be undertaken at the specific locations.</i>
Are re-vegetated areas growing appropriately? Have they been seeded at the right time of year in the correct areas?	Yes	No	<i>Actions: If not inform sub-contractor of the locations where re-vegetation requires further attention.</i>
Has re-vegetation of disturbed areas occurred immediately after disturbance has stopped, not after construction has been completed?	Yes	No	<i>Actions: If not, inform sub-contractor to start re-vegetation as soon as possible.</i>
Have temporary bridge by-passes been removed and the affected areas re-graded so as to blend in with the existing contours when the bridge is opened?	Yes	No	<i>Actions: If not, inform sub-contractors to revisit the particular sites and re-grade affected areas around the bridge.</i>
Soils - Contamination			
Are contingency plans in place to manage contamination due to spills?	Yes	No	<i>Actions: If not, ensure that sub-contractor prepares such a plan.</i>
Hydrology – Surface Water			
Are tools or machinery washed in any water source or areas that shall drain into an existing watercourse, stream, or canal?	Yes	No	<i>Actions: If yes, ensure these activities cease.</i>
Is any rain run-off from the construction sites deposited directly into any watercourse, stream, or canal?	Yes	No	<i>Actions: If yes, direct the sub-contractor to divert run-off from the camp away from water courses.</i>
Are all temporary construction facilities located at least 50 meters away from a water course, stream, or canal?	Yes	No	<i>Actions: If no, instruct sub-contractor to move temporary facilities away from the water course.</i>
Is the construction equipment checked weekly for prevention of oil and or lubrication leaks?	Yes	No	<i>Actions: If no, ensure that the sub-contractor undertakes weekly checks.</i>
Has any interruption or interference with the flow, or level, of irrigation waters been undertaken without making prior arrangements with and obtaining the agreement of the authorities having jurisdiction?	Yes	No	<i>Actions: If yes, ensure the sub-contractor ceases interruption or interference until arrangements have been agreed with the relevant authorities (mirabs / land owners etc)</i>
Hydrology – Subsurface Water			
Is the sub-contractor interfering with the supply or abstraction of groundwater?	Yes	No	<i>Actions: If yes, ensure that such activities shall cease</i>

	until the USAID/GC can assess the potential affects of such activities.	
Air Quality – Construction Impacts		
Have dusty roads, construction sites and excavation sites been sprayed to keep them moist for dust control?	Yes	No
	<u>Actions:</u> If not, ensure sub-contractor sprays sites during dusty periods.	
Are trucks carrying earth, sand or stone covered with tarps to avoid spilling?	Yes	No
	<u>Actions:</u> If not, ensure that trucks are fitted with appropriate sized tarps.	
Is any open burning occurring in populated areas?	Yes	No
	<u>Actions:</u> If yes, order sub-contractor to cease burning.	
Flora – Siting of Equipment		
Are ancillary features properly sited to avoid impacts to flora?	Yes	No
	<u>Actions:</u> If not, ensure that the sub-contractor removes ancillary features to an appropriate site authorised by the USAID/GC and return original site to its original condition.	
Historic Resources – Unanticipated Finds		
Have any unanticipated finds of historical or cultural resources occurred?	Yes	No
	<u>Actions:</u> If yes, ensure that all works close to the site are ceased until a representative of the MYC comes to site to assess the find.	
Have cemeteries / burial sites been adequately protected from construction works?	Yes	No
	<u>Actions:</u> If no, ensure that sub-contractors take the necessary precautions to protect these sites.	
Health and Safety – Health and Safety of Workers		
Are basic emergency health facilities available for workers?	Yes	No
	<u>Actions:</u> If not, ensure that sub-contractor provides these facilities at all major construction areas and at temporary construction camps.	
Have all detours and traffic re-routing been approved?	Yes	No
	<u>Actions:</u> If not, discuss detours and re-routing with sub-contractor to ensure adherence to environmental good practice.	
Has the sub-contractor prepared and implemented a written traffic control plan?	Yes	No
	<u>Actions:</u> If not, ensure the sub-contractor prepares such a plan before the next audit.	
Noise – Construction Noise		
Are source controls being maintained in good working order; including properly designed engine enclosures and intake silencers. Is regular equipment maintenance being undertaken?	Yes	No
	<u>Actions:</u> If not, remind sub-contractor of his obligations.	
Has stationary equipment been placed as far from sensitive land uses as practical; and provided with shielding mechanisms where possible?	Yes	No
	<u>Actions:</u> If not, where practical, move equipment away from sensitive land uses such as schools, clinics etc.	
Is the sub-contractor applying appropriate time and activity constraints to project activities in urban areas?	Yes	No
	<u>Actions:</u> If not, remind sub-contractor of their contractual obligations under time and activity restraints.	
Have local communities been informed of project works in their respective locations prior to the start of construction?	Yes	No
	<u>Actions:</u> If not ensure the sub-contractor holds discussions with local elders to inform them of the proposed work schedule in their area.	

<i>Other Infrastructure – Protection of Utilities</i>		
<i>Is the sub-contractor taking necessary precautions to protect utilities?</i>	<i>Yes</i>	<i>No</i>
	<i>Actions: If not, ensure that sub-contractor is aware of his contractual obligations to protect utilities. Any damage to utilities caused directly or indirectly by the Contractor's work will be considered the Contractor's responsibility.</i>	

6.4 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 construction 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:

- **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 area are recommended for consideration as part of the wider context of AIRP.

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 Gardez – Khost Road Project.

X.0 ENVIRONMENTAL

X.1 GENERAL PROVISIONS AND PRECAUTIONS

The Contractor shall take all reasonable steps to protect the environment on and off the Site and to avoid damage or nuisance to persons or to property of the public or others resulting from pollution, noise or other causes arising as a consequence of his methods of operation

The Contractor shall be solely responsible for the remedy or mitigation measure(s) required by the environment-related effects of any of his construction or construction-related activities. In case of an environmental problem, the Contractor shall immediately notify the Engineer who will instruct him as to the next course of action to take. Among the situations which may require such steps, are complaints or legal actions by third parties on matters such as environmental damage to property and natural resources, ground subsidence, interruption of groundwater flow, and surface and groundwater contamination.

During the entire process of constructing the Works - including preparation of the site and clean up upon completion - the Contractor shall exercise the utmost care in order to prevent damage to the environment. The Contractor shall conduct his operations being aware of and employ necessary means and measures for eliminating and/or if impracticable, minimizing environmental impacts pertaining to, but not limited to:

- Water quality;
- Air Quality;
- Protection of soils;
- Social Issues;
- Solid / liquid waste disposal;
- Noise;
- Historical and cultural heritage;
- Protection of utilities;
- Health and Safety; and
- UXO and mines.

The Contractor shall provide full co-operation and assistance in all environmental management surveillance carried out by the Engineer or the Client.

X.2 WATER QUALITY

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

- The Contractor shall ensure that no tools or machinery are washed in any water source or areas that shall drain into an existing watercourse, stream, or canal.
- The Contractor shall ensure that rain run-off from the construction sites is not deposited directly into any watercourse, stream, or canal.

- The Contractor shall ensure that all temporary construction facilities are located at least 50 meters away from a water course, stream, or canal.
- The Contractor shall weekly check all equipment for prevention of oil and or lubrication leaks and ensure that all equipment oil and lubrication replacements are performed only in maintenance and repair areas."
- The Contractor shall not interrupt or interfere with the flow, or level, of irrigation waters without making prior arrangements with and obtaining the agreement of the authorities having jurisdiction.
- The Contractor shall arrange with the authorities having jurisdiction those works which might interfere with the flow of irrigation waters to be carried out at such times as will cause the least disturbance to irrigation operations. Should any operation being performed by the Contractor interrupt existing irrigation facilities, the Contractor shall restore the irrigation appurtenances to their original working conditions within 24 hours of being notified of the interruption.
- The Contractor shall take all necessary measures to remove water including ground water flows from the area of his work when, necessary and/or as required by the Engineer to allow satisfactory execution of work in progress or for the protection of completed work. The exception to this requirement is established irrigation ditches or other irrigation structures. In the case of this type of water flow, the Contractor shall ensure that his works do not impede the flow of the irrigation water at any time due to his works.
- The 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 excavated materials arising from the Works.
- The Contractor shall ensure that chemicals and concrete agitator washings are not deposited into watercourses.
- All water and waste products arising on the Site shall be collected, removed from the Site via a suitable and properly designed temporary drainage system and disposed of at a location and in a manner that will cause neither pollution nor nuisance.
- The Contractor shall construct, maintain, remove and reinstate as necessary temporary drainage works and take all other precautions necessary for the avoidance of damage by flooding and silt washed down from the Works. The Contractor shall also provide adequate precautions to ensure that no spoil or debris of any kind are allowed to be pushed, washed down, fallen or be deposited on land adjacent to the Site.

X.3 AIR QUALITY

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

- The Contractor shall not install any furnaces, boilers or other similar plant or equipment using any fuel that may produce air pollutants without prior written consent of the of the local authorities having jurisdiction.
- The Contractor shall not burn debris or other materials on the Site.
- Stockpiles of sand and aggregate greater than 20 m³ for use in concrete manufacture shall be enclosed walls extending above the pile and beyond the front of the pile.

- Effective water sprays shall be used during the delivery and handling of all raw sand and aggregate and other similar materials, when dust is likely to be created and to dampen them during dry and windy weather.
- Areas within the Site where there is a regular movement of vehicles shall have an acceptable all-weather surface.
- Conveyor belts shall be fitted with wind-boards, and conveyor transfer points and hopper discharge areas shall be enclosed to minimize dust emission. All conveyors carrying materials that have the potential to create dust shall be totally enclosed and fitted with belt cleaners.
- Cement and other such fine-grained materials delivered in bulk shall be stored in closed silos.
- All air vents on cement silos shall be fitted with suitable fabric filters provided with either shaking or pulse-air cleaning mechanisms. The fabric filter area shall be determined using an air-cloth ratio (filtering velocity) of 0.01 - 0.03 m/s.
- Weigh hoppers shall be vented to a suitable filter.
- The filter bags in the cement silo dust collector must be thoroughly shaken after cement is blown into the silo to ensure adequate dust collection for subsequent loading.
- The provision of adequate dust suppression plant including water bowsers with spray bars.
- Areas of reclamation shall be completed, including final compaction, as quickly as possible consistent with good practice to limit the creation of wind blown dust.
- In dry periods, the Contractor shall spray roads within the construction areas of the Site a minimum of two or more times per day, as necessary to control dust to the satisfaction of the Engineer.
- The Contractor shall require that all vehicles, while parked on the site have their engines turned off.
- The Contractor shall ensure that all trucks used for transporting materials to and from the site are covered with canvas tarpaulins, or other acceptable type cover, properly secured to prevent debris and/or materials from falling from or being blown off the vehicle(s).
- The Contractor shall provide construction walls in all locations where strong winds could cause the blowing of dust and debris.
- The Contractor shall undertake at all times the necessary actions to prevent dust nuisance.
- Where dusty materials are being discharged to vehicles from a conveying system at a fixed transfer point, a three-sided roofed enclosure shall be provided with a flexible curtain across the entry. Exhaust fans shall be provided for this enclosure and vented to a suitable fabric filter system.
- The Contractor shall frequently clean and water the concrete batching plant and crushing plant sites and ancillary areas to minimize dust.
- Dry mix batching shall be carried out in a totally enclosed area with exhaust to suitable fabric filters.

X.4 PROTECTION OF SOILS

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

- Ensure that no earth, rock or debris is deposited on public or private rights of way as a result of its operations, including any deposits arising from the movement of Construction Plant or vehicles.
- In the event of any spoil or debris from construction works being deposited on adjacent land or any silt washed down to any area, then all such spoil, debris or material and silt shall be immediately removed and the affected land and areas restored to their natural state by the Contractor to the satisfaction of the Engineer

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 Contractors may be made responsible for setting up their dedicated crusher plants at approved quarry sites

X.5 AVOIDANCE OF SOCIAL IMPACTS

To avoid adverse social impacts, the following clauses shall be included:

- Not less than 50% of the Contractor's total labor force shall be Afghanistan citizens. The Contractor shall transmit on a monthly basis to the Employer a report on the numbers of Afghan and Non-Afghan staff and workforce. The listing shall be by discipline and skill levels and must show the percentages of Afghan versus Non-Afghan Nationals, and by nationality.
- The Contractor shall acquire all additional working areas in the vicinity of the Works or elsewhere required for construction purposes and access or other uses. The Contractor shall select, arrange for, and if necessary pay for the use of sites for construction purposes, detours, plant and other uses necessary for the execution of the Work.
- Before any land belonging to the Host Country or to a private landowner is used for any purposes in connection with the execution of the Work, the Engineer's approval shall be obtained. The Contractor shall provide written evidence that he has obtained all necessary agreements. The Engineer's approval

shall not relieve the Contractor of its responsibilities with any third party for the use of such land.

- Prior to placing the facilities in any area, all clearing and grubbing operations shall be to the satisfaction of the Engineer. The ground elevation of all temporary facilities shall be a minimum 20 cm above the adjacent existing ground. The surface shall be adequately sloped to allow rainwater to adequately drain.
- On completion of the Contract, or earlier if so directed by the Engineer, all plant, temporary facilities and any other encumbrances shall be removed, the site and land use areas shall be properly cleaned, all damage made good, and, if necessary, the land-owner paid for the use of the land
- The Contractor will be held responsible for any damage to existing structures, works, materials, or equipment because of his operations or the operations of any of its subcontractors. The Contractor shall repair or replace any damaged structures, works, materials, or equipment to the satisfaction of the Engineer, and at no additional cost to the Employer.

X.6 NOISE

To avoid adverse impacts due to noise, the Contractor shall consider noise and vibration as an environmental constraint in its design, planning and execution of the Works. The Contractor shall take all appropriate measures to ensure that work carried out by the Contractor and by its Subcontractors, whether on or off the Site, will not cause any unnecessary or excessive noise which may disturb local inhabitants.

Without prejudice to the generality of the foregoing, noise level reduction measures shall include the following:

- The Contractor shall ensure that all powered mechanical equipment used in the Works shall be effectively sound reduced using the most modern techniques available; and
- The Contractor shall construct acoustic screens or enclosures around any parts of the Works from which excessive noise may be generated;
- The Contractor shall select equipment with considerations for using equipment with lowest noise levels and ensure that all equipment is regularly maintained to ensure the level;
- The Contractor shall ensure that all equipment engines and motors are equipped with proper mufflers.
- The Contractor shall take all necessary means and measures to assure that the machinery used on site provide compliance with requirements stated herein.

The Contractor shall be responsible for repairing any damage caused as the result of vibrations generated from or by the use of his equipment, plant, and machinery

X.7 PROTECTION OF HISTORIC AND CULTURAL RESOURCES

To avoid potential adverse impacts to historic and cultural resources, the 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 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.

X.8 PROTECTION OF UTILITIES

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

- Before commencing construction work undertake a survey to establish the detailed location of all utilities affected by the Works. Survey results shall be recorded in plan form to the satisfaction of the Engineer and surface pegs fixed on the site to indicate the location of all underground utilities. These pegs shall remain for the duration of the contract.
- Where works of either a temporary or permanent nature are to be undertaken by the Contractor in the vicinity of utilities, the Contractor shall adopt appropriate construction methods, provide adequate protective devices and take precautionary measures, in order to avoid damage to the utilities. Any damage to utilities caused directly or indirectly by the Contractor's work will be considered the Contractor's responsibility.
- Be responsible for locating all existing structures affected by or affecting the work under this Contract, prior to the start of construction. Any delay or extra expense to the Contractor due to the encountering of existing structures shall not constitute a claim for extra work, additional payment, time or damages

X.9 HEALTH AND SAFETY

To avoid health and safety impacts the Contractor shall conform to the following:

- Due precautions shall be taken by the Contractor to ensure the safety and security of his staff and labor to ensure that medical staff, first aid equipment and stores, sick bay and suitable ambulance service are available at the camps, housing, and on the Site at all times throughout the period of the Contract and that suitable arrangements are made for the prevention of epidemics and for all necessary welfare and hygiene requirements
- The Contractor shall report to the Engineer details of any accident or incident pertaining to the security of its personnel, equipment, the site, its camp or the completed Works as soon as possible after its occurrence. The report shall be based on a detailed investigation by the Contractor of the event and provide particulars of what occurred (with explanatory sketch as necessary), who was involved (including names, and affiliations of such persons), what caused the incident, when the incident occurred (time and date), where the incident occurred and why the incident occurred. In addition the report shall fully describe what means and measures the Contractor shall take to prevent the future occurrence of such incidents. In the case of any fatality or serious injury, the Contractor shall, in addition, notify the Engineer immediately by the quickest available means
- The Contractor shall at all times take the necessary precautions to protect all staff and labor employed on the Site from insect nuisance, rats, and other pests and reduce the dangers to health and the general nuisance caused by the same. The Contractor shall provide his staff and labor with suitable prophylactics for the prevention of malaria and shall take steps to prevent the formation of stagnant pools of water. He shall comply with all the regulations of the local health authorities in these respects and shall in particular arrange to spray thoroughly with approved insecticide all buildings erected on the

Site. Such treatment shall be carried out at least once a year or as instructed by the Engineer. The Contractor shall warn his staff and labor of the dangers of bilharzia and wild animals

- In the event of any outbreak of illness of an epidemic nature, the Contractor shall comply with and carry out such regulations, orders, and requirements as may be made by the government or the local medical or sanitary authorities for the purpose of dealing with and overcoming the same
- The Contractor shall make any necessary arrangements for the transport, to any place as required for burial, of any of his expatriate employees or members of their families who may die in Afghanistan. The Contractor shall also be responsible, to the extent required by the local regulations, for making any arrangements with regard to burial of any of his local employees who may die while engaged upon the Works
- The Contractor shall, so far as is reasonably practicable, having regard to local conditions, provide on the Site an adequate supply of drinking and other water for the use of his staff and labor
- Save insofar as the Contract otherwise provides, the Contractor shall provide and maintain such accommodation and amenities as he may consider necessary for all his staff and labor, employed for the purposes of or, in connection with the Contract, including all fencing, water supply (both for drinking and other purposes), electricity supply, sanitation, cookhouses, fire prevention and fire-fighting equipment, air conditioning, cookers, refrigerators, furniture and other requirements in connection with such accommodation or amenities. On completion of the Contract, unless otherwise agreed with the Employer, the temporary camps/housing provided by the Contractor shall be removed and the site reinstated to its original condition, all to the approval of the Engineer

X.10 UXO AND MINES

The Contractor will be responsible for the de-mining (Clearing of Mines and UXOs) of areas on and off the Site including but not necessary limited to, all Contractor camp sites, quarry locations, points where equipment leaves the roadway and those areas required for traffic diversions and by-passes. To this effect the contractor shall employ the service of a De-Mining subcontractor, certified by the UN Mine Action Center Group and approved by the Employer, for the detection, removal and disposal of land mines and UXOs. The Contractor shall be responsible for coordinating with and obtaining de-mining certifications from the UN Mine Action Center Group. All de-mined areas shall be certified by the UN Mine Action Center Group. Copies of all certifications shall be provided to the Engineer on site, with scanned copies transmitted by e-mail to an address provided by the Engineer, immediately upon receipt of certification. No personnel or equipment shall be permitted in any area until such time as it has been de-mined and certified to be free of mines and UXOs by the Contractor's de-mining subcontractor and the UN Mine Action Center Group. The Contractor shall keep the Engineer advised of areas that have been cleared and safe to move into and those which are not. The Contractor shall include mine clearing activities in his Programme. The Contractor's Programme shall allow sufficient durations for mine clearing activities."

X.11 ENVIRONMENTAL MANAGEMENT PLAN

The Contractor shall prepare and submit to the Engineer for review and approval no later than 30 calendar days after Notice to Proceed an Environmental Management Plan which shall contain, without limitation, the following details:

- Environmental management staff organizational structure, which should identify the personnel to be engaged environmental protection and the responsibilities of the participants;

- Names, addresses and telephone of all participants;
- Criteria for appointment of principal staff;
- Proposed interaction and communication procedures between the Contractor's construction personnel and the environmental protection staff, including proposals for communication facilities. In particular, the establishment of a regular communication and reporting system;
- An undertaking signed by the managing director of the Contractor to the effect that the Contractor will ensure that environmental protection is given highest priority in all aspects of the Works and in discharging his contractual obligations;
- Frequency, coverage and intent of environmental management meetings together with the rationale for attendance;
- Frequency, coverage and intent of regular environmental reports;
- Methods of promoting an awareness of environmental protection and amongst all persons directly or indirectly associated with the Works.
- Storage of liquid, toxic and dust creating materials,
- Waste control and management;
- Materials handling;
- Erosion prevention;
- Temporary drainage;
- The powers vested in the environmental management staff which would enable them to take urgent, appropriate and direct action to prevent and/or correct disruption to the environment.
- The means by which environmental management matters and requirements will be communicated to Subcontractors of all tiers.
- The means by which environmental management systems will be supervised, monitored and audited to ensure due compliance with the principles and objectives of the environmental management Plan at all levels of construction.
- Records to be prepared and maintained by environmental management staff and communication procedures to be adopted such that the, Engineer and others associated with the Works (e.g. Subcontractor) are kept fully informed on matters relating to environmental management regulations throughout the period of the Contract; and
- Proposals to ensure that construction methods do not compromise the Contractor's commitment to environmental management

The Contractor shall submit regular environmental reports to the Engineer as a requirement of its environmental management plan. A summary report shall be submitted as part of the monthly progress report. Prior to submission, the Contractor's project manager shall endorse the report. Reports shall comprehensively address all relevant aspects of environmental requirements and, in particular, report on all environmental audits undertaken during the period covered by the report

All locations (including but not limited, construction areas, sites areas, plant and equipment areas and Contractor staff office and accommodations) that are directly or indirectly associated with the Contract shall be regularly inspected for compliance with environmental requirements. Specific issues include but not be necessary limited to:

- dust control;
- waste handling and disposal;
- oil and diesel handling and storage;
- prevention of materials encroaching outside the right of way;
- temporary drainage;
- water quality; and
- slope stability

X.13 FAILURE TO COMPLY

If the Contractor fails to comply with any Environmental requirements set forth in the Contract the Engineer may (after advising the Contractor in writing of the non-compliance and the Contractor's failure to take corrective action to the satisfaction of the Engineer, within two weeks after such notification) withhold up to twenty percent (20%) of the approved amount due to the Contractor for interim payments for the Work. Such withholdings may be made from successive interim payments after the initial withholding until the Contractor remedies, to the satisfaction of the Engineer, the non-compliance for which the initial withholding was made

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 Gardez - Khost Road Project.

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:

- 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.
- S-2 projects are those which will involve the resettlement of less than 200 persons. In such cases, the following documentation is required:
 - A land acquisition assessment,
 - Minutes or record of consultations which assess the compensation claimed and agreement reached, and
 - A record of the receipt of the compensation, or voluntary donation, by those affected (see below).
- 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:

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

- 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:

- *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.
- *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 representative/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:

- 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:
 - replacement land with an equally productive plot, cash or other equivalent productive assets;
 - materials and 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 case of cash compensation, the delivery of compensation should be made in public, i.e. at the Community Meeting.
- Project affected persons losing access to 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 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 complaints. Copies will be recorded in the posted project documentation and be available during supervision.

Subproject Approval

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

- Not approve the subproject unless a satisfactory compensation has been agreed between the affected person and the local community;
- Not allow works to start until the compensation has been delivered in a satisfactory manner to the affected persons;
- 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 also 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 project post-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 required)

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 that 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:

Attachement 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 offor the benefit of 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 :)
5. That he Owner will receive compensation against the grant of this asset as per the attached Schedule.
6. That the Recipient agrees to accept this grant of asset for the purposes mentioned.
7. That the Recipient shall construct and develop the and take all possible precautions to avoid damage to adjacent land/structure/other assets.
8. That both the parties agree that the so constructed/developed shall be public premises.
9. 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)

APPENDIX C LIST OF PREPARERS

The principal author of the Environmental Assessment (EA) for the Gardez – Khost Road Project is:

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Important contributions to the EA have been made by all members of the Louis Berger Group, Inc. (LBG) team for the Infrastructure Rehabilitation Program.