

DISI-MUDAWARRA TO AMMAN WATER
CONVEYANCE SYSTEM

ENVIRONMENTAL AND SOCIAL ASSESSMENT
REPORT

ADDENDUM 2

MARCH 2008

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LIST OF ABBREVIATIONS

ASEZ	Aqaba Special Economic Zone
ASEZA	Aqaba Special Economical Zone Authority
BRDC	Badia Research and Development Centre
CCD	Convention to Combat Desertification
CDMP	Centre of Drought Monitoring and Prediction
CEMP	Construction Environment Management Plan
CLO	Compensation Liaison Officer
CRB	Compensation Review Board
CP	Compensation Plan
DIS	Desertification Information System
DoA	Department of Antiquities
DOS	Department of Statistics
DP	Disi Project
DPAC	Disi Project Advisory Committee
EC	Environment Committee
EPC	Engineering, Procurement and Construction
EPCC	Engineering, Procurement and Construction Contractor
EPL	Environment Protection Law
ESIA	Environment and Social Impact Assessment
EMS	Environment Management System
EMU	Environment Monitoring Unit
EIA	Environment Impact Assessment
EIS	Environmental Impact Statement
EMP	Environmental Management Plan
GAM	Greater Amman Municipality
GIS	Geographical Information System
HCST	Higher Council for Science and Technology
IFC	International Finance Corporation
INCD	Intergovernmental Negotiating Committee of Desertification
JAZPP	Jordan Arid Zone Productivity Project
JMD	Jordan Meteorological Department
JOSCIS	Jordan Soil and Climate Information System
JS	Jordanian Standards
LUT	Land Utilization Types
MCM	Million Cubic Meters
MoA	Ministry of Agriculture
MoE	Ministry of Environment
MWI	Ministry of Water and Irrigation
MPWH	Ministry of Public Works and Housing
NAP	National Action Plan
NCARTT	National Centre for Agricultural Research and Technology Transfer, Jordan
NCB	National Coordinating Body
NDVI	Normalized Difference Vegetation Index
NEAP	National Environment Action Plan

NFCD	National Fund to Combat Desertification
Ngo	Non-Governmental Organizations
NSMLUP	National Soil Map and Land Use Project
OHL	Overhead Line
OPIC	Overseas Private Investment Corporation
PAP	Project Affected Person
RJGC	Royal Jordanian Geographic Center
ROW	Right of Way
RSCN	Royal Society for the Conservation of Nature
TDS	Total Dissolved Solids
UNCCD	United Nation Convention to Combat Desertification
UNCED	United Nations Conference on Environment and Development
UNCOD	United Nations Conference on Desertification
UNEP	United Nations Environment Programme
UNDP	United Nations Development Programme
UNPACD	United Nations Plan of Action to Combat Desertification
WAJ	Water Authority of Jordan

1. INTRODUCTION

1.1 PROJECT SUMMARY

The Disi Mudawarra to Amman water conveyance Project is intended to provide facilities to supply potable water to the Greater Amman Area from the Disi aquifer in the south of Jordan. Water is to be abstracted from the 'fossil' aquifer and carried approximately 325km to Amman via a pipeline. The system will convey an annual flow of 100 million cubic meters (MCM); 40MCM to a new reservoir in Abu Alanda and 60MCM to an existing reservoir in Dabuk.

A secondary Project objective is to provide five emergency turnouts from the conveyance pipeline to feed demand centres en route, (Ma'an, Tafila, Karak, Madaba and Muntazah). These turnouts can be used under emergency conditions in the future and for short durations only when the existing supply source is not able to meet the requirements of the demand centre in question.

The project infrastructure is to consist of:

- Well field consisting of 46 abstraction wells and 9 standby wells
- Well field collection network
- Main pipeline
- Break pressure stations and regulating tanks
- Pumping station
- Reservoirs
- Associated ancillary buildings
- Access roads
- Power supply and communications infrastructure

1.2 PROJECT EIA

A Project Environmental Impact Assessment (EIA) was completed by Consolidated Consultants in 2004. The EIA was prepared to be in line with both Jordanian regulations and World Bank EIA policy guidance and was submitted to the Ministry of Water and Irrigation (MWI).

1.3 REPORT PURPOSE

In 2007 Dar Al-Handasah Consultants were commissioned by GAMA Enerji A.S. to undertake a review of the Project EIA to determine the extent to which the contents of the EIA had been superseded by design modifications and by changes to the legal, institutional and policy frameworks that have occurred since report preparation.

This review concluded that the Report had four main deficiencies and a number of less fundamental weaknesses and recommended that these be corrected through the preparation of an Addendum to the EIA.

- Non-useable (excessively long) Executive Summary, presented only in English.
- Social impacts associated with loss of access, and permanent and temporary income loss not adequately planned for.
- Inadequate assessment of cumulative impacts
- The Project Environmental Management Plan (ESMP) was not considered an 'implementable' document.

In addition, since 2004 there have been changes to the Project and to the legal and policy framework within which the project is set and these were to be addressed.

That Addendum was submitted to MOE and approved in February 2008.

This Report comprises a revision of that Addendum prepared to include the findings of supplementary studies requested by IFC. Specifically:

- Ecology studies
- Archaeology studies
- Property survey,
- Public consultation, and
- Action Plan

1.4 REPORT CONTENTS

In line with the findings of the Review Report this Addendum contains the following Sections:

Section	Title	Content
2	Legal and Policy Framework	Addresses changes in the legal and policy framework since 2004 and the specific issue of compensation.
3	Project Description	Summary description of the Project as outlined in the Concept Design Report of 2008.
4	Ecological Review and Assessment	Construction details for Project Components. Review of 2004 ESA and update based on alignments in 2007 concept design report and 2008 desk studies and site surveys.
5	Archaeology	Review of 2004 ESA and update based on alignments in 2007 concept design report and 2008 desk studies and site surveys.
6	Land Acquisition and Compensation	Establishes Entitlements Matrix for the Project and outlines proposals for the preparation of a Compensation Plan to be implemented prior to Construction Start.

Review of likely impacts

7	Public Consultation	Review of 2004 ESA consultation and brief reports on findings of the new programme initiated in 2008.
8	Cumulative Impacts	Contains a brief additional assessment of potential cumulative project impacts.
9	Environmental Management Plan	Provides details of the proposed Environmental Management Plan under four principal headings: Mitigation Plan Monitoring Plan Implementation Plan Communications Strategy Includes Compensation Plan process details

1.5 STUDY TEAM

The Study Team for the preparation of this Addendum is as follows:

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<i>Dr. Mohammad Waheeb</i>	<i>Archaeologist</i>
Ecology	
<i>Dr. Ahmad Disi</i>	<i>Ecologist</i>
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<i>Land Survey</i>	
<i>Arab Surveyors</i>	

2. LEGAL AND POLICY FRAMEWORK

2.1 NATIONAL LEGISLATION AND STANDARDS

2.1.1 New EIA Framework

The Hashemite Kingdom of Jordan first implemented an EIA By-Law in May 1999 issued under the Law for Environmental Protection No. 12 of 1995, articles 15 and 34. The responsible Environmental authority during that time was the General Corporation for Environmental Protection. The approach to the EIA process adopted drew upon World Bank, Japanese and European Community guidelines and procedures.

The 1999 By-Law was superseded by the 2003 Environmental Protection Law No.1 (EPL) and the Environmental Impact Assessment Regulations (37) of 2005.

The 2003 EPL created the Ministry of Environment (MoE) as the body with responsibility for environmental affairs in Jordan.

In 2005, the Environmental Impact Assessment Regulations No. (37) were issued by virtue of Sub-paragraphs 9 and 11 of Paragraph A of Article 23 of the Jordanian Environmental Protection Law No. (1) of 2003.

These Regulations set out the issues that should be considered in the EIA, and the range of projects that are to be subject to regulation. It also outlines the information that should be provided in the Environmental Impact Statement (EIS), to be submitted to the Directorate of Licensing and Guidance at the Ministry of Environment (MoE).

Under these regulations all industrial, agricultural, commercial, housing or tourism projects or any construction development project requires an Environmental Approval from the Ministry before it can commence.

The Regulation places responsibility on the MoE to review the EIS and to give final approval for licensing. However, all EIS Reports are to be reviewed by a technical committee formed in the MoE and chaired by the Secretary General.

The Committee includes members from the following Ministries and entities:

1. The Ministry of the Environment.
2. The Ministry of Planning and International Cooperation.
3. The Ministry of Municipal Affairs.
4. The Ministry of Health.

5. The Ministry of Agriculture.
6. The Ministry of Industry and Trade.
7. The Ministry of Energy and Mineral Resources.
8. The Ministry of Water and Irrigation.
9. The Ministry of Tourism and Antiquities.
10. The Ministry of Public Works and Housing.
11. Any other concerned entity specified by the Minister.

The Regulations also require that a public consultation is organized in cooperation with the MoE. All findings of the consultation are to be included in the Scoping Statement which in turn along with the Terms of Reference are submitted to the MoE for approval. Once the ToR has been approved the Client is given notification to prepare the final EIS. Once the final EIS is submitted to the MoE, the EIS is either approved or returned to the Client with comments.

Following approval of the EIS the Client is legally entitled to proceed with the project. The EIS approval is valid for only one year and is invalid if major changes have been done to the original design of the project. Figure 2.1 summarizes the EIA process.

2.1.2 Laws for the Protection of Antiquities

All projects are required to comply with the Law No. 21/1988 (and its amendment) on antiquities and archaeology. This provides the basic legal framework for Archaeological and Historical concerns in Jordan, however, the cultural heritage beyond antiquities is not provided for in the legislation.

The Department of Antiquities of Jordan (DAJ) is the official institutional authority mandated by law to be responsible for the protection, conservation and presentation of antiquities. The main institutional policies of the DAJ are:

1. The protection of antiquities, preferring conservation measures that do not require physical intervention to the remains as the first choice where possible.
2. The preservation of antiquities, including research, survey, excavation and site management.

Jordanian cultural heritage legislation

The Jordanian Law of Antiquities no. 21 for 1988, Article 2 defines an antiquity as;

- a) any object, whether movable or immovable, or a part of the soil, which has been constructed, shaped, inscribed, erected, excavated or otherwise produced or modified by human agency earlier than the year 1700 AD together with any part thereof which at a later date has been added, reconstructed or restored;
- b) Human and animal remains of a date earlier than the year 600 AD; and
- c) any building or construction of a date later than the year 1700 AD, which the minister may by order declare to be an antiquity.

The Law also stipulates that the DAJ is the body responsible for the excavation, conservation, presentation and protection of antiquities in Jordan. There is however a lack of clearly defined prioritization mechanism, as well as lack of comprehensiveness in the present law.

Architectural heritage, dating to pre-1700 AD is protected by the Law of Antiquities, later edifices relating to urban centres or rural settings are not under legal protection. Notable sections within The Antiquities Law no. 21 include the following;

- Article 5 (E) and Article 6, regarding the recording of archaeological sites;. 'The articles designate the establishment of a register of all archaeological sites, in the name of the Treasury after being published in the official gazette'.

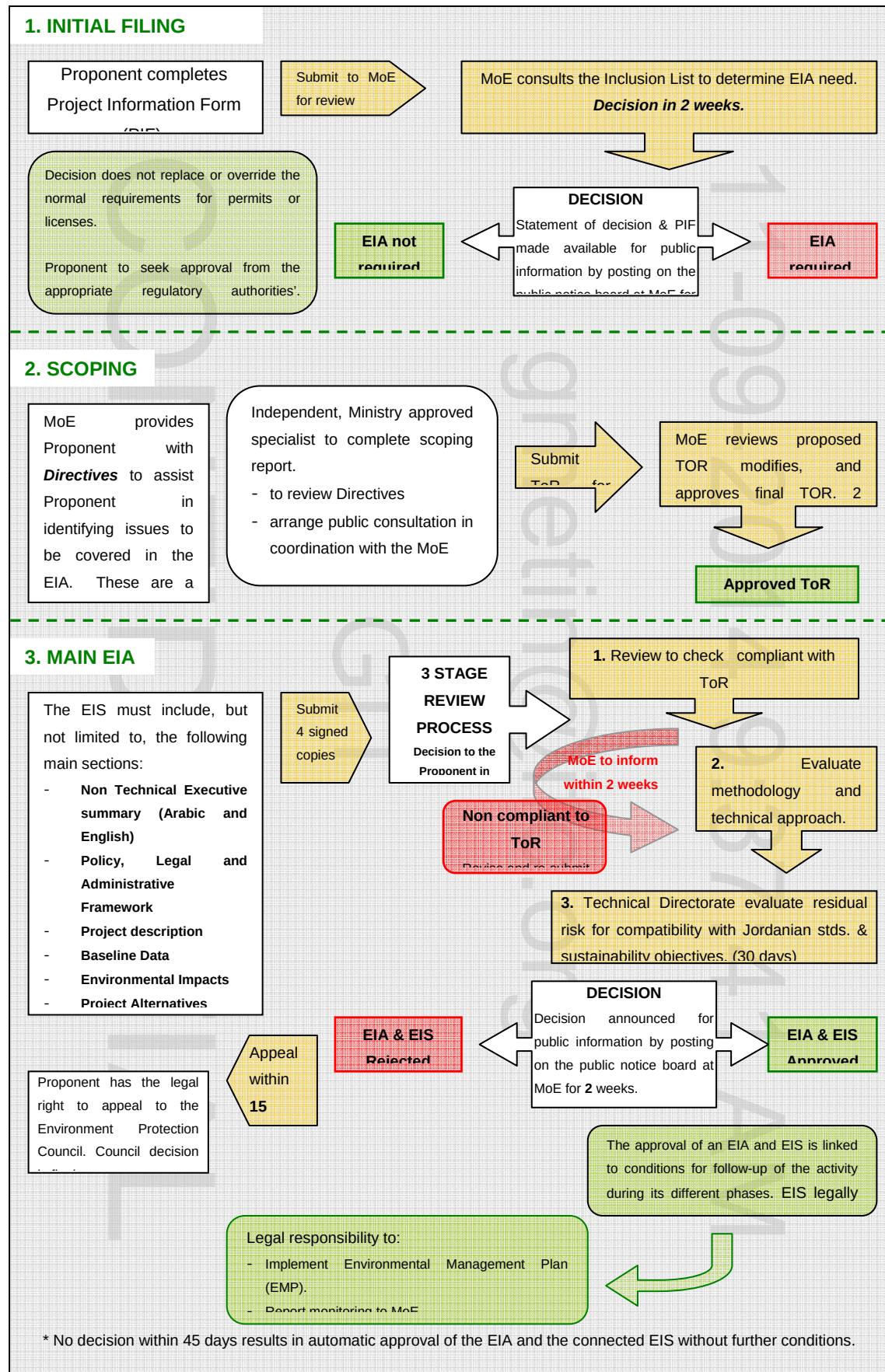


Figure 2.1 Ministry of Environment EIA Process

- Article 3 setting out the role of the Department of Antiquities. The DAJ are responsible for:
 - archaeological policy making and implementation;
 - excavating and managing sites;
 - establishing archaeological and folklore museums;
 - assisting in establishing historical, technical and other museums;
 - raising public awareness through co-operation with local, Arab and international archaeological institutions; and
 - for supervising the possession and disposition of movable antiquities and buying both movable and immovable antiquities objects.
- Article 13 and Article 29, concerning the control of construction adjacent to an archaeological site.

'No construction project including fences is granted, unless of a distance of 5-25 metre from an antiquity. In addition in case of construction contrary to the provisions of this law, it shall be removed at the expense of the aggressor including cost of repair to antiquity'.

Other Jordanian laws concerned with cultural heritage are:

1. The Environment Law (Articles 5 and 21).
2. Tourism Law no. 20 for 1988.
3. Cities, Villages and Buildings Planning Law no. 79 for 1966 and its amendments (Articles 14, 15 and 19).
4. National Jordanian Building Regulations Law, City Beautification Code 20 for 1989.

Environmental Standards

These remain unchanged since 2004.

2.1.4 International Obligations

In addition to the International Obligations listed in the Original ESIA, Jordan is a party to the following international environmental agreements:

- International Agreement of Flora Protection (Implemented on 24.04.1970).
- Convention on International Trade in Endangered Species of Wild Flora and Fauna (Implemented on 17.03.1975).
- International Convention for the Protection of Wetlands (Ramsar) (Implemented on 10.05.1977).
- Protocol for the Amendment of the Ramsar Convention (Implemented on 15.03.1984).

- Convention on the Protection of the Ozone Layer- Vienna (Implemented on 29.08.1989)
- Convention on the Trans-Boundary Movement of Hazardous Wastes and their Disposal- Basel (Implemented on 23.06.1989)
- Protocol on Substances that Deplete the Ozone Layer- Montreal (Implemented on 29.08.1989)
- Convention on the Trans-Boundary Movement of Hazardous Waste and their Disposal- Basel (Implemented on 23.06.1989)
- Convention on Climate Change (Implemented on 31.03.1994)

2.2 INTERNATIONAL GUIDANCE AND STANDARDS

It is anticipated that the Disi conveyance scheme may be funded by international financing agencies. Therefore, in addition to National EIA requirements, the Project will have to comply with policy guidance and standards applied by these lenders.

IFC performance standards define the clients' roles and responsibilities for managing their projects and the requirements for receiving and retaining IFC support. The standards include requirements to disclose information.

The standards are set out within 8 documents on Social & Environmental Sustainability (July 2007):

Performance Standard (PS) 1: Social and Environmental Assessment and Management System

PS 2: Labor and Working Conditions

PS 3: Pollution Prevention and Abatement

PS 4: Community Health, Safety and Security

PS 5: Land Acquisition and Involuntary Resettlement

PS 6: Biodiversity Conservation and Sustainable Natural Resource Management

PS 7: Indigenous Peoples

PS 8: Cultural Heritage

Bedouins in the Disi area and other regions of southern Jordan are not considered to be Indigenous Peoples for the purpose of Performance Standard 7.

The Hashemite Kingdom of Jordan does not have a law in place to recognize Bedouin as an indigenous group. Jordan reserves a number of parliamentary seats for the country's

minorities. Of the 71 seats for Muslim deputies, six are reserved for Bedouins while three go to Circassians and Chechens. The remaining nine seats go to Christian deputies.

The Bedou do not differ from the rest of the population in terms of religion, language or cultural heritage. Although the Government's economic and social policies have played an important role in shaping the Bedouin social and cultural life, the Bedouins have still maintained their tribal structures and cultural habits which govern their lifestyles.

The majority of the Bedouins in the Disi area own agricultural lands and have licenses to dig groundwater wells and cultivate the land. They also keep livestock and each major tribe has tribal grazing rights delineated by the GOJ. Bedouins also have established business activities surrounding the tourist attractions in the vicinity.

There are an accompanying set of guidance notes which are also to be reviewed by borrowers. On April 30, 2007, new versions of the World Bank Group Environmental, Health, and Safety Guidelines (known as the 'EHS Guidelines') were published. These replace documents previously published in Part III of the Pollution Prevention and Abatement Handbook and on the IFC website. The updated guidance is now set out under four headings as follows:

1. Environmental
2. Occupational Health and Safety
3. Community Health and Safety
4. Construction and Decommissioning

Where there are no national environmental standards, those set out within the EHS guidelines shall be followed.

3.0 PROJECT DESCRIPTION UPDATE

3.1 GENERAL

The principal objective of Disi Mudawarra to Amman Water Conveyance System Project is to supply additional potable water to the Greater Amman Area. Water is to be abstracted from the Disi aquifer in the south of Jordan and conveyed to Amman, a distance of approximately 325km.

The proposed system will convey an annual flow of 100 million cubic meters (MCM); 40MCM to a new reservoir in Abu Alanda and 60MCM to an existing reservoir in Dabuk.

A secondary Project objective is to provide five emergency turnouts from the conveyance to feed demand centers along the route at Ma'an, Tafila, Karak, Madaba and Muntazah. These turnouts can be used under emergency conditions in future and for short durations only when the supply source is not able to meet the requirements of the demand centre in question.

The Project Described in the 2004 EIA has been modified in three areas.

1. Rearrangement of the well layout in the well field
2. Use of epoxy pipe lining with concrete lining.

There have also been some clarifications in respect of technical options adopted by the project (e.g. power supply and disinfection) since the 2004 report.

Where relevant these revisions are incorporated into the revised project description provided below.

The general layout of the project is shown in Figure 3.1 and a brief description of the route sections provided in Table 3.1.

3.2 SYSTEM COMPONENTS

3.2.1 Well field and Collector Tank

The new layout for the well field is shown in Figure 3.2. It will comprise of 55 submersible deep well pumps (46 operational and nine standby pumps). Water is collected from each of the wells via a 'dendritic' collector network and delivered to a collector tank north of the well field by a main spinal collector.



Figure 3.1 Project Components and Layout

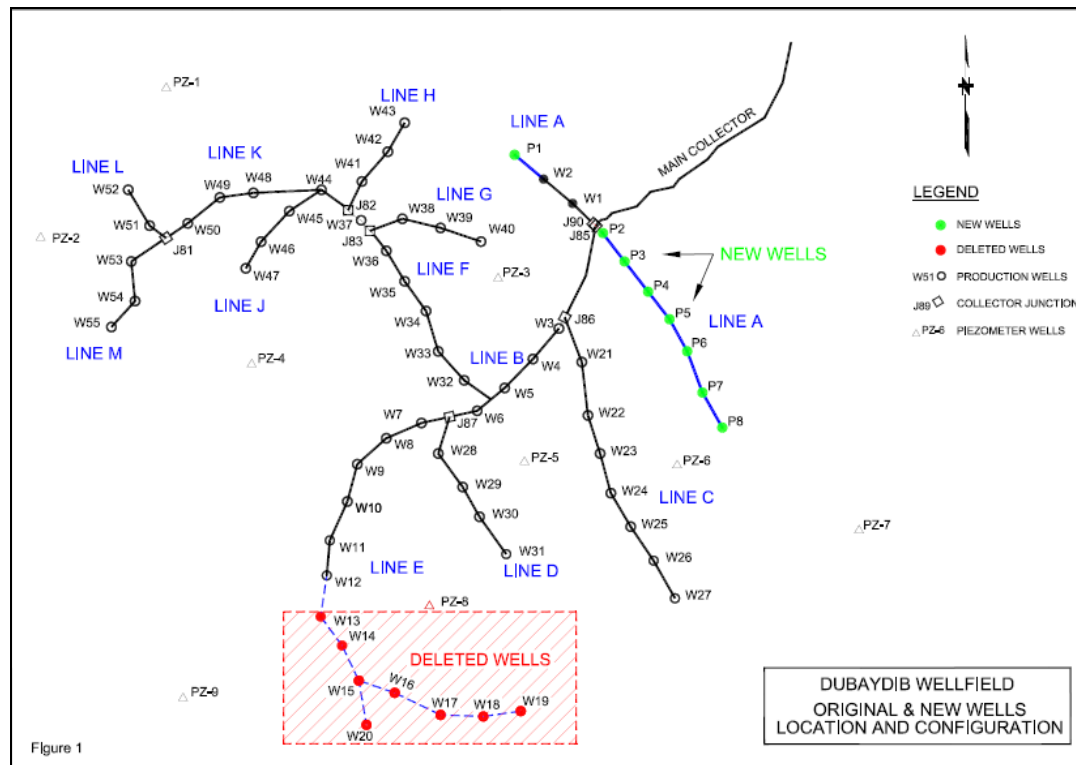


Figure 3.2 Revised Well field Layout

Table 3.1 Brief Description of Route Sections

Route section	Description	Main Project components
A	Southerly section - sparsely populated desert area. Few concentration of settlement- general associated with agricultural areas. Desert areas inhabited by Bedouin tribes. Sensitive habitat areas at Batn El Ghoul, along with archaeological sites and commercially valuable kaolin deposits.	Well field, collector network, collector tank and regulating tank. Initial section of conveyance pipeline
B	Central route section, sparsely populated desert areas. Main inhabited areas of El Hesa, Qatraneh, El Abiad mine village, and Jiza. Nearer to Amman the Desert route passes close to or through marginal areas with moderate to dense tree and vegetation cover.	Conveyance pipeline, turnouts, pumping station and O&M buildings at Madaba.
C	Northern sections containing the branches to the pipeline termini at Abu Alanda reservoir and Dabuk reservoir. Abu Alanda branch most densely populated with high concentration of small to medium enterprises and residential dwellings. Dabuk branch passes through areas with larger commercial premises, offices and larger residential properties.	Pipeline branches to Abu Alanda and Dabuk, Break Pressure station, Madaba pumping station, maintenance facilities, turnouts.

The flow from each well pump will be monitored by an electromagnetic flow meter installed downstream of the pump and prior to the connection to the main, spinal collector. All the necessary connections for washout to sump, water sampling and chlorination injection will be provided at each individual pump collector.

The Collector Tank will have a capacity of 10,000m³. Five (5) pumpsets shall lift water from the Collector Tank to the Regulating Tank. Of the 5 pumps, four are duty pumps and will deliver the full flow, the fifth pump is for stand-by.

More detailed images of the alignment are provided in Appendix 1.

3.2.2 Conveyance System

3.2.2.1 Pipeline

The conveyance pipe runs through open land between the Regulating Tank and a point 27km downstream of the first break pressure tank (BPT). It then follows the main Aqaba – Amman highway to Madaba. A pump station is provided at Madaba from which two pump headers run along the existing roads to Abu Alanda and Dabuk where ground reservoirs are provided.

The alignment in the area of the Regulating Tank was modified to lower the elevation of the tank from 1120m as proposed in the RFP to 1085m in order to reduce the required well field pump head, and the pressure class of the pipes running between the Regulating Tank and the first Break Pressure Tank. This modification does not affect the total length of the conveyor.

Elsewhere, the original alignment was reviewed with a view to determining whether the land acquisition requirements and the length of line under pressure could be reduced without compromising the required operational efficiency of the proposed pipeline.

To this end minor adjustments to the alignment have been made to ensure that north of km 110, south of Al Hesa town the pipe runs entirely within the ROW of public highways including the Amman – Aqaba Highway.

3.2.2.2 Pipe trench dimensions

The pipeline trench will be designed so that the nominal depth of cover over the crown of the pipe, as measured from natural grade line, shall be at least 1 metre. At wadis or road crossings the pipeline shall have a minimum of 2 meters earth cover. Within agricultural areas the cover shall be at least 1.5 meters.

The pipe trench width will be equal to a minimum of pipe diameter plus 1 metre.

3.2.3 Break Pressure Tank

A Break Pressure Tank is proposed along the gravity conveyor to allow for a reduction of the pressure rating for pipes over a distance of 149km. The tank is located between the Regulating Tank and the Madaba pump station 97km north of the Regulating Tank at an elevation of 965m.

The tank comprises of two compartments, each of 40m x 25m x 5m height, and has a capacity of 10,000m³.

3.2.4 Flow Control Stations

Flow Control Stations are proposed upstream of the Break Pressure Tank and Madaba Forebay tank to reduce residual pressure resulting from low flows in the systems. These comprise three flow control valves of 600mm diameter each with an additional stand-by valve. There will be isolation valves provided upstream and downstream of each flow control valve. A pressure drop of 5m is anticipated in the flow control station at full flow; however, a drop of 10m has been allowed for in the design.

At low flows, these valves will be set to reduce the incoming high pressure resulting from the reduced headloss in the pipeline to a residual pressure equivalent to 5m above the Top Water Level in the downstream tank.

3.2.5 Conveyance Pipe appurtenances

Isolating valves are proposed in chambers at about 20km spacing along the conveyor. Every valve chamber will be provided with a power source from solar panels, a pressure gauge to monitor line pressure and report to the SCADA system, as well as a telephone outlet which can be used for direct telephony with Madaba and/or the Well field operation centers. These valves will be of butterfly type with a 300mm bypass equipped with two gate valves of the same diameter. The bypass reduces the surge in the system during closure of the main isolating valves.

3.2.6 Reservoirs

3.2.6.1 Abu Alanda Reservoir

A new reservoir is proposed adjacent to the existing Abu Alanda reservoir, which is part of Amman water distribution scheme.

The capacity of the proposed tank is 150,000m³, consisting of two compartments of 150mx100m each with 5m height.

3.2.6.2 Dabuk reservoir

The existing Dabuk reservoir is fed with water from the Project and two other sources- Muntazeh and Zai. The capacity of this reservoir is 250,000 m³.

3.2.7 Turnouts

Provision will be made for five turnouts along the conveyor. Isolation valves and an allowance for the use of mobile chlorination units as well as input data outlets for the SCADA system will be provided.

3.2.8 Access and Service Roads

Access and service roads will be provided along the conveyance pipe to the extent required for pipeline construction works, operations and maintenance services. These will be required where the pipeline does not run along the existing roads/highway. The estimated length of roads required is:

Well field area	77 Km
Well field Pump Station to Regulating Tank	20 Km
Regulating Tank to Break Pressure Tank 1	97 Km
Break Pressure Tank 1 to existing Road	27 Km.

Figure 3.3 shows the routes of some of the access roads.

Roads will be gravel surfaced and while the reuse of excavated material from the pipeline trench will reduce the Project need for raw materials, additional quantities of crushed rock or equivalent material will need to be made available.

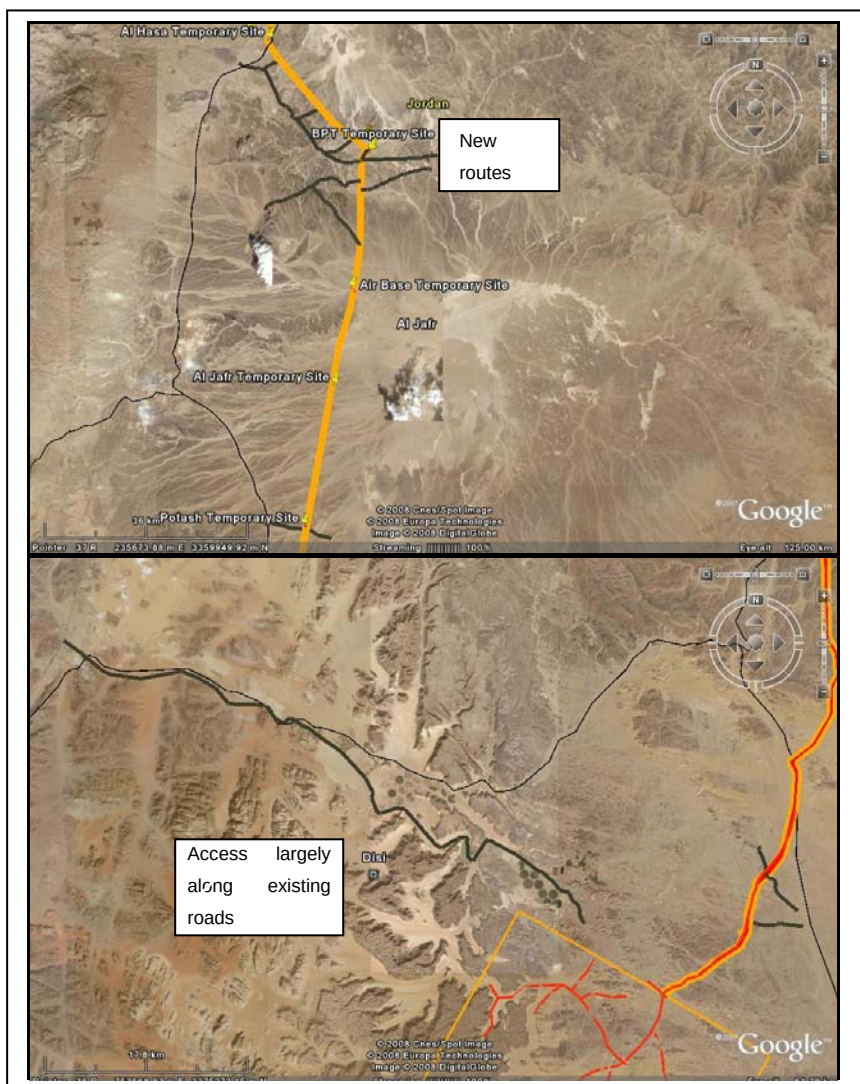


Figure 3.3 Known Access Roads

3.2.9 Power Supply

Power inputs are required for the project at two locations; the Madaba Pump Station and at the well field. At this time it is expected that this will be provided from the main power grid system as follows:

- Madaba; Provided from a dedicated line 33 kV line running from the existing NEPCO/JEPCO Airport Interchange 132/33kV substation to a step down transformer at the pump station.
- Well field; Power is to be provided from two 132kv lines (From Shidiyya and Quweira) each approximately 60kms long. These will provide power to a 132/33kV substation located near the main conveyor between the well field and the regulating tank. This will provide power to the wells in the well field via two 33kV loops. Some 85 km of line is proposed in the well field.

A 33 kV line will be provided from the substation to the well field pump station. The length of this line will be about 8 Km.

Standby power (small generators) will be provided on some sites to supply SCADA and other critical control and safety equipment and facilities only. No standby facilities will be provided on site for the project pumps.

3.2.10 Blending

With the exception of naturally occurring radionuclides, the Disi water quality will comply with the drinking water standards established by Jordanian regulation (JS 286/2001).

It is important to note that the majority of human exposure to radiation comes from cosmic radiation, radioactive elements in the soil, and radon gas decay. Of this annual dose less than 10 percent usually comes from drinking water.

MWI has drafted a revision/relaxation of the standard considering recommendations of the World Health Organization (WHO) and the International Commission on Radiological Protection (ICRP), and which are based on an effective dose of radioactivity from one year's consumption of drinking water. Disi water will effectively comply with these revised standards.

Moreover, because Disi Water will be blended in reservoirs with other water sources currently serving Amman, the resulting levels of radioactivity in drinking water throughout the distribution network will be within the acceptable levels as drafted.

In this context it should be noted that present proposals include blending as follows:

- Abu Alanda reservoir will receive water from at least two different sources: Zara - Ma'in and Disi. The Disi Project will generally supply about 50% of the water giving a blending ratio of 2:1.
- Water from the Dabuk reservoir will be obtained from a combination of at least three sources; 60 MCM from Disi, 45 MCM from Zai, and 20 MCM from Wala. Other sources of supply may also be available.

The need for any further blending will be evaluated at the final design stage by MWI when more data about water quality and sources of supply becomes available. Ultimately, MWI/WAJ will have responsibility for ensuring compliance with Jordanian drinking water quality standards.

In either case, MWI expects that the resulting levels will not justify further intervention because the incremental doses of radioactivity will not pose public health risks.

3.2.11 Disinfection

There is a requirement for disinfection in order to:

- Control taste and odour throughout the project components
- Prevent growth of micro organisms which may present human health risks
- Prevent biofouling within the pipe which may eventually impact pipeline hydraulics
- Prevent any deterioration in the water quality conveyed thru the well field and conveyance piping systems

Various disinfection methods (use of chlorine gas, hypochlorite, or ozone) have been investigated. The conveyance line will be continuously dosed up to the end reservoirs. Conveyance dosing will be at fixed locations provided downstream of Well field Pump Stations, Regulating Tanks, Break Pressure Tanks, Madaba pump station and Abu Alanda Reservoir¹.

Mobile units are to be provided at turnouts, in addition to seven mobile units in the well field.

Wells will be intermittently slug dosed and like all system equipment will require chlorination at commissioning and after maintenance.

Disinfection of the turnouts will be by chlorination units located at the future turnouts, break pressure/Regulating Tank (if any) or discharge pipes and will be supplied by MWI/WAJ. The turnouts will be provided with an isolation valve. There will also be a facility for connection into the fibre optic cable to enable WAJ to monitor and signal chlorine residuals to the control centre.

3.3 Construction details

It is anticipated that construction will commence in 2008 and last 4 years. Remaining pre-construction works to be completed include, detailed design, material and equipment specification, construction ROW clearance, camp set up, and major utilities diversions.

Brief construction details are covered in the following subsections.

¹The existing Dabuk reservoir is fed with water from other sources, monitoring and dosing of the mixed waters into and from the reservoir is beyond the scope of this project.

3.3.1 Pipeline General Construction

Installation of the pipeline will use conventional open cut construction. This includes trenching, placement of bed material, pipelaying, backfilling and reinstating the surface with larger fractions of the excavated material as protection for the pipeline.

The trench will be designed so that the nominal depth of cover over the crown of the pipe, as measured from natural grade line, shall be at least 1 metre. At wadis or road crossings the pipeline shall have a minimum of 2 metres earth cover. Within agricultural areas the cover shall be at least 1.5 metres. The pipe trench width will be equal to a minimum of pipe diameter plus 1 metre. The anticipated pipeline construction sequence is as follows:

1. Construction staking
2. Asphalt cutting (where required)
3. Trench excavation
4. Trench bedding installation and preparation
5. Pipe installation
6. Initial backfill (reuse of excavated material and some material from borrow sites)
7. Excavated material segregation, and processing
8. Final backfill (with appropriate backfill material)
9. Disinfection, testing, and start-up.

Construction requires vehicular and plant access along the trench and space for the storage of pipe sections prior to installation. **Error! Reference source not found.** to detail the general arrangement of the construction corridor.

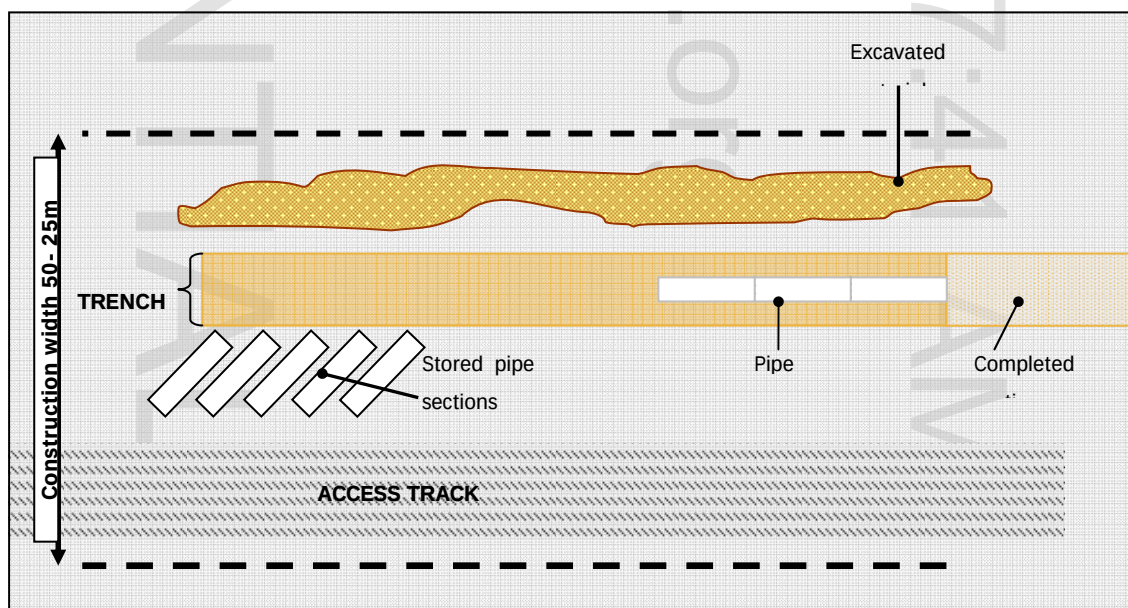


Figure 3.4 Typical construction corridor section

The maximum required construction width is estimated to be 50 -80m (restricted areas where additional excavation is required for backfill material), however it is recognised that this will be substantially reduced in the urban areas where space is limited. Here the contractor is likely to construct a vertical or near vertical trench to limit replacement of the structural road section and reduce the width of the construction corridor.

Typical open cut installation rates will vary from 100 to 200 metres every 5-6 weeks depending on the number of existing utilities encountered during excavation, construction corridor space constraints, required traffic control, and hours of work.

3.3.2 Construction Staging Areas

In addition to the construction corridor, the contractor will need staging areas along the pipeline alignment. The staging areas will be used to store equipment, materials, process backfill, and provide space for temporary construction offices.

It is assumed the Madaba PS/Control Station site and the well field area will be the location of two major staging areas. However, a number of additional sites have yet to be defined and each could be up to several acres in size. The actual number, size, and location of the staging areas will be determined at the detailed design stage by the contractor.

3.3.3 Wadi Crossings

The pipeline will be routed beneath wadis, with the top of the pipe at 2m below bed level.

The protection shall consist of a box gabion and concrete encasement of the pipeline. Where the conveyance route runs along a wadi channel the protection system shall comprise rip-rap or mattresses at the surface. Optimization of protection works will be made during the design phases of the study. Construction will require excavation of the banks and bed in order to lower the trenching to allow for sufficient depth between the pipe and bed level. **Error! Reference source not found.** details an overview of wadi crossing arrangements.

Crossing construction time is anticipated to be 6 weeks, less at smaller crossings.

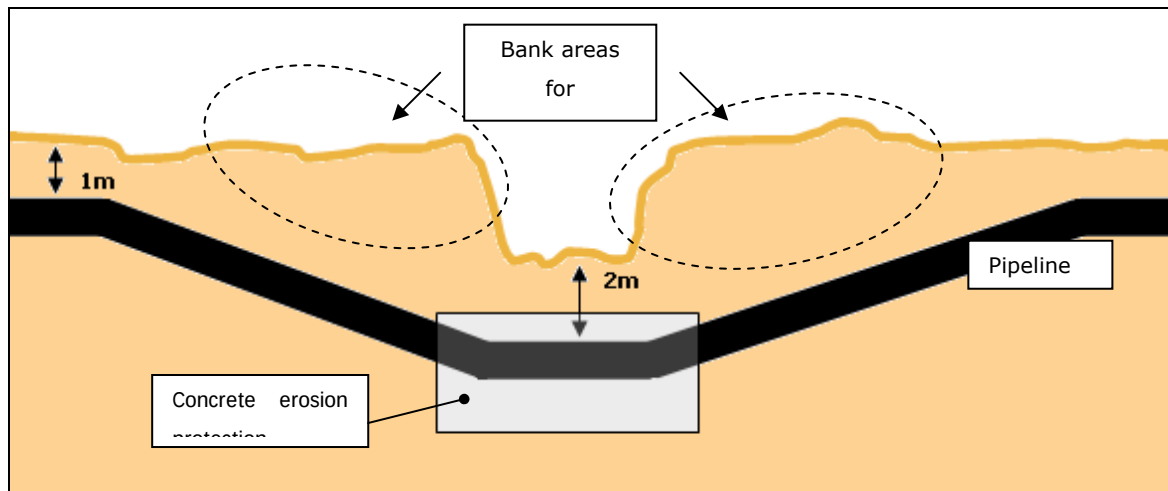


Figure 3.5 Wadi crossing details

3.3.4 Well Field

Construction of the well field will involve drilling of the well shafts, installation of well casing, screens and pump head, access road construction, and general construction methods for ancillary structures (buildings, tanks etc). Construction of the well field is anticipated to take 36 months.

It is also anticipated that a temporary camp will be required close to the well field site to house the construction workforce, construction materials, and machinery.

3.3.5 Madaba Pumping Station and Control Centre

The main operational Control Center facilities along with a BPT are to be located at Madaba. The site options are shown in **Error! Reference source not found..**

Construction activity (in addition to pipe laying) will assembly of the control centre, pumping station. Activities will include ground clearance and excavation for footings.



(Plot 4 is the final location of the Pump Station)

Figure 3.6 Madaba Pump Station Location Alternatives-

3.3.6 Power Transmission Lines

The anticipated transmission line construction sequence is as follows:

1. The transmission line ROW will be surveyed to locate the transmission line along the centreline, determine profiles for conductor clearances, and to locate structures.
2. Material Handling and Hauling. Construction materials will be stored at temporary staging areas. Materials will be hauled to the staging area using existing roads and tracks.
3. Pole Installation. A truck-mounted auger will be used to excavate the holes for the new poles. The new poles will be assembled at the pole sites or portions of the poles may be assembled at the staging areas and then hauled to the sites. Excess spoil will be spread evenly around the base of the poles or removed from the site. Insulators and hardware will then be hung.
4. Conductor Stringing. The conductor pulling, sagging, and clipping operations will take place relatively quickly. Tension-string methods will be used which do not allow the

conductor to touch the ground. Steel-pulling cables will be pulled down the line through large pulleys hanging from the insulator attached to each structure. These pulling cables and pulleys will pull the conductor into place under tension for the entire length of the project.

5. Cleanup and Restoration. Any redundant equipment and construction waste materials will be collected, hauled away and disposed of at approved sites. All disturbed areas not returned to agricultural cultivation will be regraded in a manner to prevent erosion. All disturbance areas will be restored to their original condition as feasible. Damaged gates, fences, or landscaping will be repaired.

3.4 PROJECT STAKEHOLDERS

There are a number of project stakeholders that will be involved in ongoing project permitting, monitoring and management. These include:

- MWI
- WAJ
- Greater Amman Municipality
- Maan Municipality
- Tafileh Municipality
- Qatraneh Municipality
- Madaba Municipality
- Disi Municipality
- Utilities departments (Electricity Companies (NEPCO, JEPCO, and EDCO), Telecommunication Companies, gas pipeline company and water and sewage companies).
- Department of Antiquities Jordan (DAJ)
- Roads directorate (MPWH).
- Department of Lands Survey (DSL) – Expropriation Section
- ASEZA

4. ECOLOGICAL REVIEW & ASSESSMENT

4.1 INTRODUCTION

The original ESA contained an ecological assessment for the Project but this was based on approximate locations for all project components. To ensure that the findings of that study remain valid it has been subject to a review including further site surveys. The results of the original and review study are combined in the following Section.

The specific objectives of the ecological studies are as follows:

- Definition of ecologically sensitive sites potentially impacted by the Project components,
- Mapping ecological constraints (known sensitive sites, designations and protected areas),
- Document existing environmental stressors, and
- Identifying appropriate mitigation measures to minimise or eliminate anticipated impacts.

4.2 ECOLOGICAL CONTEXT

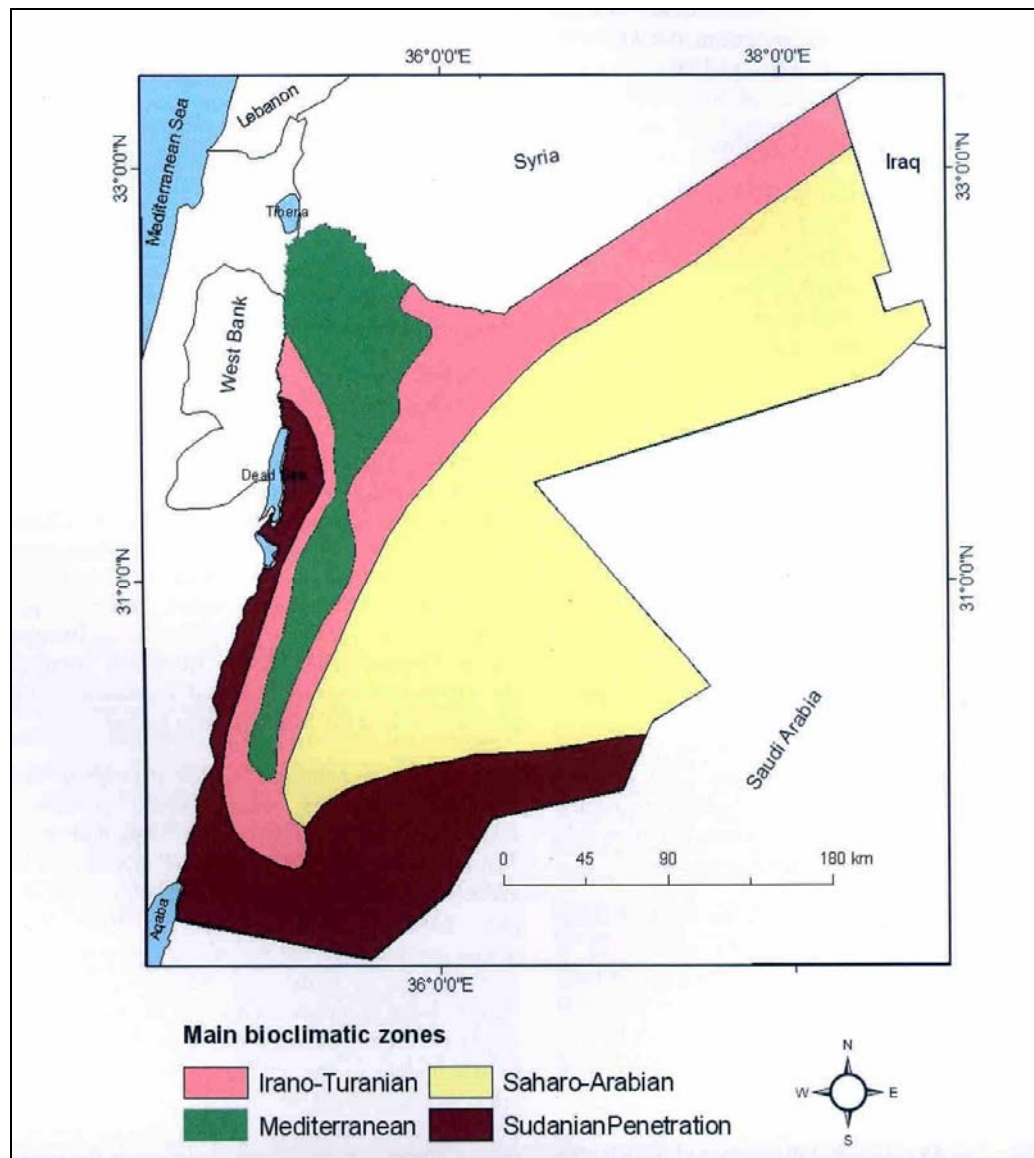
4.2.1 Bioclimatic zones

Jordan is divided into four broad bioclimatic zones, Figure 4.1.

1. Mediterranean
2. Irano-Turanian
3. Saharo-Arabian
4. Sudanian.

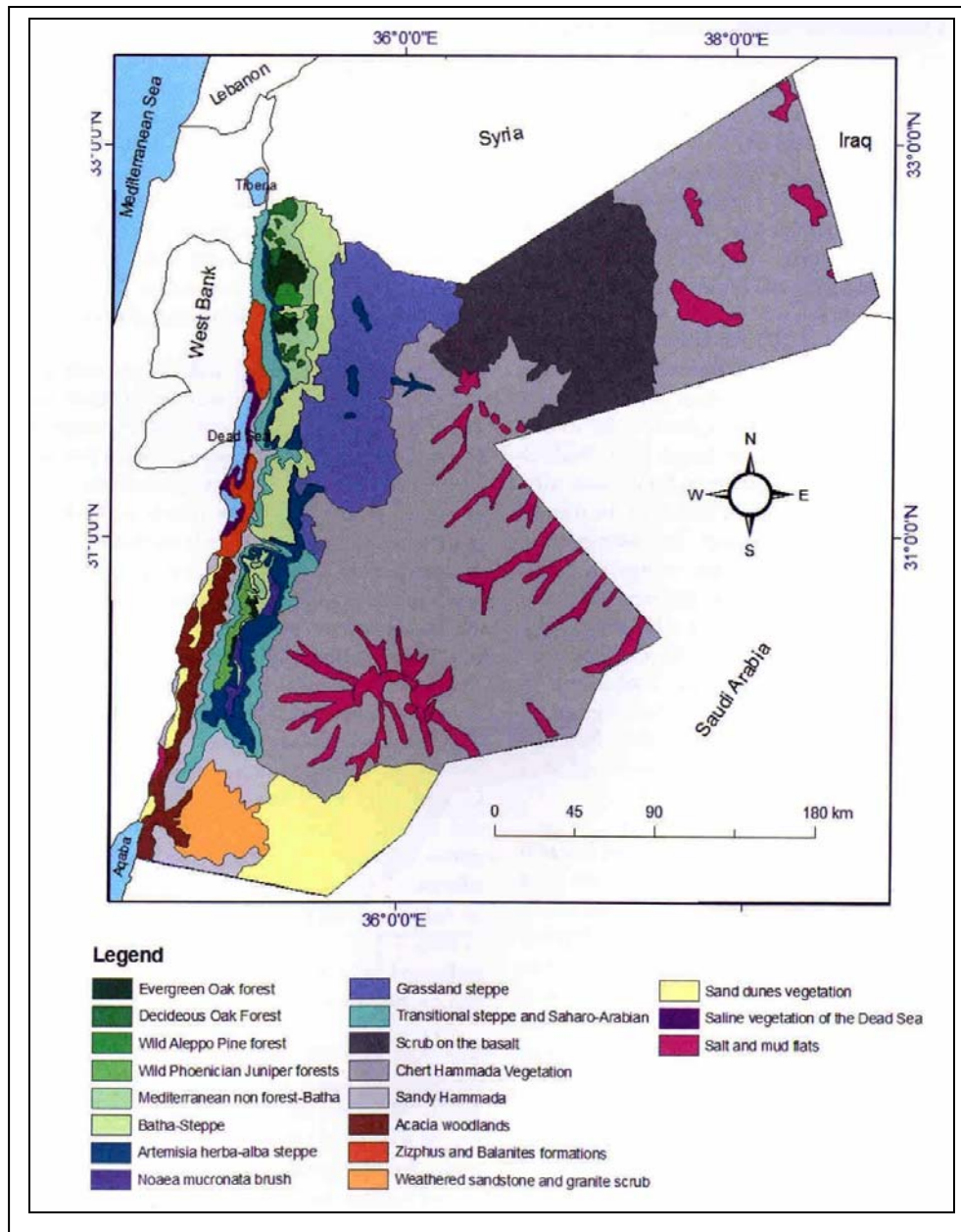
The Project corridor passes through each of these zones, with the well field occupying sections of both the Sudanian and Irano-Turanian zones. Within these broad zones, there are a different 19 vegetation types each representing different elements of flora and fauna (after Albert *et al*, and Boore 1964), Figure 4.2.

Jordan is also a meeting point for three bio realms, namely; the Eurasian, Saharo-Arabian and the Sudanian (Afro-subtropical) realms and contains the northernmost distribution of Sudanian species and the southernmost distribution of Mediterranean species.



(Source: UNEP, 2006)

Figure 4.1 Main Bioclimatic Zones



(Source: UNEP, 2006)

Figure 4.2 Vegetation types recognized within Jordan (after Albert et al, and Boore 1964)

4.3 DESIGNATED AREAS

4.3.1 Protected areas

Wadi Rum is the protected area which lies close to Project activity (Plate 4.1). A defined area of 560km² has been held protected area status since 1989. The site is also included on the Tentative List for a World Heritage Site designation for both cultural and natural purposes (2006). Jordan ratified the World Heritage Convention² in 1975.



Plate 4.1 Wadi Rum boundary edge (northern)

The protected area encompasses an isolated tract of huge, precipitous, sandstone and granite mountains, ranging up to 1,754 m (Jabal Rum, the highest point in Jordan), which are separated from each other by flat, sandy 'corridor' wadis. The predominant desert vegetation is a scanty shrub-steppe of *Haloxylon*, *Anabasis*, *Retama*, *Artemisia* and *Acacia tortilis* bushes. *Amygdalus arabicus* bushes are common in sandy wadis and in gorges leading into the mountains. Vegetation on the high inaccessible peaks of the mountains is poorer than in wadis and includes scattered *Acacia tortilis* and *Juniperus* trees, which also occur along seepage lines in Wadi Rum at the base of Jabal Rum, together with patchy, remnant vegetation of *Pistacia*, *Ficus*, *Olea* and Phoenix palms.

² Signatories agree to identify and nominate properties on their national territory to be considered for inscription on the World Heritage List. State Parties nominate properties/sites, with details of how it is protected and a management plan for its upkeep. Signatories are expected to protect the World Heritage values of the properties/sites inscribed and are encouraged to report periodically on their condition.

The main land-uses (which extend beyond the reserve boundary) are nomadic pastoralism (sheep, goats and camels), irrigated agriculture on the siltflats (centred on Disi and Abu Suwana) and 'wilderness tourism'.

From Figure 4.1, it can be seen that areas within the Wadi Rum reserve are not directly affected by the Project corridor, temporary or permanent sites. The reserve is however a biologically rich area and therefore it can be assumed that the 'buffer area' around the site may also be more ecologically rich as a result.

4.3.2 Important Bird Areas (IBA)

Jordan contains a number of IBA designations. These are non-statutory sites that provide essential habitat to one or more species of breeding, wintering, and/or migratory birds. The sites vary in size but are usually discrete and distinguishable in character, habitat, or ornithological importance from surrounding areas. Two areas intersect with the Project; Rum IBA and Abu Tarfa IBA, Figure 4.3.

The Rum Desert has been identified as an IBA, (Evans, 1994), based on the varied assemblage of desert and mountain birds it supports. These include several species of breeding and passage birds of prey, several species of Wheatear and Middle East restricted-range species such as sand partridge, Hume's tawny owl, Tristram's Grackle and Sinai Rosefinch.

The Wadi Abu Tarfa IBA area is a flat Hammada desert plateau traversed with shallow wadis extending to the Jafr basin and is only marginally affected by the Project. A grazing reserve with restricted access also exists here (precise boundaries are not available).

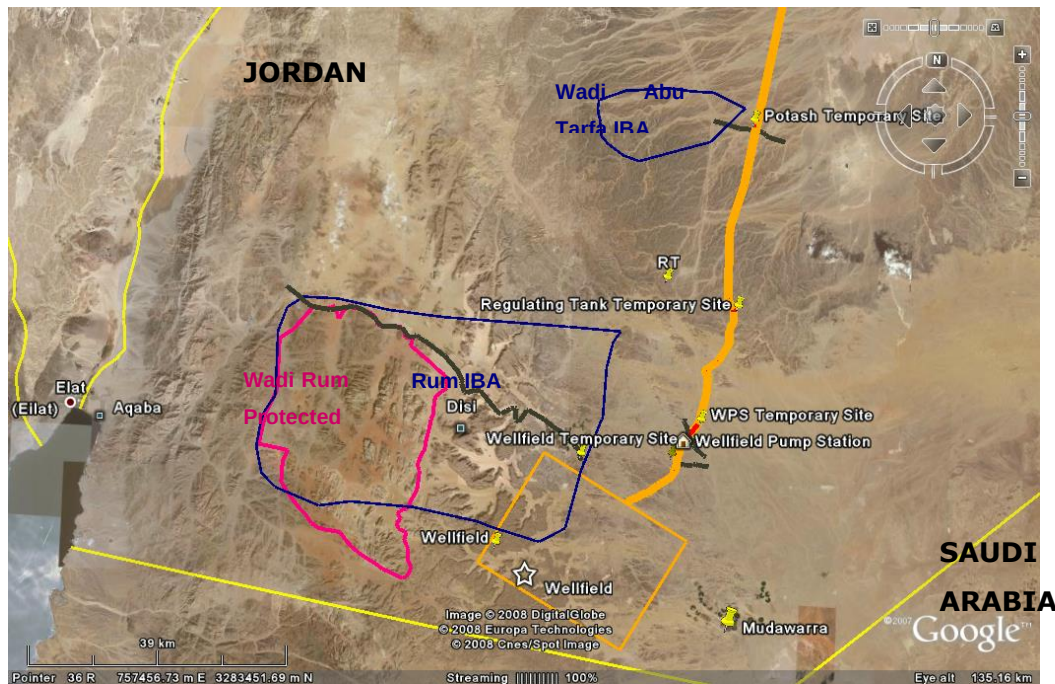


Figure 4.3 Designated sites

4.4 ECOLOGICAL PRESSURES

The harsh desert conditions give rise to the development of highly specialised plants and animals and while these characteristics allow them to survive they also make them extremely vulnerable to change.

Many plants have slow growth rates; enabling survival during long drought periods. This trait however is a disadvantage when these plants are subject to physical damage from overgrazing and off-roading. Moreover, while the loss of individual tree stands or small areas of vegetation may be seen as insignificant in other ecosystems this is not so in desert environments where individual plants provide niche habitats providing shade, refuge, and a food source for a variety of species including rodents, beetles, birds and reptiles.

RSCN have noted ongoing disturbance as having had a significant impact on a number of areas in Jordan (RSCN, 2003) and it is evident that existing stressors have already caused varying degree of loss of ecological quality across all project affected areas.

In general habitat loss and modification is greatest within the central and northern Project areas. The northern alignment extremities, in particular the route branches to Abu Alanda and Dabuk reservoirs are considered to be heavily modified, largely urban areas, interspersed to a greater or lesser degree with agriculture.

Elsewhere, the main sources of damage are:

1. Grazing pressure
2. Military exercises
3. Mining/quarrying
4. Vehicle movements
5. Firewood collection
6. Medicinal plant collection
7. Urbanisation (Loss of habitat)
8. Hunting
9. Sand extraction

Plate 4.2 shows examples of some of the environmental pressures along the alignment.



Plate 4.2 Ecological pressures

The central section to the DH intersection comprises some very limited agricultural activity, scattered settlements, and large tracts of uninhabited (on a permanent basis) desert. Even in the desert areas pressures include overgrazing, localised alterations to the drainage network to facilitate water harvesting, vegetation / wood gathering, hunting, littering and rubbish dumping.

The southern section of the route from the DH to the Well field traverses Hammada desert and silt flats to the west of Jafr, the transitional habitat (between Hammada and Sand Dune) and Sand Dunes, at the western edge of the Well field.

Pressures within these areas include pastoralist grazing, medicinal plant collecting, military training, tourism, hunting and off-roading.

The extreme southern section, in the area near Disi village and around the Rum protected area, suffers from overgrazing, military training, irrigated agriculture, tourism, hunting (probable, not observed), and the presence of settlements. Sand extraction is reported as being a pressure within the Rum protected area (Qishawi et al, 1999), and therefore is also likely to be an issue in adjacent areas. Conversely, there are however some larger areas of relatively undisturbed habitat.

4.5 WELL FIELD AND PROJECT CORRIDOR ECOLOGICAL REVIEW

The ecological survey comprised three elements; a desktop study, rapid field evaluation of selected sites by specialist ecologists and review of alignment sections above Hesa by non specialist environmental consultants.

The field evaluation covered the well field layout, the Qweira to Disi transmission route, and the collector tank point through the eastern desert to the intersection with the DH.

Environmental generalists visited selected sites adjacent to the DH and the electricity transmission corridor at Shidiyya.

4.5.1 Desk study

A number of sources were consulted for records of statutory and non-statutory wildlife designations, details of known sensitive sites and details of protected species. These comprised:

- Results from previous investigations
- Published information on statutory and non-statutory conservation
- Published information regarding the biological environment of Jordan (e.g. IUCN, RSCN).

4.5.2 Field investigations

Field investigations were carried out at predefined locations based on the following criteria:

- New project areas (well field and transmission lines)
- Selected locations to validate previous findings for 'typical' habitat types (such as wadi, hammada desert, mud flat, sand dune).

The ecological survey was undertaken by Prof. Ahmad Disi, an experienced ecological consultant and team of three assistant researchers covering avifauna, mammals, plants and herpetofauna.

During the course of this visit, the following tasks were carried out:

- Plant and animal species of the site were listed; particular attention was paid to identifying any notable plant communities or individual plant species.
- A search was also made for any species that might be specifically protected for conservation purposes by related international conventions, international conservation organizations and national legislation.
- Where applicable the habitat was also assessed with respect to its suitability for holding such rare species. A search was also made for notable habitats which might have general importance for wildlife.
- Areas were observed for signs of disturbance such as overgrazing, off-roading, hunting, and other activities such as trapping.

Environmental specialists visited selected sites along the DH to note localised ecological features at proposed temporary camp locations/wadi crossings, the electricity transmission corridor near Shidiyya and to review the habitat of the highway margins.

4.6 RESULTS

4.6.1 Habitat types along corridor

The southern section of the route (from Hesa to the Wellfield) contains distinguishable areas of natural habitat³ types, whereas the remainder of the alignment lies within Highway ROWs which comprise limited, heavily modified habitat⁴ where vegetation is generally restricted to Wadis and to roadside vegetation resulting from run-off.

In the southern section the habitat is divided into four main types; Hammada, Mudflat, Wadi and Sand Dune. The following subsection describes the general habitat by Project section. Appendix 2 contains a table detailing the vegetation and faunal assemblages for the different habitats along the route.

4.6.1.1 Desert Highway (Hesa) to project termini

This section includes the route branches from Madaba to the termini at Abu Alanda and Dabuk and the collector pipeline from Hesa to Madaba PS. The route passes through the bioclimatic regions Saharo-Arabian, Irano-Turanian and Mediterranean.

³ Natural habitat is defined as areas where biological communities consist largely of native flora and fauna species and where human activity has not extensively altered the areas primary functions.

⁴ Modified habitat is defined as areas where the natural habitat has been altered by human intervention resulting in biological communities which are limited to either monotonous communities or those which consist of predominantly non-native species, i.e. agricultural areas planted with crop species.

In the lesser developed parts of the alignment running through the Mediterranean Bioclimatic Zone the environment becomes more vegetated in the spring; however these areas are generally cultivated with limited natural habitat present. Wadis crossing the DH, and hence pipeline route, may have downstream small habitat fragments dependant on established flow regimes.

Once the pipeline meets the DH the route runs through a highly disturbed environment, from previous infrastructure installation and road construction itself. Road run-off does allow for the development of vegetation at the road margins. This is generally a monotonous community and is highly stressed by overgrazing, wood collection and littering / dumping of waste. Functioning habitat is restricted to the larger wadis where vegetation is able to grow and support biological communities; demonstrated by the presence of rodent burrows and birds using any shrubs and trees present.

As the alignment heads north of the Madaba Interchange the adjacent area becomes increasingly urban; with the routes travelling from Madaba to the termini at Dabuk and Abu Alanda containing no undisturbed areas. Vegetation is associated with roadside scrub, cultivated land and landscaping (generally with non-native species). Plate 4.2 shows the typical roadside vegetation.



Plate 4.3 Roadside vegetation within Mediterranean Bioclimatic Zone

4.6.1.2 Conveyor pipeline from DH to Wellfield

The pipeline passes through the eastern desert through the margins of the Jafr basin. This area comprises Hammada desert, a flat treeless plain with wadi outwash areas forming seasonally inundated mudflats.

Plate 4.4 shows Hammada desert habitat. This habitat type becomes sandier closer to the wellfield.



Plate 4.4 Hammada desert habitat

As can be seen, vegetation is largely absent although seasonal pools are important for migratory bird species using the area for wintering (including the Wadi Abu Tarfa IBA).

The area is reported as a location of the main targeted migratory bird species (El-Moghrabi, L, & Quatrameez, 2005).

Power Transmission line 1 – Qweira to Disi Wellfield

The transmission line corridor is yet to be finalised, however an existing 132kv power supply runs from a Sub-station south of Qweira village to the Disi agricultural area.

The route initially runs between the railway alignment and the road and then across the railway and through a large mud flat area in the expanse of desert to the north of the Wadi Rum boundary. The transmission line passes through agricultural areas and the villages of Disi and Tweisa. The route then passes through a more mountainous area along the main road. The area includes a patchwork of habitat types including sand dunes, small mud flat areas and hammada areas.

Figure 4.4 contains a map extract showing the route of the power lines and Plate 4.3 indicates typical habitat areas.

Although the area suffers from human disturbance it includes larger vegetation stands with varied plant communities that support native fauna as observed by the presence of burrows and tracks. The large seasonal mudflat is an important over-wintering area for migratory birds and provides a water source for resident species.

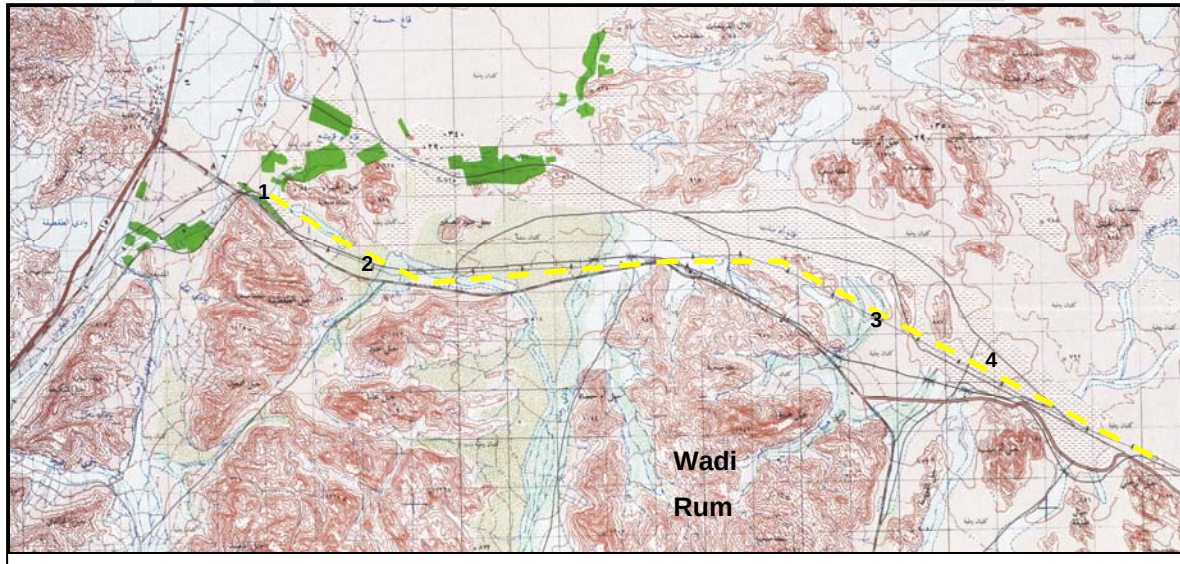


Figure 4.4 Map extract detailing route of existing power transmission route (yellow)



1 Monoteretic assemblage, overgrazed



2 Road and rail through blown sand area

**3** mud / silt flat**4** Sandy area

Plate 4.3 Habitat areas along transmission route

4.6.1.4 Power Transmission Line 2 - Shidiyya to NEPCO Site

The transmission route for this line is not yet finalised. However the most likely route would be to follow existing road from the mine to the pipeline alignment and then along the pipeline alignment itself. This route would pass through the two main habitat types shown in Figure 4.5.

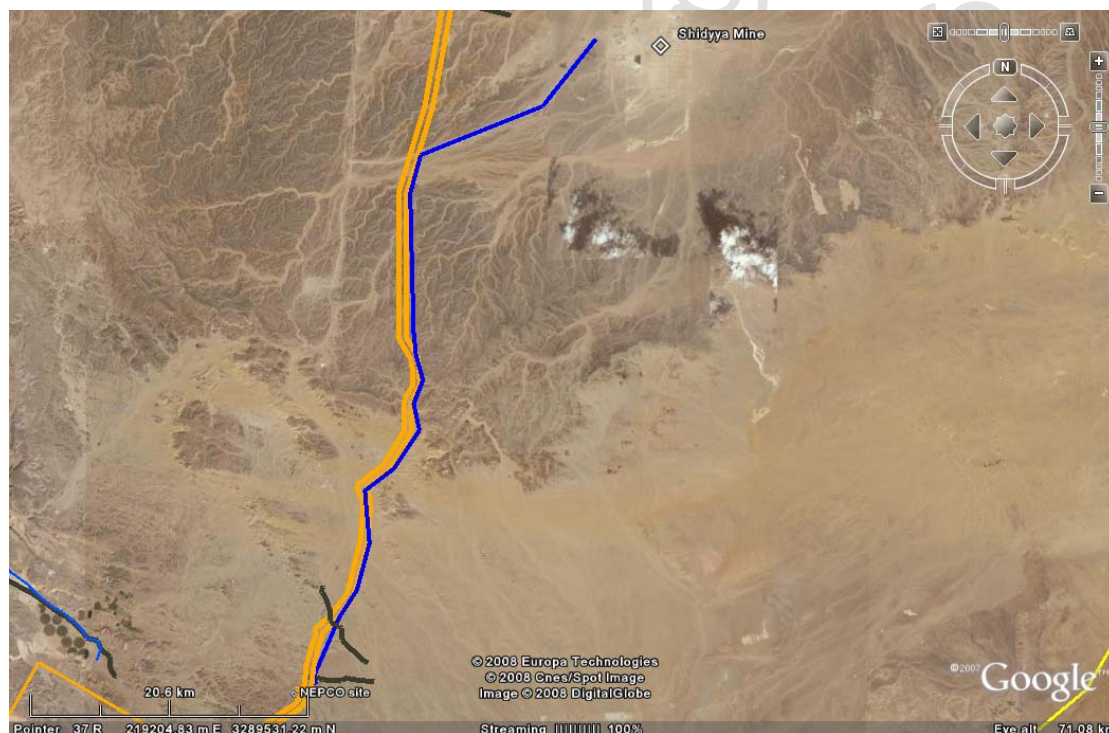


Figure 4.5 Broad habitat types along transmission line

Although the hammada area is already modified by the presence of the mine and tracks the area is known to support migratory birds, and potentially wider ranging species such as Wolves and Hyenas. Vegetation is largely absent and restricted to wadis and the fringes of mudflats, these areas are provide important foraging grounds for birds and larger mammals.

4.6.1.5 Well Field

The wellfield area is considered to be the most ecologically important area impacted by the Project. This area is located at the transition of Saharo-Arabian and Irano-Turanian Bioclimatic Zones. Consequently it is also an area where two broad vegetation types occur creating a mosaic of habitat types.

Referring to the vegetation types defined in Figure 4.2, Figure 4.6 highlights the dominant vegetation types of areas around the well field site and also shows the transitional habitats, such as the shallow accumulations over underlying rocky/gravel substrate (similar to that of the hammada habitat north of the well field) that occur throughout the well field. Plate 4-4 contains images of the type and distribution of habitats within the well field, taken at the sites noted on Figure 4.6.

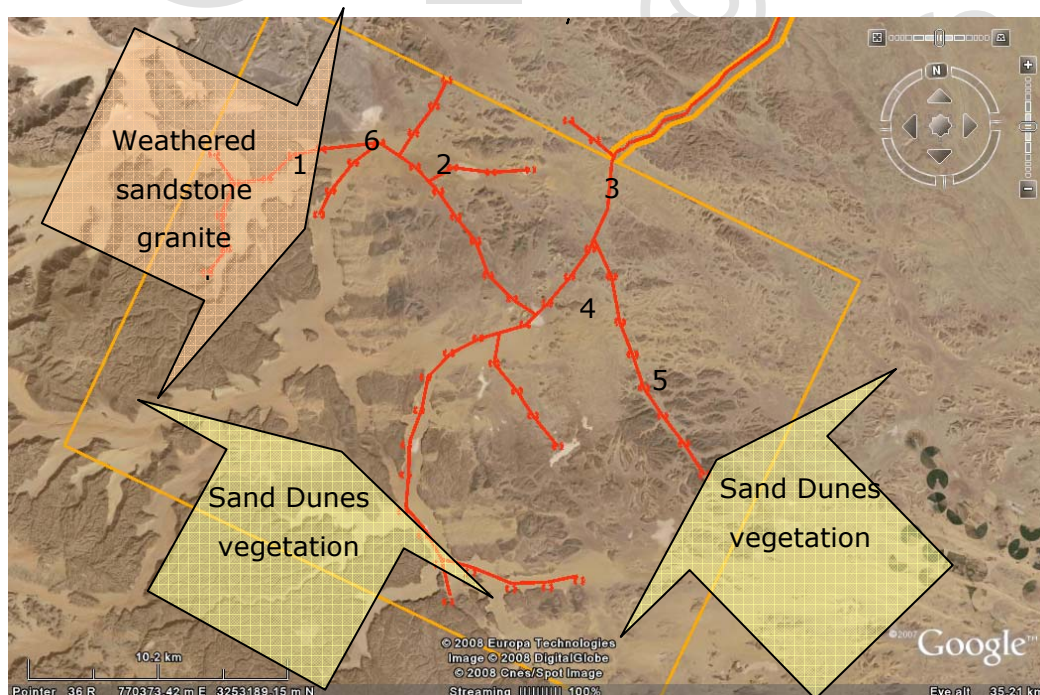


Figure 4.6 Broad habitat types within well field area



1. Sand dunes, scattered Acacia



2. 'Coppice dunes'⁵ in transitional area



3. Scattered Acacia and Halyxson sp



4. Mudflat and scattered vegetation at margins



5. Rocky hammada area, some sand accumulations



6. Vegetation accumulations at the base of rocky areas

Plate 4-4 Well Field Habitats

⁵ Vegetated sand mounds that are commonly scattered throughout sand plains in semiarid regions where shrubs and blowing sand are abundant. Only certain kinds of plants are associated with coppice dunes, because only those "edifying" species that can form new roots and shoots from buried branches can continue to grow as the sand accumulates around them (These include Ephedra,, Atriplex, Acacia, and Tamarix)

Appendix 2 **Error! Reference source not found.** gives detailed descriptions of the surveyed habitats within the southern section of the route. Vegetation and faunal assemblages which can be expected within habitats are detailed.

4.6.2 Habitats of special concern

From those identified, the habitats of most concern are the areas of scattered Acacia in Wadis (located within well field and Collector tank area and at some locations within Batn El Ghoul Area), the Sand Dune vegetation (particularly within the well field and less so at the eastern edge of transmission line 1 from Shiddiya) and vegetation within Wadis and at outwash areas.

These habitats are considered likely to support a variety of habitat, in particular for resident and migratory bird species including those which are locally threatened or rare.

Appendix 2 includes a detailed matrix detailing habitat types, species expected within those habitats and location within the project alignment.

Table 4.1 lists the criteria considered in determining habitat importance.

Table 4.1 Habitat importance criteria

Importance	Criteria
High	Undisturbed or partially disturbed near natural functioning ecosystem. Presence of typical native flora and fauna assemblages Presence of Red List species / locally and or regionally threatened species Habitat type highly vulnerable to pressures; long recovery time. Protected area (statutory and non-statutory)
Medium	Moderately disturbed habitat (small scale settlement, some access routes, grazing activity). Species typifying habitat mostly present. Habitat resilient to disturbance; shorter recovery time.
Low	Highly disturbed habitat, pressures have eliminated or severely restricted key species. Often monotonous. Species assemblages compromised. Habitat resilient to stressors; short recovery time

4.6.3 Fauna

The only fauna observed during the study were birds (unidentified) in the Well field area and those close to the irrigated agricultural areas at Disi, and the common beetle. Tracks and burrows presented evidence of small mammal presence in many areas and possible Herpetofauna in some areas (Plate 4.5 and 4.6).



Plate 4.5 Small mammal burrows



Plate 4.6 Animal tracks observed in sandy substrate

A number of floral and faunal species have been identified as being associated with the habitat types present within the study area. The status of most species is unknown at the national level because of the lack of systematic research and the lack of agreed methodology however, the baseline surveys carried out as part of the Wadi Rum Management Plan form a useful body of evidence with regard to species identified within the area.

The sections below lists species of importance that may be present within the southern route section of particular conservation importance.

4.6.3.1 Flora

Flora in the areas of least disturbance can be highly varied with low abundance, reflecting the variety of sub-habitats. Table 4.2 lists the status of some of the dominant plants identified during the site visit.

Table 4.2 Selected flora known to occur within the identified habitats

Scientific name	Habitat	Status
<i>Rheum palestinum</i>	Chert Hammada and runoffs	Endemic
<i>Haloxylon persicum</i>	Sand dunes and sandy Hammada	Locally threatened
<i>Artemisia judaica</i>	Sandy hammada	Rare
<i>Asphodelus microcarpus</i>	Sandy Hammada	Rare
<i>Cleome Arabica</i>	Sandy Hammada	Rare
<i>Acacia raddiana</i>	Scattered trees at Wadi with Field area and Batn EL Ghol	Locally and regionally threatened
<i>Kickxia floribunda</i>	Weathered sandstone and granite scrub	Rare
<i>Stigmatella longistyla</i>	Weathered sandstone and granite scrub	Endemic
<i>Onobrychis ptolemaica</i>	Weathered sandstone and granite scrub	Rare
<i>Dipcadi erythraeum</i>	Weathered sandstone and granite scrub	Rare
<i>Scabiosa eremophila</i>	Weathered sandstone and granite scrub	Rare
<i>Aegilops cylindrical</i>	Weathered sandstone and granite scrub	Rare

4.6.3.2 Avifauna

The southern section of the alignment (Eastern Desert and Mudawarra Desert area) is known to support migratory, resident and passerine species. Tables 4-4 to 4-6 indicate species which may be present, particularly within the IBA area, and their population status.

Table 4.3 Globally Threatened Bird Species*

Common Name	Scientific Name	Type	Convention
Corncrake	<i>Crex crex</i>	Passage migrant	Appendix 2 of the Bonn Convention
Houbara Bustard	<i>Chlamydotis undulate</i>	Winter visitor	Appendix 2 of the Bonn Convention

*These have been identified as occurring within the southern desert of the alignment and within the IBA, although were not noted during the site visit.

Table 4.4 Species that are Threatened or Declining throughout all or large parts of their range in the Middle East

Scientific Name	Common Name	Type	Convention
<i>Ciconia ciconia</i>	White Stork	Passage migrant	Appendix 2 of the Bonn Convention
<i>Pernis apivorus</i>	Honey Buzzard	Passage migrant	Appendix 2 of the Bonn Convention
<i>Neophron percnopterus</i>	Egyptian Vulture	Occasional breeder	Appendix 2 of the Bonn Convention
<i>Gyps fulvus</i>	Griffon Vulture	Resident	Appendix 2 of the Bonn Convention
<i>Accipiter brevipes</i>	Levant Sparrowhawk	Passage migrant	Appendix 2 of the Bonn Convention
<i>Aquila pomarina</i>	Lesser Spotted Eagle	Passage migrant	Appendix 2 of the Bonn Convention
<i>Falco biarmicus</i>	Lanner Falcon	Passage migrant	Appendix 2 of the Bonn Convention
<i>Falco cherrug</i>	Saker	Passage migrant	Appendix 2 of the Bonn Convention

Table 4.5 Species, which have relatively small total world ranges with important populations in the Middle East

Scientific name	Common name	Status
<i>Ammoperdix heyi</i>	Sand Partridge	Resident
<i>Oenanthe finchii</i>	Finch's Wheatear	Winter visitor
<i>Oenanthe xanthopyrna</i>	Red-tailed Wheatear	Winter visitor
<i>Oenanthe monach</i>	Hooded Wheatear	Resident
<i>Carpospiza brachydactyla</i>	Pale Rock Sparrow	Summer breeder

4.6.3.3 Fauna

Small mammals are common within the southern section of the route and signs were also noted within vegetated wadi areas in the central route sections. No signs of larger carnivores were observed during the site visits. Specialist observation methods are required to determine the presence of larger faunal species.

The Carnivore and Ungulate baseline surveys undertaken for the development of the Wadi Rum Protected Area Management Plan indicate that some higher mammals may be present within the southern route section including the Grey Wolf, and Hyenas. The evidence for this is largely anecdotal, obtained from interviewing local communities and the train drivers who have reported night time crossing of the railway by Hyenas. In 1999 a Grey Wolf was trapped to the east of Disi village, however no recent data has been obtained to indicate recent sitings.

Tracks were observed that indicated the presence of reptile species; however identification of species was not possible. Reptiles are not reported as being threatened within the Southern route sections; however it is likely that populations are restricted in the central and northern sections as a result of unsuitable habitat and / or habitat loss.

Error! Reference source not found. lists larger species which may occur within the Southern Route section.

Table 4.6 Endangered fauna possibly occurring in the Wellfield area

Scientific name	Common name	Status
<i>Canis aureus</i>	Golden Jackal, Asiatic Jackal	Locally Endangered
<i>Canis lupus</i>	Syrian Wolf	Locally Endangered
<i>Caracal caracal</i> *	Caracal	CITES Appendix I, IUCN
<i>Felis margarita</i>	Sand Cat	CITES Appendix II, IUCN
<i>Felis silvestris</i> **	Wild Cat	CITES Appendix II
<i>Gazella dorcus</i>	Dorcus Gazelle	locally vulnerable inside the reservoir but not in the well drillings area
<i>Gazella subgutturosa</i>	Goitered Gazelle	Locally Endangered
<i>Hyaena hyaena</i>	Stripped Hyena	Locally Vulnerable
<i>Mellivora capensis</i> ***	Ratal, Honey Badger	CITES Appendix III
<i>Vormela peregusna</i> ***	Marbled Polecat	IUCN
<i>Vulpus cana</i>	Sand Fox	locally vulnerable and CITES Appendix I
<i>Vulpus ruepellii</i>	Ruepell's Fox	locally endangered. IUCN
<i>Chamaeleo chamaeleon restricrista</i>	Chameleon	CITES Appendix II
<i>Varanus griseus</i>	Desert Monitor	CITES Appendix I
<i>Uromastix aegyptia</i>	Spiny tailed lizard	CITES Appendix II
<i>Coluber Sinai</i>	Sinai Coluber	Near Threatened

*Suspected species is in Mudawarra.

**Most likely *Felis silvestris* and *Gazella subgutturosa* are not present within the study area, however, they are listed as least possibly occurring in order to consider their protection should any be observed in the future.

****Mellivora capensis* and *Vormela peregusna* may be present in the crevices of high mountains.

4.7 IMPACT ASSESSMENT

4.7.1 General

Impacts by Project section are detailed within Table 4.1. The overall impact considers both operational and construction phases.

The following factors have been considered in determining the quality of the existing environment:

- the degree of disturbance that already exists,
- presence of protected / rare species, and
- the threat of future disturbance.

The degree of disturbance that already exists is determined by how closely a site resembles pre-settlement conditions. For example, an area may have been subjected modified drainage, residential development, agriculture, road construction, agricultural or otherwise substantially altered. Then, the extent of the alteration must be assessed.

Table 4.1 Summary of Impacts to Natural Environment

Project component	Existing pressures	Impact source	Construction impacts	Operational impacts	Impact significance
Well Field	Overgrazing Road tracks Military exercises Wood collecting Hunting (although banned in the Eastern desert⁶ it is reported in this area⁷) <i>Some areas are not affected by these disturbances and some areas include natural habitat</i>	Construction of permanent infrastructure (wells, collector network, power supply network)	Removal of sand stabilizing vegetation and sand dunes; loss of habitat and possible consequential loss of species. Increase nuisance and disturbance to wild animals (drilling, operation of plant) Noise and vibration disturbance to migratory and breeding bird species (some of those are globally and/or regionally threatened), Damage by off-road driving. Disturbance to Rum IBA (noise, vibration) Potential for small scale vegetation recovery from overgrazing during construction, as grazing access would be restricted. Temporary habitat from test pump areas. Potential introduction of alien species from machinery	Ongoing maintenance is anticipated to exert a continued disturbance to habitat i.e. clearing of sand from infrastructure. Fragmentation of habitat potentially suitable for rare and endangered species. Visual impacts of electricity lines along the collector network. Disturbance to mammals with wide ranges	High

⁶ El-Moghrabi, L, & Quatrameez, M (2005) National Report of Hunting Jordan RSCN: Amman , Jordan

⁷ Y. H. Al-Khalili, R. M. Heil, K. A. Al-Omari, M. A. Abu-Baker, and M. A. Qarqaz (1999) Wadi Rum Protected Area Ecological Baseline Surveys, Carnivores. RSCN: Amman, Jordan.

Project component	Existing pressures	Impact source	Construction impacts	Operational impacts	Impact significance
		Access roads	Increased access to remote habitat; secondary impact of increase to hunted species. Trampling of vegetation.	Increase in direct and indirect killing and active taking of wild animals (especially birds and mammals) through improved access. Increased illegal access to the protected area from its eastern borders.	
		Presence of construction camps	Littering Attraction of larger mammals to food waste Pollution incidents from accidental spills (fuel, oil) Noise and light Illegal hunting by Project staff	None	
Collector tank to DH	Road tracks Airbase Grazing Hunting (not confirmed) Mining	Access roads	Increased access to remote habitat; secondary impact of increase to hunted species. Trampling of vegetation. Construction disturbance to drainage patterns. Increase noise may disturb bird species, particularly during migration and breeding seasons.	Human presence increased and improved access may increase hunting pressures. Passes to eastern edge of Abu Tarfa IBA.	Low - Moderate
		Transmission line from Shidiyya	Potential to increase width of disturbed corridor	Visual impact	
		Pipeline	Linear disturbance to ground surface Noise and vibration disturbance to migratory and breeding bird species (some of those are globally and/or regionally threatened).	Visual impact	
DH to Madaba	Road construction Over grazing Drainage modification Development Rubbish disposal Littering	Pipeline	Removal of roadside vegetation and landscaping	Very limited maintenance activity	Low
		Temporary construction camps / staging areas	Littering, vegetation loss, disturbance to birds	None	

Project component	Existing pressures	Impact source	Construction impacts	Operational impacts	Impact significance
	Agriculture <i>Semi-natural habitat at some wadi crossings. Mediterranean zone dominated by agricultural activity. Southern hammada area subject to grazing / wood collecting. Littering and rubbish dumping throughout route. Development increases north of Airport.</i>	Wadi crossings Control centre and pumping station	Loss of vegetation Change to drainage patterns Erosion of natural channel morphology Loss of vegetation Disturbance to birds	Potential changes to erosion and deposition if erosion protection not sufficient and reinstatement not correct Very limited maintenance activity - noise Visual impact	
Dabuk	Urbanisation Agriculture <i>No significant areas of natural habitat present.</i>	Pipeline Reservoir	Loss of landscaping - not significant in representing native flora & fauna, some significance as possible bird habitat. Localised temporary disturbance to birds	None	Low
Abu Alanda	Urbanisation Agriculture (small scale) <i>No significant areas of natural habitat present.</i>	Pipeline New Reservoir	Loss of landscaping Localised temporary disturbance to birds Loss of vegetation cover	None None	Low
Transmission line – Qweira	Agriculture (inc. use of agrochemicals) Roads Railway Overgrazing Wood collecting Settlement Tourism <i>Variety of habitat types present along route, including significant areas of mud flat and some sand dune areas.</i>	New transmission infrastructure Construction camps	Disturbance during migration and breeding seasons. Loss of vegetation Littering Attraction of larger mammals to food waste Pollution incidents from accidental spills (fuel, oil) Noise and light Illegal hunting by Project staff	Visual impact Cumulative impact by increased presence of permanent infrastructure . None	Moderate (Impact level dependant on eventual route, construction methods and whether or not existing infrastructure to be upgraded)

Project component	Existing pressures	Impact source	Construction impacts	Operational impacts	Impact significance
Transmission line - Shidiyya	Roads Mining Drainage modification <i>Limited natural vegetation present, key habitat type is seasonally wetlands. ;</i>	New transmission infrastructure	Disturbance during migration and breeding seasons. Disturbance to local topography	Increased access in some locations Cumulative impact by increased presence of permanent infrastructure Area used by wintering migratory species.	Low -Moderate

4.7.2 Positive impacts

It is important to note the secondary positive impacts that may be achieved by the implementation of the Project. These relate to the ceasing or reducing of abstraction from renewable groundwater resources to the north of Amman. These include the Zarqa, Azraq and North Jordan Valley Basins.

- Reducing abstraction pressure should allow long-term recovery of groundwater levels within these areas; bringing associated ecological benefits. Of particular importance are the potential benefits to the azraq oasis (protected area and Ramsar site) where it is anticipated that recovered groundwater levels would allow the pumping of water required
- To maintain the area to cease. This would result in a more sustainable approach to the management of the site.

4.8 MITIGATION MEASURES

4.8.1 General

The measures outlined in this section will set out the means and actions needed to avoid, mitigate or reduce anticipated adverse environmental impacts to tolerable levels. Proposed mitigation measures may include the following:

- Changes to the scheme design during the design process;
- Physical measures applied on site (temporary or permanent);
- Measures to control operational or construction practices; and, or
- the provision of replacement or compensation habitat/facilities.

Mitigation measures are generally viewed as having a hierarchical approach. When impacts are related to the biological environment measures are directly related to the status of the area affected i.e. threatened habitat and or presence of endangered species.

The sequential approach to mitigation follows the pattern avoidance in the first instance then assessing what other feasible means might be appropriate to reduce or eliminate adverse impacts. Table 4.9 sets out the mitigation principles that should be adhered and links them to the habitat type considered at risk from impacts

Table 4.2 Mitigation Principles

Habitat status	Protection philosophy	Primary mitigation measure	Secondary options
Natural Habitat	No significant change or degradation of habitat, no net loss of biodiversity.	Avoid area where technically and feasibly possible.	Reduce impacts (loss of biodiversity) where they are unavoidable; achieved by; - Minimising land take - Offsetting - Strict construction and operational guidelines. - Ex situ conservation
Modified habitat	Minimise further damage, identify any opportunities for improvement through operations	Avoid remnant patches of less modified habitat. Construction management measures to reduce loss of vegetation cover. Modify construction techniques where possible to reduce impacts. Strict controls to limit reportable environmental incidents.	Strict construction and operational guidelines. Habitat enhancement – restoration to previous landscape, removal of non-native species, replanting with native species. Ex situ conservation
Landscaped areas	Losses will not reduce biodiversity.	Construction management measures to reduce loss of vegetation. Strict controls to limit reportable environmental incidents.	Reinstate to previous condition; ensure no net loss in vegetative cover. Reinstate with native species if possible.

The majority of the pipeline alignment and Project areas lie within areas with little or no natural habitat. In these locations the presence of natural species is often restricted to sparse vegetation within wadi channels. This vegetation although restricted in abundance is not considered to contain threatened, rare or endangered species.

Elsewhere the natural environment consists of landscaped areas within the Amman suburbs (i.e. irrigated grass verges), some small areas of agricultural land at the Madaba PS area and at the margins of the reservoir site at Abu-Alanda, and the tree stands at the margins of the DH.

The significant areas lie within the southern area of the pipeline, specifically the well field area, the transmission line from Qweira to the Wellfield and the section of the pipeline

which runs from the collector tank through the eastern desert to the DH just north of Hesa (also including the second transmission line)

4.8.2 Well Field

The initial conclusions from the ecology study can be summarised as follows.

The well field area contains the least disturbed habitats of the Project area. The possible presence of endangered and / or threatened species within these habitats indicates that as a matter of preference, construction should be avoided in this area. This would require either:

1. **Relocation of wells within IBA area:** It is possible that construction of wells within the Rum IBA and fringing areas will have deleterious and probable irreversible impact to the local ecology of the sand dune (W50 to W55) and Sandy Hamada (W48 to W50) habitat. Anticipated impacts include the permanent removal of sand stabilizing vegetation, increased access to remote, unique and habitat, increased illegal access to the protected area from its eastern borders, fragmentation of habitat suitable for rare and endangered species, increase nuisance and disturbance to wild animals, possible direct and indirect killing and active taking of wild animals (especially birds and mammals), disturbance to migratory and breeding bird species (some of those are globally and/or regionally threatened), and the impacts caused to by off-road driving.

Erecting electricity lines along the collector network will also have visual impacts.

In addition, in the absence of specific information ruling out the presence of endangered species, the precautionary principle would require the relocation of wells.

2. **Relocation of some wells (most western) within IBA area:** If the above measure is unachievable, it would be preferable if then the wells located within the sand dunes habitat (W50 to W55) alone could be relocated outside the IBA.

In the light of the above, further discussions were held with the MWI, the Project Company and the RSCN, the authority charged with administering IBAs in Jordan. From these discussions, RSCN issued a no objection to development in the well field area under specific conditions as listed below:

- Construction should minimise the effects of well construction on natural habitats

- Avoid Construction during crucial periods and in important habitats, especially those for breeding raptors and others (March – May)
- Proper disposal of waste materials during drilling and extraction and removal from site of all excess materials and debris
- All pits are to be filled
- Construction should take place outside of key periods; breeding, nesting and roosting.
- If any planting is proposed only native species should be used.
- All workers should be aware of the importance of the area and of the effects of harmful activities which should be banned.

A copy of the RSCN letter is provided as Appendix 3.

Table 4.9 summarise the suite of measures intended to limit impacts within the Well field area.

Table 4.9 Well Field mitigation measures

Impact	Control measure	Mitigation type
Construction:		
Habitat loss	Limiting access road width / length and vehicle movements within zones	Design Review
	Construction on previously damaged land	Avoidance
	Limit construction corridor width	Construction methodology
	Avoidance of tree stands, translocation if possible	Avoidance
Disturbance to wildlife	Prohibition of blasting/excavating activity during breeding / migratory seasons.	Procedure
	Dismissal of staff found hunting, trapping, collecting wildlife	Procedure
Change in drainage pattern	No construction in wet season	Procedure
	No stockpiling of material in wadis / outwash / mudflat areas	Avoidance
Offroading by staff	Penalty system	Procedure
Pollution	No storage of fuels/oils/chemicals within most sensitive areas	Procedure
Operation:		
Loss of habitat	Minimal movement of sandy areas from infrastructure	Procedure
Pollution	No storage of fuels/oils/chemicals within most sensitive areas	Procedure
Change to drainage patterns	No stockpiling of material in wadis / outwash / mudflat areas	Procedure
Maintenance	Prohibition of non-essential maintenance during breeding / migratory seasons.	Procedure/ Avoidance
Effective EMS	Carry out ongoing habitat/ faunal monitoring to revise plan and monitor effectiveness of measures	Procedure

4.8.3 CEMG

Box 4.1 sets out the General Principles to be adopted for the protection of the natural environment.

Box 4-1 General Principles for the Protection of the Natural Environment

- Existing roads, tracks and paths are to be used as far as practicable in order to reduce additional damage by creating new routes.
- Construction on previously damaged land should be preferred. The width of the construction corridor should be limited wherever possible to a maximum of 50m – 80m from the pipeline.
- Clearance of vegetation should be kept to an absolute minimum and tree/scrub stands within the corridor or camps should be retained if possible and fenced to prevent damage. Prohibition of the removal of Acacia and Tamarix stands.
- Timing of works should consider breeding & migratory seasons. Additionally construction in or close to temporary water features i.e. mudflat/run off area and flowing wadis should be permitted during winter /wet seasons only with permit.
- Materials should not be stored within wadi courses, depression areas or in outwash/mudflat areas.
- Prohibited activities (Project workforce):
 - o The harvesting and burning of wood and vegetation.
 - o Hunting of wildlife
 - o Collecting of plant and animal collections.
- Construction camps are to consist of mobile facilities to prevent permanent damage/disturbance to the desert environment by permanent buildings.
- Machinery from overseas should be free of any soil/plant debris to prevent the introduction of non-native species.
- As far as practicable the landscape should be restored to in a manner to conform to the natural appearance of the surrounding landscape.

These principles are intended to be implemented primarily during the construction phase of the Project and will be embedded within the suite of Construction Environmental Management Guidelines (CEMG) to be established to control project construction impacts.

General Site Planning

A key feature is the instruction to undertake a preconstruction site plan for each new construction segment/ temporary facility.

During site selection natural features such as vegetated areas, tree stands and wadis should be avoided.

Once the site is selected the plan will detail:

- The presence of natural features (trees, vegetation, wadis, dunes etc) within the site and at the periphery of the site should be noted within the plan and measures detailed for their protection.
- The locations of temporary compounds and fences.
- The dimensions, locations and materials used for construction.
- Access and egress points and associated tracks and roads.
- The timing of the works.

Should a Project site affect a known migratory and /or resident bird area the breeding and migratory seasons should be noted in the plan. The following activities are not to be permitted during such seasons:

1. Crushing, and blasting activity;
2. Ground / vegetation/ dune clearance;
3. Night time illumination;
4. Night time working; and
5. Any other such activities as deemed inappropriate.

For particularly large sites (workforce compounds, crusher sites) the habitat within the confines of the site and within a specified radius (dependant of site location) should be mapped prior to the commencement of construction. Periodic walkovers should be made to determine any negative changes to the previously identified habitat.

Additionally it should be noted if there are any improvements to the area, i.e. access restrictions to grazing animals may allow fragments of habitat to recover from overgrazing.

4.8.4 Sites Requiring Specific Measures

Tables 4.10 and 4.11 set out mitigation measures for selected Project components.

Table 4.10 Wadi Crossing Mitigation Measures

Impact	Control measure	Mitigation type
Construction:		
Erosion	Excavated material to stored away from flow paths	Construction methodology
Change in drainage pattern	No construction in wet season Storage of excavated material away from flow paths	Avoidance
Loss of vegetation	Site selection to minimise threat to existing values. Site planning to avoid or protect specific environmental attributes Good Site management	Avoidance Construction management
Loss of native fauna	Reinstatement to allow for regeneration As above but with addition of relocation of any mature tree stands	Design Avoidance
Operation:		
Erosion	Install appropriate erosion protection	Design
Change to drainage patterns	Install at appropriate depth, reinstate at grade	Design

Table 4.11 Electricity transmission line (Qweira to Wellfield) Mitigation Measures

Impact	Control measure	Mitigation type
Construction:		
Noise impacts to animals	Prohibit construction during breeding / migratory seasons	Avoidance
Habitat loss	Relocate activity elsewhere Reinstate habitat i.e. planting & regarding	Avoidance Reinstatement
Change in drainage pattern	Prohibit stockpiles within the seasonal water bodies Reinstate to original morphology Install appropriate erosion protection	Procedure Design
Operation:		
General maintenance	Avoid activity during breeding / migratory seasons	Procedural
Avian electrocution	Design to avoid roosting areas	Design
Visual impact from permanent facilities	Paint in muted tones to mimic natural habitat	Design

5. ARCHAEOLOGICAL REVIEW & ASSESSMENT

5.1 INTRODUCTION

The original ESA contained an archaeological assessment for the Project. This investigation was based on extensive field surveys, which were conducted to identify all archaeological and cultural heritage resources occurring along the alignment including any graveyards or burial sites, and to define significance to the study based on the possibility of direct or indirect impacts that might be imposed by the proposed project.

In addition, several publications and studies by Jordanian and non-Jordanian researchers along with national technical reports and studies were consulted.

In total, thirty five sites were identified within project affected areas with most of the identified sites representing the Roman and Byzantine periods. However, this survey based on approximate locations for all project components, did not include project components such as the proposed electricity transmission lines.

Therefore, further study has been carried out, including field surveys to produce a comprehensive study for 2008.

5.2 STUDY APPROACH

5.2.1 Desk study

A desk study was conducted to determine if the revised design of the well field would affect any known archaeological sites. The desk study consisted of researching for known sites in the Jordanian Archeological Data and Information System (JADIS) using the coordinates of the proposed well field corridor, and transmission line corridors.

JADIS was developed by Dr. Gaetano Palumbo in the early 1990s, at the American Center of Oriental Research (ACOR). The JADIS system is currently used by the Jordanian Department of Antiquities (JDOA) as well as archaeologists and historians working in Jordan to store and retrieve information about archaeological sites, from the Paleolithic period through the modern era. Over 20,000 sites around the Kingdom have been identified and inputted into the database. The database is used during project planning to avoid any significant archeological sites during construction.

Although JADIS is a reliable tool for identifying archaeological sites an additional literature review was conducted from the libraries of the Department of Antiquities of Jordan, Library of American Centre for Oriental Research (ACOR) and the British Council for Research in Leant (BCRL).

5.2.2 Field investigations

A field investigation for the well field, the quweira transmission line corridor and the shediyeh transmission line corridor was conducted in February 2008. The team conducted a walkover survey of the well field area and 250 meters from both sides of the pipeline. The archaeologist relied on JADIS for areas with limited accessibility.

5.3 STUDY FINDINGS

5.3.1 Pipeline Corridor

Archaeological field surveys of the pipeline environment were undertaken in 2004 and checked against the latest alignment in 2008. Thirty-five sites were identified.

5.3.1.1 Wellfield to Hasa

Twenty six archeological sites were identified with JADIS outside the pipeline corridor between the Disi wellfield and Hasa, Figure 5.1. None of the identified sites are at risk.

There were no additional sites found during the field investigation.

5.3.1.2 Jiza to Hasa

One archaeological site was identified with JADIS outside the pipeline corridor between the Hasa and Jiza. The site identified as B-1 is shown in Figure 5.2, it is located on the west side of the Desert Highway and is not at risk. There were no additional sites found during the field investigation.

5.3.1.3 Jiza to Abu Alanda

Eight archaeological sites were identified between Jiza and Abu Alanda. The sites are listed in Table 5.1 and can be seen in Figures 5.3A to 5.3G.

Table 5.1 Risk Status of Archeological Sites between Jiza and Abu Alanda

Site No.	Site Location	Site Name	Risk Status
C-1	Abu-Alanda Town	The Press	N/A
C-2	Abu - Alanda	Area of the Cave of Seven Sleepers	Previously at risk. Alignment modified
C-3	Abu - Alanda	The Cave of Seven Sleepers	N/A
C-4	Al - Juwayda plains	Al - Juwayda Mausoleum	N/A
C-5	Khirbet Es-Suq	The Mausoleum	At Risk
C-6	Al- Qastal	Al- Qastal	N/A
C-7	Al- Jiza	Al - Jiza Pool	N/A
C-8	Al - Jiza village/ under modern houses	The Byzantine Church	N/A

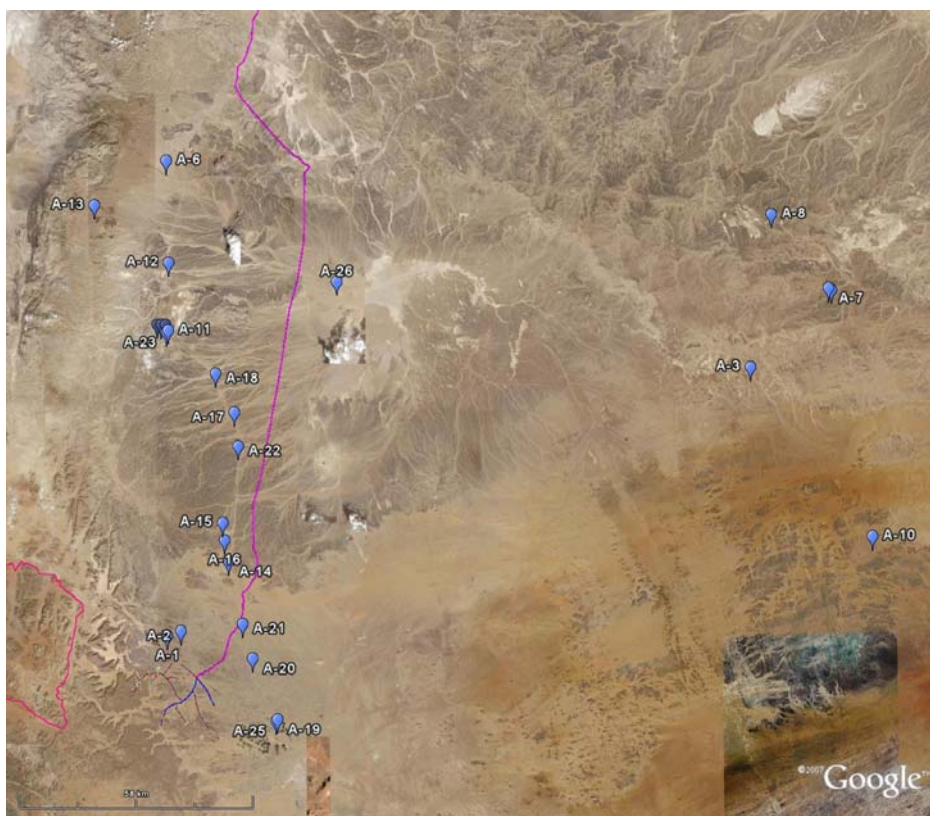


Figure 5.1 Archeological Sites between Wellfield and Hasa

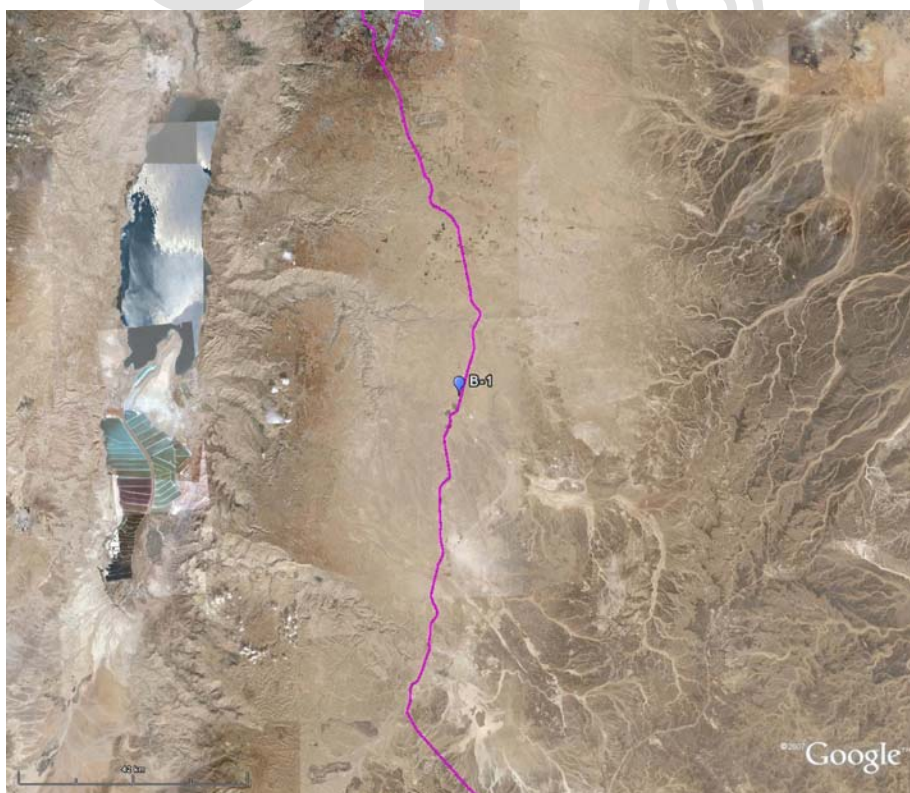


Figure 5.2 Archeological Site between Hasa and Jiza

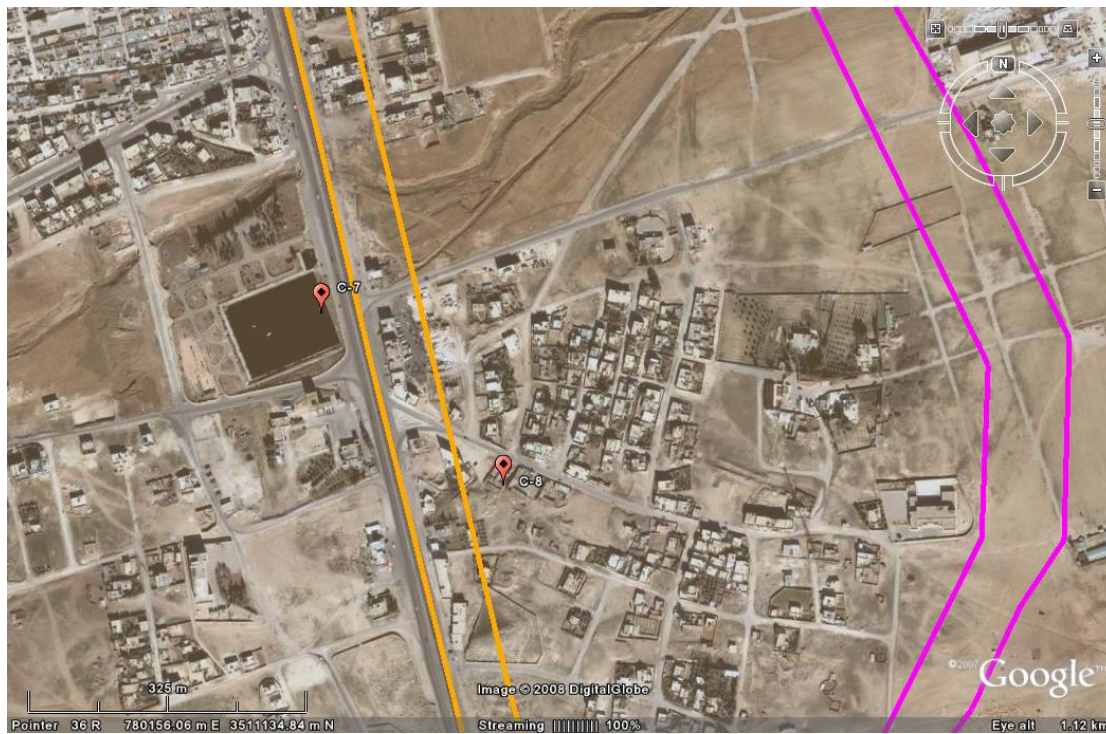


Figure 5-3A Archaeological Sites C-7 and C-8

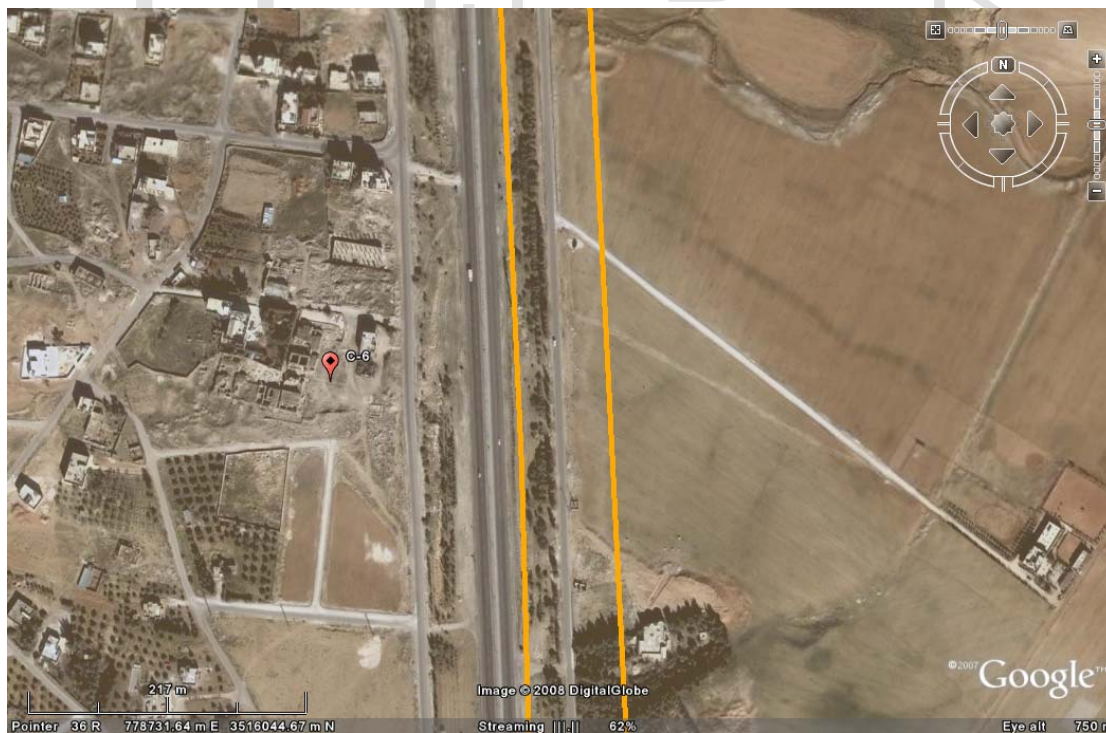


Figure 5-3B Archaeological Sites C-6



Figure 5-3C Archaeological Sites C-5 (Site at Risk) and C-4



Figure 5-3D Archaeological Sites C-5 (Site at Risk) Zoomed

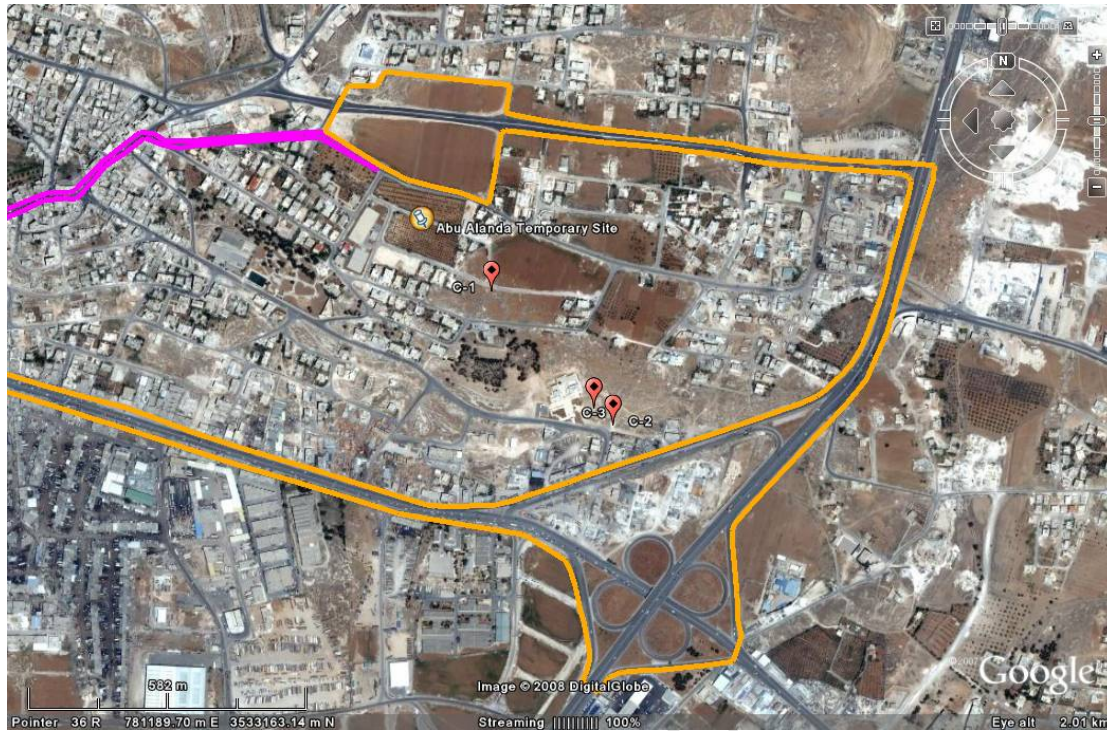


Figure 5-3E Archaeological Sites C-1, C-2 and C-3

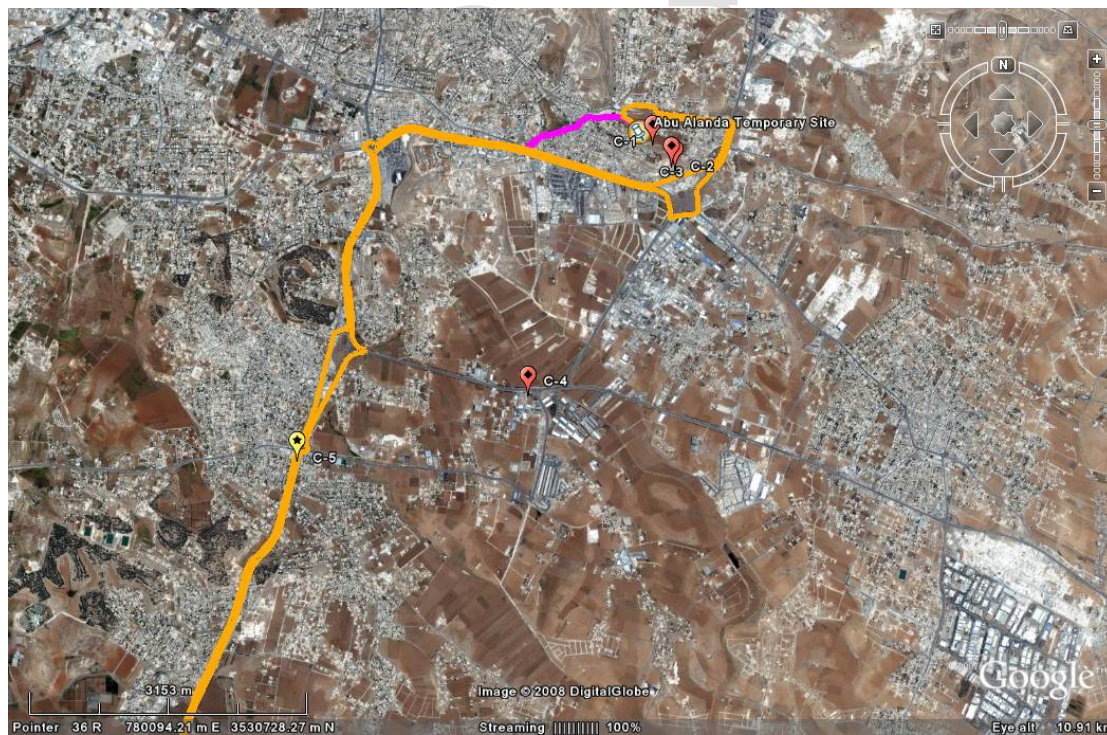


Figure 5-3F Overview of Archaeological Sites C-1, C-2, C-3, C-4 and C-5



Figure 5-3G Overview of Archaeological Sites C-6, C-7 and C-8

One of the most significant sites in Segment C is the Cave of Seven Sleepers and its surroundings. This site is regarded as a holy place and the story of the seven sleepers is narrated both in Islam and Christianity.

The Department of Antiquities also regards the area east of the Cave to be an important extension of the archaeological site. This is characterized by burial caves dug in natural limestone rocky outcrops that date back to the Byzantine period, cist tombs, rock-cut signs belonging to the Roman and Byzantine eras. These rock-cut signs are scattered around Abu Alanda Town. Flint tools dating to the Neolithic period and pottery sherds are also scattered around the site.

The Al-Juwayda Mausoleum is also potentially significant. It lies on the right edge of the Juwayda-Sahab road within the alignment corridor and is at risk (Figures 5-3C and 5-D), The structure is built of well-cut white limestone ashlars (see Plate 5-1 below), is square in shape, 12x12 m, and its remains stand 3m above the ground. The internal ports and divisions were destroyed by local activities many years ago and the site continues to deteriorate as a result of pollution, traffic vibration and human interference.

It is probable that the pipeline will need to be realigned in this area, probably into the Road. In addition, while the site already fenced there has been no systematic excavation in the area and it can be expected that there is other archaeology in its proximity.



Plate 5-1 Mausoleum

Therefore, particular care will be necessary in employing chance find procedures in this area to ensure no damage is done to unknown archaeology.

The site dates back to Roman period and was built to serve as a mausoleum and was re-used during the Byzantine period.

Al-Qatraneh castle lies on the western side of the Desert Highway and is not expected to be affected as the pipeline passes on the eastern side.

5.3.2 Well Fields

A corridor was drawn around the well field for the purpose of this study.

The coordinates of the corridor were inputted in the JADIS database. Two archaeological sites were identified adjacent to the well field but no sites were found within the well field itself. The two sites, A-1 and A-2 were listed in the original 2004 ESRS and are located 2 kms and 3.1 kms respectively from the well field, Figure 5.4.

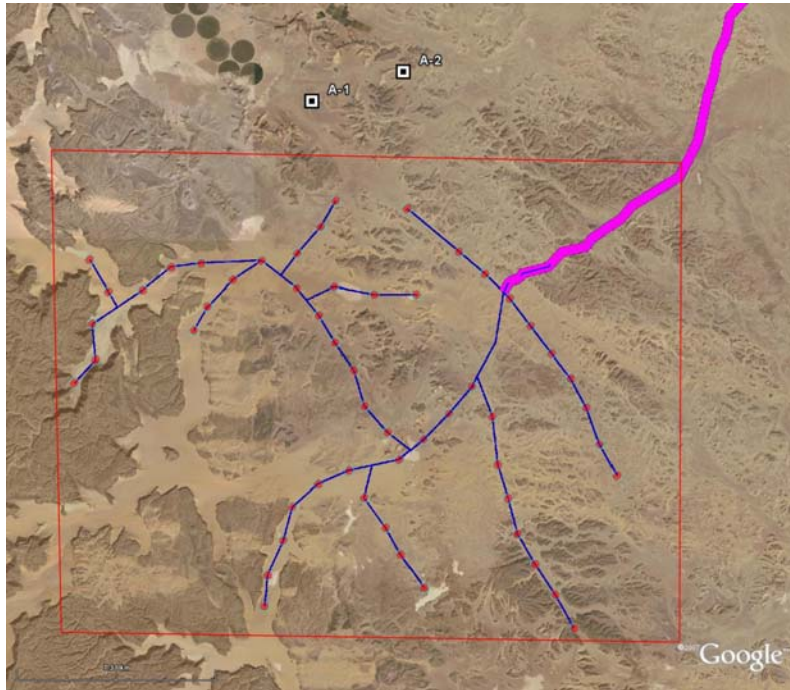


Figure 5.4 - Disi Well Field Corridor in relation to Archaeological Sites A-1 and A-2

The archaeologist team walked over the different branches of the well field. No archaeological sites were found during the field investigation. Plates 5-2 to 5-6 provide examples of the observations of the archaeologist.

5.3.3 Qweira Transmission Line

The proposed alignment of the Qweira Transmission Line is still not defined. Because of this an extended corridor was used to research all the possible archaeological sites that might be affected. Twenty six sites were identified within the exaggerated corridor. Eight sites are of archeological significance and are located within the Wadi Rum reserve. The remaining 18 sites are not considered important sites.

The locations of the 26 sites in relation to the transmission line corridor are shown in Figure 5.5.

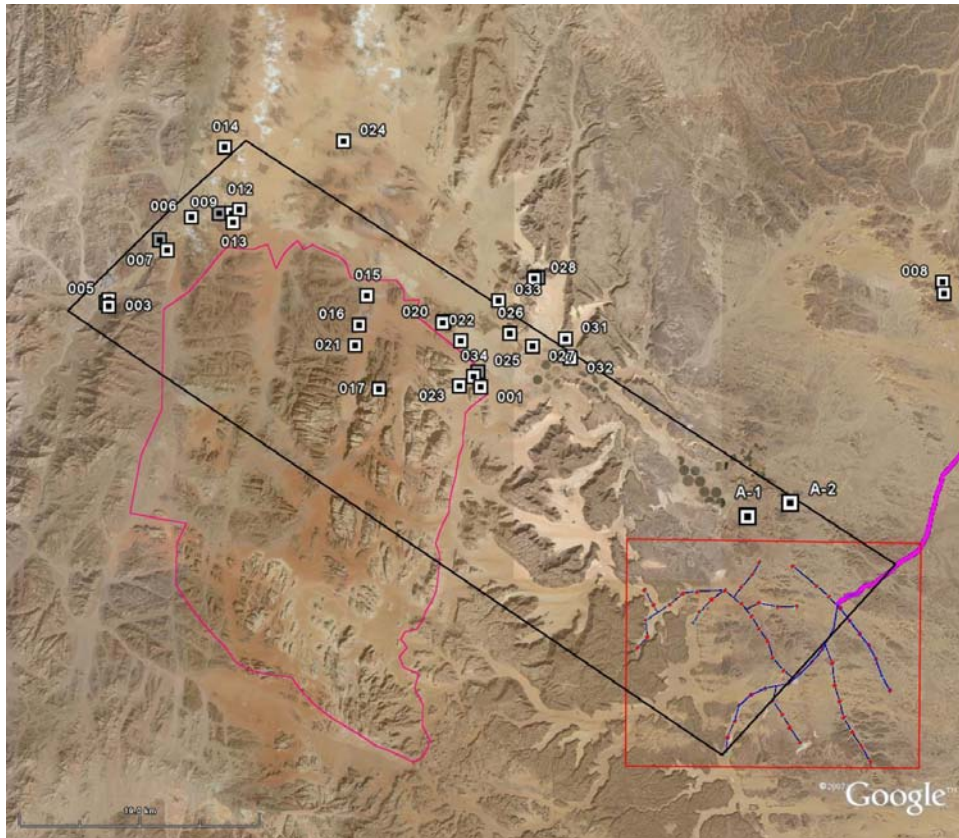


Figure 5.5 Archaeological Sites in Qweira Transmission Line Corridor

The archaeologist team walked over the Qweira Transmission Line Corridor but did not identify any new sites. The corridor is heavily disrupted by farms, villages and a number of pre-existing transmission lines, Plate 5-7.



Plate 5-2 First (northern most) branch of the well field



Plate 5-3 Second branch of the well field



Plate 5-4 Third branch of the well field



Plate 5-5 Fourth branch of the well field



Plate 5-6 Fifth branch of the well field



Plate 5-7 Quweira Transmission Line Corridor

5.3.4 Shediye Transmission Line

As with the Qweida transmission line the proposed alignment of the Shediye Transmission Line is still not defined and an extended corridor input in to JADIS. Five (5) sites were identified but none are considered important sites. The locations of the 5 sites in relation to the transmission line corridor are shown in Figure 5.6.

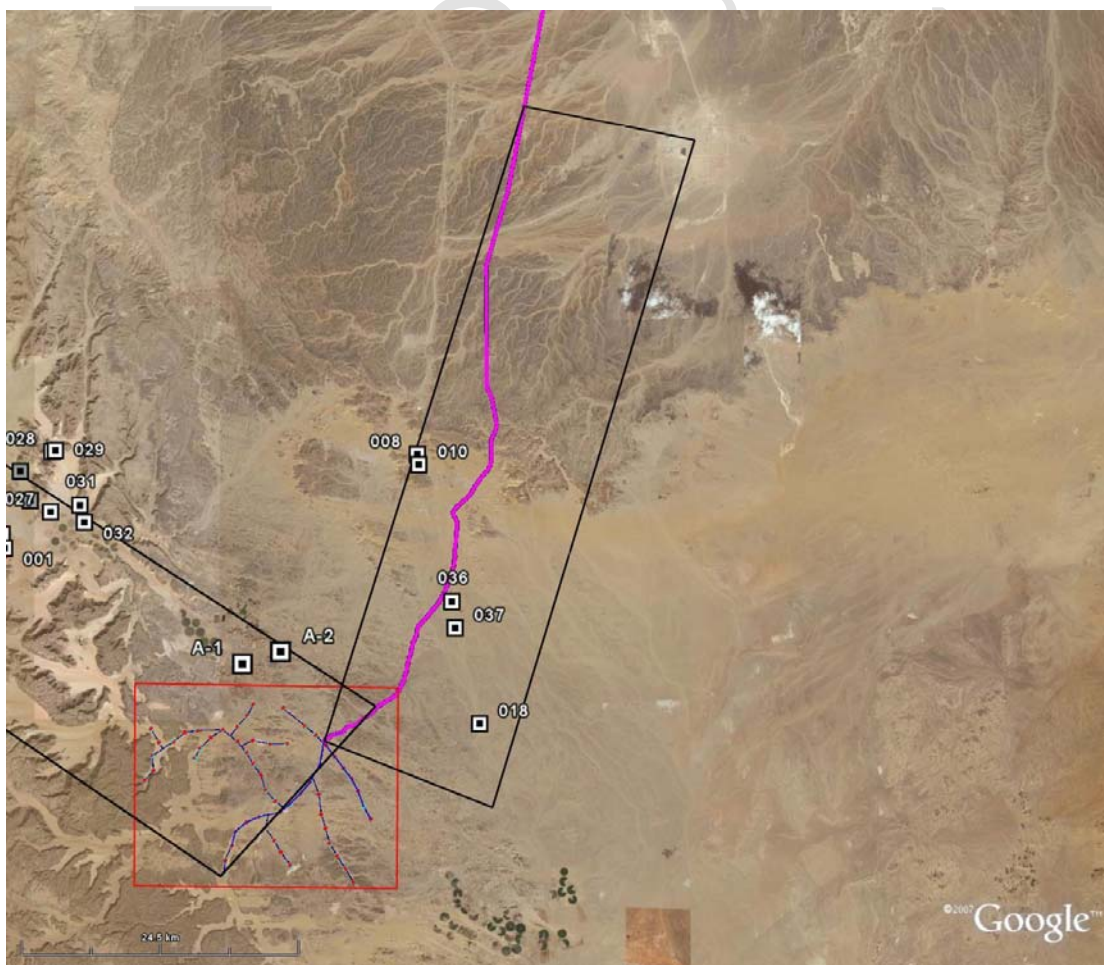


Figure 5.6 Archaeological Sites in Shediya Transmission Line Corridor

The archaeological team walked over the Shediya Transmission Line Corridor but did not identify any new sites even though the Shediya line corridor is largely undisturbed, Plate 5-8.



Plate 5-8 Shediya Transmission Line Corridor

5.3.5 Unknown Sites

Desk studies reveal that Disi and Mudawarah are located along an ancient Nabatean trade route, from Petra to Wadi Rum to Mudawara and to Medain Salih (a Nabatean city) in the Kingdom of Saudi Arabia, Figure 5.7.

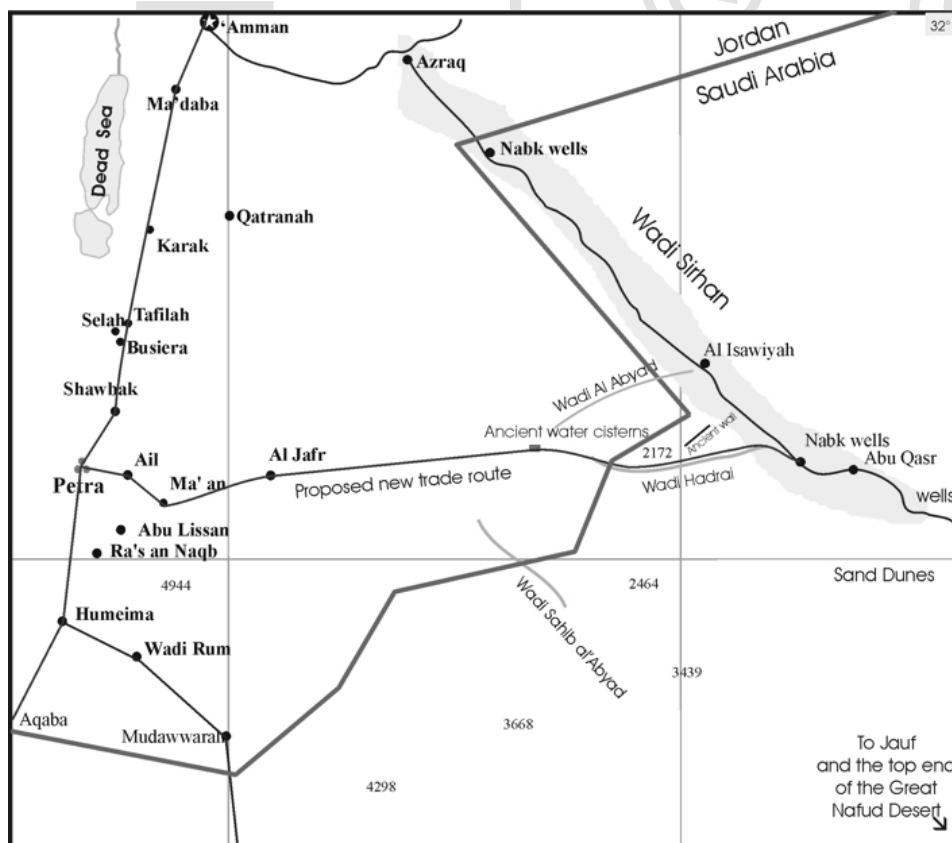


Figure 5.7 Nabatean Land Trade Routes

Around 6th Century BC, Nabateans settled in their capital city Petra. They were known for their trading skills and commenced between India, the Far East, Egypt, Syria, Rome and Greece. They dealt in a variety of goods including, spices, gold, medicine, iron, copper, perfume and fabrics. Petra was used as a trading crossroad between several cultures (Arabian, Assyrian, Egyptian, Greek and Roman). Control of the trade routes was the main livelihood of the Nabatean Empire.

Therefore, it must be considered possible that other sites, unknown at this time, will exist within potentially affected corridors.

5.4 IMPACTS AND MITIGATION

5.4.1 Impacts

At this time there is no requirement for any site discovered during the study to be destroyed.

The main other impacts associated with well drilling and pipeline construction are listed below. Impacts during the operation of the pipeline will be minimal.

1. Excavation, Site Clearance and Borrow Sites

There is a limited risk that project works will damage known cultural sites during site clearance and excavation. Similarly, it is likely that not all archaeological sites within the construction corridor have been discovered and that a new site may be damaged or potentially damaged by excavation and site clearance.

2. Dust and Pollution

Dust generated from construction activities may have an impact on archaeological sites located within 300-500 meters. Specific impacts include:

- Changes to the color of the ashlar, primarily from black to white or from white to black.
- Oxidation of sulphur dioxide leads to sulphuric acid and can cause the deterioration of the stones.

3. Vibration

Operation of construction equipment during the construction phase may induce tensile and compressive stresses in archaeological remains or sites.

4. Looting

Looting is a major threat to existing archaeological sites. While most of the identified sites are not considered to be under particular threat from looting, precautionary measures may need to be adopted. These may include measures such

as fencing that currently are the responsibility of the Department of Antiquities of Jordan.

5.4.2 Mitigation

The following programme of mitigation measures is proposed:

1. Design Review. This shall be carried out by the Project Company and EPPC.

On completion of the Design Review the PC shall define any sensitive areas. These will be sites within which they require specific precautionary measures as specified in the CRM to be employed.

2. Integration of a Cultural Resources Management Plan (CRM) within the framework of the Project Construction Environmental Management Plan.

The CRM will establish the responsibility of the various stakeholders including the Department of Antiquities / Ministry of Tourism, PS and EPCC ED and specify the lines of communication between them.

The CRM shall contain the following key components:

- Definition of sensitive sites.
- Good operating practices for contractors working in any defined sensitive zones. This may for example include excavating activities using a simple manner, using light equipment and techniques, employment of dust suppression measures.
- Requirements for event specific inspections. These will be pre-programmed visits by archaeologists associated with the opening and demarcation of a borrow area and the opening of any site deemed important or at risk. These will be defined at the conclusion of the Design Review.
- Monetary penalties for non-compliance with these specified procedures;
- Monitoring procedures and penalties for non-compliance. Regular and frequent site inspections will be required for effective monitoring of the contractors compliance with applicable guidelines, regulations and statutes and contract specifications. Authorized agents from DAJ should be given access to all sites within the project corridor.
- "Chance-find" Procedures.

Chance find procedures must be applied by all construction contractors when any fossils, coins, articles of cultural value or antiquity or other similar remains are

found. Under these requirements the contractor must immediately inform the Project Company and the Department of Antiquities (Supervisor of the Cultural Resources Management Office of the Department of Antiquities) if any antiquities are encountered in any area during construction.

The Contractor should also note that the chance find procedure covers graveyards and individual burial sites.

When such sites are found the Department of Antiquities will assess the discovered remains and may carry out an emergency salvage excavation. Salvage excavation is only conducted during chance find incidents. Given the short time typically available for a salvage excavation, this type of work should be avoided.

The Contractor shall seek the written approval of the Department of Antiquities before the removal of any chance find building, foundation, structure, fence and other obstruction over 50 years old, and any portion which is in the construction zone. All designated salvageable material shall be removed, without causing unnecessary damage, and in sections or pieces which may be readily transported, and shall be stored by the Contractor at approved locations for later use or possession of the Department of Antiquities.

6.0 LAND ACQUISITION AND COMPENSATION

6.1 PRESENT SITUATION

6.1.1 Land Acquisition

The main tranche of land acquisition for the pipeline corridor and permanent facilities was completed by MWI in 2003 with compensation paid in accordance with the Land Acquisition Law No. (12).

Articles 11-26 of the LAL state the legal basis for compensation. These set out the following key principles and stages for the process:

1. Land value is essentially dependent on the amount of land confiscated, the purpose of confiscation, the percentage of land confiscated, and status and size of the leftover land. Such details will be taken into account in setting the proper amount of compensation.
2. The land owner is responsible for paying any previous taxes on the property concerned prior to compensation.
3. Compensation, approval and authentication is required by the Directorate of Land and thereafter by the Cabinet.
4. The relevant party (in this case the MWI) is required to pay the compensation to the land owner directly or via deposits placed under their names in the Treasury for a period of three months.
5. Non-payment results in a 9% annual interest being added to the compensation starting three months after the due date.

Two types of properties were acquired:

- (i) Privately owned land and property; and
- (ii) Government, or Treasury, owned land.

Given the policy of MWI is to avoid expropriation as much as possible, the majority of the land needed for the pipeline corridor is within confined to the right-of-way for the existing Aqaba-Amman Highway and other highways. MWI obtained an authorization from the Ministry of Public Works and Housing to construct the pipeline within the road's right-of-way.

Land acquisition for permanent facilities (such as pumping stations, reservoirs etc.) was completed for the following components:

- (i) Abu Alanda reservoir;
- (ii) water pumping stations (with the exception of Madaba);

- (iii) water intake at Disi; and
- (iv) flow control stations.

Currently MWI is in the process of acquiring the last plot of land for the pumping station at the Madaba Highway interchange, Figure 6.1.

To date there are no outstanding disputes, grievances, or court claims.

6.1.2 Resettlement

From the outset Project alignments were selected to avoid residential property and other assets, with the use of road ROWs preferred.

However, the recent survey has identified 6 residential properties within the ROW that may be under threat. It remains the policy for the Project to avoid residential areas, and each of these cases should be subject to specific further review during the design revisions.

6.1.3 Other Compensation

In addition to the land acquired for permanent facilities and the pipeline corridor, there will be some temporary physical and/or economic displacement as a result of construction activities. This will include: temporary impacts on structures and properties constructed in the right of way along the highway; temporary disruption and disturbances during trenching and laying of the pipeline in some residential areas (in the northern segment of the route towards Greater Amman Area); loss of business income as a result of disruption caused by construction activities; potential loss of grazing grounds and small farmlands; and temporary loss of land.

Similarly, since 2004, a number of land uses (including informal and untitled uses, usufruct rights, and temporary and permanent uses) have evolved.

As a result five potential categories of impact are identified:

1. Removal of Assets within Road Rights of Way

The preferred option of construction within main highway rights-of-way was intended to reduce expropriation of private land however, it also has the effect of minimising the number of fixed assets, (including fruit trees and other permanent crops) that may be lost.

Notwithstanding the above it is evident from reconnaissance surveys⁸ that some homes and businesses (and associated assets) are located partially within the road rights of way and may be adversely affected by the Project.

However, the presence of large structures is rare. The main items include trees, awnings, kiosks, fences, walls, display areas, forecourts and carparks. Other assets such as advertising billboards, bus shelters, and footbridges also lie within the ROW.

Many of these facilities may be regarded as not having legal status under Jordanian law.

2. Rainfed Annual Crops

At present some areas on the margins of the ROWs are used for small scale rainfed annual crop production. These include areas that are known to catch and retain rainwater such as inside interchange loops. In all such cases the following procedure will be followed.

- Communities will be advised 4-6 months before construction that the affected lands will be required for the project. During this consultation communities will be advised that all crops at present on such lands are expected to be harvested prior to construction start.
- No compensation will be paid for crops planted after the date of the consultation.

In the event that the above process is not completed and documented, the Contractor will be liable for compensation for planted crops at an approved rate.

Horticultural and other intensive production centres will be addressed as assets under item 1 above.

3. Potential loss of earnings resulting from temporary loss of access

⁸ It is also understood that some government buildings are within the right of way.

Inevitably, the construction of the proposed pipeline along road ROWs will have the effect of isolating properties and businesses from their existing point of access. In this instance two basic cases can be defined:

- Temporary, total or partial loss of access to the facility.
- Temporary loss of car parking areas and forecourts.

These impacts have the potential to cause a loss of trade and thus income.

The maximum potential length of impact in any one area (to allow for trenching, pipe laying and restoration of the road surface/land surface) is likely to be in the order of 6-8 weeks but may be much lower.

4. Nuisance from loss of access

As with businesses, residential units and other structures, including community facilities, may have their access restricted for an extended period. This will have nuisance impacts and in the case of social infrastructure could reduce the level of service provision available to communities.

5. Contractor negligence (i.e unplanned actions) resulting in loss of or damage to assets with or without secondary impacts of loss of earnings.

6.2 ELIGIBILITY CRITERIA

6.2.1 Existing Jordanian Criteria

The known existing and legal policy framework for compensation eligibility in Jordan is set out below in Table 6.1.

Table Error! No text of specified style in document..3 Entitlements Matrix Under Present National Legislative Framework

Adverse Project Induced Effect	Compensation need	Status	National Legislative Framework	Compensation Responsibility
Land Acquisition				
Land acquisition for project construction	Reasonable compensation payment for land acquired	MWI advise that major acquisitions already completed and compensation paid.	Land Acquisition Law (LAL)	MWI and DSL

Adverse Project Induced Effect	Compensation need	Status	National Legislative Framework	Compensation Responsibility
		Only outstanding acquisition is for Madaba pump station site.		
Other Compensation – Legal Assets and Activities				
Destruction of assets. May include businesses, walls, trees, forecourts, utilities infrastructure.	Payments to replace lost assets at market value.	MWI advise that compensation has been paid as per requirements of LAL	LAL	MWI and DSL
Damage or loss of crop or part of crop by temporary use of land (provided by MWI) by contractor	Payment for lost income	No actual case defined at this time. Proximity of agricultural lands to Project alignment is such that some crops may be lost To be addressed on case by case basis during construction These impacts can be easily excluded by good Contractor Management	LAL requires payment of equitable compensation Use of Civil Law (Articles 256-287). Or Directly negotiated settlement	MWI
Temporary loss of access and nuisance values resulting from planned construction activities.	Possible compensation for nuisance values or impacts on business activities	Not addressed	Use of Civil Law (Articles 256-287) Compensation requirements not explicitly set out. No established legal basis for estimating compensation requirement.	As a planned project activity MWI to negotiate compensation and provide funds.
Loss of business or income from dislocation caused by planned project activities.	Owner Payment for lost income Employee Compensation for income lost as result	Not addressed	Use of Civil Law (Articles 256-287) Compensation requirements not	As a planned project activity MWI to negotiate compensation and provide

Adverse Project Induced Effect	Compensation need	Status	National Legislative Framework	Compensation Responsibility
	of loss of employment or reduced wages/salary.		explicitly set out. No established legal basis for estimating compensation requirement.	funds.
Other Compensation – Assets and Activities Within Highway Rights of Way Required by Project				
Destruction of assets. May include businesses, walls, trees, forecourts, utilities infrastructure.	Replacement of lost asset	Not addressed	None	As a planned project activity MWI to negotiate compensation and provide funds.
Temporary loss of access to assets as a result of planned construction activities.	Possible compensation for nuisance values or impacts on business activities	Not addressed	None	As a planned project activity MWI to negotiate compensation and provide funds.
Loss of business or income from dislocation caused by project activities.	Owner Payment for lost income Employee Compensation for income lost as result of loss of employment or reduced wages/salary.	Not addressed	None	As a planned project activity MWI to negotiate compensation and provide funds.
Other Compensation – Damage / destruction resulting from unplanned Construction Activities				
Damage or destruction to assets resulting from unplanned actions.	Payments to replace lost assets at market value. Replacement of asset by contractor at cost to project.	Not addressed	None	As an unplanned project activity Contractor to negotiate and pay compensation

Adverse Project Induced Effect	Compensation need	Status	National Legislative Framework	Compensation Responsibility
Loss of business or income from dislocation caused by unplanned activities.	Further loss of income and incremental loss of customer base.	Not addressed	None	As an unplanned project activity Contractor to negotiate and pay compensation
Other Compensation – Temporary Access to Lands Beyond Project ROW for Project Purposes				
Right to use	Compensation due for use of lands.	Not specifically addressed. If required assumed to be a case by case negotiation.	Use of Civil Law	Contractor to negotiate and pay compensation under private contract.

6.2.2 Compliance with Policy Guidance from International Financiers

From the Table above it can be seen that the existing compensation framework is deficient in a number of ways when compared to IFC and World Bank guidelines. Most importantly:

- Under Jordanian legislation there is no explicit requirement for compensation for loss of income; for the loss of 'illegal' structures or assets, or for the loss of access to a road ROW for 'illegal' commercial purposes (i.e for trading);
- There is no specific legislation setting out a mechanism for payment of compensation to those suffering income or livelihood loss from planned construction works or project proposals.
- There is no specific legislation setting out a mechanism for payment of compensation to those affected by a temporary disruption to normal service or access provision from planned construction works.

6.2.3 Proposed Eligibility Criteria

The proposed 'adjusted' eligibility criteria are set out in Table 6.2. The compensation process is outlined in the ESMP, in Section 9.3.

Table Error! No text of specified style in document..4 Entitlements Matrix**A. Private Lands Outside Public Highway Rights of Way**

Type of Loss or Disturbance	Definition of Entitled Person (EP)	Definition of Entitlement	Actions	Responsible Agency
a. Land acquisition				
Arable Land	Land owner	<i>Land</i> Cash sum compensation at full market value <i>Crop</i> Market value plus 15% for loss. Market value = average of last three years price. Yield based on land capability and location within agroclimatological zones as assessed by Ministry of Agriculture. <i>Built Assets</i> Cash compensation at replacement cost. <i>Trees/Vines</i> Olive, Almond, Vines 20 yrs NPV discounted at 12% per dunum irrigated. <i>Other</i> Lump sum to be negotiated	1. Creation of the Project Valuation Committee comprising: - a representative of the MWI - a member of the affected community - a representative of the Ministry of Finance - two professional valuers, one each from the private and public sector. 2. Determination of market value for land, assets and crops. 3. Confirmation of Land Ownership 4. Grievance resolution relating to entitlements within project framework. 5. Opening bank accounts in the name of PAPs.	1. MWI Department of Lands 2. Valuation Committee 3. Land Directorate 4. Compensation Review Board 5. MWI 6. MWI
Subdivided Land	Land Owner	<i>Land</i> Cash sum compensation at full market value.		

Type of Loss or Disturbance	Definition of Entitled Person (EP)	Definition of Entitlement	Actions	Responsible Agency
		Assets Cash compensation at replacement cost	6. Prompt Payment by cheque within the stipulated period.	7. Land Directorate
Built lands	Land Owner	Residential building Cash compensation at full market value plus 15% for dislocation. Commercial Cash compensation at full market value plus 15% for dislocation.	7. Issuance of Certificate of compensation 8. Public Notice of all awards to PAP 9. Payment of all duties on the purchase of land not occupied by government.	8. MWI 9. MWI
Other Assets (e.g. wall, infrastructure, etc).	Asset Owner	Cash compensation at full market value.	1. Estimate payment. Tasks 4 to 7 from (a)	1.Valuation Committee Items 4 to 7 from (a)
b. Economic Losses				
Loss of Business	Business Owner – if different from land and building owner.	Re-establishment cost. Acquisition of access to equivalent premises and moving costs including deposits down payments etc. Plus 25% for economic dislocation; for loss of income in move plus loss of customer base.	1. Creation of Business Valuation Committee comprising: - a representative of the MWI - a member of the affected community - a representative of the Ministry of Finance - two professional valuers, one each from the private and public sector. 2. Determination of business loss value	1. MWI Department of Lands 2.Valuation Committee

Type of Loss or Disturbance	Definition of Entitled Person (EP)	Definition of Entitlement	Actions	Responsible Agency
			Tasks 4 to 7 from (a).	Items 4 to 7 from (a)
Loss of Employment	Employee	<i>Lost Income</i> Redundancy payment in accordance with Jordanian Labour Law. To apply to all employees irrespective of nationality.	1. Estimate payment in accordance with prevailing labour law. 2. Grievance resolution relating to entitlements within project framework. 3. Payment of cash to PAPs 4. Issuance of Certificate of compensation	1.Valuation Committee 2. Compensation Review Board 3. MWI 4. MWI
c. Temporary Economic Losses				
Temporary Loss of Business Income	Business Owner – all cases	<i>Lost Income</i> Negotiated payment equivalent to estimated loss of earnings plus 15% for dislocation and loss of customer base.	1. Estimation of losses Tasks 4 to 7 from (a)	1.Business valuation committee. Items 4 to 7 from (a)
Loss of wage /salary income	Employee	<i>Loss of Income</i> Pro-rata compensation to make up income to pre-project levels for duration of expected shortfall.	1. Estimate payment. Tasks 4 to 7 from (a)	1.Valuation committee Items 4 to 7 from (a)
d. Loss of Residence				
Loss of residence	Tenant	<i>Relocation cost.</i> Costs of obtaining rental of equivalent premises including moving costs, deposits, down payments, transport costs etc. Plus 15% dislocation fee.	1. Estimate payment Tasks 4 to 7 from (a)	1.Valuation committee Items 4 to 7 from (a)

Type of Loss or Disturbance	Definition of Entitled Person (EP)	Definition of Entitlement	Actions	Responsible Agency
e. Nuisance Effects				
	All affected land users	None – If affected person feels compensation is due they may seek redress through the courts.	Civil process. Parties to respond in accordance with their legal need.	Determined by court. To be paid by Contractor

B. Within Public Highway Rights of Way

Type of Loss or Disturbance	Definition of Entitled Person (EP)	Definition of Entitlement	Actions	Responsible Agency
a. Assets				
All assets	Asset owner	<i>Fixed Structure</i> Cash compensation at replacement cost. <i>Temporary Structure</i> Nil – owner advised of start of operations in advance of project works and may relocate.	1. Estimate payment Tasks 4 to 7 from (a)	1.Valuation committee Items 4 to 7 from (a)
b. Economic Losses				
Loss of Business	Asset owner	<i>Lost Income</i> Negotiated payment for economic dislocation.	1. Estimation of losses Tasks 4 to 7 from (a)	1. Business valuation committee. Items 4 to 7 from (a)
Loss of Business	Asset operator/user/tenant – if different from asset owner.	<i>Lost Income</i> Negotiated payment for economic dislocation.	1. Estimation of losses Tasks 4 to 7 from (a)	1. Business valuation committee. Items 4 to 7 from (a)
Loss of Employment	Employee	<i>Lost Income</i> Negotiated payment	1. Estimate payment in accordance with prevailing labour law. 2. Grievance resolution relating to entitlements within project framework. 3. Payment of cash to PAPs	1.Valuation Committee 2. Compensation Review Board 3. MWI

Type of Loss or Disturbance	Definition of Entitled Person (EP)	Definition of Entitlement	Actions	Responsible Agency
			4. Issuance of Certificate of compensation	4. MWI
c. Temporary Economic Losses				
Temporary loss of Business Income	Owner – all cases	<i>Lost Income</i> Negotiated payment equivalent to estimated loss of earnings plus 15% for dislocation and loss of customer base.	1. Estimation of losses Tasks 4 to 7 from (a)	1. Business valuation committee. Items 4 to 7 from (a)
Loss of wage /salary income	Employee	<i>Lost Income</i> Negotiated payment equivalent to estimated loss of earnings plus 15% for dislocation and loss of customer base.	1. Estimation of losses Tasks 4 to 7 from (a)	1. Business valuation committee. Items 4 to 7 from (a)

6.2.4 Initial Assessment of Affected Properties, Assets and Businesses

Right of way surveys have been undertaken in order to determine the scale and type of compensation that may be required as a result of the Project construction and operation.

As part of the implementation of the Compensation Plan a census survey will be undertaken to determine the final list of properties and assets that may be affected. This will be completed once the final design is fixed, (See Section 9.4.2).

A preliminary survey was undertaken in December 2007 to categorise and evaluate approximate numbers of project affected parties.

The survey was carried out from the point where the pipeline route meets the Desert Highway near Al Hesa and continued to the termini at Dabuk and Abu Alanda. The lower section of the route (below Al Hesa) runs through largely uninhabited desert areas and was not surveyed.

The survey was undertaken under the assumption that the pipeline along the entire length from Al Hesa to the Madaba pump station ran on the eastern side of the DH.

In addition, the survey also provided an indication of the number of individuals and businesses that may be affected by nuisance values, especially noise and dust during construction.

6.2.5 Asset and Property Survey 2008

Whilst the results of the December 2007 survey, gave a good indication of the numbers and types of facilities that may be affected it did not identify assets at risk. Removal of assets, be it temporary or permanent, would also be eligible for compensation.

Therefore, in response to recommendations by potential Project funding partners further RoW surveys were undertaken to inventory the properties, assets and businesses currently within the projects area of impact to determine the type of activity and likely level of disruption.

Three categories of affected party were defined.

- Properties affected by temporary impacts, i.e. access loss.
- Properties that would be permanently disrupted.
- Assets directly threatened by the Project.

In total some 317 businesses and properties were assessed as likely to be affected by during the construction period, as shown below.

Project Component	Business likely to be effected by construction activities
Hesa Town to Madaba Interchange	26
Madaba interchange to Abu Alanda	46
Madaba interchange to Dabouk	245
Total	317

6.2.6 Survey Details

The survey was carried out between 14th and 20th February 2008 with teams of surveyors walking the RoW to record the details of impacted property types and assets. The Project Corridor was not defined on the ground but on the basis of layout mapping overlain on Google Earth base maps.

In order to facilitate the survey a survey form was developed using the following property and asset coding:

Property codes		Asset codes	
House	P1	Wall	A1
Large office	P2	Fence	A2
General grocery store	P3	Trees	A3
Vehicle workshop	P4	Bus shelter	A4
Religious structures	P5	Footbridge	A5
Plant nursery	P6	Road sign	A6
Car sales	P7	Public art	A7
Hotel	P8	Other asset	A8
Light industrial	P9	Underpass	A9
Restaurant	P10		
Kiosk	P11		
Other	P12		

GPS points were taken for every defined affected structure.

6.2.7 Assessment Categories

Directly threatened property & assets

Property or assets observed within the ROW are regarded as being in direct conflict with the construction corridor and therefore are recorded as being directly threatened by the Project.

Plate Error! No text of specified style in document.-1 gives an example of an assumed ROW boundary, based on limit of adjacent properties (dashed white line). The blue extension from the property lies beyond the building limit and into the ROW. This latter structure would be considered to be directly threatened by the construction corridor.



Plate Error! No text of specified style in document.-1 Example of Asset Within ROW

Access impeded, no alternative available

This category is to determine the potential volume of businesses that will suffer access (temporary and permanent) disruption as a result of the construction corridor. Access impedance is deemed to be the primary cause of income loss and a cause of significant nuisance.

In each such case the surveyor was asked to determine whether an alternative access could be made available.

Access impeded, alternative available

This category is also to determine the potential volume of businesses that will suffer access (temporary and permanent) disruption as a result of the construction corridor. Access impedance is deemed to be the primary cause of income loss.

In this case businesses with impeded access are those non-directly threatened businesses along the ROW which are disrupted by the construction corridor and where there is an alternative means of access available.

6.3 ESTIMATED NUMBER OF PROPERTIES AND ASSETS IMPACTED**6.3.1 Private Land – Previously Appropriated**

Land already acquired by the Project is in use for agriculture, olive groves and informal temporary grazing. The area of grazing land lost is insignificant in size in relation that available locally and therefore the loss of access to this land does not require compensation.

Compensation for annual crops planted on lands previously acquired shall not be paid provided Communities are advised during Consultation 4-6 months before construction that the affected lands will be required for the project. During this consultation communities will be advised that all crops on such lands at that time will be expected to be harvested prior to construction start.

No compensation shall be paid for annual crops and for crops planted after the date of the consultation.

Plates 6.2 to 6.4 show the permanent land take areas (and adjacent temporary sites).



Plate Error! No text of specified style in document.-2 Abu Alanda temporary (outlined in yellow) and permanent (red) sites

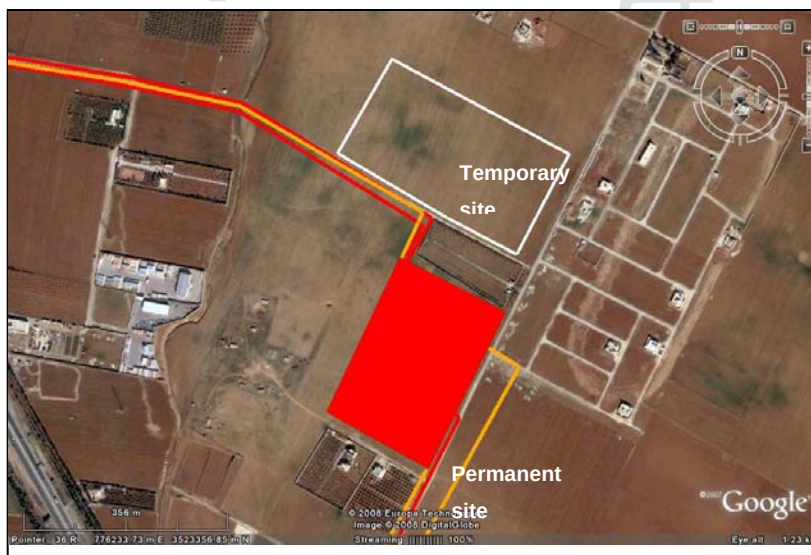


Plate Error! No text of specified style in document.-3 Madaba site



Plate Error! No text of specified style in document.-4 Permanent site within Eastern Desert (NEPCO)

6.3.2 Impacts within ROW

Sections 6.5.2.1 – 6.5.2.3 detail the results of the ROW survey and give an indication of the quantity and type of assets to be removed, and also an indication of the type and quantity of properties subject to access severance.

6.3.2.1 Directly affected property

The survey results indicated a number of property types at risk by Project activity. These are detailed within Table 6.3.

Table Error! No text of specified style in document.-5 Quantity and type of directly affected property

Route section	Property type and numbers affected											
	Housing	Large office	Vehicle workshop	General grocery store	Religious structures	Plant nursery	Car sales	Hotel	Light industry	Restaurant	Kiosk	Other
Madaba – Abu Alanda	6	0	33	18	2	11	-	-	-	-	-	6
Madaba- Dabuk reservoir	10	3	0	0	2	28	-	-	-	-	5	14
Al Hesa - Madaba	7	4	7	11	-	-	-	-	-	7	20	20
TOTAL	23	7	40	29	4	39	0	0	0	7	25	34

The presence of housing prompted a further review of the alignment against property locations. This ruled out most of the properties with only six now considered at risk by the current corridor arrangement. Design revisions will modify the alignment to avoid residential properties and then avoidance of other property types.

Details of properties are within Appendix 4.

6.3.2.2 Directly affected assets

Estimates of assets in direct conflict with the alignment (risk of removal) are detailed in

Table Error! No text of specified style in document.-6. The category of 'other' includes items such as drainage pipes and water tanks. The number of individual trees at risk is not known at this stage and the assessment of 'tree stands' includes the long landscaped stretches along the main highway.

Table Error! No text of specified style in document.-6 Directly Affected Assets

Route section	Asset type and numbers affected								
	Wall	Fence	Tree stands	Bus shelter	Footbridge	Advertising billboard	Public Art	Other assets	Underpass
Abu Alanda	76	38	34	-	3	13	5	17	1
Madaba-Dabuk reservoir	122	10	66	4	5	13	2	8	9
Al Hesa – Madaba	22	23	24	12	5	29	1	3	2
TOTAL	220	71	124	16	13	55	8	28	11

6.3.2.3 Access impacts

Access impacts are categorised as those likely to suffer complete loss of normal accessibility to property and those which may temporarily lose the normal access route but have an alternative available.

Those properties and businesses with no alternative access are used to indicate the numbers and property types that may be eligible for loss of income (temporary)

compensation. For those with alternative access the eligibility for compensation would be related to whether the loss of the main access point is a crucial element of their normal business operations.

Table Error! No text of specified style in document.-7 to

Table Error! No text of specified style in document.-9 detail the results of the ROW survey of affected access.

Table Error! No text of specified style in document.-7 Property types and access impedance estimates – Abu Alanda

Property type	Access impacted, alternative access available	Access impacted, no alternative access
Housing	0	2
Large office	0	2
Vehicle workshop	33	52
General grocery store	16	81
Religious structures	0	1
Plant nursery	7	28
Car sales	2	9
Hotel	1	0
Light industry	4	13
Restaurant	3	2
Kiosk	0	0
Other	11	26

Table Error! No text of specified style in document.-8 Property types and access impedance estimates – Dabuk

Property type	Access impacted, alternative access available	Access impacted, no alternative access
Housing	26	29
Large office	2	2
Vehicle workshop	1	1
General grocery store	14	3
Religious structures	0	0
Plant nursery	0	2
Car sales	1	0
Hotel	0	0
Light industry	0	0
Restaurant	0	0
Kiosk	0	0
Other	8	5

Table Error! No text of specified style in document.-9 Property types and access impedance estimates – Hesa to Madaba

Property type	Access impacted, alternative access available	Access impacted, no alternative access
Housing	10	7
Large office	2	2
Vehicle workshop	10	13
General grocery store	17	28
Religious structures	2	0
Plant nursery	2	1
Car sales	0	0
Hotel	0	0
Light industry	0	0
Restaurant	6	1
Kiosk	1	3
Other	0	3

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7. PUBLIC CONSULTATION

7.1 Previous consultation

During the development of the 2004 ESA, MWI conducted a set of communication and consultation activities in order to ensure that the stakeholder's views, issues of concern, foreseen impacts and worries were taken into consideration while assessing the project-related impacts.

A substantive dialogue with stakeholders from national and local government organizations, NGOs, and interested citizens was undertaken in a two-phased process – one when the study was started, and the second when the draft ESA was available.

Phase I consisted of two scoping sessions, one in Amman and one in Aqaba in March and April 2003, respectively. The main objective of these sessions was to initiate a two-way dialogue with a number of stakeholders that included government agencies, NGOs and project affected communities in Disi, Aqaba, Tafileh and Ma'an. The consultation sessions provided a platform for the stakeholders to obtain information on the Disi-Mudawarra to Amman Water Conveyance Project and to raise their concerns, ask questions and provide feedback.

Phase II consisted of three sessions in Abu Alanda, Amman and Aqaba held in November 2003. The main objective of these sessions was to present to project affected communities the findings of the ESA and receive feedback from the stakeholders. The stakeholders raised concerns regarding potential impacts of the project and related construction activities. All the issues discussed during the three sessions are documented in the 2004 ESA.

MWI disclosed and made accessible to the public complete copies of the Final ESA at their offices, as well as at the offices of the Ministry of Environment and the Aqaba Special Economic Zone. ESA Executive Summaries in English and in Arabic were disclosed at the following locations:

- Ministry of Public Works and Housing;
- Ministry of Health;
- Ministry of Municipal Affairs;
- Ministry of Agriculture;
- Royal Society for Conservation of Nature;
- Department of Antiquities; and
- Governorates of Karak, Tafileh, Ma'an and Madaba.

The World Bank also disclosed printed and electronic copies of these documents at the InfoShop in Washington, D.C. and their website in 2004.

7.2 2008 CONSULTATION

As a supplement to MWI's above-described community engagement activities of 2003 and 2004, the Project Company began the process of conducting follow-up consultation with affected communities in February 2008.

Starting with the Disi, Qatranah and Abu Alanda communities and eventually expanding to include other major communities to be affected over the coming months, this round of consultation is aimed at facilitating the informed participation of project affected communities to enable the Project Company to incorporate into their decision-making process the views of community leaders and members on issues that directly affect them (such as construction contractor compliance with mitigation measures, and minimizing disruption to their daily lives).

7.2.1 Stakeholder Identification and Analysis

The consultation sessions were arranged with the cooperation and coordination of the Municipality Mayors. The Mayors were presented with a project description in Arabic accompanied by maps of the project alignment. The Mayors were also informed of the objective of the public consultation and the need to hold the session in an easily accessible location for the public (the Municipality Buildings).

The Mayors formally invited local Bedouin leaders, elected government deputies and posted a public invitation in the respective municipality offices (on the entrance door).

Government officials from the Ministry of Public Works and Housing, Ministry of Environment, Department of Antiquities and Ministry of Agriculture were invited to attend all three consultations.

7.2.2 Information Disclosure

All attendees were presented with a project description in Arabic accompanied by maps of the project alignment. All consultation sessions were held in Arabic, a translator was available to translate English presentations to Arabic.

Each consultation was facilitated by representatives from the Ministry of Water and Irrigation (MWI) the Project Company (GAMA Enerji A.S). and their ESA consultants, Dar Al Handasah.

The MWI gave a brief description of the project and GAMA Enerji A.S. provided an overview of the construction schedule and potential impacts of the project. The floor was then open for discussion to discuss the concerns of the community and any other considerations that have not been previously addressed.

Contact information was exchanged between the Municipality Mayors and the facilitators to ease dissemination of information to the affected communities. The Municipality Mayors will be provided with an Arabic copy of the Minutes of Meetings of the respective public consultations.

A copy of the Executive Summary in Arabic will be distributed for information disclosure purposes to the above listed municipalities as well as the Ministry of Water and Irrigation and the Ministry of Environment.

7.2.3 Meeting Reviews

7.2.3.1 Disi Municipality

The Disi Municipality Mayor was contacted by phone on February 19th to discuss the project's need for a Public Consultation in the Municipality. The Mayor was visited by public consultation facilitator on February 20th. He was provided with all the necessary information regarding the project (personalized for the Disi area).

The public consultation was held on February 28th at the Disi Municipality Meeting Hall. There were 28 men present (Plate 7-1). They comprised of Bedouin Leaders, Community Leaders and members of the community. The attendees voiced and discussed their opinions and concerns with the facilitators.



Plate 7-1 Attendees at the Disi Consultation, February 2008

The culture of the area did not permit women to be included in the public consultation. Therefore a female facilitator met with 12 women in the King Abdullah Human Development Society for a women only session.

7.2.3.2 Al Qatraneh

The Qatraneh Municipality Mayor was contacted by phone on February 19th to discuss the projects need for a Public Consultation in the Municipality. The Mayor was visited by

public consultation facilitator on February 21st. He was provided with all the necessary information regarding the project (personalized for the Qatraneh area).

The public consultation was held on March 2nd at the Qatraneh Municipality Meeting Hall. There were 11 men and 1 woman present, they comprised of Community Leaders and members of the community. The attendees voiced and discussed their opinions and concerns with the facilitators. The culture of the area did not make it comfortable for women to be included in the public consultation. Therefore a female facilitator met with 8 women in a local residents' house for a women only session.

7.2.3.3 Quweismeh (includes Abu Alanda)

The Quweismeh Municipality Mayor was contacted by phone on February 19th to discuss the projects need for a Public Consultation in the Municipality. The Mayor was visited by public consultation facilitator on February 21st. He was provided with all the necessary information regarding the project (personalized for the Quweismeh area).

The public consultation was held on March 3rd at the Mayors office at Quweismeh Municipality. There were 10 men and 1 woman present, they comprised of Community Leaders and members of the community. The attendees voiced and discussed their opinions and concerns with the facilitators.

Women and men from the community were invited to the consultation session by the Mayor and a facilitator. The shop owners in the area did not show an interest in attending the consultation. Therefore the facilitators provided the Mayor with copies of the project brief for public information.

7.3 SUMMARY OF ISSUES RAISED

A full record of the Consultation sessions is provided as Appendix 5. The following text highlights the main issues of concern in each Municipality.

7.3.1 Disi Municipality

The issues raised during the Disi Municipality public consultation are listed below:

- How will the community benefit from this project?
- Disi water is being pumped to Aqaba and will be pumped to Amman but the government has not addressed the community's need for water such as an additional well for the municipality?
- The community demanded that the Ministry official convey their concern regarding financial support to the government. The community feels that use of the Disi water

for supply of Aqaba and now for Amman should bring them financial benefit. They suggested for example that a 1 fil per metre 'tax' may be paid to provide support to local communities and local projects.

- Will there be job opportunities for the men of the municipality? If so the project should work closely with one member of the community (Head of the Municipality) in regards of setting up consultation sessions and employment opportunities.
- Will university students receive scholarships for science related subjects and then be hired by GAMA during the operation of the project?
- The community is currently limited to one well used for agriculture, will the Disi project limit extraction from this well? The community has requested the government to commission a new well but the request was rejected. If the Disi project effects the existing well or does not let the community commission a new well the communities livelihood will be affected.
- Will the land above the aquifer collapse after the water is extracted?
- Disi Aquifer is not a renewable source. Has the government looked into other alternatives for water?

7.3.2 Qatraneh Municipality

The issues raised during the Qatraneh Municipality public consultation are listed below:

- What is the fate of the current 20 wells that supply Amman with water?
- Where will the pipeline be located? The community had some bad experiences during the construction of the Gas Pipeline. In particular, they did not believe that the contractor controlled dust and noise levels around homes and businesses. The community had complained to the Contractor but nothing was done to minimize the nuisances. Also, the community was concerned that the pipeline would run through private land. If so, this would devalue their land and the regular compensation process does not take that into consideration. Several community members were disgruntled by the compensation process.
- What will happen to roads that are damaged by the construction of the pipeline? Again project experience for the gas pipeline was that they would not be.
- Will there be any pipeline maintenance stations close to Qatraneh?
- Other contractors during previous projects promised to hire workers from the municipality and failed to do so. Will this happen with the Disi project?
- What is an emergency water turnout? Will this benefit us during the project.
- Will dust and noise be taken into consideration when constructing the project?
- Will the community benefit from this project?
- Will this project improve the quality of the water in Qatraneh?

7.3.3 Quweirah Municipality

The issues raised during the Quweirah Municipality public consultation are listed below:

- What is the duration of the project?
- How will the company address negative impacts such as excavation activities and crossing streets?
- Have alternative routes been considered to minimize the construction cost and to avoid any possible damage to other piping utilities in the area.
- Is the company aware of the proposed Municipality of Greater Amman to construct a bridge at one of the intersections? Will this be taken into consideration during the finalization of the design?
- Will the project consider working longer shifts in sensitive areas so as not to affect the businesses?
- Will the Contractor meet the community after finalizing the pipeline alignment?

7.4 PROJECT COMPANY COMMITMENTS

During the Consultations the Project Company informed the communities of their intent to:

- Hire labourers (skilled and unskilled) from the local communities. The labourers will be trained to international standards.
- Use local materials where available.
- Consider providing scholarships to community university students.
- Involve communities and community leaders during the final design of the project.
- Hold on going consultation in all the communities: The communities will be consulted on a regular basis to address compensation issues, complaints, and other community raised concerns. The proposed consultation framework below is proposed:

Action/ Stage	Meeting
Draft Design	Community Meeting 1
Before construction start (CS)	Community Meeting 2
90 days after CS	Community Meeting 3
360 days after CS	Community Meeting 4
720 days after CS	Community Meeting 5
1080 days after CS	Community Meeting 6
1460 days after CS	Community Meeting 7

Additional community consultation sessions will be set up if needed (on a case to case basis).

8. CUMULATIVE IMPACTS

8.1 INTRODUCTION

The cumulative impacts of the Disi Project are discussed on three levels.

- In relation to projects effects on the water sector.
- In relation to the cumulative effect of large scale regional projects on project affected areas that will be being implemented in Jordan over the same period as the Disi project.
- With respect to the cumulative impacts, direct and secondary impacts of the Disi project on the surrounding physical and socio-economic environment.

8.2 WATER SECTOR

Provision of increased water supply in Amman will in turn increase the load on the existing wastewater collection and treatment system. If there is to be a long term continuous increase in water usage this will need to be matched by an increase in the capacities of the existing collection networks and treatment plants.

Similarly, unless the project is accompanied by other measures to manage consumption the increased availability of water in Amman is likely to promote increased water wastage.

8.3 REGIONAL IMPACTS

In addition, to the ongoing construction boom being experienced in Amman at present, there are three major regional scale projects ongoing or committed in areas of Greater Amman that may generate cumulative impacts.

Amman Ring Road - ARR

The Amman Ring Road Project is co-financed by the World Bank, European Investment Bank and the Arab Fund for Social and Economic development. It is expected to have a total length of 116 km. Phase 1 of the ARR is currently under construction.

The ARR will connect the Desert Highway some 18 km south of Amman city center and travel in a north western direction towards Naur, continuing north towards Salt Highway, to Amman/Jerash Highway and finally connecting to Zarqa Highway in the north east. The ARR is expected to alleviate traffic in the rapidly growing capital of Jordan.

The ARR will cross the Disi Pipeline on the Desert Highway 18 km South of Amman city center.

Amman Development Corridor – ADC

The Amman Development Corridor is associated with the first phase of the Amman Ring Road Project, approximately 40kms from the Desert Highway to Zarqa.

The ADC includes the ongoing development of a new Customs Depot that will provide a larger site with improved access and facilitate adoption of systems that improve the coordination of clearance procedures with the five main land border crossings and Aqaba port.

The major urban development components of the ADC, between Sahab and the Desert Highway are currently under Master Planning with construction expected to be initiated in 2009.

The project is co-financed by the World Bank, European Investment Bank and the Arab Fund for Social and Economic development.

Queen Alia International Airport Upgrading Project

The Queen Alia International Airport (QAIA) Upgrading Project is expected to increase the passenger capacity of the airport from 3.2 million to 9 million a year following the completion of the project. The expansion is envisioned to be completed in 2010.

The design will include an upgrade to the existing airport facility (airfield hard stands and paved areas, lighting, fuel network systems, water and storm water drainage network) and the construction of a brand new terminal.

Aqaba is undergoing large scale development at present and this is expected to continue for a number of years and this must also be integrated into the cumulative assessment, though in this case it is treated as a single project.

New cement factory, Al-Qatranah

Licence has been granted for the construction of a new cement factory in Qatranah. Construction is due to commence in 2007, and completed by 2009.

A summary of the predicted Regional cumulative impact is provided in Table 8.1.

The cumulative effect of the Disi project will be felt strongly in one main area during construction; by placing further demands on a construction materials sector that is already suffering from supply constraints and rapidly rising costs.

Table 8.1 Summary of Regional Cumulative Affects

Likely Impact		ADC	ARR	Cement Factory	QAIA Upgrading	Aqaba	Disi SCI
Construction	Construction material demand	••	••	•	••	••	✓✓-
	Water demand	••	•	•	•	•	✓-
	Power demand	•	•	••	•	•	-
	Emissions to air	•	•	••	•	•	✓-
	Emissions to water	•	•	•	•	•	-
Operation	Water demand	-	••	•	•	••	✓-
	Power demand	-	••	•••	••	••	✓✓-
	Emissions to water	-	-	-	-	-	-
	Traffic generation	••	••	•	••	•	-
	Employment	+•	+••	+•	+•	+••	+•
	Air and climate change	•	•	•	••	•	U
	Landscape & townscape	••	••	•	-	•	-
	Quality of life and recreation	-	+••	•	-	+•	✓✓+
	Use of natural resources	•	-	••	•	••	✓-
	Production of waste	-	••	•	•	•	-

Project Impact	SCI – Significant cumulative impacts
• -ve Impact	✓-+ Negative or positive significant impact
•• Significant -ve impact	✓✓-/ + Large scale negative or positive benefit
+• +ve Impact	U Impact uncertain
+•• Significant +ve impact	- Zero or negligible forecast effect
- negligible impact	

This applies both in terms of locally sourced materials and to those materials that must be sourced internationally.

During operations the project is expected have only one potentially major effect and that is to place high additional power demands in an area with some supply constraints at present and projected future significant demand. This issue is being addressed by the authorities.

8.4 DISI SECONDARY AND DOWNSTREAM IMPACTS

Given the lack of facilities and employment opportunities in the previously uninhabited lands from the well field to Hesa town, the construction of the Disi Pipeline is not considered likely to encourage settlement or unplanned development in these areas.

Similarly, given that the Project will not generate significant permanent employment or other resource availability in these areas no larger scale changes or acceleration of existing changes to livelihoods of existing traditional communities are expected.

Finally, there is no reason for the Disi Project to increase rates of development in the development corridors within which it is proposed to run.

In this context, it is considered unlikely that the Project will generate development, planned or unplanned, in areas where significant adverse cumulative secondary and downstream impacts may be generated.

In the absence of such impacts potential secondary and downstream effects are anticipated in one cases only.

8.4.1 Modified Access Network

Although the area between the main Highway and the Well field is largely unoccupied it has an established network of access tracks and these will be linked in some way to natural resource use patterns.

During the construction of the Disi Project a new network of roads will be developed that will provide modified levels of service throughout this area. This may in turn cause a shift in road use patterns with a consequent shift in the pattern of use of resources. If this were to occur it may place increased pressure on the natural resources of affected areas, including important biological resources.

Such changes may be exacerbated by the availability of water at sites where it was previously unavailable, either from construction sites or potentially, from the effects of construction activity in wadi areas. At worst this could include localised damming of wadis.

9. ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

9.1 INTRODUCTION

This ESMP has been prepared in response to the findings of the original ESIA, the findings of the studies prepared under this Addendum and to the adoption of a BOT approach to project implementation.

A summary of the impacts to be addressed in the ESMP is provided in Tabular form in Section 2.

The proposed ESMP will have four components:

- Institutional Framework
- Mitigation Plan: This comprises three elements. A Design Review, a Compensation Plan and a Construction Management Plan;
- Monitoring Plan; for all project phases.
- Communications Strategy.

Each of these elements is detailed below, in Sections 3, 4, 5 and 6.

An outline implementation plan is provide for all project phases in Section 7. This links all major ESMP activities to project schedules and milestones and summarises the allocations of responsibility for activities to the various parties.

This ESMP requires that the eventual operator of the Project must have in place a comprehensive EMS prior to initiation of operations. It is expected that this will ensure that the issues defined in the ESIA and this Addendum will be adequately addressed. Therefore, the emphasis in this ESMP is on the management of impacts that may arise from the pre-construction and construction Phase of the Project.

A brief outline of the expected content of the required EMS is provided in Section 8.

9.2 PROJECT IMPACTS

Significant project related impacts defined in the 2004 EIA and this Addendum are listed by time of impact within project implementation in Tables 9.1A to 9.1C.

Table Error! No text of specified style in document..10 (A-C) Impacts summaries**A Pre-Construction Impacts Summary**

Impact	Source	Receptors
Social Unease	Misinformation about project activities and impacts on communities. Poorly planned and executed consultation prior to and during compensation planning exercise No, or inadequate compensation for lost business and assets. Delayed payment of compensation. Project works going ahead without prior notification to communities.	Affected Communities in particular but effects may be felt in wider society if incorrect data is widely disseminated.
Project Delay	Non compliance with conditions imposed on the Project	All project stakeholders.

B Construction Impacts Summary

Impact	Source	Receptors
Noise	Site preparation Construction camps Construction corridor Traffic Blasting Excavation of undeveloped areas Excavation of existing road surfaces Well field drilling	- Populations in close proximity to the construction corridor (residential areas close to Abu Alanda reservoir, residential neighbourhoods and "service/commercial" establishments located between Abu Alanda reservoir and Amman-Madaba Bridge, populations at Al Qatraneh, Al Hesa, and El Abiad mining village, from Airport bridge to Dabuk reservoir) - Populations close to off site facilities i.e. waste treatment facilities, construction camps, storage areas. - Populations close to diversion routes.
Dust	Excavation of trench Pipeline laying Vehicle movement Materials handling Crusher operation Blasting	- Populations along construction route (worst affected are those within 200m of construction corridor – highest density along Abu Alanda route).
Liquid waste	Workforce (domestic liquid waste) expected to be between 9-18	- Wastewater treatment facilities (increase demand).

Impact	Source	Receptors
generation and disposal	<i>m3/capita/year from project offices, camps and storage locations.</i> <i>Wastes from routine maintenance and servicing of vehicles and plant.</i> <i>Wastes from pipeline testing and disinfection</i>	- <i>Natural environment and drainage courses.</i>
Solid waste Generation and disposal	<i>Construction Wastes</i> <i>Sand and rock fragments in addition to metals, wooden and plastic fragments that will result from the different construction and installation activities.</i> <i>Domestic Waste</i> <i>Solid wastes generated from project workforce, estimated to be 0.5 kg/capita/day.</i>	- <i>Waste treatment facilities</i> - <i>Landscape (from littering and fly tipping)</i> - <i>Fauna; larger carnivores and mammals attracted to refuse stores</i>
Spills of hazmat	<i>Hazmat stored, transported and handled on site.</i> <i>Waste materials stored, handled on site and transported off site.</i>	- <i>Natural environment including water courses</i> - <i>Groundwater</i> - <i>Communities in immediate proximity to spill.</i>
Access roads and traffic	<i>Increase in HGV use of roads to transport construction equipment and materials from the Aqaba port and raw materials sites.</i> <i>Partial and/or total closure of the local road systems, especially within the urban sections</i> <i>Partial or total loss of access to local rural road networks.</i> <i>Modification to rural road networks from creation of construction road network.</i>	- <i>Users of affected Public Highways</i> - <i>Populated areas (termini branches most affected).</i> - <i>Natural environment</i>
Visual impact	<i>Visual impact from construction corridor and camps</i> <i>Visual impact of permanent structures in well field area</i> <i>Stockpiles</i>	- <i>Landscape of the construction site</i> - <i>Avifauna</i>
Biodiversity	<i>Loss of habitat at the southern zone (Eastern Plateaus, Sand Dune).</i> <i>Removal of vegetation cover and tree stands (mainly Tamarix and Acacia)</i> <i>Habitat disturbance and damage along construction corridor and access approaches.</i> <i>Disturbance to important bird areas</i> <i>Species introduction</i>	- <i>Breeding and migratory bird species</i> - <i>Desert habitats</i> - <i>Downstream areas from wadis</i>

Impact	Source	Receptors
	<i>Illegal hunting</i> <i>Increased access to sensitive habitats</i> <i>Disturbance to fauna (noise, visual impact)</i>	- Populations utilising natural resources of the region.
Socio-economic	<i>Traffic disturbance,</i> <i>Disruption in water and power supplies.</i> <i>Loss of assets, including crops and trees.</i> <i>Loss of income from access restrictions</i> <i>Accidental property damage</i> <i>Reduction in agricultural production</i> <i>Reduction in sustainability of existing agriculture – loss of water resources.</i> <i>Positive</i> <i>Additional temporary customer base</i> <i>Loss of access to social infrastructure</i> <i>Labor demand for construction</i>	- Populations in close proximity to the construction corridor - Populations close to off site facilities i.e. waste treatment facilities, construction camps, and storage areas. - Populations close to diversion routes
Public Health and Safety	<i>Creation of hazards i.e. trenching</i> <i>Traffic hazards; vehicular-pedestrian conflicts</i> <i>Reduced air quality and visibility</i> <i>Increased accident risk from traffic diversions, and increase in HGV traffic volumes.</i> <i>Increased noise levels</i> <i>Reduced access and partial road closures</i> <i>Presence of venous/biting animals (i.e. snakes, scorpions)</i>	- Populations in close proximity to the construction corridor - Populations close to off site facilities i.e. waste treatment facilities, construction camps, storage areas. - Populations close to diversion routes - Accidental spill risk to public and site staff. - Fauna (risk of trapping and killing)
Cultural heritage	<i>Construction near known sites</i> <i>Excavation of chance finds</i> <i>Looting and damage to known sites</i> <i>Increased access to sites</i> <i>Pollution impacts from dust/emissions to known sites</i>	- Mausoleum site along Dabuk branch - Other known sites within 300m of construction corridor and camps - Undiscovered sites

C Operational Impacts

Impact	Source	Receptors
Liquid waste	Washouts Waste chemicals Waste lubricating oils	Public Operational and maintenance staff
Supply interruption	Maintenance closures Loss of pressure due to leak	General public Manufacturers
Water Quality	Quality decline from micro-organisms/chemical residues Leaks allow changes in quality Poor raw water quality	General public
Noise	Permanent plant – pumping stations, regulating tanks, treatment facilities	General public Operational and maintenance staff
Public Health and Safety	Hazardous chemicals	General public Operational and maintenance staff
Health and safety	Hazardous chemicals Confined spaces	Operational and maintenance staff

9.3 ESMP Institutional Framework

This Section details (for guidance purposes) a 'typical' organisational structure that may be adopted for the effective implementation of the proposed ESMP. The proposed organisational structure is shown in Figure **Error! No text of specified style in document..2**. The principal roles of each of the parties defined in the Figure are discussed below.

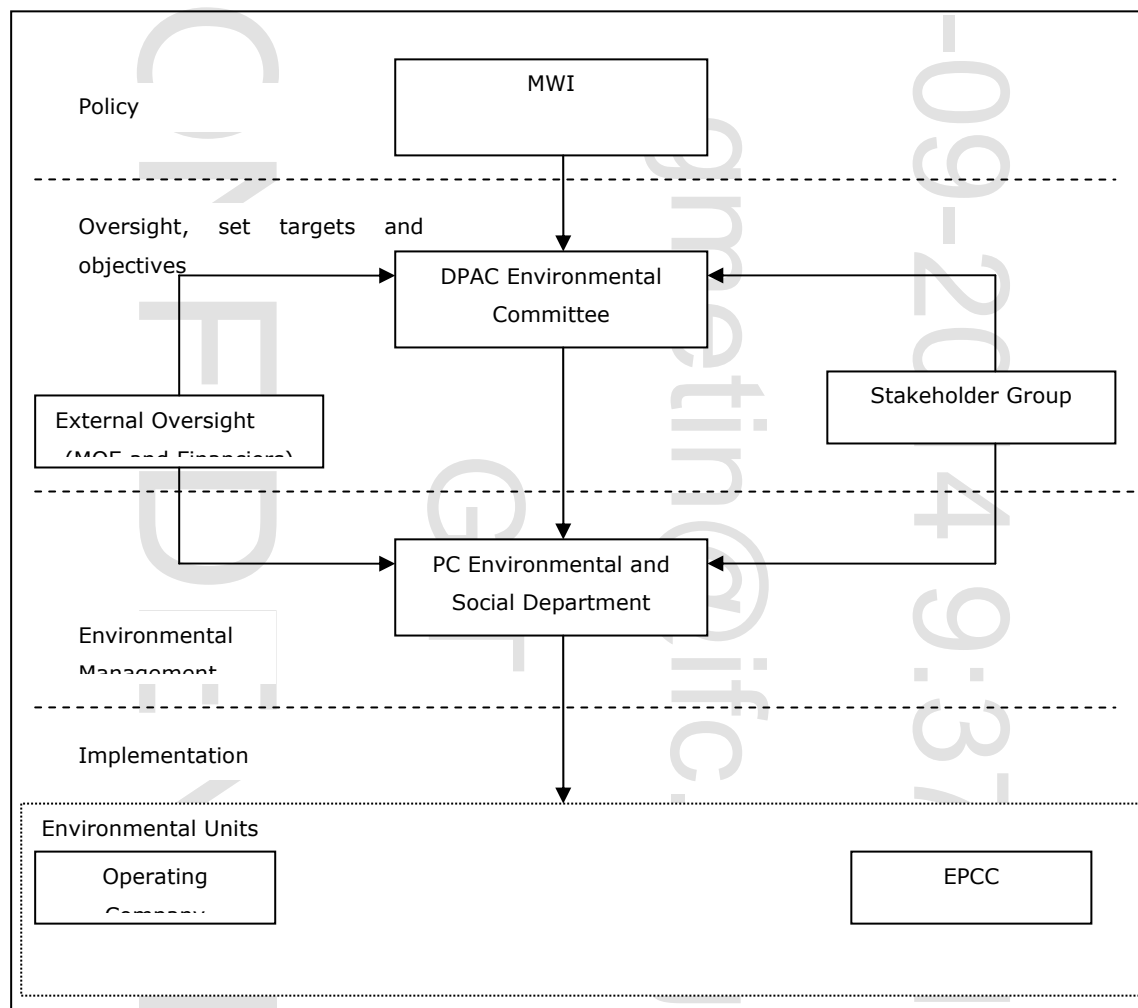


Figure Error! No text of specified style in document..1 Proposed ESMP Implementation Structure

9.3.1 MWI

MWI represent the highest level of DP management. In terms of the ESMP the MWI will be responsible for establishing the environmental policy for DP and for reviewing, approving and releasing the Annual Environmental Report.

9.3.2 DPAC Committee

The DPAC Environmental Committee will comprise the review unit for DP environmental performance. Its members will be drawn primarily from MWI and representatives from other stakeholders.

The Environmental Manager of the Project Company (PC) should be a member of the Committee and it will be chaired by a nominated representative of MWI. If appropriate, a member of MoE may be nominated to the Committee.

The responsibilities of the Committee are as follows:

- Assess the adequacy of the management of the ESMP through annual reviews to ensure its continuing suitability and effectiveness;
- Setting performance indicators and targets for DP environmental management and review performance against those targets;
- Recommend levels of resourcing necessary to implement the ESMP, including human resources, specialised skills, technology and financial provision; and,
- Approve an Annual Environmental Report for submission to MWI;

9.3.3 Project Company

The PC will be responsible for the overall implementation of the Project ESMP which will establish an Environmental and Social Department (ESD) for the purpose.

The ESD Department Head will report directly to the CEO of the Project Company, and will be supported by adequate numbers of experienced technical staff sufficient to undertake these responsibilities, as well as adequate financial resources. Roles, responsibilities, and authorities of staff will be defined, documented, and communicated to all staff and contractors involved in ESMP-related activities.

Specific principal roles for the ESD include:

- Undertaking an ESIA Design Review
- Establishment of a Human Resource Policy and Occupational, Health and Safety Policies and Plans consistent with the Jordanian Labour Law and IFC PS2.
- Implementation of human resource and occupational health and safety policies.
- Preparing and implementing the Project Compensation Plan.
- Preparation of the Construction Environmental and Social Management Plan

- Carrying out construction monitoring in accordance with the requirements of this ESMP
- Carrying out environmental monitoring and reporting as per the requirements of the ESMP
- Suggesting modifications to the CESMG as necessary to improve environmental performance.
- Review and revision of the ESMP as required over the project period.

Among the key duties of the ESD will be to ensure continuous and effective dialog with communities affected by construction, and to give special attention to the management of public safety in areas within populated residential neighbourhoods.

9.3.4 Engineering Procurement Contract Contractor (EPCC) Environmental and Social Units (EU)

The EPCC will have primary responsibility for the execution of the ESMP and the achievement of any targets set by DPAC EC and/or contained within the ESMP. Therefore it is a requirement of this ESMP that EPCC establish an environmental unit(s) for that specific purpose.

Tasks to be undertaken by EU would include:

- Undertake, self inspections, audits and other compliance assessments as per CEMG requirements;
- Carrying out construction in accordance with mitigation guidelines (CEMG guidelines).
- Carrying out day to day environmental monitoring and reporting as per the requirements of the CEMG.
- Review and propose revisions to CESMP as required;
- Design and implement a Communications Strategy, including internal and external programmes of Environmental Awareness development and education;
- Environmental reporting including preparation of Annual Reports; and,
- Maintaining an up-to-date regulatory and policy framework for the ESMP.

The EU is expected to comprise a small unit headed by an Environmental Manager (EM) who should be sufficiently senior within the EPCC management structure to sit on decision making management boards, committees or sub committees.

9.3.5 Stakeholder Group (SG)

The importance of stakeholder consultation is recognised in this ESMP. However, if this is to be effective it must be structured. *Ad-hoc* processes can be effective in obtaining an

understanding of stakeholder concerns but they tend to promote a reactive approach to environmental management that can be confrontational and inefficient.

Creating a formal structure in which information is passed between parties on a regular basis will allow for more effective stakeholder input into the implementation of the ESMP and equally importantly, its review and revision.

To this end a SG should be established to manage the day to day consultation process. The composition of this group can be determined at a later date but should include the following core members:

- PC Community Affairs Manager;
- Operations managers (as required);
- NGOs;
- Representatives from MoE; and,
- Representatives from MWI.
- Other stakeholders may be invited to attend meetings to discuss specific issues these might include MoA, NRA, Police Department, Ministry of Agriculture.

This group should meet on a two monthly basis and should operate within parameters set in the approved ESMP.

MoE (and other agencies) may also have specific responsibilities in respect of reviewing applications for the use of raw materials, location of certain project components such as camps and crusher sites (no objections certificates issued) and for approving measures taken to remedy breaches in environmental regulations and or spills of hazardous materials. These can be most easily coordinated through the SG.

9.3.6 External Oversight

MoE as the nominated National Authority for environmental affairs will undertake their normal oversight function on behalf of the Government.

International financiers will undertake external oversight to ensure compliance with their guidelines and standards and any conditions they may have imposed on the project in their financing agreements.

9.3.7 Others

A number of 'other institutions' will need to be established to implement the ESMP. These comprise:

- Valuation committees; to determine compensation rates as required in the CP.
- Compensation Review Board (CRB). Required to hear and adjudicate on compensation appeals.

9.4 MITIGATION PLAN

The environmental and social impact assessment process is the driver for the elimination, reduction and management of project impacts. The hierarchy of mitigation embedded within the differing stages of project implementation and adopted for the Disi Project are set out below in Table 9.2 and discussed briefly below.

Table Error! No text of specified style in document..11 Mitigation Hierarchy

Mitigation Hierarchy	Rationale	Impact management tool or measure	When in ESA process
Avoid impact (eliminate)	Early identification of impacts and subsequent adjustment of design and timing where possible to avoid sensitive environments.	Design Review Initial design criteria and ESIA study review have led to revision and review of alignments for the Disi conveyance to avoid sensitive habitats, cultural sites, and non-government land. Additional review is required during the final design process to minimise impacts further.	Detailed Design Stage Site planning
Remedy or offset impact	When significant effects remain that cannot be prevented or reduced, they are offset by remedial or compensatory action.	Compensation Plan Financial compensation for lost assets Compensation payments for financial loss/loss of land. Creation of compensation habitat and/or enhancement of habitat. Relocation of assets i.e. trees, archaeological features, monuments, public art.	Detailed Design Stage
Reduce impact severity	If adverse effects cannot be prevented, steps must be taken to reduce them by minimising the cause of impact at source and by abatement on site and abatement at the receptor	Application of Good Construction Practice Measures implemented and monitored through a Construction Environment Management Plan (CEMP). Measures to reduce impacts include: Use of abatement equipment at construction sites. Provision of abatement equipment to receptors. Use of alternative construction process. Operational controls Application of Good Operational Practice	Pre-construction, Construction Operations

9.4.1 Design Review

The Design Review has two objectives:

- (i) To eliminate or minimise potentially adverse social and environmental impacts by subjecting the proposed design of the conveyor alignment and wellfield to multi disciplinary review on an iterative basis.

In this case specific objectives of the review process would be to:

- Minimise the overall footprint of the well field, wells roads, power lines and other facilities and infrastructure;
- Minimise the visual effects of the above on the landscape;
- Minimise potential adverse impacts of the well field and conveyor design on biological resources.
- Minimise potential adverse impacts on cultural resources. In this case, it is recommended that an archaeologist approved DAJ carry out walkover surveys of the proposed impact areas of design components.
- Minimise potential social and economic costs associated with construction of the conveyor. To include further consultations with affected communities.

The Design Review would be carried out by the design engineers and their environmental advisors and would include site visits as required.

- (ii) To demonstrate that full coordination has been undertaken with the relevant utility authorities and with other ongoing and committed projects. This should serve to minimise adverse effects on local communities.

To provide evidence of the completion of a Design Review as specified, this ESMP requires that a Design Review Report is included in the final design documentation.

9.4.2 Compensation Plan (CP)

As indicated in Chapter 6 compensation for land acquisition has been completed for all project works except the pumping station at the Madaba Highway interchange. It is understood from discussions with MWI that negotiations for the acquisition of these lands are ongoing and are expected to be completed shortly.

For the ESMP, it is further assumed that any compensation due to Government agencies resulting from Project requirements will be resolved by negotiation on a government to government basis, and that the conditions, processes etc to be applied in these negotiations are not required to be specified in the CP.

Additional land outside the right of way that the Project will require temporarily for construction purposes (such as camps, areas for pipe storage etc.) will fall under the responsibility of the Project Company. Subsequent to the detailed design stage, the PC will need to identify temporary land requirements for construction purposes, and, consistent with IFC Performance Standards, compensate land owners for temporary use of the land, as appropriate.

Therefore this Compensation Plan has been drawn up to:

- Establish the project's strategy for compensating individuals physically and/or economically displaced;
- Establish the projects strategy for livelihood restoration for temporary and/or permanent displacement;
- Provide a description of all types of asset ownership and/or user rights of the population likely to be affected by the project;
- Describe the process for consulting with the affected populations in the planning, implementation and monitoring of the compensation process ;and
- Detail the proposed Project grievance redress mechanism.

Compensation entitlements under this CP were outlined in the Entitlement Matrix provided earlier in Table 6.2. Implementation of the CP shall be the responsibility of MWI, PC and EPCC. The principal agent will be a Community Liaison Officer (CLO) operating from within PC ESD.

Boxes 1 to 5 (located at the end of this Section) provide a detailed programme of activities or tasks to be completed in undertaking the CP.

The principal elements of that programme are discussed briefly below.

(i) Confirmation of Entitlements Matrix

It is evident from the legal and policy review that no specific guideline is available to determine precisely what compensation is to be due to whom. In this regard, the guidelines of IFC, as meeting or exceeding the legal requirements of all parties, have been adopted for use in this ESMP. These provide a definition of the types of

compensation that could be paid but they do not include triggers or indicators as to when such compensation might be paid.

These are provided in Table **Error! No text of specified style in document..12** but it will necessary for all parties involved in the implementation of the Project to agree on the final entitlements matrix and triggers to be applied.

(ii) **Compensation Inventory**

Once the entitlements matrix is defined and the Design Review complete, an inventory of potential affected properties and assets will be undertaken. Once these are defined, an affected persons census must be carried out to define individual entitlements. This will include:

- Asset owners,
- Building / site users,
- Persons employed by building owners or users.

Table Error! No text of specified style in document..3 Indicative Triggers for Application of Compensation

A. Private Lands Outside Public Highway Rights of Way

Type of Loss or Disturbance	Entitled Person	Entitlement	Trigger
a. Land acquisition			
Arable Land	Land owner	Land Crop Built Assets Trees/Vines	Any land under production Any cropped area All assets All trees
Subdivided Land	Land Owner	Land Assets	All affected land up to 25% of plot at rate per m ² Beyond 25% right to purchase entire plot. All assets
Built lands	Land Owner	Residential building Commercial Other	Any direct impact on structure – entire building. If structure would be left unsuitable for existing purpose (loss of access etc) entire structure.
b. Economic Losses			
Loss of Business	Business Owner – if different from land and building owner.	Re- establishment cost.	Any case of forced relocation
Loss of Employment	Employee	Lost Income	All employees made redundant
c. Temporary Economic Losses			

Type of Loss or Disturbance	Entitled Person	Entitlement	Trigger
Temporary Loss of Business Income	Business Owner – all cases	Lost Income	Following implementation of design review mitigation and consultation. 1) Large business with planned daily delivery and out-shipment of goods. No interruption permissible without compensation. 2) Any business dependent on drive in access. No total loss of access during main business hours without compensation 3) Medium and small business > Compensation payable for closure of business due to loss of access for greater than 3 days. 4) Compensation for reduced access for greater than 10 days.
Loss of wage /salary income	Employee	Loss of Income	All cases when specified by business owner.
d. Loss of Residence			
	Tenant	Relocation cost	Any case of forced relocation.
e. Nuisance Effects			
Disturbance	All affected land users	None	None. Legal process to be applied.

B. Within Public Highway Rights of Way

Type of Loss or Disturbance	Entitled Person	Entitlement	Trigger
a. Built assets	Asset owner	Fixed Structure	Any constraint preventing continued operation at present level Removal of asset
b. Economic Losses			
Loss of Business	Asset owner	Lost Income	Inability to carry on trading as result of loss of all or part of structure.
Loss of Business	Non owner operator	Lost Income	
Loss of Employment	Employee	Lost Income	All cases when specified by business owner.
c. Temporary Economic Losses			
Temporary loss of Business Income	Owner – all cases	Lost Income	1) SME businesses Compensation payable for closure of business for greater than 3 days. Compensation for reduced access for greater than 10 days. 3) Shack/Kiosk – None. Structure can be easily relocated.
Loss of wage /salary income	Employee	Lost Income	All cases when specified by business owner.

A scope of work for a census study is provided as Appendix 5.

Prior to the implementation of the inventory and notification process and irrespective of the consultation and survey process proposed therein, there is a need to undertake a consultation to advise the communities that the Project will be going ahead and that it will affect their community.

In particular the consultation will be used to explain the compensation process to the community and will emphasise the rights held by affected persons in respect of their entitlement to compensation and the right to appeal. A more detailed description of the proposed Consultation process is provided in Section 9.6.

The consultation will take the form of community meetings held in each affected community under the auspices of the relevant Municipality.

It should be noted that the inventory survey and subsequent CP activities will not necessarily be implemented as a single programme. In reality, given the physical length of the project works and the expected duration of construction, it is just as likely to be implemented over a number of years and on a when required basis, just ahead of the construction programme.

(iii) Notification

Once the affected assets are defined affected individuals shall be notified of the expected project impact. Notifications will be placed in two National newspapers and at each affected Municipality.

(iv) Valuation and Negotiation

Once the affected persons and asset census has been completed it will be necessary to establish which potential impacts may be resolved fully or partly through solutions other than the payment of compensation.

The following provides a hierarchy of mitigation:

1. Micro level investigation of engineering options

2. Where design review can not eliminate impacts prepare appropriate traffic management plan – in consultation with Police and other authorities to minimise impacts.
3. Advance warning via community consultation to allow for adaptation where possible.
4. Modify construction process to shorten construction time in some sections.
5. Use affected businesses for supplies, maintenance contracts and or provide employment during construction.
6. Negotiate cash settlement for compensation.

Impacts that may be resolved by other solutions should be addressed in the design review and entitlements development process and should be based on discussions held with the affected parties.

Cash compensation will be considered only where it is clear that other solutions can not completely resolve the issue. Where such a need is defined, PAPs will be contacted again to be informed of the date for a valuation visit. PAPs will be offered the opportunity to attend (or delegate someone on their behalf to attend) the visit but if no response is received within 14 days of notification of the valuation visit, the valuation will take place in the absence of the PAP.

After the visit, the valuation will be prepared and a notification delivered to the PAP. This will specify the nature of any compensation to be paid, the level of compensation to be paid, and the timing of payment of that compensation.

To provide valuations, two valuation committees shall be established the Land Valuation Committee and the Business Valuation Committee. These shall be guided in their deliberations by a pre-established valuation framework developed for the project.

Once PAPs have been identified and notified and a valuation prepared and received, further discussions and negotiations with individual PAPs will be initiated. PAPs will have the right to appeal the valuation provided within a 28 day period from receipt of notification of the valuation.

A period of 60 complete days shall be available to all PAPs for negotiation after receipt of the initial valuation. Three cases may apply.

No Appeal

If no intent to appeal is received by the end of the 28 day period the PAP will be visited by the CLO and requested to sign a document agreeing to the compensation offer. Once a final agreement is signed it will be forwarded for approval and subject to the completion process.

Appeal Lodged

If an appeal is lodged the CLO with the help of the Municipality (if requested) may seek to negotiate with the PAP for the remaining element of the 60 day period to seek a compromise. If at the end of that period no agreement is reached and ratified (as above) the case will be referred to a Compensation Review Board (CRB).

However, if the PAP wishes to he may demand a hearing at CRB without further negotiation.

Though negotiations will be entered into on a case by case basis they will be framed by guidelines developed for the purpose and by an approvals process. They will seek to ensure that appropriate and fair redress is given at an acceptable cost. The process should not be accepted as a mechanism for the granting of wish lists, or as a pre-defined means of extracting additional compensation, but as a true negotiation. Negotiations will be carried out by MWI on behalf of the Project.

No Response

If the PAP does not respond to the initial valuation and no further response is obtained within a 60 day period from the date of receipt of the initial valuation and provided it can be adequately demonstrated that reasonable effort has been made by the CLO to contact the PAP the case should be referred to the CRB for approval of the draft compensation offer. In this case letters of notification of approval of the compensation should be served if possible.

The funds allocated for this compensation should be placed in a bank account for a minimum period of 5 years from the date of issuance of the payment, to be claimed by the PAP on proof of eligibility.

(v) Appeal Process

Given that there is no specific legal basis in Jordanian law for the provision of any

compensation defined in the entitlements matrix no formal appeals process exists outside of the civil courts. Therefore a project specific process must be developed.

Four possible appeals are envisaged. The timing of the appeals within the compensation process, and the appeals process are illustrated in Box 5 and described below.

1. Appeal Against the Intent to Expropriate.

Appeals may be lodged in writing by the PAP during the 15 day interval following publication in the newspapers of the intent to acquire land. Appeals are to be lodged with relevant municipalities. All appeals will be acknowledged in writing and considered by the relevant municipalities and the PC.

2. Disputed Ownership.

Disputes may arise over who is entitled to compensation. Lack of formal documentation over the status of a piece of land, asset or tenancy agreement may lead to such disputes, affecting the project implementation. In such cases the further verification of status of the entitlement by MWI/PC and other relevant parties will be necessary.

This may include consideration of a variety of documentation:

- Copies of land titles, mortgage deeds, revenue receipts or other legal tender showing ownership of tenancy;
- In the case of renters of farmed or rented land, documentary evidence of the understanding between the landowner and the renter, if available; and
- For proof of residence, voters list or any other official record.

The municipality will attempt to facilitate an agreement within the project framework, failing which the case will be referred to the Valuation Committee for resolution.

Any PAP will have the right to appeal through court proceedings. In these cases the compensation process will proceed through to valuation irrespective of the status of the land. Compensations due will be assessed and funds held in a Bank Account until the conflict is resolved.

3. Appeal against the Compensation Valuation.

A single appeal against the Compensation Valuation is proposed. This will be heard by the CRB, an independent review body established for the purpose. The decision of the CRB will be final.

The CRB will review each case and come to one of three recommendations:

- (i). Reconfirm the original offer;
- (ii). Propose a revised offer at the hearing; or
- (iii). Establish new guidelines for the development of a revised offer to be developed under negotiation.

If agreement is still not reached under revised guidelines, the Municipality will confirm the details of the last offer in writing to the person concerned and refer the matter back to the Valuation Committee. In the event that the committee do not revise the offer, *either* party may refer the matter to the Courts.

4. Appeal to the Courts.

Article 10 of the Jordanian LAL states that failure to agree on levels of compensation at this stage will lead to the matter being referred to the Courts. Clearly, all citizens of Jordan have the right to take legal advice and to pursue compensation through the Civil Courts. However, once a decision to use the civil courts has been made the compensation process is taken out of the hands of the project specific implementation structure.

The judgement of any civil court will be binding on all parties. However, if the asset to be acquired is not classed as directly affecting a residential unit (either by demolition or in making the property uninhabitable) the acquisition process will proceed on the basis of the last valuation made by the CRB. Any changes on that compensation ordered by the courts will be settled as required.

(vi) Completion

Once an agreement is reached payments will be made to PAPs.

Past experience in Jordan is clear in establishing that cash is the preferred means of compensation, provided it was adequate and paid in time and in full. All compensation in this Plan will be provided in the form of cheques. All cheques will be paid in to specially opened bank accounts. Copies of all records of payments will be attached together with a copy of the PAPs national identity document. Once the certificate of compensation is signed it will be placed in a personal file containing the documentary record of entire compensation process. The original file will be the property of the PAP. One copy will be retained by MWI, and a third will be lodged at the Municipality Offices for a period of 5 years.

Once compensation matters are completed, a Certificate of Compensation will be prepared. This will certify that the full cash compensation has been paid according to the agreed valuation.

(vii) Monitoring

Three levels of CP monitoring are proposed

- Internal Project Monitoring of the Performance of the CP with respect to the effectiveness of the processes established and ultimately therein, the disbursement of compensation.
- Independent Monitoring of the Processes and the Compensation.
- External Monitoring.

These are reviewed in more detail in Section 9.5.3.2.

(viii) Vulnerable Groups

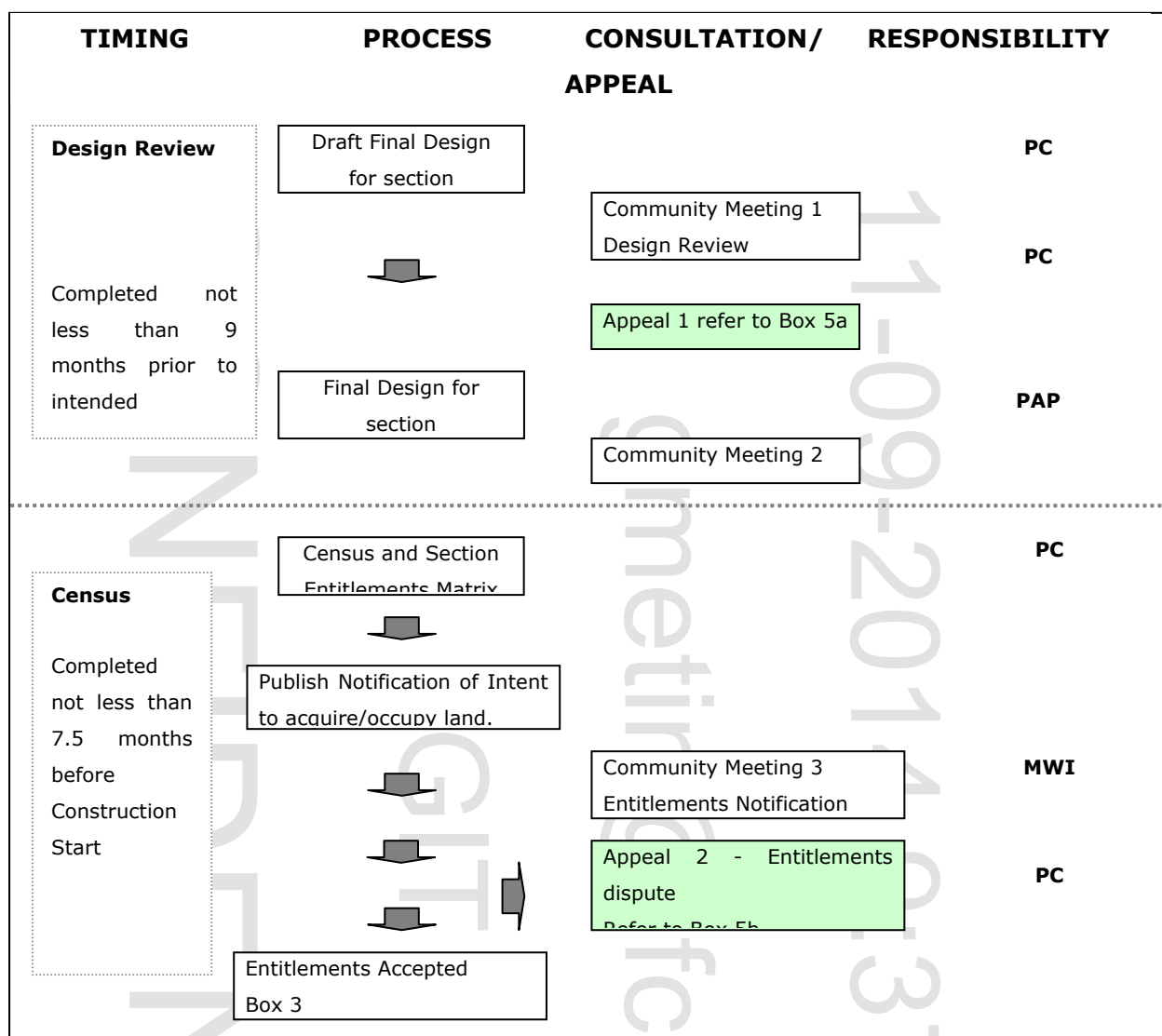
It is possible that a number of PAPs will be women that will be subject to pressure or harassment to sign over their rights or relinquish their entitlement under this CP.

This issue should be addressed in the Census process with women only meetings and consultations held if required. In these meetings women specialists will be employed to ensure that the PAPs are aware of their rights and entitlements and that they are also aware of the assistance that will be available to them to ensure that those rights are exercised.

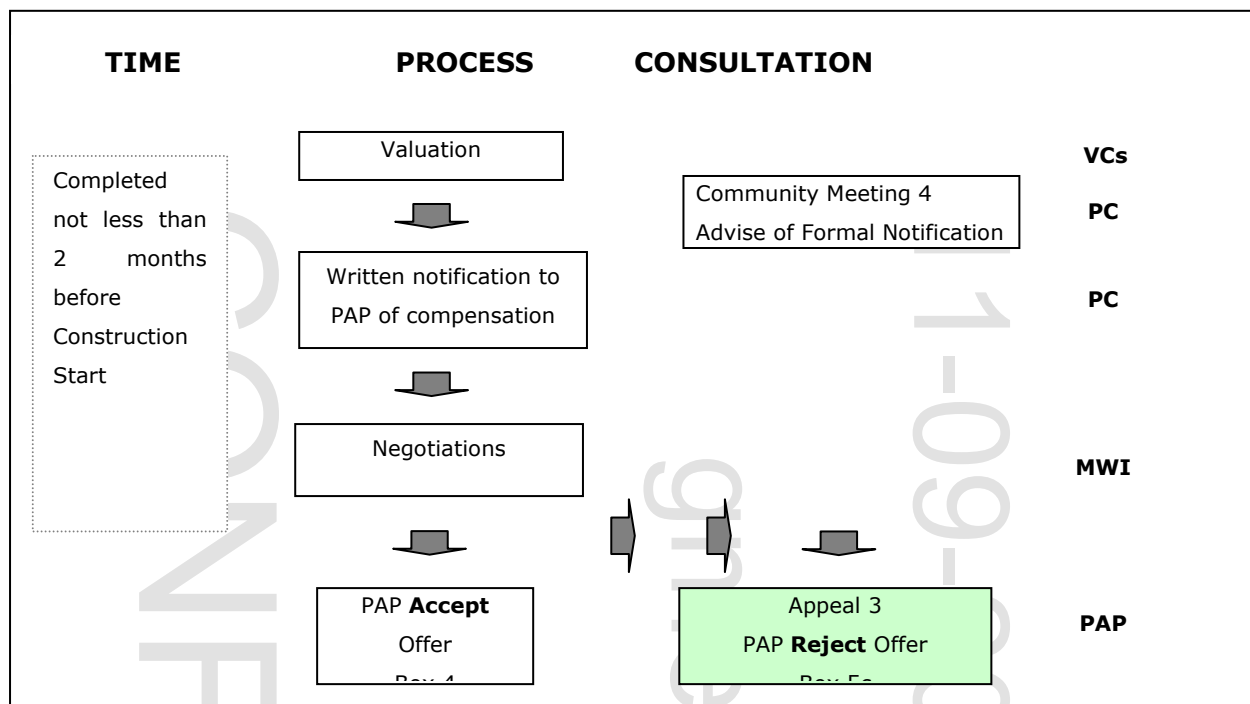
Finally, no payment will be made for compensation to a female PAP to a bank account other than opened specifically for her (as the sole account holder) by the Project. Payment to pre-existing joint signatory, or new joint signatory accounts will not be permissible.

	ACTION	RESPONSIBILITY
March 2008	Establish evaluation land and business evaluation committees.	MWI
	Finalise Grievance Resolution Process (GRP)	MWI
	Establish negotiation and awards framework	MWI
	Confirmation of entitlements matrix	MWI
	Establish environmental units within PC and EPCC	MWI

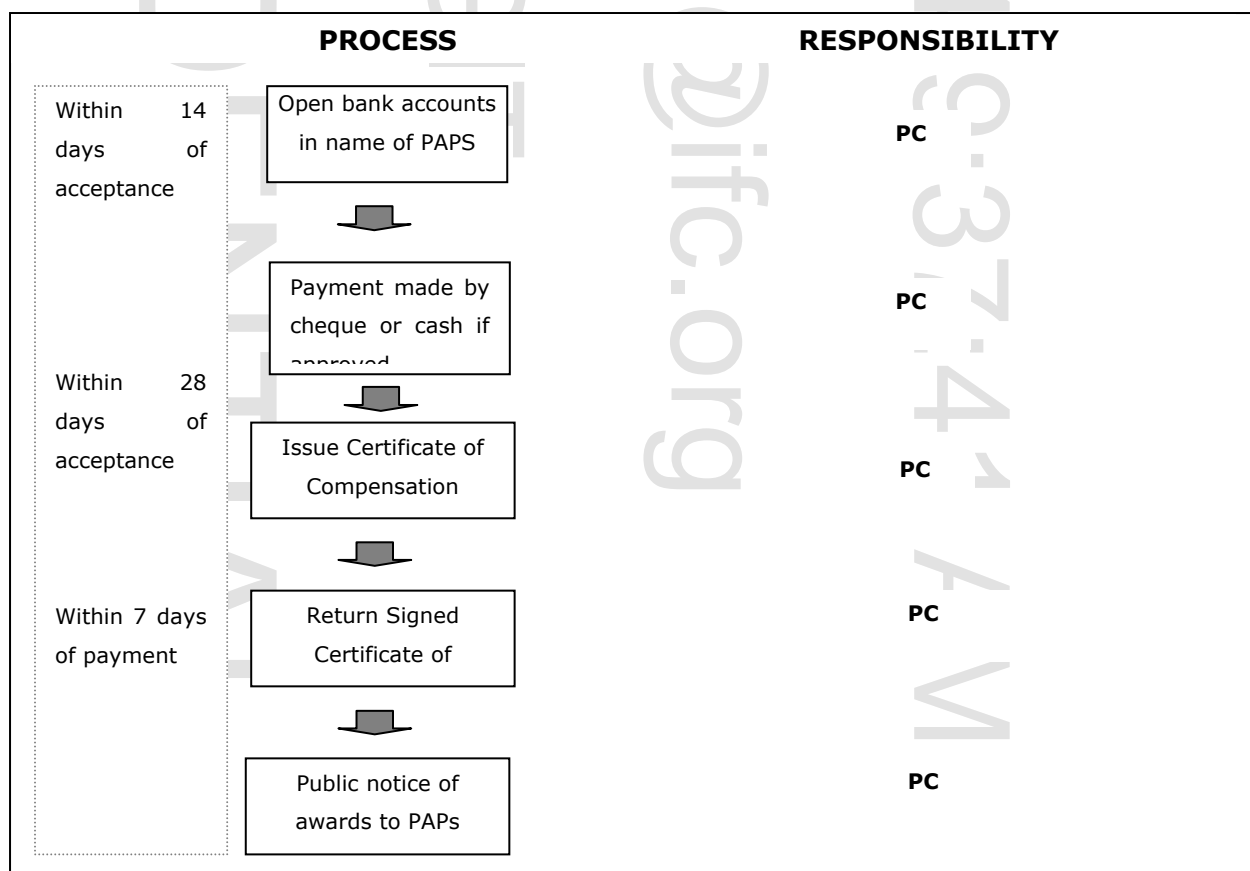
Box 9.1**Required Preparatory Actions**



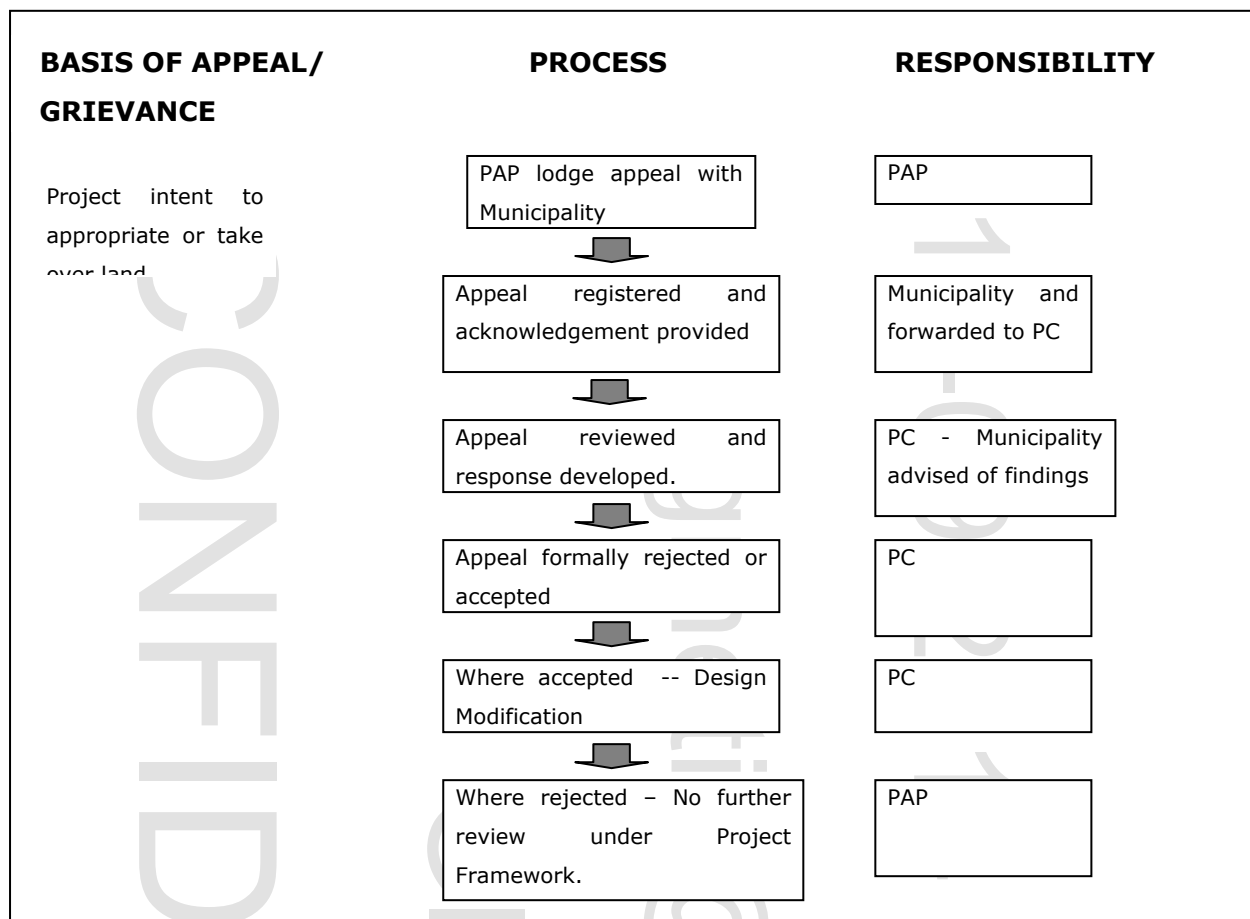
Box 9.2 Design Review and Definition of Compensation Entitlement



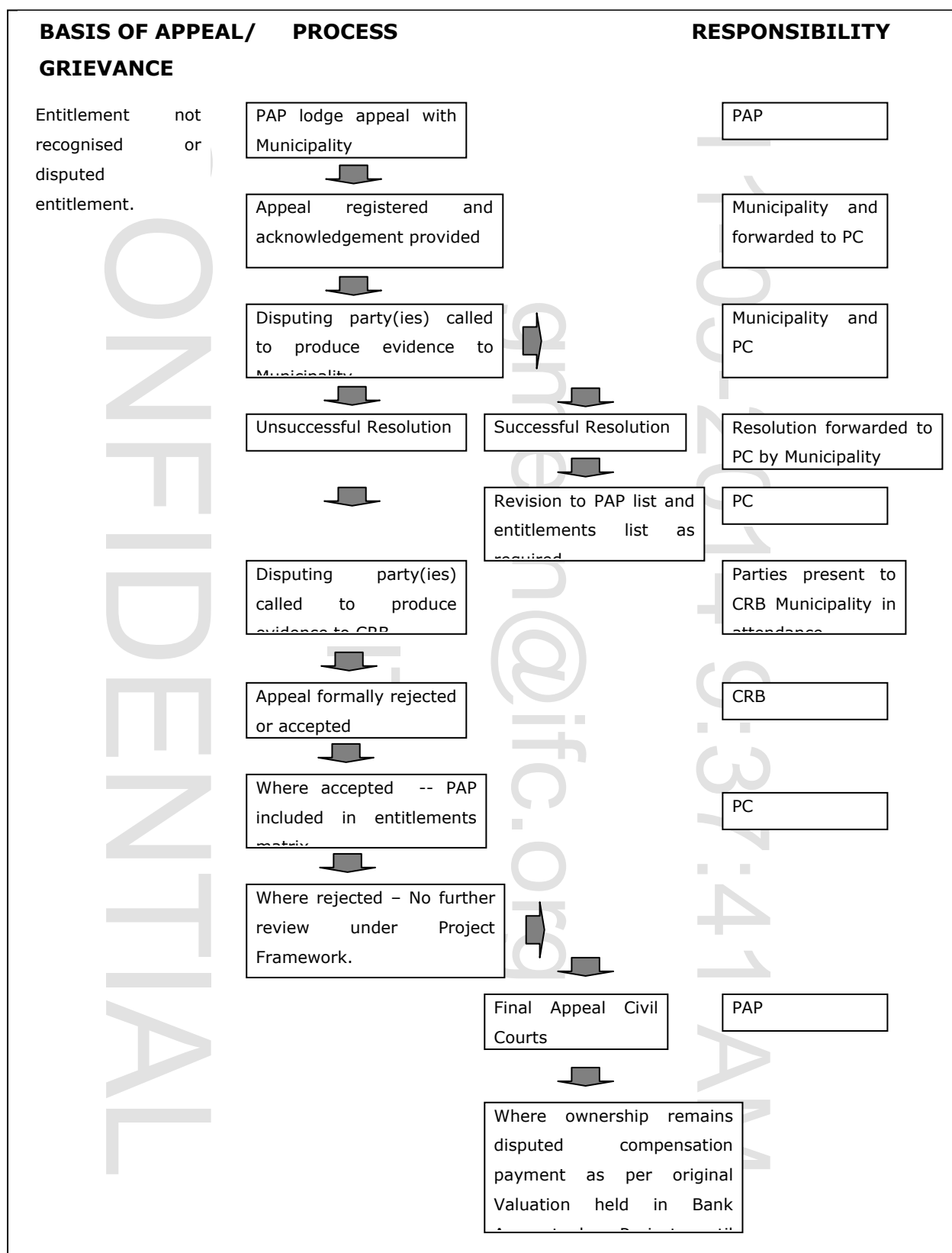
Box 9.3 Valuation Process



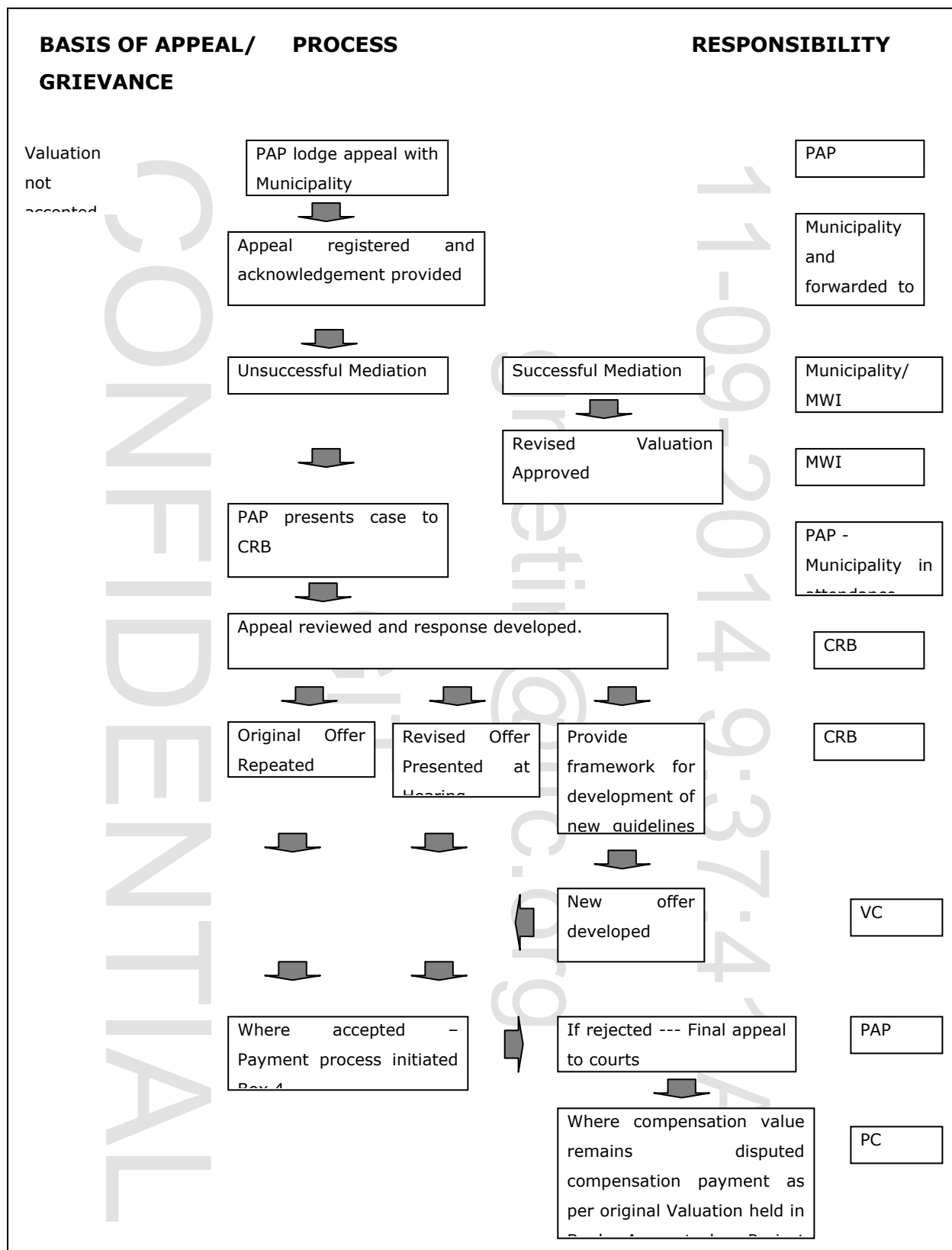
Box 9.4 Payment Process



Box 9.5a Grievance Resolution Process – Intent to Appropriately or Temporarily Take Over Land



Box 9.5b Grievance Resolution Process – Disputed Entitlement / Ownership



Box 9.5c Grievance Resolution Process – Compensation Valuation

9.4.3 Construction Environmental and Social Management Plan (CESMP)

The objective of CESMP is to ensure that all contractors performing work on the DP do so in accordance with regulatory environmental, social and health protection guidelines and that in doing so they:

- Formulate comprehensive work instructions to be adopted by contract personnel for the protection of the quality of the environment,
- Take action to eliminate or minimize risks of harm to local ecosystems,
- Assure the protection of the environment based on sustainable development principles,
- Develop a system for implementing the guidelines.

9.4.3.1 CESMP Content

The CESMP is the mechanism by which it is proposed potential construction impacts will be managed. At this time it is envisaged that the CESMP will comprise a Compliance Framework document supported by separate guidance notes as follows:

Guideline CEMG-01	General Guidelines
Guideline CEMG-02	Waste Management
Guideline CEMG-03	Hazardous Materials Management
Guideline CEMG-04	Construction Camps
Guideline CEMG-05	Access Management Plan
Guideline CEMG-06	Borrow Sites
Guideline CEMG-07	Ecology and Wildlife Management
Guideline CEMG-08	Cultural Heritage

In each case the CEMG guidelines will be designed to meet the requirements of both the relevant National Environmental Standards.

In addition, specific contract provisions are required to mandate formal adoption by all 'Project Contractors' of a Community Relations, Security, Health, Environment, and Safety Policy, or equivalent, compatible with the requirements of Jordanian Labor Law and IFC PS2 (which is based on ILO Convention). This will provide information to employees regarding their rights under national labor law and employment terms, and will address compliance with legal requirements such as minimum wage, hours of work, overtime payments, health and safety conditions, contributions to health insurance and pension schedules, and other legally-mandated employment terms.

Draft Tables of Contents for the individual Compliance Framework Document and the CEMGs are provided in Appendix 6.

9.4.3.2 Use of CESMP

The CESMP requires that the EPCC makes reasonable efforts to conform to the specified CEMGs.

Persistent non-compliance with the requirements of the CEMGs shall incur negative performance points (NPPs) that will reflect the contractor's poor performance in meeting their environmental obligations. The Negative Performance Point scale shall be based on the nature and severity of the non-compliance events, and will be specified with respect to pre-defined inspection checklists made available to the EPCC.

The compliance status of the EPCC will be determined in quarterly reports prepared following site inspections using the pre-prepared checklists. (See Section 9.5.5).

9.4.3.3 Compliance System

An inspection and compliance reporting programme without an associated sanctioning or compliance recognition system will have no value. Similarly, a system that is designed only to react to inspections reports will have limited value.

For long term benefits to accrue, a compliance recognition system must have the wider objective of improving overall contractor performance. To do this it must:

- Ensure all project contractors understand that a clean environment is a critical element of the product delivered on completion of their contract.
- Ensure contractors are aware of their responsibilities and accountability in order that they become proactive in implementing the necessary environmental protection measures.
- Promote self identification of existing work practices that contaminate and otherwise damage the environment and promote adoption of suitable modifications.

A draft system programme of penalties, based on NPP system outlined is outlined below based on the intervention thresholds shown in

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Table Error! No text of specified style in document..4 Intervention Thresholds for Non-Compliance with CESMP by Contractors

Threshold Level	Intervention Action
1	<i>Advisory note of non-compliance requesting corrective action</i>
2	<i>Issue written warning and request schedule of corrective action</i>
3	<i>Written warning of threat of imposition of financial penalty – withholding of payment.</i>
4	<i>Issue withholding notice.</i>

A critical element of the CESMP is that it requires all contractors involved in the Project to certify that they will undertake their contractual obligations in compliance with the CESMP. No contractor shall be permitted to operate on Project sites unless they have duly signed the certificate. An example of a certificate of compliance is attached as Appendix 7.

9.4.3.4 CESMP Preparation

The CESMP will be prepared by EPC Contractor and certified as compliant with the requirements of this ESMP by the Project Company prior to work start.

9.4.4 Summary of Mitigation Management Proposals

Tables 9.5 – 9.9 provide a listing of significant defined impacts and identifies how they are addressed within the ESMP.

Table Error! No text of specified style in document..5 Impact Management Preconstruction Phase

Impact or issue	Examples of mitigation measures	ESMP Component	Responsibility	Comment
<i>Land acquisition</i>	Payments made under the LAL Appeals system in place for affected parties	None	MWI	Land acquisition believed completed except for 1 site. Processes in place under LAL will be applied should need for additional compensation be identified
<i>Cultural heritage</i>	Avoidance of known sites. Revision of alignment and location of facilities away from known sites.	Design Review	EPCC	Contractor to review findings of study EIA and take guidance from international finance agencies regarding cultural heritage.
<i>Drainage</i>	Culverts appropriately sized, Provision of adequate erosion and scour protection	Design Review		
<i>Sensitive habitats</i>	Avoidance of known sites. Revision of alignment and location of facilities away from known sites. Definition of access routes that will minimise impacts on habitats.	Design Review		
<i>Noise from permanent plant</i>	Noise abatement measures included within design	Design Review		
<i>Compensation for loss of income and assets</i>	Advance warning via community consultation to allow for adaptation where possible. Development of appropriate traffic management plan – in consultation with Police and other authorities. Provide temporary access according to the plan Modify construction process to shorten construction time in some sections. Use affected businesses for supplies, maintenance contracts and or provide employment during construction Negotiated settlement for compensation.	CP	MWI	

Impact or issue	Examples of mitigation measures	ESMP Component	Responsibility	Comment
Conflicts with other major projects	Early consultation between project proponents and contractors to devise management of conflict areas i.e. ARR contract to build in crossing infrastructure to allow for pipeline crossing at Projects expense	Design Review	MWI EPCC	Effective coordination with all external parties required.

Table Error! No text of specified style in document..6 Impact Management - Construction Phase – Construction Corridor and Access Roads

Impact or issue	Mitigation measure	ESMP Component	Responsibility	Comment
Biodiversity	Camps located away from sensitive sites. Only approved disposal sites are to be used. Only approved raw material sites to be used. Education programme for construction teams. Penalties for unnecessary disturbance Plan access roads to minimise possible ecological damage. Limit access to defined construction roads Impose code of conduct on staff that bans any form of use of natural environment; hunting, firewood gathering, etc.	CESMP CEMG 1	EPCC	Good Practice operational procedures set out within general CESMP guidelines.
Landscape	Movement of project teams, materials and equipment restricted to defined routes. No trees felled outside RoW. Trees translocated when practicable. Works graded to natural topography. Reinstatement of vegetation at contractors expense.	CESMP CEMG 1	EPCC MWI	
Soil damage	Confine vehicles to defined access routes	CESMP	EPCC	GP Operational procedures set out within general

Impact or issue	Mitigation measure	ESMP Component	Responsibility	Comment
	Plan access routes to minimise wadi crossing and unstable areas Pollution prevention measures as per CEMG Remediation of pollution at Contractors expense	CEMG 5		CESMP guidelines.
Groundwater Contamination	Spill response and clean up Effective waste management planning and performance monitoring	CESMP CEMG 3	EPCC	
Water pollution	Comply with national regulations Spill response procedures Silt trapping for dewatering Remediation of pollution at Contractors expense	CESMP CEMG 1	EPCC	
Solid Waste Generation	Waste reduction	CESMP	EPCC	Preparation of specific waste management plan.
Solid Waste Disposal	Implementation of approved waste management plan.	CEMG 2		
Erosion and sedimentation	Erosion abatement at discharge points Temporary erosion protection for water and soil environment Controls on stockpile heights/size Restricted access routes to prevent erosion by vehicular movement	CESMP CEMG 1	EPCC	GP Operational procedures set out within general CESMP guidelines.
Dust	Controlled operations near sensitive receptors Damping down Use of defined access routes only	CESMP CEMG 1	EPCC	
Noise	Controlled operational hours in built up areas	CESMP CEMG 1	EPCC	
Air quality (exc. Dust)	Compliance with national standards.	CESMP	EPCC	

Impact or issue	Mitigation measure	ESMP Component	Responsibility	Comment
	Regular vehicle and plant maintenance No vehicle idling Fires prohibited Plant to comply with emissions regulations	CEMG 1		
Storage of excavated materials	Friable material to be sheeted or dampened Control of stockpile height and shape Grading to natural topography	CESMP CEMG 1	EPCC	
Excavated materials	Reuse within scheme first priority Appropriate storage and eventual disposal of remaining material	CESMP CEMG 1	EPCC	
Tree removal	Prohibited outside construction corridor Relocation Consultation with MoA	CESMP CEMG 1	EPCC MoA	GP Operational procedures set out within general CESMP guidelines Application of process defined by MOA.
Pollution incident response	Spill response procedures and training	CESMP CEMG 3	EPCC	GP Operational procedures set out within general CESMP guidelines Specific management planning required for hazardous materials under CEMG 3.
Pollution incident reporting	CEMG Appoint EM site staff	CESMP CEMG 3	EPCC	GP Operational procedures set out within general CESMP guidelines
Public health and safety	Fencing and securing of hazard material ie.explosives Warning signs Provision of out of hours contact details Nuisance control measures Site barriers Traffic management Specific Management Plan for Chlorine storage use and handling in residential areas.	CESMP CEMG 1	EPCC	GP Operational procedures set out within general CESMP guidelines

Impact or issue	Mitigation measure	ESMP Component	Responsibility	Comment
Site health and safety	Use proper techniques for trenching and shoring Special procedures for installation near roadsides: - Establishment of work zones so as to separate workers from traffic and from equipment as much as possible - Reduction of allowed vehicle speeds in work zones; - Use of high-visibility safety apparel for workers in the vicinity of traffic - For night work, provision of proper illumination for the work space, while controlling glare so as not to blind workers and passing motorists Provision of PPE Training in site health and safety and response plans. Penalties for non-compliance with H&S plan/regulations Develop and implement a plan for responding to accidental releases. Specific Management Plan for Chlorine storage use and handling	CESMP CEMG 1	EPCC	
Traffic	Traffic management plan developed in consultation with community and local police Signposting	CESMP CEMG 5	EPCC Municipality	GP Operational procedures set out within general CESMP guidelines
Loss of access	Consultation with affected community to review established access routes and to give appropriate project information. Provision of temporary access points Appoint community consultation officer Reinstate access upon completion	CP CESMP - CEMG 5	EPCC MWI	GP Operational procedures set out within general CESMP guidelines Detailed traffic management and access Plans to be prepared

Impact or issue	Mitigation measure	ESMP Component	Responsibility	Comment
	Payment of compensation – last resort.		MWI	Community consultation will be required under CEMG 5.
Temporary loss of income	Appoint community consultation officer Provide access Signposting Compensation process	CP	MWI	Guidance from international finance agencies regarding land acquisition and compensation requirements
Damage to or loss of assets – accidental	Contractor to avoid by adhering to CESMP guidance Contractor to replace asset or compensate at market value.	CESMP CEMG 1	EPCC/MWI	GP Operational procedures set out within general CESMP guidelines Compensation process set out within CP.
Cultural heritage	CRM implemented including DAJ chance finds procedures No access to known sites by construction teams Fencing of sites at risk but outside construction corridor	CESMP	EPCC DAJ	GP Operational procedures set out within general CESMP guidelines
Public utilities	Locate and document utilities within construction corridor Consult relevant departments and establish operational procedures for management of temporary service disruption Damage to defined utilities to be repaired at Contractors/MWI expense	CESMP CEMG 1	EPCC/MWI Utilities departments/co mpanies	GP Operational procedures set out within general CESMP guidelines

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Table Error! No text of specified style in document..7 Impact Management - Construction Phase –Off Site Areas

Impact or issue	Mitigation measure	ESMP Component	Responsibility	Comment
<i>Site Establishment</i>	Application of EIA Screening Process Compliance with other required approvals processes and other approvals processes Use of design / site layout guidelines	CESMP CEMG 1 CEMG 4 CEMG 6		<i>Specific management planning required for each off project corridor facility in CEMG 4 and CEMG 6 for borrow areas.</i> <i>Other agencies, such as NRA, MWI, MoEnv and Local authorities will be involved in the approvals process.</i> <i>Depending on location consultation with communities may also be required.</i>
<i>Site Operation</i>	Short direct location to main access routes Provision of water, shelter, sanitary facilities Locate away from sensitive sites Briefing of staff on camp regulations Appropriate storage of hazardous materials Prior approval required prior to camp site construction	CESMP CEMG 1 CEMG 4	EPCC	<i>Specific management planning required for each off project corridor facility.</i> <i>Other agencies, such as NRA, MWI, MoEnv and Local authorities will be involved in the approvals process.</i>
<i>Waste disposal</i>	Disposal to prior approved sites under management plan.	CESMP CEMG 2	EPCC	<i>Full suite of measures and operational procedures set out within CESMP guidelines.</i>
<i>Traffic</i>	Use of restricted routes Access control points Speed controls Cleaning of adjacent public roads Delivery of abnormal loads outside peak hours – i.e. slow moving or wide vehicles	CESMP CEMG 5	EPCC	<i>Full suite of measures and operational procedures set out within CESMP guidelines.</i> <i>Local police/traffic department will need to be consulted as will any affected communities.</i>

Table Error! No text of specified style in document..8 Impact Management – Operations Phase

Impact or issue	Mitigation measure	ESMP Component	Responsibility	Comment
Noise	Insulate all permanent plant near sensitive receivers Maintenance and deliveries to be outside sensitive hours in built up areas	EMS	EPCC/Operator	Included at design stage
Public health and safety Accidental leaks and spillages Water quality	Training program for operators who work with chlorine and ammonia regarding safe handling practices and emergency response procedures Refresher training at regular intervals Regular water quality testing by WAJ as per national regulations	EMS	EPCC/Operator	Covered by operational and maintenance procedures WAJ procedures for managing existing infrastructure provide template
Maintenance	Follow standards O&M guidelines. Formulate a leak detection and repair program (including records of past leaks and unaccounted- for water to identify potential problem areas) Minimize erosion during flushing, for example by avoiding discharge areas that are susceptible to erosion and spreading the flow to reduce flow velocities	EMS	EPCC/Operator	Covered by standard operational and maintenance procedures – WAJ procedures for managing existing infrastructure provides a template
Service provision	Prior notification procedures for disruption to supply	EMS	EPCC/Operator	Covered by operational and maintenance procedures – WAJ procedures for managing existing infrastructure provides a template
Depletion of Disi aquifer	Level monitoring plan to assess and confirm depletion rates	EMS	EPCC/Operator	Standard operational procedures to specify monitoring procedures and frequency.

	Operator to provide annual report on Disi aquifer quality and levels			
<i>Future planning</i>	Retention of accurate as-built drawings	EMS	EPCC/Operator	

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9.5 MONITORING PLAN

9.5.1 Plan Components

The Monitoring Plan (MP) comprises four elements

- CESMP Monitoring
- CP Monitoring
- Environmental Quality Monitoring
- External Monitoring

At the operational stage remaining impacts will be managed through a series of O&M Procedures developed under the framework of the proposed EMS for the operation of the Project. These are not reviewed further here.

9.5.2 CESMP

Monitoring will be undertaken to verify and document that construction and commissioning activities associated with the construction of the pipeline and associated facilities (temporary and permanent) are conducted in compliance with the requirements of the CESMP. It will also ensure the feedback necessary to update and revise the CESMP is available.

The principal mechanism by which monitoring will be achieved will be a programme of site inspections and audits. However, it is also required in this ESMP that the EPCC has the capacity to undertake environmental quality monitoring in response to complaints from the community, (Section 9.5.2.3).

9.5.2.1 Site Inspections

EPCC

Primary responsibility for monitoring compliance with the CESMP will rest with the EPCC Environmental Monitoring Units⁹ (EMU). Staff from the EMU will carry out regular site inspections using pre-prepared checklists. Monthly inspection and compliance reports will be issued to PC and to the MoE.

These inspections are intended to provide the contractor with an internal record of his performance in respect of the CESMP and to indicate areas of non-compliance. To further

⁹ Given the length of Project Pipeline it is expected that monitoring would be split between individual EMUs assigned to the management of Project Sections. Environmental monitoring reports for the various project Sections will then be collated by the EPCC Environmental Manager and submitted to PC.

facilitate effective implementation of the CESMP, weekly meetings will be held between EPCC Environmental Units, PC ESD and sub-contractors to discuss project issues and areas of concern to all parties.

Project Company (PC)

The application of NPPs as specified in the CESMP will be based on the findings of validation inspections carried out on a quarterly basis by PC using the same checklists used by the EPCC in their internal inspections.

With respect to the above, it should be noted that EPCC and PC inspections will be carried for all project facilities, and that EPCC will be responsible for all project sites including those that may be operated solely by sub-contractors.

This raises an important consideration for EPCC. Recent experience in Jordan indicates that the accrual of NPP during site inspections is most directly related to the performance of Sub-contractors, not that of the Main Contractor themselves. In this case, it may be in EPCC's interest to include in their selection criteria consideration of the likely performance of a sub contractor with respect to CESMP

9.5.2.2 Audits

Project Company will retain the capacity to undertake audits to monitor project construction sites and camps including sites beyond the construction corridor i.e. waste disposal sites.

Annual audits will be undertaken of all major facilities including the following:

- Main Construction Camps and Yards;
- Labour Camps;
- Main Non-Hazardous Material Storage Area;
- Hazardous Materials Storage and Use;
- Waste Disposal Sites,

Subsidiary and/or temporary camps, yards and storage area, small sites, and other sites outside the area of construction, for example, quarries and fabrication yards, may be subject to audit on a random basis.

9.5.2.3 Complaints Monitoring

The CESMP requires that the EPCC retains the capability to undertake environmental quality monitoring in respect of water quality, air quality (dust) and noise in response to

complaints received or at the request of PC. In all cases the decision to undertake such surveys will rest with PC.

The equipment required for this purpose should be purchased by the EPCC to specifications provided by PC. All EPCC EMU staff shall be trained in the use of such equipment.

9.5.3 CP Monitoring

Three forms of Compensation Plan monitoring are proposed.

- Internal Project Monitoring of the Performance of the CP with respect to the effectiveness of the processes established and ultimately therein, the disbursement of compensation.
- Independent Monitoring of the Processes and the Compensation award.
- External Monitoring.

9.5.3.1 Internal Monitoring

Internal monitoring will be a primary responsibility of PC. The programme will have a number of specific objectives:

- To provide early warning of CP related project difficulties and concerns.
- To monitor the progress of CP implementation against predetermined performance targets.
- To ensure that payments are made to the correct individual and as in the compensation agreement, and that other entitlements are also made available as promised.
- To facilitate the work of the external and independent monitors through effective record keeping and the preparation of Project Progress Reports for each period the CP is operational.

The programme will be implemented through a fortnightly progress report prepared on the basis of documentation provided by the EPCC and obtained from weekly meetings between the EPCC, EMU and PC.

9.5.3.2 Independent Monitoring

It is desirable that PC agrees to independent monitoring of the implementation of the CP. The primary objectives of this monitoring are as follows:

- to review compensation negotiation processes to ensure that **all** PAPs are receiving adequate support and advice from the Project and that some are not being disadvantaged by poor CLO performance.

- to monitor the reaction of the PAP community to the processes and procedures adopted in the implementation of the CP programme and to document opportunities for the future improvement.
- to ensure that compensation is paid on a timely basis.
- to respond to complaints received over late or delayed payments or negotiation concerns, etc.
- to review the deliberations of the CRB (including observation of proceedings if felt necessary).

The monitor shall have the right to access all documentation held in a PAP file and to review any case he wishes. The monitor will report to the DPAC.

9.5.4 Environmental Quality Monitoring

Three EQM programmes are proposed:

9.5.4.1 Water Quality

The water quality monitoring programme will comprise Baseline and monitoring surveys. In both cases, sampling and testing of water quality in compliance with JS 286/2001 Drinking Water Quality.

(i) **Baseline**

The baseline parameters and frequency to be tested for new wells under this standard are as follows:

Tested once every 3 months for the first year	Tested once every 6 months for the first year	Tested once every 2 years
- pH - TDS - Total Hardness - Ammonium - Aluminium - Manganese - Iron - Copper - Zinc - Sodium - Chloride - Sulphates - Colour - Turbidity - Nitrates - Nitrites	- Arsenic - Lead - Cyanide - Cadmium - Chrome - Barium - Selenium - Boron - Mercury - Silver - Nickel - Antimony - Fluoride	- Alpha Radionuclides excluding Radon - Beta Radionuclides excluding Tritium and Carbon 14

For the Baseline study, water will be abstracted from three well sites selected by MWI to represent the well field. These samples shall be tested prior to operations as required and on completion of each testing programme a report will be prepared for submission to WAJ for information. On completion of the entire testing package a comprehensive report of the Baseline Programme will be prepared and submitted to WAJ to approve water from the Disi aquifer for use as a potable water source.

(ii) Operations

After the first year of well operation the frequency and parameters to be tested according to JS 286/2001 are as follows:

Inorganics

Testing in the first year should be every three months, then annually for the following:

- Colour
- Taste
- Odour
- Turbidity
- Ammonium
- Aluminium
- Manganese
- Iron
- Copper
- Zinc
- Sodium
- Chloride
- Sulphate
- Hydroxide
- TDS
- Total hardness
- Chemical detergents

Testing in the first year should be every six months and annually thereafter for the following:

- Arsenic
- Lead
- Cyanide
- Cadmium

- Chrome
- Barium
- Selenium
- Boron
- Mercury
- Silver
- Nickel
- Antimony
- Fluoride

Radionuclides

The following should be tested once every 2 years

- Alpha Radionuclides excluding Radon
- Beta Radionuclides excluding Tritium and Carbon 14

Water quality shall be monitored during operations by the operator and monthly compliance reports (with respect to JS 286/2001) provided to DPAC, MoE and WAJ.

9.5.4.2 Biodiversity

During the design review Biodiversity assessments will be carried out for the well field area and the alignment from the well field to the public highway. In the well field this will comprise of a review and a specific well sites and proposed alignments for local access roads and power lines. Outside the well field it will comprise of a further rapid appraisal of the final alignment. In each case the objective of the assessment will be to define baseline conditions and to identify sites at risk that may need to be the subject of specific design consideration and or construction planning and management.

After construction is completed further monitoring will be required over a period of 3 years to ascertain if possible changes to access patterns resulting from project construction and associated possible changes in resource use patterns have affected or could affect any identified significant resources.

This will take the form of discussions with traditional communities and site visits. 6 visits are proposed for an ecologist for 3 years.

9.5.4.3 Condition of Renewable Water Resources

Disi Project documentation is explicit in determining that a principal benefit of the Disi project is that it will reduce the extraction pressure on the renewable aquifers that

currently supply potable water to Amman and therefore will permit some recovery in the quality and quantity of water available from these resources in the future.

Accordingly, the project should seek to measure the extent to which these benefits actually accrue.

It is understood that most of these aquifers are regularly monitored by the authorities and that good existing trend data is available. In this case it is proposed that DPAC prepare a 2008 baseline report of the key aquifers indicating their present status and forecast their future status based on present trends.

This document should be reviewed and updated at the time of start of operation of the Disi Conveyor and every 5 years thereafter for at least 15 years.

9.5.5 ESMP Reporting and Review Process

9.5.5.1 Reporting

Figure Error! No text of specified style in document.. provides a summary of the proposed Project Reporting Structure.

CESMP

A structured program of Reporting will be required to support the CESMP.

- **Monthly Inspection Reports:** Prepared by the EPCC and circulated for information purposes internally within EPCC and to PC ESD. These will comprise reports on the internal site inspection programme and will be intended to inform EPCC and the PC ESD of ongoing environmental performance. In particular, they will identify areas of contractor non-compliance with the CESMP and provide guiding remarks on remedial actions to be taken. The significance of the non-compliance will also be reported in respect of possible penalty imposition.
- **Quarterly Inspection Reports:** These will be prepared by the PC ESD and will be the primary source of information on ongoing project activities and environmental compliance. It will contain the statement of compliance or otherwise with the CEMG that determines whether withholding penalties will be applied and will be circulated widely among project stakeholders.

Operational Compliance

ESD will compile half yearly environmental reports detailing compliance with operational guidelines and management plans.

Each of the operational guidelines and management plans should be reviewed in turn, with the indicators and monitoring results discussed. The rate of compliance should be presented, non-compliance detailed and proposals made for mitigating incidents of repeated non-compliance.

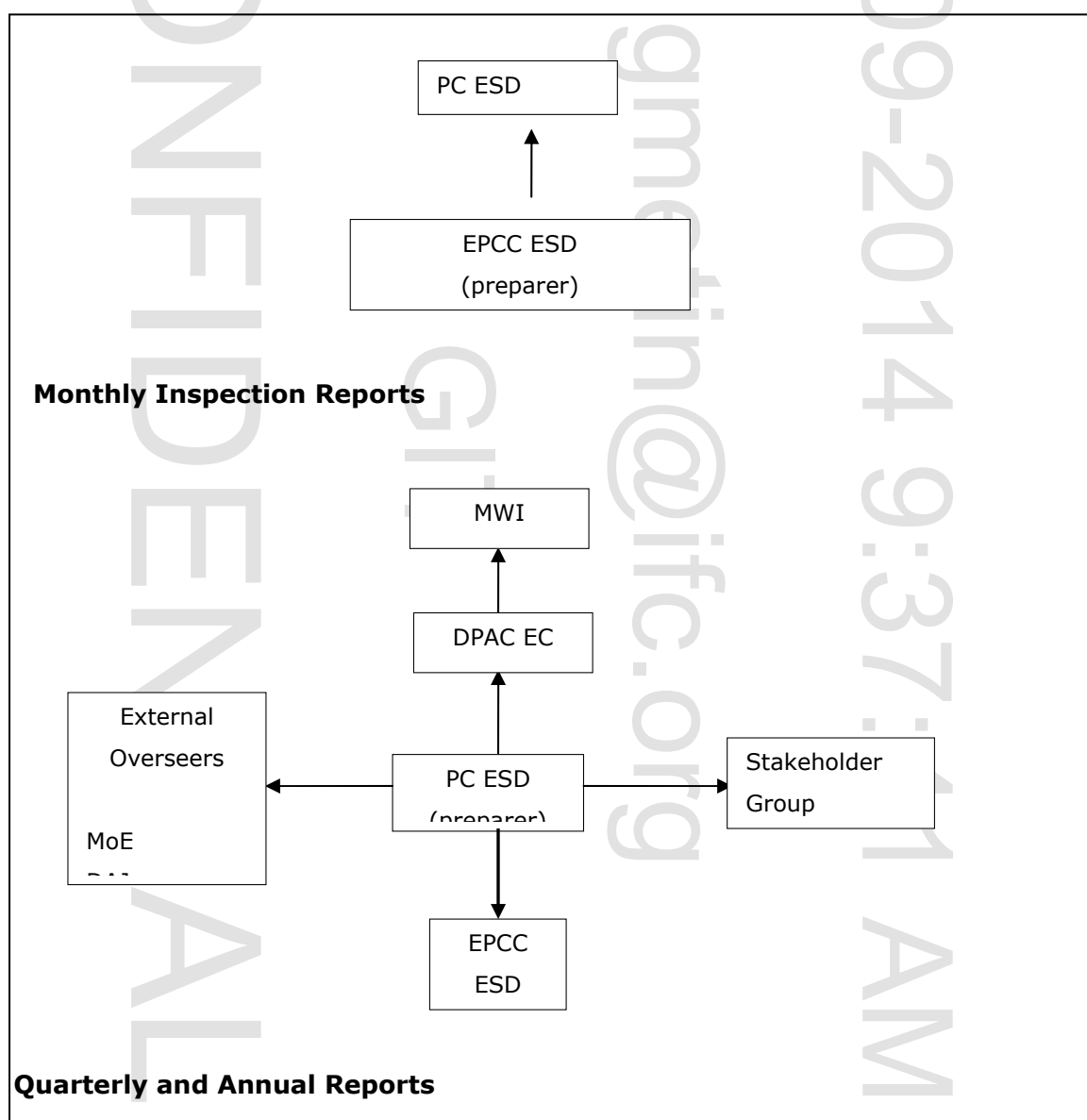


Figure Error! No text of specified style in document..2 Summary of CESMP Reporting Structure

Annual Report

Reporting on the ESMP as a whole shall be on an annual basis via Annual Reports prepared by ESD and submitted to MWI for review by the end of October each year. The Annual Report should include the following:

- Review of environmental policy;
- Review of the defined environmental indicators, any changes introduced during the year to reflect new legislation and/or internationally-accepted best practice, and the impact of these changes on the level of environmental protection offered;
- Summary of the environmental monitoring programmes undertaken during the year, discussion of the results, and assessment of compliance;
- Discussion of any major environmental incidents, to include the causes and reasons for the lack of prevention, the impacts suffered, any special mitigation measures suffered, and any amendment to the ESMP and/or ESD procedures to prevent reoccurrence;
- Forthcoming changes in Jordanian environmental legislation and/or regulations that will require amendment of the ESMP and/or ESD policy/procedures, details of the likely changes, and cost estimates for their implementation.

In addition to the above the ESMP requires ESD to submit a Design Review Report that documents the measures taken during the detailed design to limit or otherwise mitigate adverse project related environmental and social impacts.

Design Review Report

The Design Review Report will detail the measures taken to avoid potential environmental and social impacts during the design review process. The Report will be prepared by the PC and circulated to EPCC, DPAC committee and international financiers as required.

9.5.5.2 ESMP Review Process

Without routine management review and support, the ESMP will quickly cease to be a useful management tool. Therefore, the ESD will review the effectiveness of the ESMP at the mid-point of the construction schedule. This review will be undertaken by ESD and will include consultation with key stakeholders. All aspects of the Plan shall be open for review but it is expected that the focus will be on:

- The adequacy of the ESMP and related management programs to achieve the desired outcomes and to define any changes that might be necessary to ensure continued compliance with applicable Jordanian law and IFC's Performance Standards;

- Results of E&S monitoring undertaken during the past year and review of compliance with appropriate and relevant requirements; and
- Discussion of major incidents, including causes, impacts suffered, and changes needed to the ESMP and related operating procedures to prevent reoccurrence.

9.6 COMMUNICATIONS STRATEGY

It is recommended that the Project establish a Communications Strategy. This will have 3 objectives:

- ensure relations with affected communities remain positive throughout project construction process and during operations,
- address the specific needs of components of the ESMP,
- ensure that the project has in place a specific strategy and policy for dealing with other external parties.

The Communications Strategy will need to be developed by the PC with the support of MWI.

In the specific case of Consultation with affected communities it will be necessary during the design stage of the Project for the PC to undertake a programme of consultations with every major community affected. The objective of this programme would be to:

- Provide information about the project to communities; project purpose, nature of works, timing of works, etc.
- Receive comments from communities.
- Facilitate the design and implementation of the compensation process
- Establish strong project links with affected communities.

At this time the following Consultation Programme is envisaged:

Project Stage	Consultation	/	Objective
	Appeal		
Draft Design	Community Meeting 1		Project Update Introduce relevant CLO. Show project design and request comment Initial advisory on compensation process and appeals option.
	Appeal 1		Against the alignment. Request changes to avoid assets etc.
Census and Entitlements definition	Community Meeting 2		Project Update Advisory that census is going to start and what that means.
	Public Notification		
	Community Meeting 3		Project Update

		Explanation of entitlements and the meaning of the Notification.
		Discussion of options and outline assistance available to PAP in the process.
	Appeal 2	Entitlement and ownership dispute.
Valuation	Written notification	
140 days before Construction Start (CS)	Community Meeting 4	Project Update
130 days before CS	Appeal 3	Explain appeal and review process and timings.
70 days before CS	Negotiation/completion of valuation process	Explain assistance available to PAP in the process.
21 days before CS	Community Meeting 5	Against valuation
		Individual negotiations with PAP.
30 days after CS	Community Meeting 6	Advise of start of works and measures proposed to minimise impacts on community
120 days after CS	Community Meeting 7	Reconfirm complaints and grievance processes.
210 days after CS	Community Meeting 8	Status Update and response to comments
300 days after CS	Community Meeting 9	Status Update and response to comments
390 days after CS	Community Meeting 10	Post Project completion meeting 1
		Post Project completion meeting 2
		Post Project completion meeting 3

Community Liaison Officers (CLO) should be nominated to manage the consultation and act as a single point of contact for community complaints / information requests during the construction of the Project.

It is also desirable that Project offices are opened in affected communities. These offices may be manned on a part time basis but should be manned according to a fixed weekly schedule and would remain open throughout the Project Construction Period.

9.7 PROJECT IMPLEMENTATION

9.7.1 Implementation Milestones

A summary of specific responsibilities for principal actions to be carried out in the implementation of the ESMP is provided as Table ERROR! NO TEXT OF SPECIFIED STYLE IN DOCUMENT.

9.7.2 Key ESMP Milestones

The principal ESMP Milestones are placed in the context of overall Project Milestones in Figure **Error! No text of specified style in document..3.**

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Under IFC guidelines a client will establish and maintain a Social and Environmental Management System appropriate to the nature and scale of the project and commensurate with the level of social and environmental risks and impacts.

Accordingly, the Operator will be required to:

- Establish an Environmental Policy
- Establish an Environmental Management Capability
- Establish an Environmental Information System.

Table Error! No text of specified style in document..9**Proposed Allocation of Responsibility for ESMP Implementation**

Action	Task	Responsible Agency								
		MW I	DPAC EC	PC ESD	EPCC ED	Operator	SG	MoE	Municipalities	Other
Preparatory Works										
1	Obtain Approval for EIA and EIA Addendum from MoE	E								R
2	Establish PC ESD	E						N		
3	Establish DPAC Environmental Committee	E						N		
4	Establish SG	E						N		
5	Establish EPCC EU			N	E					
6	Develop and Implement External Communication strategy	S		E			N			
7	Community Consultation	S			E		N	N	S	
8	Coordination with External Agencies – Permitting and Consultation	S		E	E		S			N
9	Establish Human Resources and Health and Safety Policies and Plans	N	N	E	N			N		
Design Review										
10	Desk study design review			S	E					
11	Site Validation		S		E				S	
12	Prepare Design Review Report	R	R	E						
Compensation Plan										
13	Develop Valuation Guidelines for Committees	E		E					S	S
14	Confirmation of Entitlements Matrix	R		E			N			
15	Compensation Inventory	N	N	E					S	
16	Notification		N	E					S	
17	Establish Valuation Committees and CRB	E		N					S	

Action	Task	Responsible Agency								
		MW I	DPAC EC	PC ESD	EPCC ED	Operator	SG	MoE	Municipalities	Other
18	Valuation and Negotiation	E	N	N					S	
19	Appeal Process		N	E					S	
20	Completion – Payment and certification	N	N	E	N				N	
CEMG										
21	Finalise CEMG for inclusion in EPC Contract Documents	N		E				N		
22	EPCC Certification of Willingness to Comply with CESMP		N	N	E		N	N		
23	Establish EPCC EU			N	E		R			
24	Identify and train relevant staff.		N	N	E			N		
25	Develop management plans		N	R	E			N		
26	Implement management plans			R	E					
27	Obtain approval for location of off site facilities		N	N	E		N/R	N	N/R	R
28	Maintain complaints register		N	N	E		N	N	N	
29	Prepare internal monitoring programme			N	E					
30	CEMP review and revision		N	E	N		N	N		
Monitoring Plan										
CSMP										
31	Undertake day to day monitoring			N	E					
32	Undertake Quarterly Check Monitoring		N	E	N		N	N		
33	Undertake Facilities Audits		N	E	N		N	N		
34	Penalty Review Inspections	N	N	E	N		N	N		
35	External Reviews	N	N	N	N		N	N		E
CP										

Action	Task	Responsible Agency								
		MW I	DPAC EC	PC ESD	EPCC ED	Operator	SG	MoE	Municipalities	Other
36	Appoint external inspector	E		N	N					
37	Internal Monitoring			E						
38	Independent Monitoring		N	N						E
39	External Monitoring		N	N			N	N		N
	Environmental Quality									
40	Water Quality Baseline		N	E				N		N
41	Water Quality Monitoring	N	N	E				N		N
42	Biodiversity Baseline		N	E				N		N
43	Biodiversity Monitoring		N	E	N			N		N
	ESMP(incl. CESMP) Reporting									
44	Monthly			N	E					
45	Quarterly	N	N	E	N		N	N		
46	Annual	N	N	E	N		N	N		
	Develop EMS									
47	Develop Disi Project Operational EMS			N		E				
48	Implement EMS	N	N	N		E		N		
49	Review and Revise EMS	N	N	N		E		N		
50	Operational Compliance Reporting		N	N		E		N		

Key: R= Review/clear E= Execute S= Support N= Notified

APPENDICES

Appendix 1	Imagery of Project Alignment
Appendix 2	Ecological Data
Appendix 3	RSCN Letter of No Objection Rum IBA
Appendix 4	Project Affected Sites Survey
Appendix 5	Consultation Record
Appendix 6	Project Affected Persons' Census and Socio-Economic Survey Terms of Reference
Appendix 7	Indicative Table of Contents for Proposed CEMG
Appendix 8	Example of Certificate of Compliance

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Figure 1 – North east section of Disi Well field

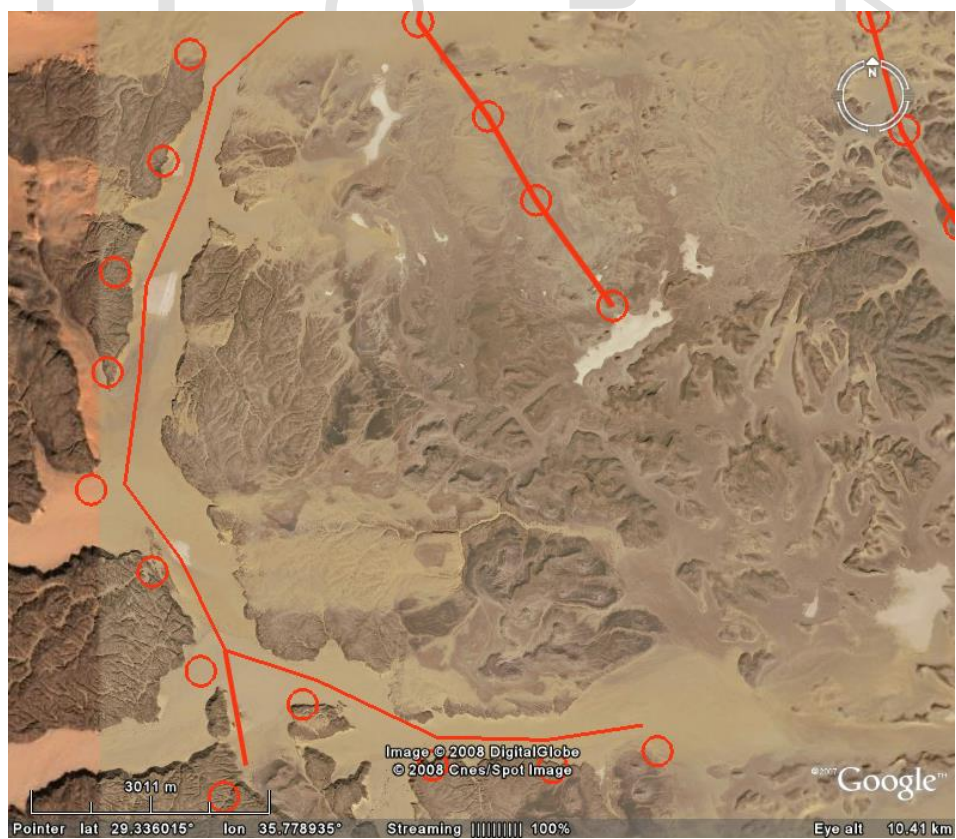


Figure 2 – South east section of Disi Well field



Figure 3 – South west section of Disi Well field



Figure 4 – North west section of Disi Well field

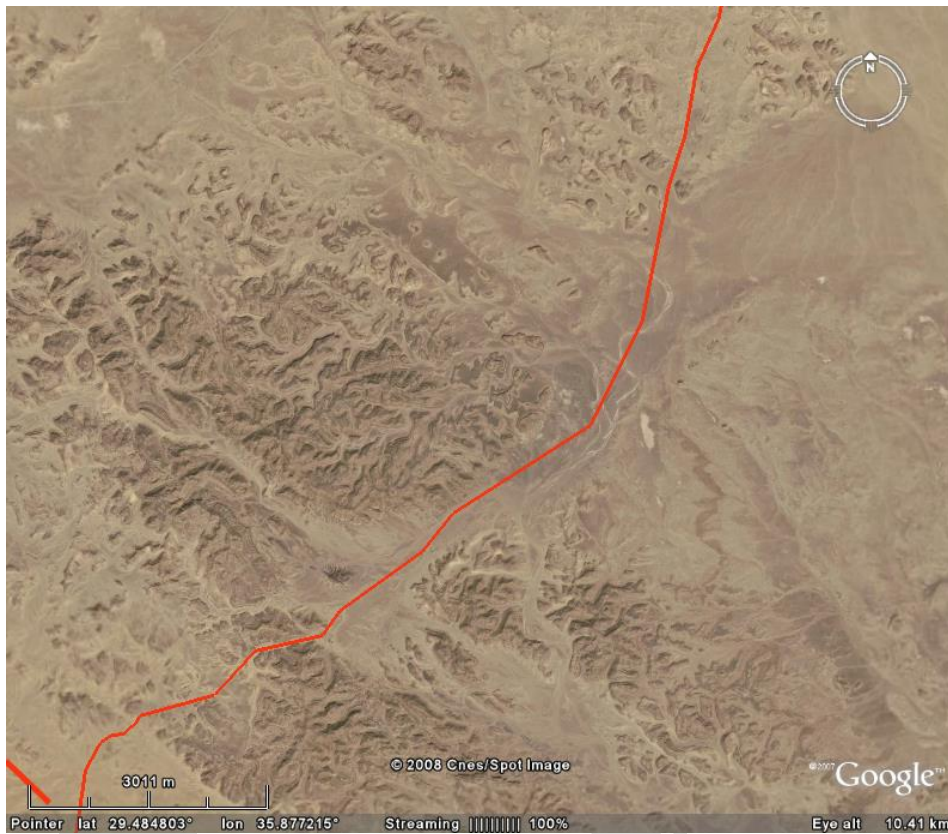


Figure 5 Approximately Km 0 to Km 9

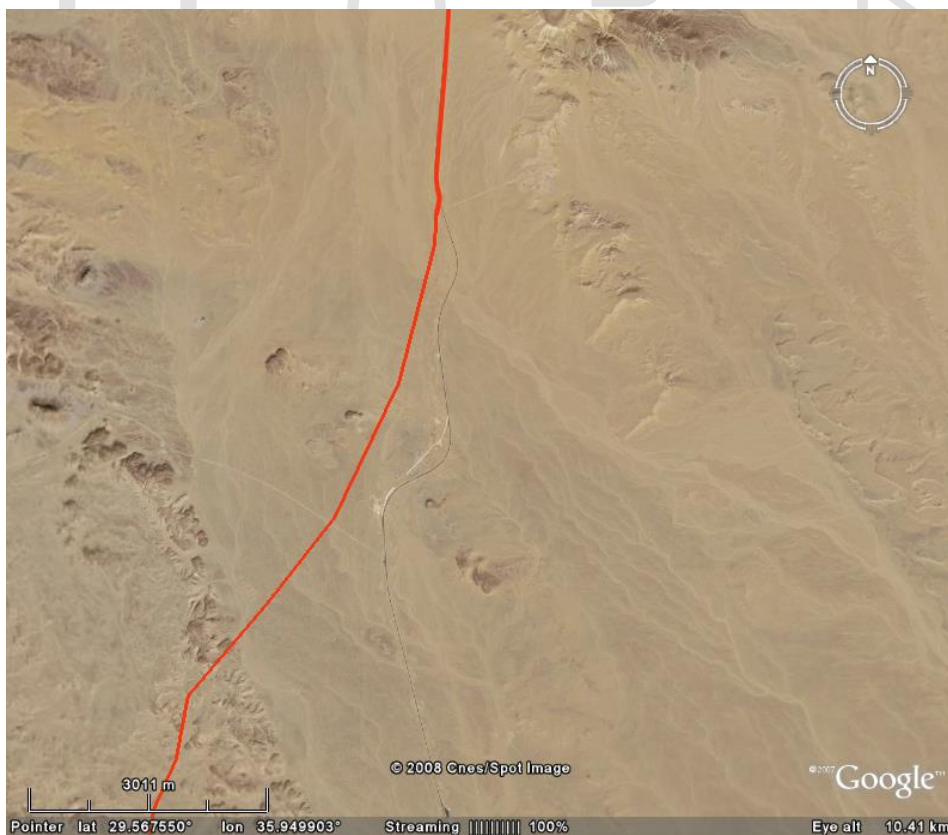


Figure 6 Approximately Km 9 to Km 18



Figure 7 Approximately Km 18 to Km 30

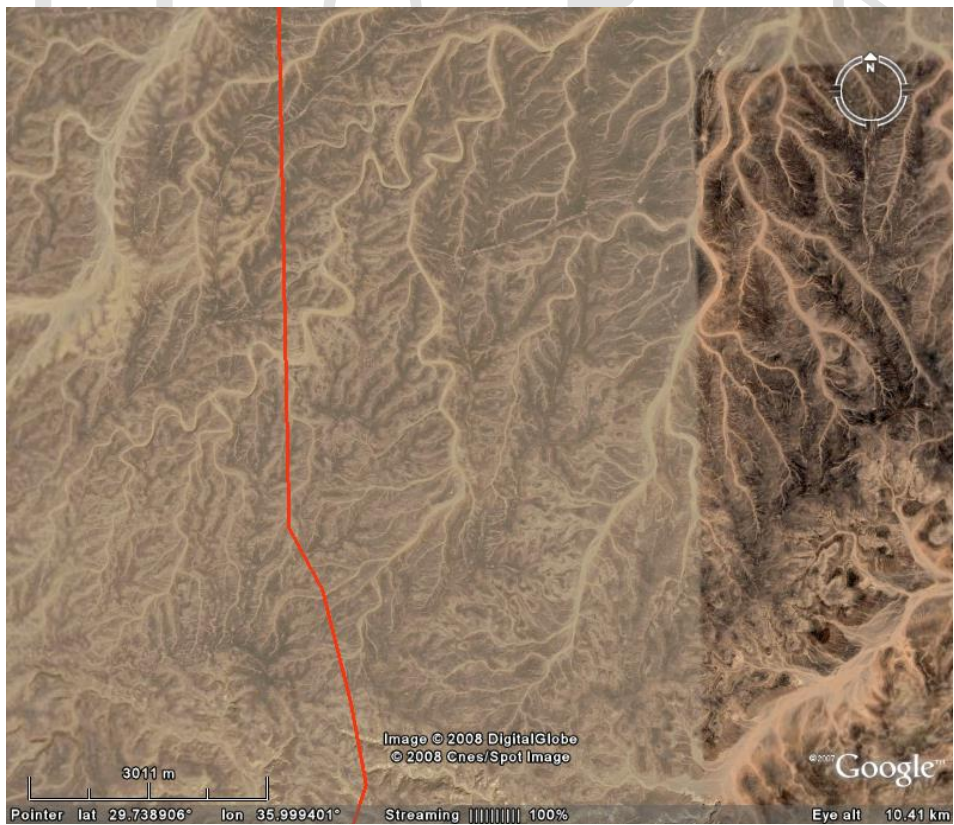


Figure 8 Approximately KM 30 to 39

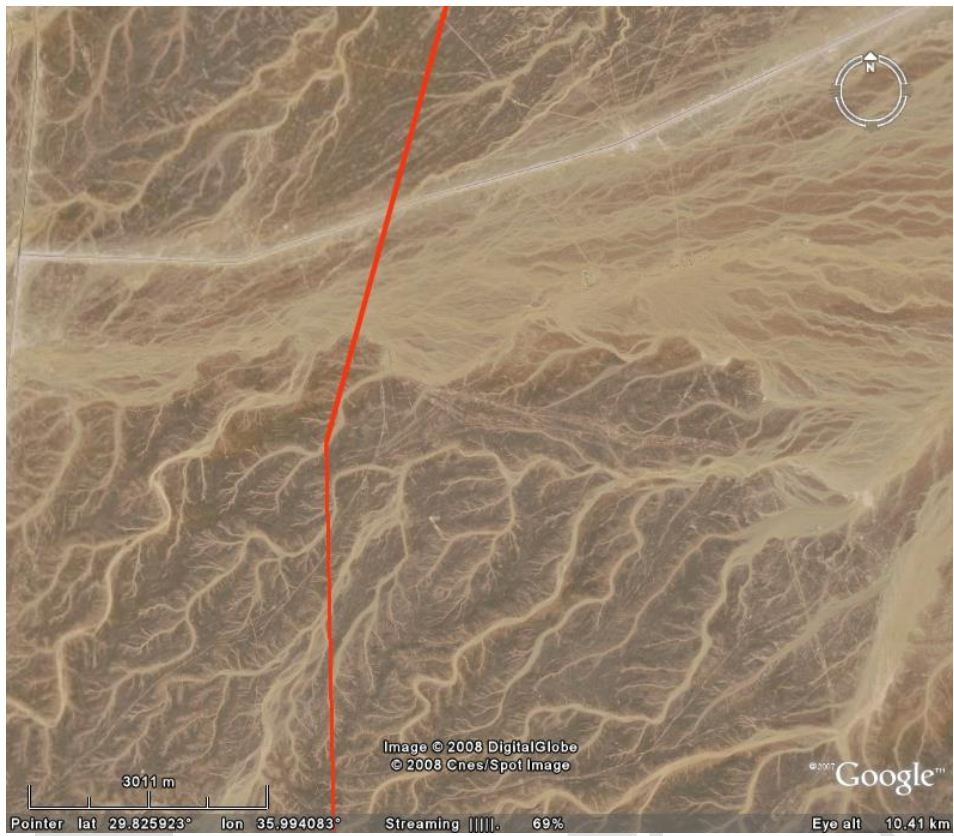


Figure 9 Approximately KM 39 to 48

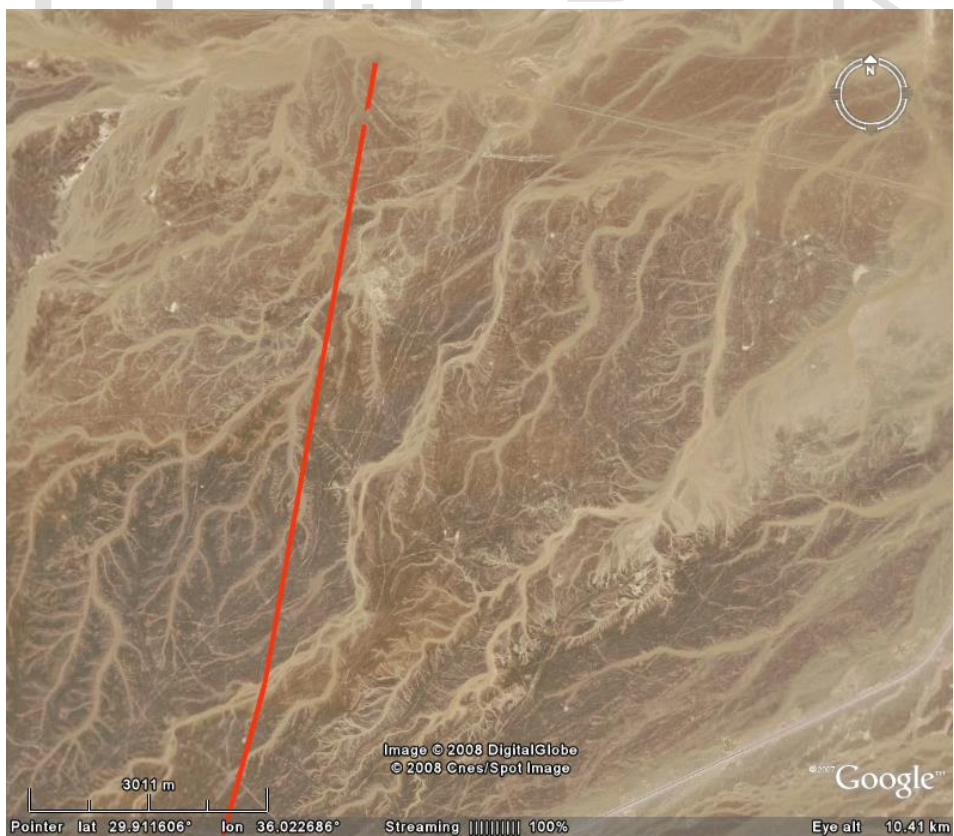


Figure 10 Approximately KM 48 to KM 57

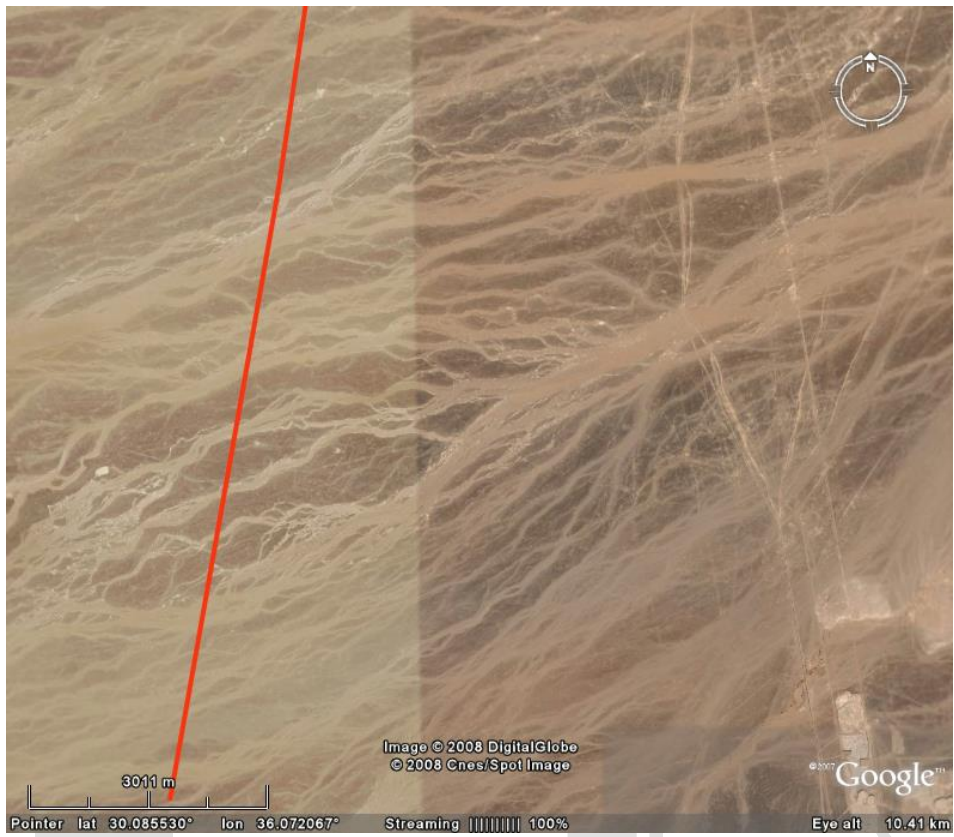


Figure 11 Approximately KM 57 to KM 65



Figure 12 Approximately KM 65 to KM 74



Figure 13 Approximately KM 74 to KM 83



Figure 14 Approximately KM 83 to KM 92



Figure 15 Approximately KM 92 to KM 101



Figure 16 Approximately KM 101 to KM 110

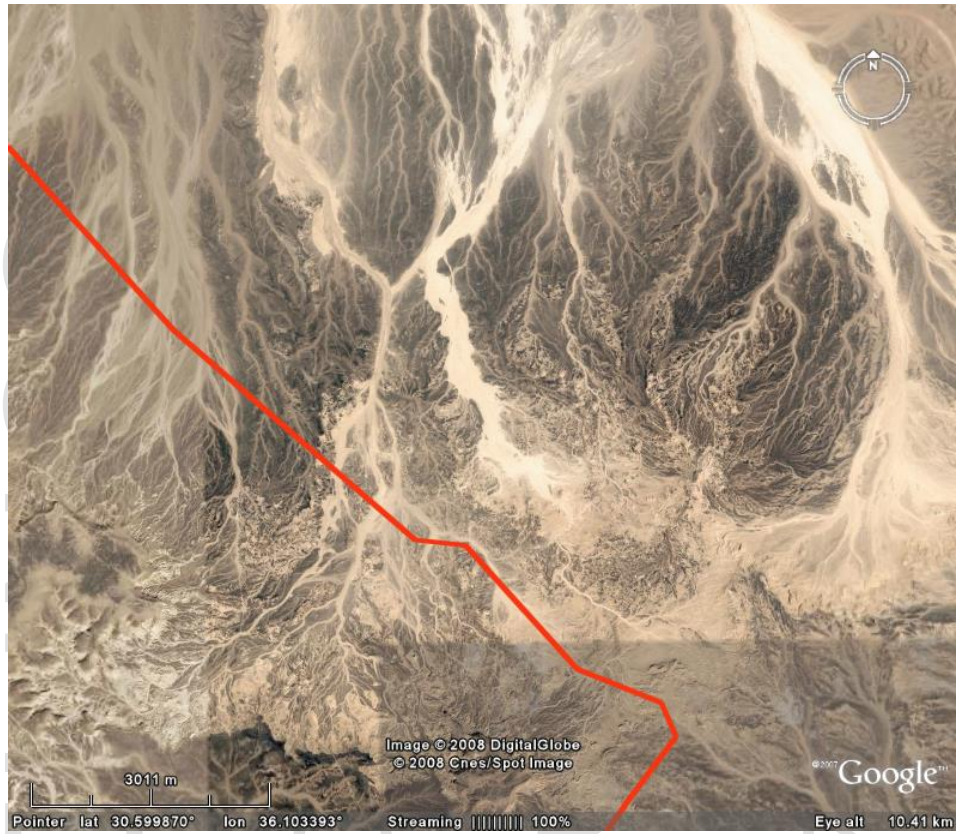


Figure 17 **Approximately KM 110 to KM 119**



Figure 18 **Approximately KM 119 to KM 128**



Figure 18 **Approximately KM 128 to KM 137**

Appendix 2 Detailed Habitat Description Southern Route Sections

Site	Sites of occurrence	Habitat	Importance / Sensitivity	Flora	Species of particular concern	
					Avifauna	Fauna
Wellfield	W1 to W12, W21 to W46, and points P1 to P8. (all located outside Rum IBA)	Hammada and Sandy Hammada	Medium to High		Saharoarabian restricted breeders : Cream-coloured Courser, Hoopoe Lark, Temminck's Lark, Desert Wheatear, Scrub Warbler, Long-legged Buzzards, and Brown-necked Raven.	Reptiles: <i>Bunopus tuberculatus</i> Bluch Rock Gecks, <i>Hemidactylus turcicus turcicus</i> Turkish Wary Gecko, <i>Pristurus rupestris</i> Dwarf Rock Gecko, <i>Ptyodactylus guttatus</i> Common or Spotted Fan-footed Gecko, <i>Ptyodactylus haselquistii haselquistii</i> Egyptian Fan-footed Gecko, <i>Stenodactylus doriae</i> Doria's Thin-toed Gecko, <i>Stenodactylus slevini</i> Arabian Thin-toed Gecko, <i>Tropicolotes nattereri</i> , <i>Phrynocephalus arabicus</i> Arabian Toad-headed Agama, <i>Uromastix aegyptia microlepis</i> Spin-tailed Dabb, <i>Acanthodactylus boskianus</i> Boosc's Fringe-toed lizard, <i>A. opheodurus</i> Snake-like lizard, <i>A. schmidtii</i> Spiny-toed lizard, <i>A. scutellatus</i> , <i>A. tillburyi</i> , <i>Mesalina brevirostris</i> , <i>M. guttulata guttulata</i> , <i>M. olivieri</i> , <i>Scincus scincus meccensis</i> , and <i>Varanus griseus</i> . Snakes: <i>Leptotyphlops macrorhynchus</i> , <i>Coluber elegantissimus</i> , <i>C. rhodorhachis rhodorhachis</i> , <i>C. Sinai</i> , <i>Eirenis coronella</i> , <i>Lythirhynchus diadema</i> , <i>Psammophis schokari</i> , <i>Spallerosophis diadema cliffordi</i> , <i>Cerastes gasperettii gasperetti</i> , and <i>Echis coloratus</i> . Rodents: <i>Jaculus jaculus</i> Three-toed jerboa (Common rodent in Wadi Rum desert), <i>Gerbillus cheesmani</i> (Soft Wind-blown Sand dune area), <i>Gerbillus henleyi</i> (Hamada area with sarce vegetation cover of <i>Anabasis articulata</i>), <i>Gerbillus nanus</i> Baluchistan gerbil (Sanddunes around mud flats), <i>Meriones libycus</i> Libyan jird (Agricultural Station/Soft Sandy Substrat dominated by <i>Anabasis articulata</i>), <i>Meriones crassus</i>
	W3 to W6, W21 to W36 and part of Alignment Section.	Chert Hammada vegetation	Low	<i>Rheum palestinum</i>		
	W6 to W12	Weathered sandstone and granite scrub (blown sand over gravel plains)	Medium	<i>Kickxia floribunda</i> , <i>Stigmatella longistyla</i> , <i>Onobrychis ptolemaica</i> , <i>Dipcadi erythraeum</i> , <i>Scabiosa eremophila</i> , <i>Aegilops cylindrical</i>	Rocky mountain margins suited to Sand Partridge, Mouring and Black Wheaters, Scrub Warbler, Sinai Rosefinch, House bunting.	
	W21 to W27 and W28 to W31. (all located outside Rum IBA)	Mixed Sandy chert Hammada and Mud Flats	Medium High		Saharoarabian restricted breeders : Sand Partridge, White-crowned Black Wheatear, Mourning Wheatear, Little Owl, Kestrel, Scrub Warbler, Long-legged Buzzard, Hooded Wheatear, and Desert Wheatear.	

Site	Sites of occurrence	Habitat	Importance / Sensitivity	Flora	Species of particular concern	
					Avifauna	Fauna
						<i>Sand jird (Sandy area/ wide range habitats including hammada and Acacia vegetation), Psammomys obesus with Anabasis articulata</i> Mammals: <i>Canis lupus</i> Wolf, <i>Vulpes rueppelli</i> Sand fox, <i>Vulpes vulpes</i> Red fox, <i>Felis margarita</i> Sand cat, and <i>Hyaena hyaena</i>
	W45 to W55. (all located inside Rum IBA)	Sand Dunes (proper) and Rocky mountains	High		Sand Dunes :Saharosindian restricted breeders : Sand Partridge, Chukar, Hume's Tawny Owl, Hooded, Mourning and White-crowned Black Wheatears, Tristram's Grackle, Trumpeter Finch and Sinai Rosefinch (the national bird of Jordan). Rocky Mountains : Short-toed Eagle, Verraux's Eagle (former breeder), Barbary and Sooty Falcons, and the Globally threatened Lesser Kestrel (rare). Low vegetation stand and open sandy provide suitable nesting habitat for a number of resident species. Others utilise low cliffs and crevices within adjacent rocky areas.	Reptiles: <i>Stenodactylus doriae</i> Doria's Thin-toed Gecko, <i>Stenodactylus slevini</i> Arabian Thin-toed Gecko, <i>A. schmidtii</i> Spiny-toed lizard, <i>A. scutellatus</i>, <i>A. tillburyi</i>, <i>Scincus scincus meccensis</i> Snakes: <i>Cerastes gasperettii</i> gasperetti Rodents: <i>Jaculus jaculus</i> Three-toed jerboa (Common rodent in Wadi Rum desert), <i>Gerbillus cheesmani</i> (Soft Wind-blown Sand dune area), <i>Gerbillus nanus</i> and <i>Baluchistan gerbil</i> (Sanddunes around mud flats), <i>Meriones crassus</i> and Sand jird (Sandy area/ wide range habitats including hammada and Acacia vegetation). Mammals (in the western part of Rum and possibly occur in the sand dunes of the wellfield): <i>Canis aureus</i> Golder or Asiatic Jackel, <i>Canis lupus</i> Wolf, <i>Vulpes cana</i> Blanford's fox, <i>Vulpes rueppelli</i> Sand fox, <i>Vulpes vulpes</i> Red fox, <i>Felis margarita</i> Sand cat, <i>Hyaena hyaena</i>, <i>Procapra capensis</i> Common Rock hyrax, <i>Capra ibex</i> Nubian Ibex, and <i>Lepus capensis</i> Arabian Hare
	W43, W44, collection Point (P3-P1)	Scattered Acacia in Wadis	High	Acacia trees: <i>Acacia raddiana</i>		
	W44 to W47,	Weathered sandstone and granite scrub (blown sand over gravel plains)	Medium	<i>Kickxia floribunda</i> , <i>Stigmatella longistyla</i> , <i>Onobrychis ptolemaica</i> , <i>Dipcadi erythraeum</i> , <i>Scabiosa eremophila</i> , <i>Aegilops cylindrical</i>		
	W48 to W50	Sandy Hammada	Medium	<i>Artemisia judaica</i> , <i>Asphodelus microcarpus</i> , <i>Cleome Arabica</i> , <i>Haloxylon persicum</i>		
	W50-W55	Sand Dune vegetation	High	<i>Haloxylon persicum</i>		

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Site	Sites of occurrence	Habitat	Importance / Sensitivity	Flora	Species of particular concern	
	Disi Mudflat and at small areas within Well fields and collection points	Mud flat	High	Unvegetated	Avifauna	Fauna Mud flat surrounding - Reptiles: <i>Hemidactylus turcicus turcicus</i> Turkish Wary Gecko, <i>Pristurus rupestris</i> Dwarf Rock Gecko, <i>Stenodactylus sthenodactylus</i> Elegant Thin-toed Gecko. Snakes: <i>Spallerosophis diadema cliffordi</i> . Rodents: <i>Gerbillus nanus</i> Baluchistan gerbil (Sanddunes around mud flats), and <i>Meriones crassus</i> Sand jird (Sandy area/ wide range habitats including hammada and Acacia vegetation). Mammals: <i>Vulpes vulpes</i> Red fox, and <i>Hyaena hyaena</i>
Electricity Transmission Route						
Electricity Transmission Route from Rum road junction to the Wellfield	From the village of Disi to the Wellfield - mosaic of habitat types, including the larger wetland areas of Qa Um Salab and Qa Disi to the north of Wadi Rum	Hamada and chert Hammada vegetation (referred to in previous studies as Hammada Vegetation)	Low to Medium	<i>Rheum palestinum</i>	Towards the eastern edge Sand Dune species present. Local wetland area would attract many species including migratory bird species.	See faunal species listed for the Hammada and Sandy Hammada vegetation (habitat) in the Wellfield
		Wadi vegetation	Medium-High	Often <i>Hammada sailcornia</i> and <i>Raetum</i> sp	Locally impoortant foraging and roosting sites for passerines. Larger open vegetated sandy wadis suitable for ground nesters such as Bar tailed, Desert and Hoopoe Larks.	See faunal species in Wadi Abu Tarfa
		Mudflat and sand dune	High	Unvegetated mudflat. Sand dune species as above	Seasonal habitat for overwintering birds.	See faunal species in Disi mudflat and Sand Dune.
Wellfield to highway section						

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Site	Sites of occurrence	Habitat	Importance / Sensitivity	Flora	Species of particular concern	
					Avifauna	Fauna
Wadi Abu Tarfa	the whole alignment is located outside the Rangeland Reserve, however the areas crossed by the alignment holds a similar habitat	Runoff vegetation	Medium	Largely unvegetated	Temminck's Lark, Desert Wheatear, Scrub Warbler, Long-legged Buzzards, and Brown-necked Raven.	Reptiles: <i>Bunopus tuberculatus</i> Bluch Rock Gecks, <i>Hemidactylus mindiae</i>, <i>Hemidactylus turcicus turcicus</i> Turkish Wary Gecko, <i>Pristurus rupestris</i> Dwarf Rock Gecko, <i>Ptyodactylus guttatus</i> Common or Spotted Fan -footed Gecko, <i>Stenodactylus sthenodactylus</i> <i>sthenodactylus</i> Elegant Thin-toed Gecko, <i>Tropicolotes nattereri</i>, <i>Laudakia stellio brachydactyla</i>, <i>Phrynocephalus arabicus</i> Arabian Toad-headed Agama, <i>Pseudotrapelus sinaitus</i> Sinai Agama, <i>Uromastix aegyptia microlepis</i> Spin-tailed Dabb, <i>Acanthodactylus baskianus</i> Boosc's Fringe-toed lizard, <i>A. opheodurus</i> Snake-like lizard, <i>Mesalina brevirostris</i>, <i>M. guttulata guttulata</i>, <i>M. olivieri</i>, <i>Varanus griseus</i>. Snakes: <i>Leptotyphlops macrorhynchus</i>, <i>Coluber elegantissimus</i>, <i>C. rhodorhachis rhodorhachis</i>, <i>C. Sinai</i>, <i>Eirenis coronella</i>, <i>Lytirhynchus diadema</i>, <i>Psammophis schokari</i>, <i>Spallerosophis diadema cliffordi</i>, <i>Telescopus dhara</i>, and <i>Echis coloratus</i>. Bats: Arabian Horseshoe Bat <i>Rhinolophus elivossus</i>, <i>Bodenheimer Pipistrelle Pipistrellus bodenheimeri</i>, <i>Pygmy Pipistrelle Pipistrellus ariel</i>, <i>Botta's Serotine Eptesicus bottae</i>, <i>Grey Long-eared Bat Plecotus allstriacus</i>, <i>Hemprich's Long-eared Bat Otonycteris hemprichi</i>, and <i>European Free-tailed Bat Tadarida teniotis</i>. Rodents: <i>Eliomys melanurus</i> Dormouse, <i>Acomys cahirinus</i> Cairo Spiny Mouse, <i>Acomys russatus</i> Golden Spiny Mouse, <i>Gerbillus andersoni</i>, <i>Gerbillus dasyurus</i> Rocky areas, and <i>Sekeetamys calurus</i> Busby-tailed jird. Mammals: <i>Canis aureus</i> Golder or Asiatic Jackel, <i>Canis lupus</i> Wolf, <i>Vulpus cana</i> Blanford's fox, <i>Vulpus rueppelli</i>

Site	Sites of occurrence	Habitat	Importance / Sensitivity	Flora	Species of particular concern	
					Avifauna	Fauna
						<i>Sand fox, Vulpes vulpes Red fox, Felis margarita Sand cat, Hyaena hyaena, and Lepus capensis Arabian Hare</i>
Sahl Sowan	From the village of Disi to the Wellfield incudes frequent small mudflat areas.	Sandy Hammada	High	<i>Artemisia judaica, Asphodelus microcarpus, Cleome Arabica, Haloxylon persicum.</i>	Saharoarabian restrected breeders : Cream-coloured Courser, Hoopoe Lark, Temminck's Lark, Desert Wheatear, Scrub Warbler, Long-legged Buzzars, and Brown-necked Raven	Reptiles: <i>Bunopus tuberculatus</i> Bluch Rock Gecks, <i>Hemidactylus turcicus turcicus</i> Turkish Wary Gecko, <i>Pristurus rupestris</i> Dwarf Rock Gecko, <i>Ptyodactylus guttatus</i> Common or Spotted Fan -footed Gecko, <i>Ptyodactylus haselquistii hasselquistii</i> Egyptian Fan-footed Gecko, <i>Scincus scincus meccensis</i> , <i>Stenodactylus doriae</i> Doria's Thin-toed Gecko, <i>Stenodactylus slevini</i> Arabian Thin-toed Gecko, <i>Tropicolotes nattereri</i> , <i>Phrynocephalus arabicus</i> Arabian Toad-headed Agama, <i>Uromastyx aegyptia microlepis</i> Spin-tailed Dabb, <i>Mesalina brevirostris</i> , <i>M. guttulata guttulata</i> , <i>M. olivieri</i> , <i>Acanthodactylus boskianus</i> Boosc's Fringe-toed lizard, <i>A. opheodurus</i> Snake-like lizard, <i>A. schmidtii</i>

Site	Sites of occurrence	Habitat	Importance / Sensitivity	Flora	Species of particular concern	
		Weathered Scrub	Low to Medium		Avifauna	Fauna
Batn El Ghol	in the southern and south-west parts of Batn El Ghol	Sandy Hammada	High	<i>Artemisia judaica</i> , <i>Asphodelus microcarpus</i> , <i>Cleome Arabica</i> , <i>Haloxylon persicum</i>		Spiny-toed lizard, <i>A. scutellatus</i> , <i>A. tillburyi</i> , and <i>Varanus griseus</i> . Snakes: <i>Leptotyphlops macrorhynchus</i> , <i>Coluber elegantissimus</i> , <i>C. rhodorhachis rhodorhachis</i> , <i>C. Sinai</i> , <i>Eirenis coronella</i> , <i>Lytirhynchus diadema</i> , <i>Psammophis schokari</i> , <i>Spallerosophis diadema cliffordi</i> , <i>Cerastes gasperettii gasperetti</i> , <i>Echis coloratus</i> . Rodents: <i>Jaculus jaculus</i> Three-toed jerboa, <i>Gerbillus cheesmani</i> (Soft Wind-blown Sand dune area), <i>Gerbillus nanus Baluchistan gerbil</i> (Sanddunes around mud flats), <i>Gerbillus henleyi</i> (Hammada area with sarce vegetation cover of <i>Anabasis articulate</i>), and <i>Meriones crassus</i> (Sand jird Sandy area/ wide range habitats including hammada and <i>Acacia</i> vegetation). Mammals: <i>Canis lupus</i> Wolf, <i>Vulpes rueppelli</i> Sand fox, <i>Vulpes vulpes</i> Red fox, <i>Felis margarita</i> Sand cat, <i>Hyaena hyaena</i>
		Weathered Scrub	Low to Medium	Mudflats unvegetated	Saharoarabian restricted breeders : Sand Partridge, White-crowned Black Wheatear, Mourning Wheatear, Little Owl, Kestrel, Scrub Warbler, Long-legged Buzzard, Hooded Wheatear, and Desert Wheatear.	
Alignment Sections and electricity transmission	Alignment Sections with intersecting wadis.	Wadi vegetation (major Wadis)	High	<i>Rheum palestinum</i> , <i>Tamarix nilotica</i> stands	Desert shrub and tree stands suited to Shrikes and Blackstart.	See faunal species in Wadi Abu Tarfa

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Site	Sites of occurrence	Habitat	Importance / Sensitivity	Flora	Species of particular concern	
					Avifauna	Fauna
line from Shidiyya	Disi mudflat, Jafr mudflat and other smaller mudflats	Mud flats	High	Mudflats are usually barren with seasonal vegetation at margins	Migratory and passerine species in Eastern Desert Seasonal mudflat provides important rest place for migratory species.	See faunal species in Disi Mudflat <u>Faunal Species in Al Jaffer area (surrounding the mudflat):</u> Reptiles: <i>Bunopus tuberculatus</i> Bluch Rock Gecks, <i>Cyrtopodion scabrum</i>, <i>Hemidactylus turcicus turcicus</i> Turkish Wary Gecko, <i>Stenodactylus grandiceps</i>, <i>Trapelus pallidus agnetae</i>, <i>Acanthodactylus boskianus</i> Boosc's Fringe-toed lizard, <i>A. grandis</i>, <i>A. hardyi</i>, <i>A. opheodurus</i> Snake-like lizard, <i>A. schmidtii</i> Spiny-toed lizard, <i>A. scutellatus</i>, <i>A. tillburyi</i>, <i>Mesalina brevirostris</i>, <i>M. guttulata guttulata</i>, <i>M. olivieri</i>, <i>Chalcides ocellatus ocellatus</i>, <i>Varanus griseus</i>. Snakes: <i>Coluber rhodorhachis rhodorhachis</i>, <i>C. rogersi</i>, <i>Lytorhynchus diadema</i>, <i>Malpolon moilensis</i>, <i>Psammophis schokari</i>, <i>Spallerosophis diadema cliffordi</i>, <i>Pseudocerastes fieldi</i>. Mammals: <i>Canis aureus</i> Golder or Asiatic Jackel, <i>Canis lupus</i> Wolf, <i>Vulpus cana</i> Blanford's fox, <i>Vulpus rueppelli</i> Sand fox, <i>Vulpes vulpes</i> Red fox, <i>Felis margarita</i> Sand cat, <i>Hyaena hyaena</i>, <i>Lepus capensis</i> Arabian Hare. Rodents: <i>Jaculus jaculus</i> Three-toed jerboa, <i>Eliomys melanurus</i> Dormouse, <i>Acomys russatus</i> Golden Spiny Mouse, <i>Gerbillus dasyrus</i> (Rocky areas), <i>Gerbillus henleyi</i> (Hamada area with sarce vegetation cover of <i>Anabasis articulata</i>), <i>Gerbillus nanus</i> Baluchistan gerbil, <i>Gerbillus gerbillus</i>, <i>Meriones libycus</i>, <i>Meriones crassus</i> Sand jird, and <i>Psammomys obesus</i>
	Alignment Sections between Batn El Ghol and Hasa	Chert Hammada vegetation	Low	<i>Rheum palestinum</i>	Some roosting and song perch sites provided by small vegetation stands. Locally important to passerines and possibly migratory species.	See faunal species listed for the Hammada and Sandy Hammada vegetation (habitat) in the Wellfield

Site	Sites of occurrence	Habitat	Importance / Sensitivity	Flora	Species of particular concern	Fauna
Hasa/Abyad (pipeline area)		Wadi vegetation	High	<i>Tamarix</i> stands	Mudl	Reptiles: <i>Bunopus tuberculatus</i> Bluch Rock Gecks, <i>Hemidactylus turcicus turcicus</i> Turkish Wary Gecko, <i>Stenodactylus grandiceps</i>, <i>Trapelus pallidus agnetae</i>, <i>Acanthodactylus ahmaddisii</i>, <i>A. boskianus</i> Boosc's Fringe-toed lizard, <i>A. grandis</i>, <i>A. opheodurus</i> Snake-like lizard, <i>A. tristrami</i>, <i>Mesalina brevirostris</i>, <i>M. guttulata guttulata</i>, <i>M. olivieri</i>, <i>Chalcides ocellatus ocellatus</i>, <i>Varanus griseus</i>. Snakes: <i>Eyrx jaculus</i>, <i>Eirenis coronella</i>, <i>Coluber rhodorhachis rhodorhachis</i>, <i>C. rogersi</i>, <i>Lytorhynchus diadema</i>, <i>Malpolon moilensis</i>, <i>Psammophis schokari</i>, <i>Spallerosophis diadema cliffordi</i>, <i>Telescopus nigriceps</i>, and <i>Pseudocerastes fieldi</i>. Mammals: <i>Canis aureus</i> Golder or Asiatic Jackel, <i>Canis lupus</i> Wolf, <i>Vulpes vulpes</i> Red fox, <i>Felis margarita</i> Sand cat, <i>Felis silvestris</i>, <i>Hyaena hyaena</i>, and <i>Lepus capensis</i> Arabian Hare. Rodents: <i>Jaculus jaculus</i> Three-toed jerboa, <i>Eliomys melanurus</i> Dormous, <i>Gerbillus dasyrus</i> (Rocky areas), <i>Gerbillus gerbillus</i>, <i>Meriones libycus</i> Libyan jird, <i>Meriones crassus</i> Sand jird (Sandy area/ wide range habitats including hammada and Acacia vegetation), and <i>Psammomys obesus</i> (with <i>Anabasis articulata</i>)
Hasa(pipeline area)		Wadi vegetation	low	<i>Tamarix</i> stands and <i>Hammada salicornia</i>	Desert shrub and tree stands suited to Shrikes and Blackstart.	

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Habitat sub-type	Description	Sites of occurrence:
Scattered Acacia in Wadis	Scattered Acacia stands are confined to wadis within the weathered sandstone and granites of the Batn el Ghouel area and Wadi Rum. Here groundwater seepage sustains the growth of larger tree and shrub species. Soils are sandy or (occasionally) boulder alluvium with the composition depending on the surrounding geology. It corresponds to some of the rush vegetation types with the exception of the presence of <i>Acacia raddiana</i> (Sant Trees). The amount of <i>Acacia</i> sp. has probably been reduced by cutting for fuel and other purposes. . At some sites especially at the northern part of the Wellfield area, there are indicators of disturbance including the presence of <i>Citrillus colycynthus</i> (Hanthal)¹, wood cutting and human movement (tracks, litter, and evidence of small fires).	Well field area (W43-W44), and collection Point (P3-P1)
Weathered sandstone and granite scrub (blown sand over gravel plains)	Level or gently sloping weathered sandstone and maintains some scrub Which grows in shallow soils formed from eroded sandy material. No generalization can be made about the vegetation assemblage which is scanty. This habitat type occurs mostly in the Wellfield areas and is characterized by the presence of remnant <i>Acacia raddiana</i> trees and <i>Hammada salicornica</i> acting as sand dune stabilizer. Some other sites are colonised predominantly by <i>Hamada salicornica</i>. These areas are classified as having high diversity and low abundance with other plant species present including; <i>Anabasis articulate</i>, <i>Gymnocarpus decandrum</i>, <i>Ajuga chia</i>, <i>Diploaxis harra</i>, <i>fagonia glutinosa</i>, <i>Kickxia floribunda</i>, <i>Morettia philaeana</i>, <i>Onobrychis ptolemaica</i>, <i>Stipagrostis obtusa</i>, <i>Aegilops cylindrica</i>, <i>Anisosciadium isosciadium</i>, <i>Astragalus gyzensis</i>, <i>Atriplex dimorphosregia</i>, <i>Bassia muricata</i>, <i>Crucianella membranacea</i>, <i>Cutandia memphitica</i>, <i>Eremobium aegyptiacum</i>, <i>Erodium laciniatum</i>, <i>Gartrocotyle hispida</i>, <i>hyaoscyamus pusillus</i>, <i>Ifloga spicata</i>, <i>Linaria haeleva</i>, <i>Lotua halophilus</i>, <i>L. peregrinus</i>, <i>Matthiola aspera</i>, <i>Medicago truncatula</i>, <i>Ononis serrata</i>, <i>Picris cyanocarpa</i>, <i>Pimpinella cretica</i>, <i>Plantago cylindrical</i>, <i>Scabiosa eremophila</i>, <i>Schimpera arabica</i>, <i>Schismus barbatus</i>, <i>Silene arabica</i>, <i>Stigmatella longistyla</i>, <i>Allium sindjareense</i>, <i>Ashphodelus microcarus</i>, <i>Dipcadi erythraeum</i>, <i>Pancratium sickenbergeri</i>.	W44- W47, W6-W12
Hammada vegetation This is represented in various types of vegetation along the alignment.	Hammada vegetation assemblages are important avifauna areas. This area provides suitable nesting and food sources for many species. It is also an area utilised by a number of species during winter migration. These areas support species that are nationally, regionally and globally threatened. These include the Sand Partridge, Sinai Rosefinch and Corncrake. Populations of small mammals (Gerbils and Jirds) are common and often denser in vegetated areas or areas with softer soil conditions. (i) Chert Hammada vegetation Sometimes also referred to as mixed formation of deserts and halophytic semi-woody shrub communities. The area contains flat or gently undulating gravel plains where erosion predominates over deposition. Alternatively there are extensive gently sloping fans where erosion and deposition alternate. The soils are hammada soils. Vegetation is restricted to wadis which may contain shrubby Chenopds such as <i>Ananbais articulata</i>, <i>Phlomis sp.</i> Where aridity is not too great, the extensive gravel fans have a greater cover of vegetation. In some locations silt can accumulate in small depressions, populations of annual grasses mainly <i>Bromus</i> sp., can be observed. In areas experience extremely low rainfall very shallow braided wadis are formed with no defined channels.	Sites of Occurrence: Alignment Sections between Sahl As-Suwwan and Hasa, and well field points W3 to W6 and W21 to W36

¹ Hanthal is a common medicinal plant

Habitat sub-type	Description	Sites of occurrence:
	In areas closer to the sandier areas sand is deposited into shallow wadi areas permitting more vegetation growth. Such areas are often fringed with <i>Retama raetam</i> (Ratem). This species is the most dominant vegetation type within the wellfield. The presence increases as the alignment ascends from Batn el Ghol area towards the eastern plains towards Jafr area. <i>R.raetum</i> provides an important roosting and feeding area for migrant birds species, but is however onfrequently used by breeding species (Welch et al 2000). Along the desert highway <i>R.raetum</i> is is present up to the Qatraneh area. Usually these plains are devoid of vegetation however road runoff and wadi crossing sprovide sufficient moisture to enable growth. The mudflats and larger Wadis transecting this habiata type are generally devoid of vegetation with the margins dominated by halophytes, drift-line communities or annual meadows (after spring rain). Main shrubs likely to be observed are <i>Atriplex halimus</i>, <i>retama raetam</i>, <i>Salsola tetrandra</i>, <i>S. vermiculata</i>, <i>Seidlitzia rosemarinus</i>. Other plant species include <i>Anabasis articulate</i>, <i>Halogeton alopecuroides</i>, <i>Helianthemum sessilfolium</i>, <i>Teucrium polium</i>, <i>Cynodon dactylon</i>, <i>fagonia bruguieri</i>, <i>launaea naudicaulis</i>, <i>Peganum harmalla</i>, <i>Scorzonera pusilla</i>.	
	(ii) Sandy Hammada Sandy wadis, usually bordered with <i>Retama raetam</i>. The more well defined wadis in sand derived from sandstone or granite have increased marginal vegetation of <i>Retama raetam</i>, <i>Hammada Salicornica</i> and often, <i>Zilla spinosa</i>. Within areas of well drained sandy alluvium soils <i>Traganum nudatum</i> and few scattered Acacia trees do occur occasionally. Groundwater seepage in areas closer to mountain / rocky areas supports denser vegetation assemblages.	Sites of Occurrence: well field points W48 to W50, some sites at Batn el Ghol
Wadi	Vegetation is present within wadi channels and is sustained by seasonal inundation and groundwater. These areas provide suitable habitats for a variety of plant species. Assemblages will alter throughout the alignment as it moves through the difference bioclimatic zones. Wadis catchments can range from few meters to hundreds of meters in area. Examples of larger systems include Wadi Abu tarfa, Wadi Hasa and Wadi Abyad. These are also characterized by the occurrence of stands of <i>Tamarix nilotica</i>.	Sites of Occurrence: Along the whole alignment. Key wadis are provided in Section C of the previous ESA report.
Sand dune vegetation	This vegetation assemblage occurs amongst the gentle sandy slopes and larger dunes located within the sandstone desert region. Soil is wind blown sand the sand is mobile but not to a great extent (indicated by the presence of vegetation...). These slopes are usually dominated by <i>Haloxylon persicum</i>² (Ghada) associated with the following species; <i>Traganum nudatum</i>, <i>Hammad salicornica</i>, <i>Ferula sp.</i> <i>Lotus pusillus</i>, <i>Eremobium sp.</i> <i>Neuroda procumbens</i>, <i>Cenchrus ciliaris</i>, etc. <i>Haloxylon dominted areas are reported to support the Cheesmans Gerbil (Gerbillus cheesmani) and Wagner's Gerbil (Gerbillus dasyurus)</i>. <i>H. persicum</i> has been shown to reach great age and a considerable height. This species is an important as sand stabilizer and valuable for fuel and camel fodder and is therefore vulnerable to collection. <i>Haloxylon</i> bushes provide song posts for passerine species such as the Mournign Wheatear (<i>Oenanthe arabicus</i>). Sandy wadi corridors with low vegetation are nesting grounds for breeding species of bird such as the Desert Lark and Scrub Warbler. This makes them especially vulnerable to vehicle movement .	Sites of Occurrence: well field points W50 to W55, some pockets to the eastern extremity of the electricity transmission route from Qweira SS to Disi wellfield.

²Plant species with extensively soil stabilising root system

Habitat sub-type	Description	Sites of occurrence:
	Other plant species present within this habitat include <i>Artemisia judaica</i> , <i>Asteriscus graveolens</i> , <i>Stipagrostis plumosa</i> , <i>Astragalus schemperi</i> , <i>centaurea pallescens</i> , <i>Cleome arabica</i> , <i>Plantago ciliata</i> , <i>Savignya parviflora</i> , <i>Zygophyllum simplex</i> .	
Mudflats	Small mud flat areas are dispersed within the wellfield; these increase in size towards the Jafr area. The mudflats are seasonally inundated and are important water sources for desert flora and fauna (Plate 4.7). These are usually bare of vegetation except around the edges where there may be sparse cover of annuals and chenopods. This is due to the physical nature of the soil and probably also to salinity. Small patches or stripes of vegetation may occur round places where there is free drainage.	Sites of Occurrence: Small areas within wellfield and collection points, electricity transmission route from Qweira, desert section of alignment (from collector point to Hesa).
Mountains	Higher mountainous and rocky areas flank the wells and collector network in some locations. The inaccessible nature of the higher areas means these habitats are less impacted by human activity and therefore can be regarded as pristine areas. However the inaccessible nature also restricts study. The crevices provided by the rock formations provide habitat for larger carnivores such as the Blandford's Fox (<i>Vulpes cana</i>) and historically the Nubian Ibex (<i>Capra ibex nubriana</i>). No firm evidence suggests its presence within the Project area, however Wadi Abu-Harr to the south west of Mudawarra village is a popular hunting area for this species (Qarqaz, 2001). The highest areas provide suitable nest sites in the various ledges, caves and holes. Plants and tree species which are known to grow within the higher mountain areas include <i>Artemisia</i> and some species from the Mediterranean bioclimatic zone such as <i>Juniperus Phoenicia</i> (reported in the higher more westerly Rum reserve). These species were not observed within the Wellfield. The higher areas and plateau provide important roost and breeding areas for various bird species. Whilst lower cliffs and slopes provide suitable habitat for others (including the Tristram's Grackle).	W50 – 55, J81, w7 - 12

gmetin@ifc.org

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Selected vegetation types: Field visit – Feb 08



Bulbous sp



Haloxylon persicum



Hammada salicornia



Neuroda procumbens



Raetum sp.



Retama raetam



Acacia sp



Tamarix sp

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etin@ifc.org
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FAX:

PAGE 1

نساعد الطبيعة... نساعد الناس
Helping Nature...Helping People

Date: March, 4th 2008

Ref : R S/16/1/238

Mr. Anil Sevinc,
Disi Project Coordinator
Diwaco General Manager
GAMA Enerji A.S.
No229, Kavakildere 06680 Ankara
Turkiya.

Subject: Disi to Amman Water Conveyance Project

Dear Mr. Anil,

The Royal Society for the Conservation of Nature (RSCN) would like to thank you for taking into consideration the nature and biodiversity conservation in your projects.

Referring to our meeting on Sunday March 2nd 2008 at the RSCN's HQ , and the discussion on the wells to be constructed in Wadi Rum area, and your request of information on the possibility of constructing such wells, please find below the information and RSCN's opinion regarding this issue.

The area of the project lies on the periphery of the Wadi Hizma Important Bird Area (IBA), and is completely out side the Wadi Rum Protected area. The IBA is an area that has no legal designation and not fixed boundaries, thus it has importance to a number of important birds or communities of birds, this has raised the importance of these sites, yet not to a level of a protected area, but to a level where certain measures has to be taken to ensure that the ecosystems supporting wildlife and in particular birds, are not being jeopardized by any activity.

The RSCN, believing in and supporting sustainable development, and according to your project's activities, the RSCN dose not have any objection towards the project if the company is committed to the following mitigation measures:

- Minimize the effect of well construction on natural habitat of the region.
- Avoid construction during crucial periods and in important habitats specially for breeding Raptors and other animals (March - May)

بإدارة الأردن
Wild Jordan

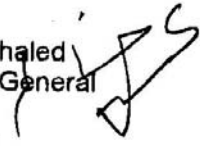
The Royal Society for the Conservation of Nature: Tel (+962 6) 5337931/2 Fax (+962 6) 5357618 P.O.Box 1215, Jubeiha 11941, Jordan
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- Proper disposal of waste materials during drilling and extraction and all excess construction materials and debris should be removed
- All pits should be filled
- Construct project features outside breeding, nesting, roosting and spawning periods.
- If there will be any plantations around the constructed well, it should be from native species to that area.
- All workers should be aware of the ecological importance of that area and any harmful activities (hunting, wood cutting) should be baned.

Please do not hesitate to contact us if you needed any extra information.

Best regards,

Yehya Khaled
Director General



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gmetin@ifc.org

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SURVEY FORM

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RESULTS

ABU ALANDA

Date: 14.02.08 Route section:

Block	E	N	Asset type	Directly threatened property	Asset removed	Loss of access	Alt access available	Photo	Comment
1			p3	2	2	1	1		
1			p3	2	2	1	1		
1	236253	136400	P9	2	2	1	1		
1	236269	16483	P9	2	2	1	1		
1			P9	2	2	1	1		
1			p9	2	2	1	1		
2	236301	136703	a3	1	1	1	1		a3 asset lost
2			p8	2		1	1		
3	236 330	136887	a2	2	1	1			
4	236 330	136855	a3	2	2	2	2		2 trees
5	236 350	136 887	a3		1	2	2		
5			p12	2	2	1	2		
5			p2	2	2	1	2		
5			p2	2	2	1	2		
5			p3	2	2	1	2		
5			p3	2	2	1	2		
5	236 368	136 961	p3	2		1	2		
5			p7	2	2	1	2		
5			p9	2	2	1	2		
6	236 359	136 971	a3		1	2	2		
6	236 357	117007	p12	2		2	2		
7	236 385	137097	a1	1	1	1	2 x		
7			a1	1	1	1	2 x		
7	236396	137128	p9	2	2	1	2		
7			p9	2	2	1	2		
8	236 386	137 128	a2	1	1	1	2 x		
8	236 422	137 153	a2	1	1	1	2 x		
9	236414	137218	a1	1	1	1	2		
9			a1	1	1	1	2 x		
9	236422	137256	p12	2	2	1	2 x		comments
9			p12	2	2	1	2		
9			p12	2	2	1	2		
9			p4	2	2	1	2		
10	236 422	137 218	a1	1	1	1			omnent
10	236 430	137 256	p12	2	2	1	2		
10			p12	2	2	1	2		
10			p9	2	2	1	2		
10			p9	2	2	1	2		
11	236430	137256	a1	1					
11			p12	2	2	1	2		
11	236432	137280	p9	2	2	1	2		
12	236432	137280	p9	2	2	2	2		
12	236440	137299	p9	2	2	2	2		
13	236432	137280	a3	2	1	1	2		p12
13	236444	137328	a3	2	1	1	2		p7
14	236451	137 343	a2	1	1	1	1		
14	236460	137356	a2	1	1	1	1		
15	236451	137363	a1	1	1	1	2		a3
15			a1	1		1	2		a3
15	236460	137437	p9	2	2	1	2		
15			p9	2	2	1	2		
15			p9	2	2	1	2		
15			p9	2	2	1	2		
15			p9	2	2	1	2		
15			p9	2	2	1	2		
15			p9	2	2	1	2		
16	236456	137462	a1		1	1	2		p6
16	236459	137482	a1		1	1	2		p6
16			p6	2		1	2		
16			p6	2		1	2		
17	236471	137613	p3	2	2	1	2		
17	236459	137487	p7	2	2	1	2		c
18			A3	1	1	2			C
18	236487	137613	a1	1	1	2			
18	236457	137487	a3	1	1	2			
18			a3	1	1	2			
18			p6	2		1	2		

- Property codes (P)
- House P1
 - Large office P2
 - General grocery store P3
 - Vehicle workshop P4
 - Religious structures P5
 - Plant nursery P6
 - Car sales P7
 - Hotel P8
 - Light industrial P9
 - Restaurant P10
 - Kiosk P11
 - Other P12
- Asset codes (A)
- Wall A1
 - Fence A2
 - Trees A3
 - Bus shelter A4
 - Footbridge A5
 - Road sign A6
 - Public art A7
 - Other asset A8

1	Yes
2	No

236	137
236	137

18			p6	2		1	2	
18			p6	2		1	2	
18			p6	2		1	2	
19	236488	137	a1	1	2	1	2	
19			a1	1	2			
19	236	137	p3	2	2	1	2	
20			a3	1	1	1	2	
20			a3	1	1	1	2	
20			p3	2	2	1	2	
20			p3	2	2	1	2	
21			a2	1	1	1	1	
21			a8	1	1	1	1	
22			a2	1	1	1	1	
22			a2	1	1	1	1	
22			a3	1	1	1	1	Comment
22			p6	1	1	1	1	
23			a3	1	1			
23			a3	1	1			
23			p6	2		1	2	
23			p6	2		1	2	
24			p6	2	2	1	2	
24			p6	2	2	1	2	
25			p6	2	2	1	2	
25			p6	2	2	1	2	
26			p6	2	2	1	2	
26			p6	2	2	1	2	
27			a3	1	1			
27			a3	1	1			
27			a3	1	1			
27			a3	1	1			
27			p6	1		1	2	
27			p6	1		1	2	
27			p6	1		1	2	
27			p6	1		1	2	
28			a2	1	1			
28			a2	1	1			
28			p6	2		1	2	
28			p6	2		1	2	
29			a2	1	1			
29			a2	1	1			
29			a3	1	1			
29			p4	2		1	2	
29			p4	2		1	2	
30			a2		1			
30			a2		1			
30			p6	2		1	2	
31			a6		1			
32			a3		1			
33			a3		1			
34			a6		1			
35			a2		1			
35			a2	2	1			
36			a2	2	1			
36			a2	2	1			
36			p12	1		1	2	
36			p12	1		1	2	
37			a2	2	1			
37			a2	2	1			
37			p6	2		1	2	
37			p6	2		1	2	
38			a2	2	1			
38			a2	2	1			
38			p6	2		1	2	
38			p6	2		1	2	
39			a2	2	1			
39			a2	2	1			
39			p6	2		1	2	
39			p6	2		1	2	
40			a6	1	1			
41			a6	1	1			
42			p10	2		1	2	
42			p3	2		1	2	
42			p3	2		1	2	
42			p3	2		1	2	

43			p6	1		1	2	
			p6	1		1	2	
	236321	136780						
	236 330	136 855						
	236 350	136 887						

Date: 16/02/2008

Route section:

Block	E	N	Asset type	Directly threatened property	Asset removed	Loss of access	Alt access available	Photo	Comment
47			P5	1		1	2		
			P5	1		1	2		
48			A1	2	A1				
			P12	1	A1	1	2		
			A1	1					
49			A5	1	A5				
50			P12	1		1	2		
			P12	1		1	2		
			P12	1		1	2		
			P4	1		1	2		
51			P6	2	A1	1	2		
			A3		A3				
			P6	2	A1	1	1		
58	52		P12	2		1	11		
			P12	2		1	1		
53			P12	2		1	1		
			P12	2		1	1		
60	54		P4	2		1	1		
			P4	2		1	1		
			A1	1	a1	1			
55			P12	2		1	2		
			P7	2		1	2		
			P12	2		1	2		
56			A1		a1				
			P12	2		1	1		
			P12	2		1	1		
			P12	2	a1	1	1		
57			A1						
			P4	2					
			P12	2		1	2		
			P12	2		1			
			P12	2		1			
			P12	2	a1	1			
			A1						
58			A5	1	a5	1	2		
59			P3	2		1	2		
			P3	2	a1				
			A1	1					
60			P12	2		1	2		
			P12	2		1	2		
			P12	2		1	2		
			P12	2		1	2		
			P12	2	a1	1	2		
			A1	1					
61			P12	2		1	2		
			P12	2		1	2		
			P12	2		1	2		
			P12	2		1	2		
			P12	2		1	2		
			P12	2		1	2		
			P3	2	a1	1			
			A1	1					
62			P3	1		1	1		
			P3	1		1	1		
63			P4	2		1	1		
			P4	2		1	1		
			P4	2		1	1		
			P4	1		1	1		
			P4	1		1	1		
70	64		P3	1		1	1		
			P3	1		1	2		
			P3	1		1	2		
			P3	1		1	2		
65			P4	1		1	2		
			P4	1		1	2		
66			P4	1		1	1		
			P4	1		1	1		

House P1
Large office P2
General grocery store P3
Vehicle workshop P4
Religious structures P5
Plant nursery P6
Car sales P7
Hotel P8
Light industrial P9
Restaurant P10
Kiosk P11
Other P12
Wall A1
Fence A2
Trees A3
Bus shelter A4
Footbridge A5
Road sign A6
Public art A7
Other asset A8

			P4	2	1	1		
			P4	2	1	1		
			P4	2	1	1		
			P4	2	1	1		
67			P4	2	1	1		
			P4	2	1	1		
			P4	2	1	1		
			P4	2	1	1		
			P10	2	1	1		
68			P4	2	1	2		
			P4	2	1	2		
			P4	2	1	2		
			P12	2	1	2		
			P12	2	1	2		
			P7	2	1	2		
69			P4	2	1	1		
			P4	2	1	1		
			P4	2	1	1		
			P3	2	1	1		
			P4	2	1	1		
			P4	2	1	1		
			P4	2	1	1		
			P4	2	1	1		
			P4	2	1	1		
70			P4	2	1	1		
			P4	2	1	1		
			P4	2	1	1		
			P4	2	1	1		
			P4	2	1	1		
			P4	2	1	1		
			P4	2	1	1		
71			P4	2	1	1		
			P4	2	1	1		
			P4	2	1	1		
			A1	1	1			
			P4	2	1	1		
			P4	2	1	1		
			P12	2	1	2		
			P4	2	1	2		
			P4	2	1	2		
			A1	2	1			
			P4	2	1	2		
			P4	2	1	2		
			P4	2	1	2		
72			A1	1				
			A1	1				
73			A1	1	1			
			P4	2	1	2		
			P4	2	A1	1	2	
			A1	1	1	2		
74			P6	2	1	2		
			P6	2	1	2		
75			P6	2	1	2		
			P6	2	1	2		
			A2	1	A2			
			A2	1	A2			
76			P7	2	1	2		
			A2	1	A2			
			P7	2	1	2		
77			A2	1	A2			
			P4	2	1	2		
			P4	2	1	2		
			P4	2	1	2		
			P4	2	1	2		
			P4	2	1	2		
			P4	2	1	2		
			P4	2	1	2		
			P4	2	1	2		
			P4	2	1	2		
78			P4	2	1	2		
			P4	2	1	2		
			P4	2	1	2		
			A1	1	A1			
			A1	1	A1			
79			A1	1	A1	1	2	
			P4	2	1	2		

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			P4	2	A1	1	2		
			A1	1					
80			A3	1	A3				
81			P3	2		1	2		
			P3	2		1	2		
			P3	2		1	2		
			P7	2	A3	1	2		
82			A3	1					
83			P12	2		1	1		
			P12	2		1	1		
84			A8	1	A8				
85			P4	1		1	2		
			P4	1		1	2		
86			P3	2		1	2		
			P3	2		1	2		
87			P4	2		1	2		
91			P3	1		1	2		
			P4	1		1	2		
			P4	1		1	2		
			P4	1		1	2		
			P4	1		1	2		
88			P3	2		1	2		
			P12	2		1	2		
			P3	2		1	2		
			P3	2		1	2		
			P3	2		1	2		
			P5	2		1	2		
			P3	2		1	2		
			P4	2		1	2		
89			P3	2		1	2		
			P3	2		1	2		
90			P4	2		1	2		
			P4	2		1	2		
			P4	2		1	2		
			P4	2		1	2		
			P4	2		1	2		
			P4	2		1	2		
			P4	2		1	2		
			P4	2		1	2		
91			P3	2		1	2		
			P3	2		1	2		
92			P4	2		1	2		
			P4	2		1	2		
			P4	2		1	2		
			P4	2		1	2		
93			P4	2		2	2		
			P4	2		2	2		
94			P4	2		2	2		
			P4	2		2	2		
			P4	2		2	2		
			P3	2		2	2		
95			P4	2		2	2		
			P4	2		2	2		
			P4	2		2	2		
96			A1	1	A1				
			P10	2		1	1		
			P10	2		1	1		
			A1	1	A1	1	1		
			P3	2		1	1		
			P3	2		1	1		
			P3	2		1	1		
97			P6	2		1	1		
			A3	1	A3				
			P6	2		1	1		
			A3	1	A3				
98			A1	1	A1				
			A1	1	A1				
99			P12	2				2 U/C	
			P12	2					
100			P10	2		1	2		
			P3	2		1	2		
101			P1	2		1	2		
			P1	2		1	2		
			A1	1	A1				

			A1		1A1		1	2		
			A1		1A1		1	2		
128			P3		2		1	2		
			P3		2		1	2		
			A1		1A1					
			A8		1A8					
			A1		1A1					
129			P3		2		1	1		
			P3		2		1	2		
130			A1		1A1					
			A8		1A8		1	2		
			A1		1A1					
			A1		1A1		1	1		
131			A6		A6					
132			P3		2		1	2		
			P3		2		1	2		
133			P3		2		1	2		RES ABOVE
			P3		2		1	2		
134			P3		2		1	2		
			P3		2		1	2		
135			P4		1		1	2		
			P4		1		1	2		
136			P4		1		1	2		
			P4		1		1	2		
137			P4		2		1	2		
			P4		2		1	2		
138			A1		A1		1	2		
			A1		A1		1	2		
139			P3		2		1	2		
			A8		1A8		1	2		
			P3		2		1	2		
140			A1		1A1		1	2		
			A1		1A1		1	2		
141			P4		1		1	2		
			P4		1		1	2		
142			A2		1A2		1	2		
			A2		1A2		1	2		
143			P3		1		1	2		
			P3		1		1	2		
144			A2		1A2		1	2		
			A2		1A2		1	2		
145			P3		1		1	2		
			P3		1		1	2		
146			P3		1		1	2		
			P3		1		1	2		
147			A3		1A3		1	2		
			A3		1A3		1	2		
148			P4		1		1	2		
			P4		1		1	2		
149			P4		1		1	2		
			A1		1A1		1	2		
			A8		1A8		1	2		
			P4		1		1	2		
150			P4		1		1	2		
			P4		1		1	2		
151			P3		1		1	2		
			P3		1		1	2		
152			A2		1A2		1	2		
			A2		1A2		1	2		
153			A6		1A6		2	2		
154			A1		A1		2	2		
155			P4		2		1	2		
			A8		1A8		1	2		
			P4		1		1	2		
			P3		2		1	2		
			A1		1A1		1	2		
			A1		1A1		1	2		
			P3		2		1	2		
			A8		1A8		1	2		
			P3		2		1	2		
156			P3		2		1	2		
			A8		1A8		1	2		
			P3		2		1	2		
			P3		1		1	2		

157		P3	2		1	2		
		P3	2		1	2		
158		P3	2		1	2		
		P3	2		1	2		
159		P3	2		1	2		
		P3	2		1	2		
160		A6	1	A6	1	1		
161		A3	1	A3	1	1		
		A3	1	A3	1	2		
162		P3	2		1	2		
		P3	2		1	2		
		P3	2		1	2		
		A3	1	A3	1	2		
		A3	1	A3	1	2		
		P3	2		1	2		
163		P3	2		1	2		
		P3	2		1	2		
164		P4	1		1	2		
		P4	1		1	2		
165		P3	2		1	2		
		P3	2		1	2		
166		P4	1		1	2		
		P1	1		1	2		
167		P3	2		1	2		
		P3	2		1	2		
168		P3	2		1	2		
		P3	2		1	2		
169		A8	2	A8	1	2		
		A6	1	A6	1	2		
		A8	2	A8	1	2		
170		P3	2		1	2		
		P3	2		1	2		
171		P3	2		1	2		
		P3	2		1	2		
172		P3	2		1	2		
		P3	2		1	2		
173		A7	2	A7	1	2		
		A7	2	A7	1	2		
174		A8	1	A8	1	2		
175		P3	2		1	2		
		P3	2		1	2		
176		P1	1		1	2		
		A1		A1	1	2		
		A1		A1	1	2		
		P1	1		1	2		
177		P3	2		1	2		
		P3	2		1	2		
178		P7	2		1	2		
		P7	2		1	2		
179		P3	2		1	2		
		P3	2		1	2		
180		A6	1	A6	1	2		
181		P6	1		1	2		
		P6	1		1	2		
182		A7	1	A7	1	2		
		A5	1	A5	1	2		
		A7	1	A7	1	2		
183		P1	1		1	2		
		P1	1		1	2		
		P1	1		1	2		

HESA TO MADABA

Date: 18/02/2008				Route section: Dabuk					
Block	E	N	Asset type	Directly threatened property	Asset removed	Loss of access	Alt access available	Photo	Comment
196			a3		a3				5 trees
			a3	2	a3	1	2		
197			p12	1					
198			p12	1					
199			p12	1					
200			p2	2	a1	2	1		
			p2	2	A1	2	1		
210			P12	1					
211			P11	1		1			
212			P10	1		1	1		
213			P10	2		1	1		
214			P10	2		1	1		
215			P4	2		1	1		
216			P10	1		1	1		
217			A4	1	A4				
218			A9	1					UNDERPASS
219			A4	1	a4				
229			P12	1					Transformer
230			p2	1	a2	1	1		
			p2	1	a2	1	1		
231			p12	1					
232			A9						
233			P11	1					
234			P11	1		1	2		
245			P10	1		1	2		
246			A2		A2				
			A2		A2				
247			A9		A9				
248			A9						
249			P12	1	A1	1	2		
			P12	1	A1	1	2		
250			P12	1	A3	1	2		
			P12	1	A3	1	2		
251			P12	1		1	2		
252			P12	1		1	2		
253			P12	1	A3	1	1		
			P12	1	A3	1	1		
254			P12	1	A3	1	2		
			P12	1	A3	1	2		
255			P11	1		1	2		
256			P12	1		1	2		
			P12	1		1	2		
			P12	1		1	2		
			P12	1		1	2		
257			A9	1		1	2		
258			P1	1		1	2		
			P3	1		1	2		
			P1	1	A1	1	2		
259			P3	2		1	2		
			P3	2		1	2		
260			P3	2		1	2		
			P3	2		1	2		
			P3	2		1	2		
261			P4	2		1	2		
			P4	2		1	2		
262			P12	2	A1	1	2		
			P12	2	A1	1	2		
263			A2	1	A2				
			A2	1	A2				
264			P1	2	A1	1	1		
			P1	2	A1	1	1		
265			P10	2	A1	1	1		
			P10	2	A1	1	1		
			A1		A1	1	1		
266			A9	2	A9	1	2		
266			P10	1	A1	1	1		
			P10	2		1	1		

			P10	2		1	1		
267			P10	2		1	2		
268			P3	2		1	2		
			P3	2		1	2		
269			P4	1		1	2		
			P3	1		1	2		
270			P1	2		1	2		
271			P1	2		1	2		
			P1	2		1	2		
272			P3	2		1	2		
			P3	2		1	2		
			P3	2		1	2		
273			P11	1	A1	1	2		
			P11	1	A1	1	2		
274			P1	2		2	1		
			P1	2		2	1		
275			P3	2		1	2		
			P3	2		1	2		
276			P3	2		1	1		
			P3	2		1	1		
277			P3	1		1	1		
			P10	1		1	2		
278			P3	2		1	2		
			P3	2		1	2		
279			P3	2		1	1		
			P3	2		1	1		
280			P3	2		1	1		
			P3	1	A1	1	1		
281			P1	1	A1	2	1		
			P3	2	A1	2	2		
			P3	2		2	2		
282			P11	1	A1	2	1		
			P11	1		2	1		
283			P3	1		1	2		
			P1	1	A1	1	2		
			P1	1	A1	1	2		
284			P10	1		1	2		
			P10	1		1	2		
			A1	2		1	1		
			A1	2	A1	1	1		
285			P11	2		1	1		
286			P11	1		1	2		
287			P4	2		1	1		
			P4	2		1	2		
			P4	2		1	2		
288			P4	2		2	2		
			P4	2		2	2		
289			P4	2		1	2		
			P4	2		1	2		
290			P3	2		1	2		
			P3	2		1	2		
291			P1	2		1	2		
			P1	2		1	2		
292			P12	1	A1	1	1		
			P12	1	A1	1	1		
293			P3	1	A1	1	1		
			P3	1	A1	1	1		
294			P4	1	A1	1	2		
			P4	1	A1	1	2		
295			P4	1		1	2		
			P4	1	A1	1	2		
296			P3	1	A1	1	2		
			P3	1		1	2		
			P11	1		1	2		
297			P3	2		1	2		
			P11	1		2	2		
			P3	2	A1	1	2		
298			P3	2		1	1		
			P11	1		1	1		
			P3	2		1	1		
299			P3	2		1	1		
			P11	1		1	1		
			P3	2		1	1		
300			P4	1		1	2		

[illegible]

DESERT HIGHWAY

Date: 20/02/2008

Route section: Desert Highway

	Block	E	N	Asset type	Directly threatened property	Asset removed	Loss of access	Alt access available	Photo	Comment
1081	306			P1	2	A1	1	1		
1081	306			P1	2	A1	1	1		
1080	307			P11	1		1	1		
1079	308			P11	2		1	2		
1078	309			A5	1	A5	1	1		
1077	310			P11	2		1	2		
1076	311			P11	2		1	2		
1075	312			P3	2		1	2		
1075	312			P3	2		1	2		
1074	313			P1	2		1	2		
1074	313			P1	2		1	2		
1073	314			A4	1	A4				
1072	315			P11	1		1	2		
1071	316			P4	2	A1	1	2		
1071	316			P4	2	A1	1	2		
1070	317			A4	1	a1				
1092	318			P1	2	A1	1	1		
1092	319			P1	2	A1	1	1		
1091	320			A4	1	A4				
1090	321			P1	2		1	1		
1090	321			P1	2		1	1		
1089	322			A4	1	A4				
1088	323			P6	2		1	1		
1088	323			P6	2		1	1		
1087	324			P4	2	A1	1	1		
1087	324			A3	1	A3				
1087	324			A3	1	A3				
1087	324			P4	2	A1	1	1		
1086	325			A4	1	A4				
1085	326			P11	1		1	2		
1084	327			P3	2		1	1		
1084	327			P3	2		1	1		
1083	328			A2	2	a2				
1083	328			P4	2		1	1		
1083	328			P4	2		1	1		
1082	329			A2	2	a2				
1082	329			A2	2	a2				
1093	330			A6	1	A6				
1094	331			A4	1	A4				
1095	332			A2	1	a2				
1095	332			A3	1	A3				
1095	332			A3	1	A3				
1095	332			A2	2	a2				
1095	332			P1	2	A2	1	1		
1095	332			P1	2	A2	1	1		
1095	332			A3	1	A3				
1096	333			A6	1	A6				
1097	334			A3	1	A3				
1098	335			A4	1	A4				
1099	336			A1	2	a1				
1099	336			A1	2	a1				
1100	337			A3	1	A3				
1100	337			A8	1	A8				
1100	337			A3	1	A3				
1101	338			A2	1	A2				
1101	338			A2	2	a2				
1102	339			A6	2	a2				
1103	340			A6	1	A6				
1104	341			A6	1	A6				
1105	342			A8	1	A8				
1106	343			A3	1	A3				
1106	343			A6	1	A6				
1106	343			A3	1	A3				
1107	344			A2	1	A2				
1107	344			A2	1	A2				
1108	345			A6	1	A6				

House P1
 Large office P2
 General gn P3
 Vehicle wo P4
 Religious : P5
 Plant nurse P6
 Car sales P7
 Hotel P8
 Light indus P9
 Restaurant P10
 Kiosk P11
 Other P12
 Wall A1
 Fence A2
 Trees A3
 Bus shelter A4
 Footbridge A5
 Road sign A6
 Public art A7
 Other asse A8
 Underpass A9

[illegible]

DABUK LEG

Date: 18/02/2008

Route section: Dabuk

Block	E	N	Asset type	Directly threatened property	Asset removed	Loss of access	Alt access available	Photo	Comment
316			P6	1	A1				
			A3	1					
317			P1	2	A1	1	1		
			A1	1					
			P1	2	A1	1	1		
			A1	1		1	1		
318			P2	2	A1	1	1		
			A1	2		1	1		
			P2	2	A1	1	1		
			A1	2		1	1		
319			P1	2	A1	1	1		
			A1	2		1	1		
			P3	2	A1	1	1		
			A1	2		1	1		
			P1	2	A1	1	1		
			A1	2		1	1		
220			P1	2	A1	1	1		
			A1	2		1	1		
221			P12	2					
222			P1	2	A1	1	2		
			A1	2		1	1		
			P1	2	A1	1	2		
			A1	2					
223			P1	2	A1	1	2		
			A1	2					
			P1	2	A1	1	2		
			A1	2	A1	2	2		
224			A1	2	A1	2	2		
226			A1	2	A1	2	2		
227			P1	2	A1	1	2		
			A1	2					
			P1	2	A1	1	2		
			A1	2					
228			A1	2	A1				
			A1	2	A1				
229			P12	2	A2	2	1		
			A2						
			P12	2	A2	2	1		
			A2						
230			P6	1	A3				
			A3						
231			A3		A3				
232			P6	1					
			A3	1	A3				
233			P1	2	A1	2	1		
			A1						
			P1	2	A1	2	1		
			A1						
234			P1	2	A1	2	1		
			A1						
			P1	2	A1	2	1		
			A1						
235			P1	2	A1	1	2		
			A1						
			P1	2	A1	1	1		
			A1						
236			A1	2	A1	2	1		
			A1	2	A1	2	1		
237			P1	2	A1	2	1		
			A1						
			P1	2		2	1		
238			P1		A1	1	2		
			A1						
			P1		A1	1	2		
			A1						
239			P6	1	A3				
			A3						

House P1
 Large office P2
 General grocery st P3
 Vehicle workshop P4
 Religious structure P5
 Plant nursery P6
 Car sales P7
 Hotel P8
 Light industrial P9
 Restaurant P10
 Kiosk P11
 Other P12
 Wall A1
 Fence A2
 Trees A3
 Bus shelter A4
 Footbridge A5
 Road sign A6
 Public art A7
 Other asset A8

240		A6		A6				
241		P6	1	A3				
		A3						
242		P2	2	A1	1	1		
		A1						
		P2	2	A1	1	1		
		A1						
243		P3	2		1	2		
		P3	2		1	2		
244		P6	1	A3				
		A3						
		P6	1	A3				
		A3						
245		P5	1	A1	1	1		
		A1						
		P5	1	A1	1	1		
		A1						
246		A3	1	A3				
247		P11	1					
249		P7	2		1	1		
		P12	2		1	1		
250		P6	1	A3	1	1		
		A3						
		P6	1	A3	1	1		
		A3						
251		P6	1	A3				
		A3						
252		P12	2	A1	1	2		
		A1						
		P12	2	A1	1	2		
		A1						
253		P12	2		1	1		
		P12	2		1	1		
254		P6	2	A1	1	2		
		A1						
		P6	2	A1	1	2		
		A1						
355		P12	2		1	1		
		P12	2		1	1		
256		P3	2	A1	1	1		
		A1						
		P3	2	A1	1	1		
		A1						
257		P6	1	A3				
		A3						
258		P3	2	A1	1	1		
		A1						
		P3	2	A1	1	1		
		A1						
259		P6	1	A3				
		A3						
260		A1	1					
		A1	1					
261		P1	1	A1	1	1		
		A1						
		P1	1		1	1		
		A1		A1				
262		P6	1					
		A3						
263		P1	2	A1	1	1		
		A1						
		P3	2	A1	1	1		
		A1						
		P1	2	A1	1	1		
		A1						
264		A5	1	A5				
265		A6	1	A6				
266		P6	1	A3	1	1		
		A3						
		P3	2	A3	1	1		
		A3						
		P6	1	A3	1	1		
267		P6	1	A3				
		A3						

268		A1		A1	1	2		
269		P1	2	A1	1	2		
270		A1						
271		P12	1					
		P12	1	A1				
272		A1						
		P1	2	A1	1	2		
		A1						
273		P12	1					
274		P3	2		1	1		
		P3	2		1	1		
		P3	2		1	1		
275		P6	1		1	1		
		P6	1		1	1		
276		P6	1	A3				
		A3						
278		A4		A4				
279		A4		A4				
280		P1	2	A1	1	1		
		P1	2	A1	1	1		
281		P1	2	A1	1	1		
		A1						
282		P1	2	A1	1	2		
		P1	2	A1	1	2		
		P1	2	A1	1	2		
		P1	2	A1	1	2		
283		P1	2	A1	1	2		
		P1	2	A1	1	2		
284		P1	2	A1	1	2		
		P1	2	A1	1	2		
185		P1	2	A1	1	2		
		P1	2	A1	1	2		
186		P1	2	A1	1	2		
		P1	2	A1	1	2		
187		P1	2	A1	1	2		
		P1	2	A1	1	2		
188		P3	2		1	1		
		P3	2		1	1		
189		P1	2	A1	1	1		
		P1	2	A1	1	2		
190		P1	2	A1	1	1		
		P1	2	A1	1	1		
191		P1	2	A1	1	1		
		P1	2	A1	1	1		
192		P1	2	A1	1	1		
		P1	2	A1	1	1		
193		P1	2	A1	1	1		
		P1	2	A1	1	1		
194		P1	2	A1	1	1		
		P1	2	A1	1	1		
195		P1	2	A1	1	1		
		P1	2	A1	1	1		
196								

AIRPORT ROAD TO DABUK

Date: 17/02/2008

Route section:

	Block	E	N	Asset type	Directly threatened property	Asset removed	Loss of access	Alt access available	Photo	Comment
1	184			A3	1					
	185			A3	1	A3				
	186			A3	1	A3				
4	187			p6	1	A6	1	1		
	188			A6	1					
	189			A6	1	A6				
	190			P12	1					
8	191			P6	1	A3	1	1		
9	192			A9	1	a9				
10	193			A8	1	A8				
11	194			P6	1	A3	1	2		
12	195			A2	1	A2				
12				P12	1		2			
12				A2	1	A2				
13	196			P12	2	A2	1	2		
14	196			A8	1	A8				water pipe
	197			A8	1	A8				water pipe
	198			A3	1	A3				
	199			P6	1	A3	1	2		
18	200			P6	1	A3	1	2		
	201			A8	1	A8				water pipe
	202			P12	1	A1	1	1		Water Tank Filling Station
21	203			A1		a1				
	204			A1		A1				
23	205			A3		A3				
	206			P11	1		1	2		
	207			A8	1	A8				water pipe
	208			A3	1	A3				
27	209			A6	1	A6				
	210			A8	1	A8				water pipe
	211			A3	1	A3				
	212			A8	1	A8				water pipe
				A9	1	a9				
	213			A3		a3				
	214			A6	1	A6				
	215			A3	1	A3				
35	216			A3	1	A3				
	217			A9	1	a9				
	218			A3	1	A3				
	219			P12	2	A2	2	2		
39	220			A3	1	A3				
	221			A1	1	A1				
	222			A6	1	A6				
	223			A3	1	A3				
	224			A3	1	A3				
	225			A3	1	A3				
	226			A3	1	A3				
				A3	1	A3				
	227			A3	1	A3				
	228			A3	1	A3				
	229			A3	1	A3				
40	230			A3	1	A3				
41	231			A9	1	a9				Under Pass
	232			P6	1	A1				
	233			P6	1	A1				
	234			A3	1	A3				
	235			A3	1	A3				
	236			A3	1	A3				
46	237			A7	1	A7				
50	238			A9	1	a9				
	239			P12	1					
	240			A9	1	a9				Underpass
	241			A3	1	A3				
	242			A3	1	A3				
	243			A9	1	a9				Underpass
	244			A6	1	A6				
	245			A7	1	A7				

House P1
 Large office P2
 General gri P3
 Vehicle wo P4
 Religious : P5
 Plant nurse P6
 Car sales P7
 Hotel P8
 Light indus P9
 Restaurant P10
 Kiosk P11
 Other P12
 Wall A1
 Fence A2
 Trees A3
 Bus shelter A4
 Footbridge A5
 Road sign A6
 Public art A7
 Other asse A8

58	246		A9	1	a9			
	247		A9	1	a9			
	248		A6	1	A6			
	249		P6	1		1	2	
			P6	1		1	2	
	250		A6	1	A6			
	251		A5	1	A5			
	252		A6	1	A6			
65	253		A5	1	A5			
	254		A6	1	A6			
	255		A3	1	A3			
	256		A9	1				
	257		A3	1	A3			
	258		A2	1	A2			
	259		P1	1	A2	1	1	
	260		P1	1	A2	1	1	
	261		A3	1	A3			
	262		A6	1	A6			
	263		A3	1	A3			
	264		P1	1	A1	1	1	
	265		P1	1	A1	1	1	
76	266		A3	1	A3			
	267		P12	1	A1			
	269		P12	1				
	270		P1	1	A1	1	1	
			P1	1	A1	1	1	
81	271		P12	1				
	272		A3	1	A3			
	273		P3	2	A1	1	2	
			A1					
			A8	2	A8			
	274		P12	1				
	275		P12	1	A1	1	2	
			A1	1				
			P12	1	A1	1	2	
			A1	1				
	276		P12	2	A1	1	2	
			P12	2	A1	1	2	
			P2	2	A1	2	1	
			P2	2	A1	2	1	
	277		A5	1	A5			
	278		A3	1	A3			
	279		A3	1	A3			
	280		p3	2		1	1	
	281		p3	2		1	1	
	282		p1	2		1	2	
			p1	2		1	2	
	283		p1	2		1	2	
			p1	1		1	2	
	284		A3	1	A3			
			A3	1	A3			
96	285		P1	2	A1	1	1	
			P1	2	A1	1	1	
	286		A1	1	A1			
	287		A1	1	A1			
	288		A3	1	A3			
100	289		P12	1	A1	1	2	
	290		A1	1	A1			
	291		A3	1	A3			
	292		P4	2		1	2	
			P4	2		1	1	
	293		P11	1		1	2	
	294		A3	1	A3			
	295		A4	1	A4			
	296		A1	1	A1			
	297		P1	1	A1	1	1	
	298		P2	2	A1			
			P2	2	A1			
	299		P1	2	A1	1	1	
			P1	2	A1	1	1	
	300		P2	1	A1	1	1	
			P2	1	A1	1	1	
	301		P2	1	A1	1	1	
			P2	2	A1	1	1	

		P2	2	A1	1	1		
302		A3	1	A3				
303		P12	2	A1	1	1		
		P12	2	A1	1	1		
		P12	2	A1	1	1		
304		A3	1	A3				
305		A4	1	a4				
306		A3	2	A3				
307		A2	2	a2				
308		A3	1	A3				
309		P2	2	A1	1	1		
		P2	2	A1	1	1		
310		P2	2		1	2		
		P2	2		1	2		
311		P11	1					
312		A3	1	a3				
313		A3	1	A3				
314		P11	1					
315		A5	1	A5				FASTLINK

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APPENDIX 5 CONSULTATION RECORD

Minutes of Meeting – Disi Municipality- February 28, 2008

Attendees:	Eng. Othman Kurdi	– MWI
	Eng. Sitki Serifeken	- GAMA
	Eng. Anil Sevinç	- GAMA
	Mr. Saed Huwaytat	– DISI Municipality Head
	Ms. Shaza Zeinelabdin	- IFC Social Development Specialist
	Ms. Dima Maroun	- Dar Al Handasah
	Dr. Amer Homoud	- Dar Al Handasah

Number of community members: 28 men (Bedouin Tribe Leaders), invited to the meeting through word of mouth. The invitation for the meeting was posted on the front door of the municipality offices. After the meeting it was apparent that most of the Bedouin Elders were illiterate.

Mr. Saed Huwaytat –

- Introduced himself and the community to GAMA and MWI.
- Informed the community the objective of the meeting.

Eng. Othman Al Kurdi-

- Gave a project brief to the community.
- Introduced GAMA as the project company for the project.

Eng. Sitki Serifeken -

- Introduced GAMA
- Discussed the project
- Emphasized that the consultation session is an ongoing process
- Discussed the plan to hire community liaison officers to communicate with the communities during construction of the project.

Issues discussed during the meeting:

- Community Concern – How will the community benefit from this project?

GAMA – During the 4 year construction phase there will be around 1,000 job opportunities that need to be filled. GAMA will look for local community members to fill these positions. The hired workers will receive training to meet international standards.

- Community Concern – Will the community receive any financial support from the project, such as one fils per meter extracted to support the local community?

MWI- There will be no direct financial support to the community through the project. The issue should be discussed with the government through the proper channels.

GAMA- The community will benefit indirectly from the project through employment opportunities and the related training.

- Community Concern – Demanded that the Ministry official convey their concern regarding financial support to the government. The community feels cheated that water has been conveyed to Aqaba and will now be conveyed to Amman and the community has not and will not receive any financial support.

MWI – These issues should be raised with the proper government channels and with decision making government officials. GAMA is not responsible for giving direct financial support to the community.

GAMA- The company will try to support the community with training and employment during the 4 years of construction.

- Community Concern- Will university students receive scholarships for science related subjects and then be hired by GAMA during the operation of the project?

GAMA- University students will only get a chance to be trained during the implementation of the project. But the matter will be taken into consideration.

- Community Concern- The project should work closely with one member of the community (Head of the Municipality) in regards of setting up consultation sessions and employment opportunities.

GAMA- This consultation session is not the first and last session to be held in Disi municipality. They will continue to work with the community and the head of the Municipality during the course of the project.

- Community Concern- Will the community be limited in well extraction because of the DISI Project?

MWI- No, the Disi project will not affect the wells currently used by the municipality.

- Community Concern- Will the land above the aquifer collapse after the water is extracted?

MWI- No.

- Community Concern- Disi Aquifer is not a renewable source. Has the government looked into other alternatives for water?

MWI- Yes, the government is currently proposing a desalination plant in Aqaba.

- Community Concern- Disi water is being pumped to Aqaba and will be pumped to Amman. Why hasn't the government addressed our need for water such as an additional well for the municipality?

MWI- This issue should be forwarded to the appropriate decision makers in the government.

Consultation Session with the women of the community

Women did not attend the public consultation session. Therefore the IFC and Dar Al Handasah Advisor met with 12 women in the King Abdullah Human Development Society.

Issues discussed during the meeting:

- Community Concern- The community is currently limited to one well used for agriculture, will the Disi project limit our extraction of this well?

Dar Al Handasah – No. The Disi project will not limit your extraction of the municipality well.

- Community Concern- The community members rely mostly on farming for their livelihood. If the Disi project effects the existing well or does not let us commission a new well the communities livelihood will be effected.

Dar Al Handasah - The Disi project will not limit your extraction of the municipality well. The need for a new well was raised during the public consultation with the MWI official. He informed the Head of the Municipality to address this issue with decision makers from the MWI.

- Community Concern- The community has requested to commission a new well from the government and the request was rejected.

Dar Al Handasah - The need for a new well was raised during the public consultation with the MWI official. He informed the Head of the Municipality to address this issue with decision makers from the MWI.

- Community Concern- Will there be job opportunities for the men of the municipality?

Dar Al Handasah – Yes. GAMA will employ and train some of the required workers from Disi municipality during the 4 years of construction.

Minutes of Meeting – Qatraneh Municipality- March 2, 2008

Attendees: Eng. Mohammad Al Atrash – MWI
Eng. Naser Maragha – GAMA
Mr. Faisal Al Asfar – Qatraneh Municipality Head
Ms. Dima Maroun – Dar Al Handasah
Dr. Amer Homoud – Dar Al Handasah
Eng. Narmeen Abu Shaweesh- Dar Al Handasah

Number of community members: 11 men (Decision Makers of the Community) 1 woman (government employee), invited to the meeting through word of mouth. The invitation for the meeting was posted on the front door of the municipality offices. 2 men from the Ministry of Environment present at meeting.

Mr. Faisal Al Asfar –

- Introduced himself and the community to GAMA and MWI.
- Informed the community the objective of the meeting.

Eng. Mohammad Al Atrash -

- Gave a project brief to the community about the project and its status.
- Introduced GAMA as the project company for the project.

Eng. Naser Maragha -

- Introduced GAMA
- Discussed the project
- Emphasized that the consultation session is an ongoing process
- Discussed the plan to hire community members as workers during the construction process.

Issues discussed during the meeting:

- Community Concern – What is the fate of the current 20 wells that supply Amman with water?

MWI- Wells is probably be used for the municipality after the Disi pipeline starts pumping water to Amman. Qatraneh will need the wells to supply the foreseen increase in water demand due to an increase in investments in the area.

- Community Concern – Where will the pipeline be located? The community had some bad experiences during the construction of the Gas Pipeline.

GAMA – The pipeline will be located on the right of way of the highway and will run through government land. GAMA will meet with the community again during the design of the project to discuss the final design of the pipeline alignment.

MWI- It is not in the interest of the government or the project to construct the pipeline in private land.

- Community Concern – What will happen to roads that are damaged by the construction of the pipeline?

MWI and GAMA – There will be coordination with the municipality prior to any crossing of roads. The roads that will be damaged during construction will be reconstructed to the original standard or better.

- Community Concern – Will there be any pipeline maintenance stations close to Qatraneh?

GAMA- No. Generally maintenance will be required at the pumping stations. One in Disi and one in Madaba.

- Community Concern – Other contractors during previous projects promised to hire workers from the municipality and failed to do so. Will this happen with the Disi project?

GAMA- The company will try to support the community with training and employment during the 4 years of construction.

- Community Concern- What is an emergency water turnout? Will this benefit us during the project.

GAMA- the turn outs will not be used unless there is an extreme water shortage in the town.

- Community Concern- Will dust and noise be taken into consideration when constructing the project?

GAMA- Dust and noise will be kept to a minimal according to the requirements of existing laws and regulations.

Consultation Session with the women of the community

Only one woman attended the public consultation session. Therefore Dar Al Handasah Advisors met with 8 women in a local resident's house.

Issues discussed during the meeting:

- Community Concern- Will the community benefit from this project?

Dar Al Handasah – Yes. Locals will be hired during the construction of the project. Also the presence of construction workers in the area will benefit local shops and services.

- Community Concern- Will this project improve the quality of the water in Qatraneh?

Dar Al Handasah – The Disi pipeline will pump water to Amman and not to Qatraneh. The MWI official has been made aware of the water quality in the municipality and will look into the matter.

- Community Concern- What will happen to the wells current 20 wells that supply Amman with water?

Dar Al Handasah - Wells will probably be used for the municipality after the Disi pipeline starts pumping water to Amman. Qatraneh will need the wells to supply the foreseen increase in water demand due to an increase in investments in the area.

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Minutes of Meeting – Quweismeh Municipality- March 3, 2008

Attendees: Eng. Mohammad Al Atrash – MWI
Eng. Anil Sevinç – GAMA
Eng. Naser Maragha – GAMA
Mr. Osama Dabbas – Quweismeh Municipality Head
Ms. Dima Maroun – Dar Al Handasah
Dr. Amer Homoud – Dar Al Handasah
Eng. Narmeen Abu Shaweesh- Dar Al Handasah

Number of community members: 10 men and 1 woman, invited to the meeting through word of mouth and invitations were sent by hand to community leaders and factory owners. The invitation for the meeting was posted on the front door of the municipality offices.

Eng. Anil Sevinç -

- Introduced GAMA
- Discussed the project
- Emphasized that the consultation session is an ongoing process
- Discussed the plan to hire community liaison officers to communicate with the communities during construction of the project.

Issues discussed during the meeting:

- Community Concern – What is the duration of the project?

GAMA- the duration for the implementation phase will be 4 years by the Disi Water Company (DIWACO) and Gama Energi company will operate the project for 25 years then the project will be handed to the government of Jordan.

- Community Concern – How will the company address negative impacts such as excavation activities and crossing streets?

GAMA- The project will start in 3 different locations simultaneously and the construction will take place within the ROW of the roads to minimize any disturbance to the local residents. The design and the implementation will be done according to the issues and concerns heard through the public consultation meeting. The company will appoint liaison officers to coordinate with local community and related agencies. The company will take all necessary measures to minimize the negative impact. Also they will coordinate with utility companies to avoid any damage to utilities in the area of construction.

The company will also make alternative routs to ensure that people can reach their destination with ease and without affecting the existing businesses.

- Community Concern – Have alternative routes been considered to minimize the construction cost and to avoid any possible damage to other piping utilities in the area.

GAMA- GAMA is willing to consider any suggestions related to alternative routes for the project.

- Community Concern – Is the company aware of the proposed Municipality of Greater Amman to construct a bridge at one of the intersections? Will this be taken into consideration during the finalization of the design?

GAMA- There will be a complete coordination with the district and other agencies and that they will take this into consideration.

- Community Concern – Will the project consider working longer shifts in sensitive areas so as not to affect the businesses?

GAMA- This is the intention of the company provided that this will not disturb the residents in the area.

- Community Concern – Will the Contractor meet the community after finalizing the pipeline alignment?

GAMA- There will be several meetings and that the company will allocate offices with liaison officers to have an ongoing consultancy with local communities.

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محضر إجتماع مشاورات أعمال البيئة لمشروع نقل مياه الديسي المدورة في منطقة الديسي

تم عقد إجتماع يوم الخميس الموافق 2008/2/29 في بلدية الديسي وبحضور مندوبين عن الحكومة والشركات التركية المنفذة والمشغلة للمشروع (شركة مياه الديسي "Disi Water Company-DIWACO" وشركة غاما التركية) على التوالي إضافة إلى شركة دار الهندسة المشرفة على الأمور المتعلقة بالبيئة وبحضور مندوب عن الجهة الممولة للمشروع (IFC).

تم تقديم نبذة عن المشروع لأهالي المنطقة من قبل وزارة المياه والشركات التركية المنفذة والمشغلة للمشروع ومن ثم تم فتح مجال الأسئلة والنقاش للحضور لإبراز إهتماماتهم بما يخص المشروع.

وصف لمحضر الإجتماع:

- رحب سعادة رئيس البلدية بالحضور.
- قدم المهندس عثمان الكردي (مندوب وزارة المياه والري) شرحاً موجز عن المشروع وأهدافه من حيث طول الخط الناقل والبالغ (325 كم) لنقل 100 مليون متر مكعب من المياه سنوياً من آبار مياه تم تحديد مواقعها في منطقة الديسي لعمان (منطقة دابوق ومنطقة أبو علندا). كما تطرق للمفاوضات التي تمت مع الشركة التي أحيل عليها عطاء التنفيذ والتشغيل حسب الية (Build, Operate, and Transfer: BOT) حيث ستقوم الشركة بتنفيذ المشروع خلال مدة 4 سنوات ومن ثم تشغيله مدة 25 سنة ليتم بعد ذلك تمليكه لوزارة المياه والري.
- وضح مدير الشركات التركية (شركة مياه الديسي وشركة غاما) السيد صدقي أن منطقة الديسي ستحتوي على مواقع الضخ الرئيسة للمشروع. كما أعلم الأهالي بنية الشركة البدء بالتنفيذ خلال 6-9 أشهر من الآن وسيتم البدء بتجهيز المواقع ونقل المعدات والآليات في غضون 3 أشهر. وأضاف بأن هذا الإجتماع الأول لعدة إجتماعات لاحقة وأن مكاتب الشركات ستكون مفتوحة للإستماع لإهتمامات أهالي المنطقة خلال مراحل سير العمل. كما أفاد بأنه سيتم إعطاء الأولوية لأهالي المنطقة في التشغيل وسيتم تدريبهم على العمل حسب المتطلبات الدولية. واختتم الحديث بالقول بأن الشركة ستقوم بتعيين منسقين للتباحث والتنسيق مع المجتمع المحلي.

المناقشات التي تمت

(س) أبدى سعادة رئيس بلدية الديسي (السيد سعد الحويطات) الإستعداد للتعاون التام مع الجهات المعنية والمساعدة في التنسيق لتشغيل أبناء المنطقة في المشروع وأن يتم تعيين منسق من جانب البلدية أيضاً للتنسيق مع الشركات التركية. وتساءل السيد سعد عما سيتم تقديمه كدعم للبلدية بشكل دائم كأن تكون هناك نسبة مئوية ولو ضئيلة لتنمية المجتمع المحلي.

(ج) أجاب السيد صدقي بأن المشروع سيحتاج لتشغيل 1000 شخص للعمل في المشروع بعد أن يتم تدريبهم للوصول لمستوى مقبول فنياً (وستكون أغليبيتهم من أهالي منطقة الديسي). أما موضوع الدعم المباشر فإن ذلك غير ممكن حيث لم يتم التباحث مع الحكومة بهذا الخصوص. كما أفاد مندوب وزارة المياه والري بأن هذا مطلب يجب بحته مع الحكومة.

(س) علق مواطن بأنه لا يعقل عدم الإستفادة من مياه الديسي ودعم المجتمع المحلي

(س) طرح مواطن موضوع تخصيص فلس على كل متر يتم استخراجها من المنطقة لدعم أهالي المنطقة

(ج) أكد مندوب وزارة المياه والري على أهمية المشروع الوطنية وضرورة التركيز على الفوائد المباشرة من حيث العمالة في المشروع وأن نقل المياه بات ضرورة ملحة لا بديل عنها في الوقت الحالي.

(س) احتج بعض مواطن آخر مطالباً بوجود صاحب قرار من وزارة المياه لبحث الدعم أهالي منطقة الديسي مشيراً لعدم الإستفادة من موضوع خصخصة المياه المنقولة لمدينة العقبة.

ج) تم التأكيد من قبل مندوب وزارة المياه بضرورة السير ضمن القنوات الرسمية مع الحكومة وأن الشركات التركية غير مسؤولة عن هذا المطلب و التركيز على الدعم من حيث تدريب وتشغيل أبناء المنطقة

س) أستفسر أحد المواطنين عن الجانب الإنساني لمساعدة الطلبة الجامعيين من حيث تأمينهم بمنح جامعية لدراسات علمية لضمان عملهم في المراحل التشغيلية للمشروع.

ج) أجاب السيد صدقي بأنه سيتم تدريب الطلبة الجامعيين في المشروع فقط.

- وفي الختام شكر رئيس البلدية الحضور وأكد بتقديم الدعم اللازم لإنجاح المشروع كما أكد السيد صدقي بأن أبواب الشركة ستكون مفتوحة أمام اهالي المنطقة وأن هذا اللقاء الأول من عدة لقاءات لاحقة.

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محضر إجتماع مشاورات أعمال البيئة لمشروع نقل مياه الديسي المدورة في منطقة القطرانة

تم عقد إجتماع يوم الأحد الموافق 2008/3/2 في بلدية القطرانة وبحضور مندوبين عن الحكومة (وزارة المياه والري ووزارة البيئة) والشركات التركية المنفذة والمشغلة للمشروع (شركة مياه الديسي - "Disi Water Company" و DIWACO وشركة غاما التركية) على التوالي إضافة إلى شركة دار الهندسة المشرفة على الأمور المتعلقة بالبيئة.

تم تقديم نبذة عن المشروع لأهالي المنطقة من قبل وزارة المياه والشركات التركية المنفذة والمشغلة للمشروع ومن ثم تم فتح مجال الأسئلة والنقاش للحضور لإبراز إهتماماتهم بما يخص المشروع.

وصف لمحضر الإجتماع:

- رحب سعادة رئيس بلدية القطرانة (السيد فيصل الأصفر) بالحضور.
- قدم المهندس محمد الأطرش (مندوب وزارة المياه والري) شرحاً موجز عن المشروع وأهدافه وأنه مشروع وطني لما يعاينه الأردن من عجز مائي.
- وضح مندوب الشركات التركية (شركة مياه الديسي وشركة غاما) السيد ناصر ان الشركة قد أحيل عليها عطاء التنفيذ والتشغيل حسب الية (Build, Operate, and Transfer: BOT) حيث ستقوم الشركة بتنفيذ المشروع خلال مدة 4 سنوات ومن ثم تشغيله لمدة 25 سنة ليتم بعد ذلك تمليكه لوزارة المياه والري. كما أن المشروع سيمر من منطقة القطرانة في اراضي حكومية ضمن حرم الطريق. كما أعلم الأهالي بنية الشركة البدء بالتنفيذ خلال 6-9 أشهر من الآن وسيتم البدء بتجهيز المواقع ونقل المعدات والاليات في غضون 3 أشهر. وأضاف بأن هذا الإجتماع الأول لعدة إجتماعات لاحقة كون الشركة ستقوم بإنهاء التصاميم اللازمة بعد عملية التشاور مع أهالي المنطقة لشمول ملاحظاتهم وأخذها بعين الاعتبار أثناء التصميم. كما أكد أن مكاتب الشركات ستكون مفتوحة للإستماع لإهتمامات أهالي المنطقة خلال مراحل سير العمل. و أفاد بأنه سيتم إعطاء الأولوية لأهالي المنطقة في التشغيل وسيتم تدريبهم على العمل حسب المتطلبات الدولية. واختتم الحديث بالقول بأن الشركة ستقوم بتعيين منسقين للتباحث والتنسيق مع المجتمع المحلي.

المناقشات التي تمت

- ش) تساءل رئيس بلدية القطرانة عن مصير الابار الحالية التي يتم ضخ مياهها حالياً إلى عمان.
- ح) أجاب مندوب وزارة المياه بأن المنطقة مقبلة على مرحلة تطور تحتاج إلى موارد مائية لذا سيتم التنسيق مع وزارة المياه والري مستقبلاً لإفادة المنطقة من هذه البآر.
- ش) استفسر نائب رئيس البلدية عن مسار الطريق وإن كان سيمر ضمن أراضي الحكومة فقط. كما تطرق إلى تجربتهم مع خط الغاز حيث أن الأهالي قد تضرروا من جراء تنفيذ المشروع.
- ج) أجاب السيد ناصر أن الحكومة والشركة ركزت على مرور الأنبوب الناقل ضمن أراضي حكومية (حرم الطريق) لتقليل الكلفة الإنشائية. حيث سيتم أخذ ذلك بعين الاعتبار في التصاميم النهائية للمشروع ومن ثم سيتم التشاور مع أهالي المنطقة لاحقاً.
- س) إستفسر أحد المواطنين عن الإجراء المتبع في حال الحفر ضمن شوارع البلدية مشيراً إلى التجربة السيئة مع المشاريع السابقة.
- ج) تم التأكيد من قبل مندوب وزارة المياه ومندوب الشركة بالتنسيق المسبق مع البلدية والتعهد بإعادة الطرق كما كانت أو أحسن مما هي عليه وحسب مواصفات عالية.
- ش) استفسر أحد المواطنين وجود مواقع صيانة للمشروع.

(ح) أجاب مندوب الشركة بوجود مواقع الصيانة في منطقة الديسي ومادبا لوجود مرافق تحتاج لمتابعة وصيانة. أما موقع القطرانة فلا حاجة لوجود مركز صيانة دائم.

(س) تخوف نائب رئيس البلدية من إعطاء أولوية لتشغيل العمالة من خارج المنطقة.

(ج) أجاب مندوب الشركة بأن الأولوية ستكون من أهالي المنطقة في الوظائف المؤهلين للعمل بها وسيتم تدريبهم لرفع مستواهم بما يتناسب مع متطلبات العمل والمعايير الدولية. كما سيتم عمل معسكرات مخصصة لتدريب وإقامة العمال وأنه سيتم التمسك بمن يثبت نفسه في العمل للعمل في مراحل المشروع المختلفة.

(س) استفسر رئيس البلدية عن موضوع تزويد المناطق بالمياه في الحالان الطارئة.

(ج) أجاب مندوب الشركة بأن ذلك سيتم في حال حاجة المنطقة للمياه وسيتم التنسيق في ذلك.

(س) استفسر نائب رئيس البلدية عن آلية الحفر لا سيما في المناطق المأهولة وتم التأكيد على الحد من الأغبرة والإزعاج أثناء الحفر.

(ج) أجاب مندوب الشركة بأخذ ذلك بعين الاعتبار.

- وفي الختام شكر رئيس البلدية الحضور وأكد بتقديم الدعم اللازم لإنجاح المشروع كما أكد السيد ناصر بأن أبواب الشركة ستكون مفتوحة أمام أهالي المنطقة وأن هذا اللقاء الأول من عدة لقاءات لاحقة.

محضر إجتماع مشاورات أعمال البيئة لمشروع نقل مياه الديسي المدورة في مديرية منطقة القويسمة/ أمانة عمان الكبرى

تم عقد إجتماع يوم الإثنين الموافق 2008/3/3 في مديرية منطقة القويسمة /أمانة عمان الكبرى وبحضور مندوبين عن الحكومة (وزارة المياه والري) والشركات التركية المنفذة والمشغلة للمشروع (شركة مياه الديسي " Disi Water Company-DIWACO و شركة غاما التركية) على التوالي إضافة إلى شركة دار الهندسة المشرفة على الأمور المتعلقة بالبيئة.

تم تقديم نبذة عن المشروع لأهالي المنطقة من قبل وزارة المياه والشركات التركية المنفذة والمشغلة للمشروع ومن ثم تم فتح مجال الأسئلة والنقاش للحضور لإبراز إهتماماتهم بما يخص المشروع.

وصف لمحضر الإجتماع:

- رحب مندوب الشركات التركية (شركة مياه الديسي وشركة غاما) السيد ألن بالحضور ان الشركة قد أحيل عليها عطاء التنفيذ والتشغيل. ثم تحدث عن أهمية المشروع للأردن وللشركة وبين خبرة الشركة في تنفيذ مشاريع هامة وكبيرة في الأردن وفي دول أخرى عديدة حيث قامت الشركة بتنفيذ محطة كهرباء خربة السمرات بطاقة 300 ميغا واط ومشاريع محطات تنقية عين غزال والسمرات. ونظراً لتنوع وحجم المشاريع التي نفذتها الشركة فإنها ترغب إشراك المجتمعات المحلية عند تصميم وتنفيذ المشاريع.

كما تحدث السيد ألن عن نية الشركة بالبد في العمل خلال 6-9 أشهر وأعطى نبذة عن المشروع من حيث ضخ المياه من آبار في منطقة الديسي مروراً في القطرانة إلى جسر مطار الملكة علياء ومن ثم إلى دابوق وأبو علندا. وأضاف بأن هذا الإجتماع الأول لعدة إجتماعات لاحقة كون الشركة ستقوم بإنهاء التصميم اللازمة بعد عملية التشاور مع أهالي المنطقة لشمول ملاحظاتهم وأخذها بعين الاعتبار أثناء التصميم. كما أكد أن مكاتب الشركات ستكون مفتوحة للإستماع لإهتمامات أهالي المنطقة خلال مراحل سير العمل. واختتم الحديث بالقول بأن الشركة ستقوم بتعيين منسقين للتباحث والتنسيق مع المجتمع المحلي.

المناقشات التي تمت

(ص) تساءل مواطن عن مدة المشروع.

(خ) أجاب السيد ألن بأن مدة تنفيذ المشروع ستكون 4 سنوات وسيتم تشغيل المشروع من قبل شركة غاما التركية لمدة 25 سنة وبعدها سيتم تسليم المشروع للحكومة الأردنية.

(ص) إقترح مدير منطقة القويسمة (د. أسامة الدباس) التحدث عن السلبات المتوقعة ليتم أخذها بعين الاعتبار في في المنطقة من حيث الحفر والحاجة لقطع الشوارع والآلية المتبعة في الحفر.

(ج) أجاب السيد ألن بأن المشروع سيتم تنفيذه في 3 مواقع رئيسة بنفس الوقت وأن العمل سيكون على الأغلب ضمن حرم الطريق. كما أن الشركة ستصمم وتنفذ المشروع ضمن استراتيجية عمل أخذة بعين الاعتبار الملاحظات التي سيتم طرحها والتنسيق المسبق مع الجهات المعنية والمجتمع المحلي. وستقوم الشركة بتعيين ضباط إرتباط للإستماع لآراء وملاحظات الجميع مدركين صعوبة العمل داخل حدود المدينة. و أكد أن الشركة ستأخذ كافة الإحتياجات اللازمة للتقليل من إزعاج المجتمع المحلي والتنسيق مع الأمانة وشركة الكهرباء وشركة الإتصالات ووزارة المياه والمجاري لتفادي حدوث أي ضرر في حال وجود تمديدات في منطقة الحفر. كما سيتم عمل طرق بديلة مناسبة في المنطق المأهولة لضمان وصول الناس لكافة المواقع بسهولة وعدم حدوث إعاقات للأعمال والمسكن والمرافق الهامة.

(س) إقترح رئيس اللجنة المركزية في مديرية المنطقة (السيد علي الحديد) مسار لخط المياه من شأنه التقليل من احتمالية وجود خطوط لجهات أخرى مما يقلل من كلفة الإنشاء ويسهل عمليات الحفر.

(ج) أكد السيد ألن بأخذ المقترح بعين الاعتبار وأنه سيتم التنسيق والتشاور لاحقاً للإستماع لأفكار المجتمع المحلي للتأكد من الوصول إلى أفضل الحلول لمسار خط أنبوب المياه.

ص) تحدث د. أسامة عن ضرورة التقليل من الإضرار بالمصالح التجارية المتواجدة لتجنب الوصول للقضاء للحصول على تعويضات ناجمة عن أعمال التنفيذ..

خ) أجاب السيد ألن بأن الشركة ستقوم بدراسة عدة مقترحات والتشاور اتجنب ذلك.

ش) أفاد د. أسامة نية الأمانة لعمل جسر عند نقطة التداخل مع المعارض قريباً حيث سيكون هناك عمليات حفر وبناء قواعد. لذا يجب أخذ ذلك بعين الاعتبار.

ح) أجاب السيد ألن بأنه سيتم التنسيق المسبق مع الأمانة للتعرف على كافة المشاريع المتوقع تنفيذها ليتم أخذها بعين الاعتبار.

س) أشار أحد المواطنين إلى وجود مواقع حساسة في المنطقة وأنه يجب الأخذ بعين الاعتبار بالعمل على مدار الساعة لإنجاز العمل بأقل مدة ممكنة وبدون عمل إزعاج للمواطنين.

ح) أجاب السيد ألن بنية الشركة العمل على مدار الساعة مع التقليل من الإزعاج ما أمكن.

س) أستفسر السيد علي عن النية للإجتماع بعد الإنتهاء من تصميم الخط.

ح) أكد السيد ألن بأنه سيتم الإجتماع عدة مرات للتشاور والتباحث كما سيتم إنشاء مركز لتلقي ملاحظات الجميع وإبقاء قنوات الحوار مفتوحة بشكل دائم.

- وفي الختام شكر السيد ألن الحضور وإتاحة الفرصة لعقد الإجتماع كما أكد بأن أبواب الشركة ستكون مفتوحة أمام اهالي المنطقة وأن هذا اللقاء الأول من عدة لقاءات لاحقة.

APPENDIX 6: PROJECT AFFECTED PERSONS' CENSUS AND SOCIO-ECONOMIC SURVEY TERMS OF REFERENCE

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**JORDAN
DISI CONVEYOR PROJECT**

**PROJECT AFFECTED PERSONS CENSUS
AND SOCIO-ECONOMIC SURVEY**

TERMS OF REFERENCE

A. OVERVIEW

1. **Introduction.** The Ministry of Water and Irrigation (MWI) the Hashemite Kingdom of Jordan is developing the Disi Conveyor Project which is proposed for partial funding by the IFC and OPIC. As an element of the project preparation process, the MWI seeks the services of a Consultant to prepare a Project Affected Persons Census and Socio-Economic Survey. This would include a Consultation Process and development of a Data Base. These complementary activities would support the integration of the provisions of IFC PS 1 and PS 5 into the project design, implementation and monitoring process for the proposed Project.
2. **Public Meetings to Support Census, Socio-Economic Survey and Consultation Process.** In order to facilitate the work of the Consultant, the MWI will formally notify local governments of its plan to undertake the census, socio-economic survey and consultation process and request that they support the Consultant by arranging a series of public meetings. These meetings would provide an opportunity to explain the purpose of these activities to local leaders, residents and non-governmental organisations (NGOs). These meetings may also encourage owners, tenants, works and other parties to come forward and register as a Project Affected Persons (PAPs) giving details for where and how they can be contacted.

B. PROJECT AFFECTED PERSONS CENSUS

1. **Objective.** A census is to be undertaken of all the PAPs within the Desert Highway ROW for the Section to be occupied by the DP. This will also include an inventory of all assets on the site and details of their use and is to be completed and reported on or before April 30th 2008. The objectives of the census are:
 - (a) **Parties Entitled to Compensation.** Establish who will be affected by the Project in terms of loss of assets including land and structures, or loss of livelihoods. The losses should cover owners of assets, as well as those with established use-rights; and
 - (b) **Asset Base.** Establish the asset base of those affected including the type of asset being lost and its current use (land use, tenancy rights, etc.) and determine the extent of project related impact in those assets and on the mode of its utilisation.

It is recognised that initially the PAPs would be identified as "potential" PAPs until the final decision on the alignment of the pipeline and supporting infrastructure would be made MWI following review and approval of the final designs. To support this process the MWI would re-establish a surveyed centreline along the anticipated alignment which would facilitate the Consultant in the identification of affected assets and PAPs.

2. Outputs. The outputs from the study will be:

- (a) Computerised Database.** A computerised database containing unique files for each PAP and each structure affected. This will contain sufficient information to determine the significance of asset take and disruption to livelihood with regard to the ability to PAPs to maintain their existing standard of living;
- (b) Hard Copy of the Database.** A hard copy version of the computerised data base will also be prepared in English and Arabic provided in ten (10) copies (each) to the MWI;
- (c) Maps.** Maps will be prepared for show the location of each asset.
- (d) Affected Assets.** A description of all assets affected by the proposed Project would be prepared and integrated into the computerised database.

Information prepared under items (c) and (d) would be subject to review and finalisation by the Project Compensation Committee.

3. Registration Census. The Consultant will undertake an initial review of the use and ownership of the affected assets.

It is recognised that in some cases, due to modifications of the pipeline alignment or siting of Project related infrastructure, there may be some change in the number and location of PAPs. These changes will be reflected in the Data Base described below and additional census, socio-economic survey and consultation activities would be undertaken to address the needs of these PAPs.

4. Potentially Vulnerable Groups. The Consultant would give special attention in their work to evaluation of some PAPs which may be more significantly affected, or particularly vulnerable to hardship unless special protections are included. These special categories may include: (a) persons dependent on common lands, (b) persons losing income or employment because of impacts upon firms.

5. Contacting PAPs. All PAPs shall be contacted in person wherever practicable.

- (a) PAPs Resident in Project Area.** If necessary, repeat visits at appropriate intervals and times will be required by the Consultant to contact PAPs resident in the Project area. The date and times of these visits will be documented. A minimum of three attempts is required. These visits will include meetings with PAPs who are land owners, tenants, workers and informal users.

C. SOCIO-ECONOMIC SURVEY

12. Socio-Economic Survey. A socio-economic survey will be undertaken to establish the baseline date of PAPs. This analysis will form the basis of the compensation estimation process. In addition, to describing standard household characteristics, consistent with IFC procedures the surveys would describe:

- (a) Duration.** The duration of the impact.
- (b) Resource Base.** Information on the full resource base of the population including income derived from informal sector and non-farm activities.

- (c) **Loss of Assets.** The extent to which PAPs will experience total or partial loss of assets;
- (d) **Services Affected.** Public infrastructure and social services that will be affected;

D. PROJECT AFFECTED PERSONS CONSULTATION PROCESS

13. Consultation. Associated with the Census will be a Potentially Affected Parties Consultation Process which is intended to:

- (a) **Project Status.** Outline the status of the project and the works proposed in the near future;
- (b) **Compensation for Other Property.** Explain how compensation will be paid for assets and crops;
- (c) **Indirect Damages.** Explain how compensation will be paid by the Government and/or the Contractor for indirect damage to crops or assets from the construction process;
- (d) **Compensation for Renters, Tenants and Employees.** Explain how compensation would be paid to renters, tenants and employees who would be adversely affected by the proposed project; and
- (e) **Available Assistance.** Advise them on the assistance that will be available throughout the process from the Project Compensation Committee and/or other parties.

E. DATABASE AND DATA MANAGEMENT

14. Structure of the Database. The data obtained from the census will be recorded as both a manual and computerised database.

15. Elements of the Database. The database will include:

- (a) **Plot Ownership.** Each PAP shall be referenced to a unit defined as the lowest known level of plot ownership record available for each square metre of land to be acquired.
- (b) **Comprehensive Coverage.** The database will include all PAPs; asset owners, tenants and employees, each of whom will be referenced to an asset.
- (c) **Physical Data.** Data on assets shall be recorded as follows:
 - No. and size of structures
 - Structure condition
 - Other assets.
- (d) **Socio-Economic Data.** Data on PAP shall be established at the Household level and linked to an asset by use status.
 - No. of households.
 - No. of persons.
 - Economic activities on site.

While a project specific referencing system may be adopted for asset numbers and PAPs the database should also include the asset reference number.

- 16. Compensation Information.** This database should also be developed in such a way that it may be expanded to accommodate further details. Specifically for each PAP:

- (a) **Compensation.** To include estimated and then final and agreed details of:
- Compensation entitlement;
 - Compensation sum;
 - The nature of the compensation to be provided; and
- (b) **Total Cost.** Total cost for each compensation item.
- (c) **Implementation Programme.** Information on the implementation programme and disbursement for compensation.
- (d) **Monitoring.** Implementation Monitoring Record (including references to all communications concerning plot acquisition).

F. REPORTS

- 17. Reports.** The Consultant would provide the following Report:

- (a) **Project Compensation Report.** The Report will include:
- A definitive list of PAPs;
 - A statement of the assets that will be affected by the Project;
 - A statement concerning issues and actions related to loss of livelihood;
 - Summary details of the characteristics of the PAPs;
 - An overview of the processes undertaken to contact each affected PAP.
 - A summary statement of incomplete or conflicting data as of April 30th.
 - A detailed list of specific outstanding issues, including their reason, location and magnitude; which would require resolution as final design details in some areas are reached in the future; and
 - A comprehensive cost estimate for the compensation programme and a recommended schedule for payment linked to directly to the overall Project implementation plan.

This report would be provided in 10 copies in both Arabic and English.

G. SCHEDULE

- 18. Proposed Schedule.** The Consultant would provide a detailed schedule as part of their proposal which would outline how they would accomplish the activities in this TOR by April 30th 2008.

H. CONTACT PERSONS

- 19. Contact Persons.** The following individuals, or their designated representatives, will serve as the contact persons for the activities included under this TOR:

(a) Government of Jordan

Name
Position
Address
Telephone:
Email:

(b) GAMA

Name
Position
Address
Telephone:
Email:

(c) IFC

Name
Position
Address
Telephone:
Email:

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COMPLIANCE FRAMEWORK DOCUMENT

1. Objectives
 - 1.1 Introduction
 - 1.2 Commitment to the Environment
 - 1.3 Guideline Objectives and Goals
 - 1.4 Compliance with Other Complementary Policies and Guidelines
 - 1.5 Definitions
2. Legislative Framework
 - 2.1 Jordanian Legislation
 - 2.2 Applicable Guidelines
 - 2.3 International Legislation
3. Responsibilities
 - 3.1 Main Contractor
 - 3.2 Project Company
 - 3.3 EPC Contractor
 - 3.4 Authorities
 - 3.5 Nominated Contacts
4. Environmental Compliance System
 - 4.1 Purpose and Objectives
 - 4.2 Compliance Procedures
 - 4.3 Performance Recognition System
 - 4.3.1 Negative Performance Points
 - 4.3.2 Positive Performance Points
 - 4.3.3 Improving Performance Recognition
 - 4.3.4 Performance Points Scale
5. Contractors Declaration

CEMG – 01 General Guidelines

1. General
 - 1.1 Purpose of Document
 - 1.2 Responsibilities
 - 1.3 Contents
- 2 General Guidelines
 - 2.1 Guidance and Training of Personnel
 - 2.2 Use of Environmentally Friendly and Safe Materials
 - 2.3 Construction Activities
 - 2.4 Construction Equipment
 - 2.5 Pollution
 - 2.5.1 Prevention of Water Pollution
 - 2.5.2 Prevention of Soil Pollution
 - 2.5.3 Remediation
 - 2.6 Site Boundary
 - 2.7 Public Services and Utilities
 - 2.8 Water Supply and Use
 - 2.9 Public Hygiene and Sanitary Facilities
 - 2.10 Waste Management
 - 2.11 Construction Traffic
 - 2.12 Non Hazardous Materials Storage
 - 2.13 Hazardous Materials Storage and Use
 - 2.14 Noise Control
 - 2.15 Air Quality
 - 2.15.1 Dust Abatement
 - 2.15.2 Other Atmospheric Pollution
 - 2.16 Hydrology- Prevention of Erosion and Increased Sedimentation
 - 2.16.1 Water Discharge from Site
 - 2.16.2 Dewatering
 - 2.17 Operations in Unstable Areas
 - 2.18 Cultural Resources
 - 2.19 Ecosystems and Wildlife
 - 2.20 Transport of Construction Workforce
3. Off site Works
 - 3.1 General
 - 3.2 Construction Camps and Yards
 - 3.3 Raw Materials Extraction Points
 - 3.4 Materials Processing Sites
 - 3.4.1 General
 - 3.4.2 Wastewaters
 - 3.4.3 Atmospheric Pollution
 - 3.4.4 Noise
4. Post Contract Activities and Demobilisation

CEMG – 02 Waste Management

1. General
 - 1.1 Purpose of Document
 - 1.2 Regulations
 - 1.2.1 Guidance on Waste and Legislation
 - 1.2.1.1 What is waste?
 - 1.2.1.2 Legislation and Guidelines
 - 1.2.2 Waste Classification
 - 1.2.3 Prohibited Waste Disposal Practices
 - 1.3 Responsibilities
 - 1.3.1 Project Company
 - 1.3.2 EPCC
 - 1.4 Contents
2. Guide to Formulating a Waste Management Plan
3. Disposal Options
 - 3.1 Inert Waste and Domestic or Municipal Waste (Category A and B Waste)
 - 3.2 Non- Hazardous Industrial Waste
 - 3.2.1 Construction and Demolition Waste
 - 3.2.2 Unusable / Excess Fill Material
 - 3.3 Hazardous Wastes
 - 3.4 Discharge of Wastewater
 - 3.4.1 Discharge to a Sewer
 - 3.4.1.1 Sewer Discharge Permits
 - 3.4.2 Monitoring Requirements
 - 3.4.3 Kitchen Waste
 - 3.4.2 Discharge to an Internal System
4. Duty of Care- Company Responsibilities
 - 4.1 Definition
 - 4.2 Transfer Notes
5. Best Waste Management Practice
 - 5.1 Identify a Waste Manager
 - 5.2 Developing a Waste Prevention Program
 - 5.3 Good Housekeeping Practices
 - 5.4 Guide to Best Practice and Training Materials
 - 5.5 Nominated Representatives
 - 5.6 Reporting

CEMG - 03 Hazardous Materials Management

1. General
 - 1.1 Purpose of Document
 - 1.2 Regulations
 - 1.3 Responsibilities
 - 1.3.1 PC
 - 1.3.2 EPCC
 - 1.4 Contents
2. Definition and Hazmat Responsibilities
 - 2.1 Definition
 - 2.2 Hazmat Responsibilities
 - 2.2.1 General
 - 2.2.2 HAZMAT Inventory
 - 2.2.3 Emergency Response Plan
3. Best Practice Guidelines
 - 3.1 General
 - 3.2 Fuel Storage and Use
 - 3.2.1 Storage
 - 3.2.2 Spills
 - 3.3 Bitumen
 - 3.3.1 Storage and Handling
 - 3.3.1.1 Handling
 - 3.3.1.2 Storage - Safety Considerations for Tankage
 - 3.3.1.3 Loading, Transportation and Discharge - Cold Form
 - 3.3.2 Use of Bitumen
 - 3.4 Chlorine
 - 3.4.1 Storage and Handling
 - 3.4.1.1 Handling
 - 3.4.1.2 Storage - Safety Considerations
 - 3.4.1.3 Loading, Transportation and Discharge
 - 3.4.2 Use of Chlorine
 - 3.5 Hazmat Waste Collection and Disposal
4. Development of Emergency Response Procedures for Accidents Involving Dangerous Goods
 - 4.1 General
 - 4.2 Progress of an Incident
 - 4.3 Planning
 - 4.3.1 Risk Assessment and Mitigation
 - 4.3.2 Subsequent Site Safety Auditing
 - 4.3.3 MSDS and HAZMAT Inventories
 - 4.3.4 The Incident Plan Management System
 - 4.4 Further Advice

CEMG – 04 Construction Camps and Yards

1. General
 - 1.1 Purpose of Document
 - 1.2 Regulatory Framework
 - 1.3 Responsibilities
 - 1.4 Contents
- 2 Determining Site Location
 - 2.1 Main Camps and Yards
 - 2.2 Secondary Facilities
- 3 Preparation of Site Plan
 - 3.1 Required Information
 - 3.1.1 General
 - 3.1.2 Site Plan Content
 - 3.1.3 Modification of Approved Site Plans
- 4 Special Measures
 - 4.1 General
 - 4.2 Security
 - 4.3 Accommodation
 - 4.3.1 Facilities
 - 4.3.2 Housekeeping and Maintenance
 - 4.3.3 Conduct
 - 4.3.4 Complaints from Local Communities
 - 4.4 Parking
 - 4.5 Cultural Resources
 - 4.5 Drainage
 - 4.6 Waste Supply and Use
 - 4.7 Other Public Services and Utilities
 - 4.8 Waste Management
 - 4.9 General Hygiene
 - 4.10 Workshops and Repair Areas
 - 4.10.1 Workshop Activities
 - 4.10.2 Material Storage and Handling
 - 4.11 Hazardous Materials
 - 4.12 Air Quality
 - 4.13 Noise

CEMG – 05 Access Management

1. General
 - 1.1 Purpose of Document
 - 1.2 Regulatory Framework
 - 1.3 Responsibilities
 - 1.3.1 PC
 - 1.3.2 EPCC
 - 1.3.3 Civil Defence and Police
 - 1.4 Contents
2. Conditions on the Use of the Public Rights of Way
 - 2.1 General
 - 2.2 Guidelines in Preparing the PMP
 - 2.3 Public Notification
 - 2.4 Damage to Public Highways and Utilities
3. Guidelines for Development of Site Access
 - 3.1 General
 - 3.2 Water Course Crossing
 - 3.3 Definition of Construction Access Routes
4. Management of Construction Traffic Operations
5. Maintenance of Existing Local Network and Property Access

CEMG – 06 Quarries and Borrow Areas

1. General
 - 1.1 Purpose of Document
 - 1.2 Regulations
 - 1.3 Responsibilities
 - 1.3.1 PC
 - 1.3.2 EPCC
 - 1.3.3 NRA
 - 1.4 Contents
2. Guidelines for Borrow Pits
 - 2.1 General
 - 2.2 EIA Requirements
 - 2.3 Borrow Site Planning and Design
 - 2.4 Borrow Site Operations
 - 2.5 Pit Restoration
3. Guidelines for Quarries
 - 3.1 General
 - 3.2 EIA Requirements
 - 3.3 Quarry Site Planning and Design
 - 3.4 Quarry Site Operations
 - 3.5 Blasting
 - 3.6 Site Restoration

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CEMG – 07 ECOLOGY AND WILDLIFE MANAGEMENT

1. General
 - 1.1 Purpose of Document
 - 1.2 Regulations
 - 1.3 Responsibilities
 - 1.3.1 PC
 - 1.3.2 EPCC
 - 1.3.3 RSCN
 - 1.4 Contents
2. Guidelines for Operation in Sensitive Areas
 - 2.1 General
 - 2.2 Operational Plan Requirements
 - 2.3 Ground Restoration
3. Guidelines for Staff
 - 3.1 General
 - 3.2 Training
 - 3.3 Code of Conduct
 - 3.4 Penalties

CEMG – 08 CULTURAL RESOURCES

1. General
 - 1.1 Purpose of Document
 - 1.2 Regulations
 - 1.3 Responsibilities
 - 1.3.1 PC
 - 1.3.2 EPCC
 - 1.3.3 DAJ
 - 1.4 Contents
2. Application of Chance Find Procedures
 - 2.1 General
 - 2.2 Training
3. Operations in Sensitive Areas.
 - 3.1 General
 - 3.2 Training
 - 3.3 Site Demarcation
 - 3.4 Blasting and other potential damaging actions
 - 3.5 Code of Conduct

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CERTIFICATE OF ENVIRONMENTAL COMMITMENT

Name of Contractor			
Construction Project Name			
Construction Ref. No		Commencement Date	

1. Application of Environmental Management Guidelines, Site Assessment and Inspection

The following should be read by all persons involved in the Construction of the Project.

- a) In operating their sites the Main Contractor agrees to abide by the requirements outlined in the Construction Environmental Management Guidelines and the Compliance Framework Document.
- b) The Main Contractor agrees to a pre-construction assessment of affected sites prior to construction to determine their environmental condition. These assessments would be undertaken jointly between MWI and/or MWI nominated personnel, GAMA Personnel and nominated Main Contractor personnel.
- c) The Main Contractor agrees to have MWI and GAMA staff, or nominated representatives, conduct Inspections of all contract sites throughout the Construction period. No advance notification of inspection will be required.
- d) GAMA will provide the Main Contractor with copies of all Compliance Inspection Reports.
- e) The Main Contractor shall maintain a log of all Inspection Reports in a Project File. The Project File shall be maintained on site and be made available to permitting authorities on request. The contents of the Project File are attached as Annex 1 to this document.
- f) Prior to hand over of a site at the end of the Contract the Main Contractor agrees to a post-construction assessment to determine its post-contract environmental condition. This would be undertaken jointly between MWI and/or MWI nominated personnel, GAMA Personnel and nominated Main Contractor personnel.

2. Contractors Declaration

I the undersigned, the legal representative of the Main Contractor having read the conditions above confirm that _____ (Main Contractor) undertake to fulfil the obligations outlined.

Signed
Witness

Position
Position

Date
Date